

XXII. REVISION OF THE ORIENTAL TIPULIDAE WITH DESCRIPTIONS OF NEW SPECIES.

PART II.

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(With Plates VII, VIII.)

Late in 1911 I published a revision of the Oriental Tipulidae, listing all the species known at that date, with notes that appeared of interest and descriptions of over fifty new species. Since then my volume including this family in the "*Fauna of British India*" series has been published, containing descriptions of considerably over one hundred and twenty new species; whilst papers by de Meijere, Alexander, Enderlein and others of recent date have appeared, containing further descriptions and many synonymic notes of importance. In the present paper it is my endeavour to record all species set up since my first paper, to incorporate all corrections and to describe over seventy new species. Mere records of localities are not included as they will figure in my forthcoming catalogue of Oriental Nemocera, but the species taken recently by Dr. Annandale in Japan and Siam are mentioned.

Special appreciation is due to Mr. S. Kemp for his collecting of a very large number of Tipulidae from Goa in Portuguese India, the Garo Hills, Assam and elsewhere, including a considerable number of new species, all the specimens being in exceptionally good condition and perfectly pinned. In this work also Mrs. Kemp deserves special mention for her energetic collaboration.

Unless otherwise stated, the types of all the new species are in the Indian Museum collection.

The total number of species in this family now known from the Oriental and South Asiatic Region, as far as I can ascertain, is nearly six hundred.

Subfamily PTYCHOPTERINAE.

TANYDERUS, Phil.

To the only previously known oriental species (*ornatissimus*, Dol.) de Meijere has added a second, *mirabilis*, (Tijd. v. Ent. LVIII, 104, fig. 1, wing, 1915) from Papua. The (presumably) 3rd submarginal cell is not bisected at the middle by a crossvein as it is in the genotype *pictus*, Phil. from Chili. The only remaining known species is *forcipatus*, Os. Sac. from New Zealand.

PTYCHOPTERA, Mg.

A ♂ of what is possibly an undescribed species was taken by Dr. Annandale at Otsu, near Kyoto, Japan, x-15.

Ptychoptera tibialis, Brun.

P. atritarsis, Brun., *Rec. Ind. Mus.*, VI, p. 234 ♀ (1911).

My *atritarsis* is only the ♀ of *tibialis*. I took a long series of this species at Darjiling in June, 1917 and it shows some variation in the coloration of the legs. In the ♂ the anterior tibiae are mainly black, the apical half of the middle pair being more or less yellowish; in the ♀ the anterior tibiae are wholly yellow, at most the basal part of the middle pair a little blackish. As regards the hind femora in the ♀, all grades are present from a distinct black basal half to wholly orange-yellow. The antennae are certainly only 15-jointed but the last joint, though attenuated, is only from slightly longer than to one and a half times as long as the penultimate, and not twice as long as stated in my description.

Ptychoptera annandalei, sp. nov.

♂. Southern Shan States.

Long. 6 mm.

Head and palpi pale brownish-yellow; frons, vertex and upper part of occiput brilliantly shining dark blue; antennae about as long as abdomen; scape bright yellow, about basal half of first flagellar joint yellowish, rest of antennae black with microscopic greyish pubescence and a few longer hairs.

Thorax.—Dorsum brilliantly shining dark blue, the colour extending posteriorly over the whole of the metanotum except for a large oblong yellow spot in the centre, the blue colour everywhere very sharply delineated from the pale yellow sides of the thorax and the very small bright yellow scutellum.

Abdomen brownish-yellow, hind margins of segments with more or less narrow black bands, broadest on last segment, very narrow on penultimate segment. Genitalia large, conspicuous and complex, consisting apparently of two pairs of large claspers, the second joint of the upper pair provided on the upper side with a comb-like organ of stiff black bristles. A small ventral plate, produced into two long style-like hairy fingers, curved upwards and ending in sharp points.

Legs yellowish, femora and tibiae narrowly black towards tips; tarsi black.

Wings pale grey, costal cell yellowish; two narrow pale blackish transverse bands of varying intensity (as in the second specimen they are much paler); the first across the middle of the wing, over the "cross veins," the second from the rather small black oval stigma, across the bases of the "forked cells." Halteres black, extreme base of stems yellowish.

Described from two ♂♂ in the Indian Museum from Kalaw, 4,000—4,500 ft., Southern Shan States, Burma 10-iii-1917 (*Gravelly*). Not uncommon at the roots of grass at dusk, but difficult to capture.

Subfamily TIPULINAE.

Section CTENOPHORINI.

Xiphura indica, sp. nov.

(Plate viii, fig. 1.)

♂. Darjiling.

Long. 12 mm.

Head blackish-grey with yellowish hairs, more or less white dusted on frons, face, and lower part of head; a well defined yellow circle on frons around base of each antenna; scape of latter black, tips of both joints yellowish, 1st flagellar joint of same length as the rest, with two thumb-like prolongations on under side; 2nd to 12th joints with a bisinuate ray on inner and outer sides, placed at base of each joint, and a thumb-like prolongation on under side of each at about the middle; 13th joint without rays, slightly longer than 12th, with a slight thickening in middle of under side. Each ray has a single verticil on upper side at about one-third of its length and each joint one on upper side in middle; in addition, each ray is microscopically pubescent. Proboscis blackish-brown, pubescent, bright yellow for a short space on each side near base: palpi blackish-brown; occiput black.

Thorax bright shining yellow; collare conspicuous. Three coalescent shining black spots in middle of dorsum, taking the form of a median broad band with parallel sides, not reaching anterior margin, and two oval contiguous spots on each side barely interrupted by suture, practically forming one spot on each side of the short median stripe. Scutellum and metanotum yellow; latter with two round blackish spots on hinder side.

Abdomen shining yellowish; a more or less distinct median shining black stripe, and hind borders of segments black, the colour spreading over greater part of apical half of abdomen. Genitalia large, black.

Legs shining black or (tibiae) blackish brown; under side of femora yellowish except at tips; basal half of fore femora, which are distinctly thickened towards tips, shining yellowish-brown.

Wings distinctly yellowish, shining, iridescent; stigma brown; most of the veins slightly grey suffused, also wing tip; halteres yellow, clubs dark brown.

Described from a single perfect ♂ in my own collection, taken by me at Darjiling, 6,900 ft., i-vi-1917. The first species of this genus known from the East.

PSELLIOPHORA, Os. Sac.**Pselliophora laeta**, F.

A ♂ from Castle Rock, North Kanara District, differs from the typical form by the head, thorax and femora being wholly black. The two large spots on the wing are paler yellow and do not quite reach the costa, whilst the basal pale spot (normally united more or less to the proximal large spot narrowly along the costa) is absent.

Pselliophora gaudens, Walk.

A ♀ in the Indian Museum, from Singla, Darjiling District, 1,500 ft. (Lord Carmichael's coll.) June, 1913 is probably this species, as the only discrepancies are the absence of any yellow at the base of the dark brown wings, and the colour of the transverse band on the wings, which is yellow, not whitish. Described from Celebes, from whence other specimens are known, but the species is not recorded from elsewhere than that island.

Pselliophora fumiplena, Walk.

Mr. Edwards notes some specimens of this in the British Museum from "North China." This species is possibly out of place in Oriental lists.

Pselliophora divisa, Brun.

A ♀ from Pashok Spur, Darjiling District (*R. S. Lister*) in the Indian Museum agrees exactly with my description. The type is in the Vienna Museum labelled "East Indies." Edwards records (*Ann. Mag. Nat. Hist.* (8) XVIII, p. 254) a ♂ in the British Museum from Sikkim, 2,000 ft., May 1896, and a ♀ from Bhutan, adding some interesting sexual notes.

Pselliophora elongata, Edw.

Ann. Mag. Nat. Hist. (8) xii, p. 202 ♀ (1913).

From Hakgala, Ceylon, 4,500 ft., v-1911. The unique type in the British Museum.

Pselliophora suspirans, Os. Sac.

Bezzi describes a new variety of this, *hilaris*, from three localities in Luzon (*Phil. Jour. Sci.* XII, Sect. D, p. 109 ♂ ♀ (1917).

ectenophorina, Riedel, *Ent. Mitt.* II, p. 274 (1913).

Kankau (Koshun), Formosa, v, vi, vii, ix, 1912. Edwards records a ♂ in the British Museum from Koannania, S. Formosa, 15-vi-06 (*Wileman*). Types and cotypes in Deuts. Ent. Mus.; cotypes in Riedel collection.

strigipennis, de Meij., *Tijd. v. Ent.* LVI, Supp. p. 5 ♀ 1913 (Mar. 1914). Java.

speciosa, Edwards, *Ann. Mag. Nat. Hist.* (8) XVIII, p. 254 ♂ (1916). Khasi Hills, Assam. Unique type in British Museum.

semirufa, *id.*, *loc. cit.*, p. 255 ♀ (1916). Taihoku, xi-1909 (*Nitobe*). Unique type in British Museum.

luctuosa, de Meij., *Tijd. v. Ent.* LIX, p. 199 ♀ (1916). Gunung Susuruh, Preanger, Java (*Corporaal*).

praeifica, Bezzi, *Phil. Jour. Sci.*, XII, Sect. D, p. 110 ♂. Mindanao, Phil. Is. (*Baker*).

tripudians, *id.*, *loc. cit.*, p. 111 ♀ (= ?*praeifica* ♀). Laguna, Phil. Is. (*Baker*).

***Pselliophora approximata*, sp. nov.**

♀. S. W. India.

Long. $12\frac{1}{2}$ mm.

Head and *thorax* wholly and uniformly bright orange; dorsum of antennae just perceptibly darker; palpi slightly duller.

Abdomen brownish-orange, last segment and genitalia shining black.

Legs.—Coxae and femora orange, latter with moderately broad apical ring; rest of legs black; hind tibiae with yellowish ring at base, a bare trace of similar rings on anterior tibiae.

Wings blackish: both basal cells, basal half of costal cell, marginal cell (the colour extending to the costa), basal parts of discal, 4th and 5th posterior cells, and basal half of anal and of both axillary cells bright orange yellow. Halteres orange.

Described from a single ♀ in the Indian Museum. Talewadi, near Castle Rock, N. Kanara District, 3--10-x-16 (*Kemp*).

This must be very like *gaudens*, Walk. described from Celebes, but that species presumably has a white basal ring on all the tibiae and the blackish wings have a "whitish" exterior band which is attenuated hindward. It is also distinctly larger, 7 to 10, lines. The black and yellow colours in the wing are so evenly divided that it is impossible to correctly assign it to either my group B or BB in the table of species given in my previous paper on this family. Assuming the wing to be "principally black" it will separate from *gaudens*, Walk. on the characters given above.

***Pselliophora flavofasciata*, sp. nov.**

(Plate viii, figs. 2, 3.)

♂ ♀. Assam.

Long. ♂ 10 mm.; ♀ 12 mm. to tip of ovipositor.

Head.—Occiput much flattened, upper half shining dark brown; antennae placed practically on vertex, black, except 1st scapal joint pale yellow; rest of head mainly moderately dark brown; yellowish below antennae and rather bright pale yellow on lower half of back of head; nasus and palpi with black hairs.

Thorax.—Dorsum very shining dark brown, just perceptibly lighter at ends of suture: collare conspicuously bright orange; pleurae pale yellowish, nearly white; sternopleura and pteropleura dull black; scutellum dull yellow; metanotum dark shining brown.

Abdomen.—1st and 2nd segments bright chrome yellow; apical half of 1st and nearly apical half of 2nd black; 3rd, 4th and 5th bright chrome yellow with a black stripe at middle of both sides, extending upwards from the all black belly (these stripes much shorter in ♂); rest of abdomen black, hind margin of 6th segment yellowish. Genitalia in ♂ black, the large basal joint of claspers shining yellowish-brown, in ♀ ovipositor shining mahogany brown. Belly of 1st and 2nd segments as upper side, rest black, hind margins narrowly yellow.

Legs very dark brown; a broad white ring at base of all tibiae.

Wings dark blackish-brown, shining; a pale yellow stripe including basal half of marginal cell, nearly apical half of 2nd basal cell and all

the 5th posterior cell, except that the posterior cross vein is rather broadly brown suffused. Basal third of anal and 1st axillary cells nearly clear. Halteres blackish, tips of clubs whitish.

Described from 2 ♂♂ and 2 ♀♀ from above Tura, Garo Hills, Assam, 3,500—3,900 ft., vii-17 (*Kemp*).

***Pselliophora aurantia*, sp. nov.**

♀. Assam.

Long. $12\frac{1}{2}$ mm. to tip of ovipositor.

Head bright orange yellow; nasus with concolorous rather long hair; antennal scape dark brown; flagellum black; palpi with 1st and 2nd joints yellowish or brownish yellow; rest dark brown.

Thorax, scutellum and metanotum orange yellow; pleurae lemon yellow; pteropleura more orange yellowish.

Abdomen orange yellow; a median black stripe on basal half of 2nd segment, and a black transverse band beyond middle; a similar band on base of 3rd segment, both more or less indefinite, evidently variable; tip of abdomen dark brown, extent of colour evidently variable; ovipositor shining dark brown. Belly orange yellow except the blackish tip.

Legs.—Femora orange yellow except extreme tips of anterior pair and a sub-apical black ring on hind pair; tibiae dirty brownish yellow with a distinct though not conspicuous narrow white ring just beyond base on all three pairs, broadest on hind pair; tarsi black.

Wings yellowish-grey, shining, iridescent; stigma small, dark brown, clear cut; halteres yellow, inner side of clubs blackish.

Described from two ♀♀ in Indian Museum from above Tura, 3,500—3,900 ft., viii-17 (*Kemp*).

***Pselliophora latifascipennis*, sp. nov.**

♀. South India.

Long. 20 mm. to tip of ovipositor.

Head.—Occiput and frons dark blackish-grey with stiff hairs round sides; face brown, nasus brownish-yellow, hairy, with short golden hairs on upper side; labella large, brownish-yellow, hairy. Palpi blackish brown, hairy, 2nd joint smooth, pale, with fine hairs; 4th joint with a knotted appearance. Antennae wholly black.

Thorax barely shining, dark olive green, nearly blackish; dorsum with almost microscopic sparse yellow hairs in places. Marginal space between dorsum and underside yellowish-brown, the colour extending narrowly between the prothorax and mesothorax and carried downwards in front of the sternopleura. Mesonotum black.

Abdomen practically bare, 1st segment wholly, nearly the apical half of 2nd, 3rd except hind margin, 5th except at sides, 6th, 7th and 8th wholly black, the remainder of the abdomen orange yellow. Belly much the same as upper side. Ovipositor black, valves shining reddish-brown.

Legs (middle pair missing).—Coxae dark olive brown, fore pair yellowish brown in front; femora brownish-yellow, fore pair black on nearly apical half, hind pair with broad black apical ring. Tibiae and

tarsi all black, a sub-basal narrow white ring on former. Legs microscopically pubescent.

Wings almost equally divided into yellow and black. They can be best described as yellowish with the tip broadly blackish brown from costa to hind margin, the colour filling the 2nd submarginal, 1st, 2nd and 3rd posterior cells and encroaching on about half of the discal cell and a little way into the 4th posterior cell. A broad median blackish-brown band from the costa (where it is fainter) extending across the wing to the hind margin, where it runs along the margin narrowly to the base of the wing, extending also along some part of the 7th longitudinal vein. Its breadth is approximately uniform and covers about the middle third of the basal cells. No stigma; halteres blackish.

Described from a unique ♀ from Pollibetta, Coorg South India, 24-x—16-xi-15 (*Fletcher*). *Type* presented by Mr. T. B. Fletcher to the British Museum.

Section *TIPULINI*.

PRIONOCERA, Loew.

Stett. Ent. Zeit. V, p. 170 (1844).

Prionota, Wulp, *Notes Leyd. Mus.* VII, p. 1 (1885).

Stygeropsis, Loew, *Berl. Ent. Zeits.* VII, p. 298 (1863).

One new species, *P. flaviceps*, Ender. (*Zool. Jahr.* XXXII, p. 28; 1912). The unique ♀ type from Sumatra in Stettin Zoological Museum.

CTENACROSCELIS, Ender.

Zool. Jahr. XXXII, p. 1 (1912).

GENOTYPE: *C. dohrnianus*, Ender., by original designation.

Enderlein describes three new species on which he founds this genus, *dohrnianus* (*loc. cit.*, p. 1, ♀ fig. A, wing, from Sumatra); *sikkimensis* (*l. c.*, p. 4, ♂, from Darjiling; and *sumatranus* (*l. c.*, p. 5, ♀, from Sumatra). The three unique types in Stettin Zoological Museum.

He also removes *Tipula praepotens*, Wied. here. The genus is characterised by a row of black spines on the upper side of all the femora towards the tip. Alexander regarded the genus as synonymous with *Holorusia*, Loew.; in his subsequent paper on Javan Tipulidae he recognised it as valid, but he compares the characters of the two genera and with those of *Tipula*.

At the moment of going to press I receive information (through the kindness of Mr. T. Bainbrigge Fletcher) of the following gigantic new species described by Alexander.

rex, Alex., *Insec. Insit. Menst.* V, p. 21, ♂ (1917).

Two ♂ ♂ from Taungoo District, Burma. Type in American Entomological collection, Philadelphia; cotype in Alexander's collection. He claims it to be possibly the largest species of the family in the world, each wing measuring 40 mm., but the full expanse of my *Tipula carmichaeli* is 91 mm. and is also a ♂. There cannot, therefore, be much difference between them and the females of both are probably larger.

TIPULA, L.

One species, *praepotens*, W. has been removed to his new genus *Ctenacroscelis* by Enderlein.

The following new species have been described by Dr. de Meijere : *T. cinctipes*, *Tijd. v. Ent.* (1911) LIV, p. 64 ♂, Borneo ; *gedehana*, *l. c.*, p. 66, ♀, pl. iv, 47, wing, Java ; *cinereifrons*, *l. c.*, p. 68, ♂, pl. iv, 48, wing, Java¹ ; *inconspicua*, *l. c.*, p. 70, ♂, pl. iv, 49, wing, Java. Types of first three species in Leyden Museum ; the unique type of *inconspicua* in Amsterdam Museum.

He also removes to *Tipula* his *Tanypremna omissinervis*.

In my Fauna volume (1912) the following new species are described. *T. gracillima*, p. 302 ♀, Ceylon ; *princeps*, p. 306 ♂ ♀, Kurseong ; *dives*, p. 307 ♂, Kurseong ; *serricornis*, p. 309 ♂ ♀, Naini Tal ; *pulcherrima*, p. 310 ♂ ♀, E. and W. Himalayas ; *fuscinervis*, p. 312 ♀, Kurseong ; *patricia*, p. 313 ♀, Kurseong ; *splendens*, p. 314 ♂, Gahrwal District ; *tessellatipennis*, p. 317 ♂ ♀, Naini Tal ; *marmoratipennis*, p. 319 ♂, Darjiling ; *quasimarmoratipennis*, p. 320 ♀, Darjiling, Kurseong ; *griseipennis*, p. 321 ♂, pl. v, 15, wing ; *nigrotibialis*, p. 324 ♂, Darjiling ; *striatipennis*, p. 325 ♀, Kurseong ; *subtineta*, p. 326 ♂, Kurseong ; *continuata*, p. 328 ♂ ♀, Darjiling ; *quadrinotata*, p. 330 ♀, Manipur ; *brunnicosta*, p. 332 ♂ ♀, Simla ; *tenuipes*, p. 333 ♀, Sylhet ; *flavescens*, p. 334 ♀, Ceylon ; *munda*, p. 336 ♂ ♀, Mussoorie ; *cincto-terminalis*, p. 338 ♀, Kurseong ; *elegantula*,² p. 339 ♂, Assam. The types of all these species, many represented by unique specimens only, are in the Indian Museum.

***Tipula marmoratipennis*, Brun.**

One ♀, Darjiling, 7,000 ft., 10-vi-17 (*Brunetti*).

***Tipula quasimarmoratipennis*, Brun.**

Five ♂ ♂ and a ♀, all in splendid condition, from above Tura, Garo Hills, Assam, 3,500—3,900 ft., ix-17 (*Mrs. Kemp*), in conjunction with the three ♀ ♀ in the Indian Museum fix this species definitely as quite valid, as are also my *marmoratipennis*, *griseipennis* and *tessellatipennis*, all of which are represented by further specimens of each since their description. Though so closely allied the small distinctions appear quite constant.

T. himalayensis varies most in this group but is easily recognised by the yellow subapical femoral ring which is absent in all the others with marmorated wings except *elegans*, of which I have seen no specimen except the original type.

***Tipula gracillima*, Brun.**

Described from a single ♀ from Peradeniya, a second ♀ coming from Cochin State. Four ♂ ♂ from Castle Rock, N. Canara District, taken

¹ Enderlein records it from Sumatra.

² The figure of a wing attributed to *elegantula* in the Fauna volume is not this species, nor am I able to say what species it does represent.

by Mr. Kemp are apparently of the same species. The median dorsal stripe on the thorax has a very fine line on each side of it, and each of the usual outer stripes is replaced by a pair of narrower stripes. The abdominal markings are more distinct, especially the apical black band and basal whitish one; the genitalia are of considerable size, and the 2nd tarsal joint is broadly black instead of wholly snow white as in the ♀.

***Tipula fulvolateralis*, Brun.**

Alexander thinks this is probably synonymous with *T. umbrinus*, W., but as he puts this species in *Ctenacroscelis*, Ender., a genus characterized by spines on the femora, they cannot be identical as there are certainly no femoral spines in my species. It is the commonest of the very large species in the Himalayas.

***Tipula borneensis*, nom. nov.**

Tipula pallida, Walk., (1865).

The specific name *pallida* being preoccupied by Loew in 1863 for a North American species, the name *borneensis* is herewith proposed for Walker's species.

***Tipula melanomera*, Walk.**

One ♂ of what is probably this species from Sureil, Darjiling District, 5,000 ft., iv-v-15 (*Kemp*). The thorax is uniformly orange. The species was described from Sikkim. An extraordinary resemblance exists between this species and my new one *Pachyrhina hypocrites* taken in the same locality.

coquilletti, Ender., *Zool. Jahr.* XXXII, p. 7 (1912). *Nom. nov.* for *nubifera*, Coq. 1898 preocc. Wulp. 1881. Arisan, Formosa, 8,000 ft., 10-x-12 (*Nitobe*). Also occurs in Japan.

carmichaeli, Brun., *Rec. Ind. Mus.* IX, p. 257, ♂ (1913). A unique specimen captured by Lord Carmichael at Sureil, Darjiling District, June 1913. Type in Indian Museum.

imperfecta, *id.*, *loc. cit.*, p. 260, ♀ (1913). Unique type from Darjiling in Indian Museum.

tropica, de Meij., *Nova Guin. Res.* IX, p. 311, ♀ (1913).

novae guineae, *id.*, *loc. cit.*, p. 313, ♂ ♀ (1913).

divergens, *id.*, *loc. cit.*, p. 312, ♂ ♀ (1913).

dentata, *id.*, *loc. cit.*, p. 313, ♂ ♀ (1913).

The above four species from Papua, the types in Amsterdam Museum.

aetherea, de Meij., *Tijd. v. Ent.* LVIII, Supp., p. 7, 1915, ♀ (Mar. 1, 1916).

sinabangensis, *id.*, *loc. cit.*, p. 9, ♂ ♀ (Mar. 1, 1916).

pumila, *id.*, *loc. cit.*, p. 9, ♂ (Mar. 1, 1916).

The above three species from Simalur Island, near Sumatra; the types (presumably) in Amsterdam Museum.

klossi, Edw., *Ann. Mag. Nat. Hist.* (8) XVII, p. 351, ♀ (1915).

Kedah Peak, 3,200 ft., Malay Peninsula (*Dr. Stanton*).

Type in British Museum, paratype in Kuala Lumpur Museum.

shirakii, Edw., *loc. cit.*, XVIII, p. 258, ♀ (1916). Arisan, Formosa, 8,000 ft., 10-x-12 (*Nitobe*). Khasi Hills, Assam.

The latter specimen in the British Museum, the type is not.

rufomedia, *id.*, *loc. cit.*, p. 259, ♂ ♀, pl. xii, 5-7, genitalia (1916).

Horisha, Formosa (*Maki*); Formosa (a second specimen).

Types in British Museum.

***Tipula gravelyi*, sp. nov.**

♂. Darjiling.

Long. about 32 mm. from tip of nasus to tip of genitalia.

Head very dark velvet brown, nearly black; nasus dark brown; antennae black, seen to be grey dusted in certain lights; verticillate hairs pale yellowish; 2nd basal joint reddish-brown: palpi brown, tips black, a little pale at base of each joint.

Thorax dark velvet brown, a little darker towards sides of dorsum. Pleurae less dark than dorsum, whitish dusted on sternopleura, pteropleura and hypopleura. Scutellum dark brown; with a little silvery shimmer, which extends forwards between the post sutural callosities and along the suture itself each side for a short distance; also along the frenulum and over part of the posterior calli. Metapleura well defined, brownish yellow. Some soft, moderately short dark pubescence along sides of dorsum and a few fine pale hairs on hind margin of scutellum.

Abdomen moderately pale brown, last segment darker; 1st segment at base with a little whitish shimmer, remaining segments with a pale brownish-yellow transverse streak,—interrupted in the middle,—towards base, except on 2nd segment, in which it lies approximately across the middle. Extreme sides of dorsal plates narrowly black, the hind angles pale, as are also the extreme margins of 5th and 6th segments. (Possibly in individuals margins of other segments also pale.) A few very short pale yellowish hairs at sides of segments and along hind margins. Genitalia very large and conspicuous, shining dark brown. A very large curved dorsal plate, with a little golden yellow pubescence towards sides and tip; a pair of claspers with the usual large basal joint, the 2nd joint being long, irregularly conical, slightly curved, horny, shining bright brown, with long bright yellow hairs on outer side. A large lower piece is present, and apparently some inner organs; the ventral plate is very small, subquadrate.

Legs brownish-yellow, coxae and tarsi tips darker; a practically apical yellow ring on femora with a narrow black ring immediately preceding it. Extreme base of tibiae just perceptibly paler yellowish.

Wings dark grey; costal, stigmatic and discal cell regions distinctly yellow. Costa slightly bulging out in front of the stigma, which, with a short distance around it, is very dark brown, as is also a spot over base of 2nd longitudinal vein. A small pale yellow spot occurs towards tip of 2nd submarginal cell, and in the centre of the margin of all five posterior cells. A similar spot on wing margin immediately behind 6th vein, a small one in front of 7th vein. In the 1st basal cell a pale yellowish space just before origin of 2nd vein; in 2nd basal cell a similar spot like a "7" backwards, continuing into anal cell. A very small pale

yellowish spot just beyond middle in 1st posterior cell; another near base of 4th posterior cell; another just beyond base of anal cell; another a little further on in 1st axillary cell. Base of 1st and in a less degree the 2nd basal cell darker brown. Halteres brownish-yellow with dark brown knobs.

Described from a unique ♂ in the Indian Museum. Darjiling, 7,000 ft., 13-vi-14, in perfect condition (*Gravelly*).

***Tipula contigua*, sp. nov.**

♂. Assam.

Long. 13 mm.

Head.—Occiput and frons blackish-grey, rest of head brownish-yellow with whitish reflections; proboscis, labella and palpi moderately dark brown, latter with last joint yellow. Antennae with 1st scapal joint yellow, 2nd brown, flagellum black.

Thorax light grey with three blackish longitudinal stripes, the outer ones very much foreshortened; dorsum behind suture, also scutellum and metanotum blackish. Pleurae pale brownish-yellow with whitish reflections.

Abdomen yellowish-brown; segments narrowly blackish towards hind margins but extreme margins pale; last two or three segments mainly blackish. Genitalia of moderate size, brown, apparently normal.

Legs.—Femora dirty brownish-yellow, hind pair darker. Anterior tibiae blackish-brown, a little lighter towards tips with a snow white ring just beyond middle; hind pair black, with a broad sub-basal white ring and a very broad one just beyond middle. Fore tarsi brownish-yellow, middle pair dark brown, hind pair snow white except basal fifth of metatarsus.

Wings pale grey; stigma distinct, black, the colour extending over base of 2nd submarginal cell and 1st posterior cell; basal side of discal cell, posterior cross vein and apical section of 5th vein blackish suffused. Apical half of both submarginal cells pale smoky black, the colour extending indistinctly and indefinitely along wing border. Halteres black.

Described from a single ♂ in the Indian Museum from above Tura, Garo Hills, Assam, 3,500—3,900 ft., viii-17 (*Kemp*).

This species bears a general resemblance to my *patricia* but the yellowish and brown fore and middle tarsi respectively easily separate the species from all others in this group.

***Tipula simillima*, sp. nov.**

♂. West India.

Long. 12-13 mm.

Differs from my *gracillima* only in three minor characters but which appear to be constant. The stigma fills only the apical half of the marginal cell instead of all of it; the femoral rings are twice as broad as in *gracillima* and rather more yellowish; but the principal character is that the 2nd joint of the tarsi is broadly black on the anterior pairs and more narrowly so on the hind pair, whilst in *gracillima* the tarsi are all white except the base of the metatarsus.

Three ♂♂ in the Indian Museum, taken by Mr. Kemp at Castle Rock, N. Kanara District, 11-26-x-16.

Tipula fumifascipennis, sp. nov.

♂ ♀. Darjiling.

Long. ♂ 17, ♀ 25 mm. excl. ovipositor.

Head.—Frons and occiput mouse grey, latter with numerous short black hairs; rest of head, proboscis and labella brownish-yellow, latter dark brown above; palpi dark brown, pale at emarginations, last joint black. Antennae brownish-yellow, flagellar joints, except 1st, more or less blackish at base.

Thorax brownish-yellow, prothorax a little darker, dorsum light brownish-grey; configuration of the usual three stripes slightly darker. Scutellum darker brown; metanotum pale yellowish, with grey dorsum. Pleurae paler brownish-yellow.

Abdomen in ♂ mainly yellowish, two basal segments principally brownish-yellow above, hinder part of 1st segment obscured. Whole upper surface of abdomen with very short yellow hairs except at emarginations. In the ♀ darker grey, actual sides with a distinct black stripe from base and tip. Dorsum of 1st segment mainly yellowish. Belly grey in ♂ and ♀.

Legs.—Coxae brownish-yellow: femora brownish-yellow at base, gradually darkening to dark brown at tips where the colour appears as a broad apical black band, ill defined proximally. Tibiae and tarsi dark brownish-yellow, rather lighter in ♀.

Wings distinctly grey, darker brownish-grey from the slightly yellowish grey costa to the 4th longitudinal vein, except towards wing tip, but the brownish colour extending over apical third of 2nd basal cell except at its tip. There is also a slight brownish suffusion across the anal cell, just before the middle. A nearly clear space from inner side of the inconspicuous, barely darker brown stigma, downwards, embracing tips of both basal cells and proximal half of discal cell, below which it diffuses somewhat along bases of 2nd, 3rd, 4th and 5th posterior cells. Basal two-thirds of 2nd basal cell and basal half of anal cell (except for the brownish spot) clearer than ground colour of wing. Halteres black.

Described from a ♂ and ♀ in good condition in the Indian Museum from Darjiling, 6,000—7,000 ft. 11-vi-14, *type* ♂; 12-vi-14, *type* ♀ (both *Gravely*); a second ♂ from Darjiling taken by me, 7,000 ft., 28-v-10.

Tipula fumicosta, sp. nov.

♂. Assam.

Long. 15 mm.

Head.—Occiput and frons dark grey; proboscis brownish-yellow, hairy; labella broadly brown margined; palpi blackish-brown, pubescent, base of 2nd and 3rd joints narrowly pale. Antennae brownish-yellow, base of each joint except 1st (and perhaps 2nd) narrowly black.

Thorax pale brownish-yellow, dorsum slightly grey, with the configuration of the three usual stripes; prothorax and neck rather darker brown. Scutellum greyish, with some bright yellow hairs on posterior margin.

Abdomen brownish-yellow, becoming brown towards tip of 2nd segment and gradually darkening to black at tip. 2nd segment in *type* with a narrow, transverse black line (interrupted in centre) across middle of segment, giving the appearance of two segments. Genitalia composed

of a thick large black square barely curved dorsal plate with scattered dark golden brown hairs and a fringe of golden ones on hind margin. 1st joint of claspers large, blackish, 2nd brownish-yellow, its exact shape indeterminable; a narrowly keeled ventral plate.

Legs brownish-yellow, tibiae sometimes darker (*type*): femora with a moderately broad black apical ring.

Wings uniformly pale grey; costal cell brownish yellow stigma small, inconspicuous, brownish, restricted to outer half of marginal cell. A faint darker grey spot in 2nd basal cell towards end, contiguous to 5th longitudinal vein, and a similar one before middle of anal cell. Halteres blackish.

Described from two ♂♂ in the Indian Museum from Shillong, 5,500–6,400 ft. 28-viii–5-ix-15, *type* (*Kemp*); and Shillong, 4,900 ft., 10–12-x-14 (*Kemp*). In the second specimen the abdomen is wholly moderately dark blackish-brown, and the tibiae no darker than the rest of the legs. A barely perceptibly paler streak runs through the 2nd basal, discal, and 2nd, 3rd and 4th posterior cells. A third ♂ comes from Tura, Garo Hills, Assam, 1,400 ft., ix-17 (*Mrs. Kemp*) and in it the faint dark spots in the 2nd basal and anal cells are absent.

***Tipula flavoides*, sp. nov.**

♂ ♀. Assam.

Long. tip of nasus to tip of genitalia, ♂ about 24, ♀ about 28 mm.

Closely allied to my *flava* and *serricornis* but certainly distinct. The first flagellar joint is narrow, as long as 1st scapal, the 2nd rather shorter, 3rd rather shorter still, all *subcylindrical*, barely deeper in middle, the remaining joints except the last one or two distinctly convex on lower sides. In *serricornis* the 1st flagellar joint is cylindrical, not quite so long as 1st scapal, but the remaining joints (except the apical joint) are *subtriangular*, the upper side nearly horizontal, all well separated. In *flava* the joints are presumably normally tipuliform (I have no specimen of it to compare). *Flavoides* has the palpi black, the flagellum similar but slightly pale at base. The abdomen is uniformly dark velvet brown on the dorsum in the ♂, less dark in ♀ and less uniformly coloured. Legs except coxae and trochanters blackish brown, very slightly pale about base of femora. The dorsal plate in the ♂ genitalia is quadrate whereas in both *flava* and *serricornis* it is distinctly bilobed.

Described from one ♂ and two ♀♀ from above Tura, Garo Hills, Assam, 3,500–3,900 ft., ix-17 (*Mrs. Kemp*).

***Tipula flicornis*, sp. nov.**

♂. Darjiling.

Extreme length 14 mm.

Head yellowish-grey; proboscis more brownish; palpi pale yellowish. Antennal scape brownish-yellow; flagellum very long and slender, the joints much longer and narrower than usual in this genus; rather dark brown, verticils long and numerous.

Thorax.—Dorsum not very dark brown grey; two narrow paler median stripes anteriorly, rather close together. Under side very pale yellowish: metanotum yellowish-grey.

Abdomen yellowish-brown, blackish towards tip. Genitalia brownish-yellow, the claspers small; a moderate sized, curved dorsal plate fringed apically with bright yellow hairs;

Legs proportionately long and thin, black, coxae and base of femora a little yellowish.

Wings pale grey; stigma obvious but irregular, blackish, moderate in size.

Described from a perfect unique ♂ in the Indian Museum from Pashok, Darjiling District, 3,000 ft., 26-v—14-vi-16 (*Gravelly*).

The extremely attenuated form of the antennae distinguishes this species from all others occurring in India.

***Tipula rufiventris*, sp. nov.**

♀. Darjiling. Long. about 18 mm. from tip of nasus to tip of ovipositor.

Head, thorax and scutellum wholly deep velvet black; antennae and palpi in certain lights shewing a little grey dust; a little sparse dark pubescence towards margins of thoracic dorsum.

Abdomen.—1st segment and base of 2nd black; rest of 2nd and from the 3rd to the 7th inclusive bright brownish yellow with almost a red tinge; sides narrowly blackish from 3rd segment onwards, the black colour gradually widening; 8th segment all black. Belly black, with very fine black pubescence, 3rd, 4th and 5th segments mainly reddish or brownish-yellow, the colour extending obscurely over the centres of the next two segments. Ovipositor exhibiting only the two small black terminal lamellae.

Wings dark grey; stigma rather small, yellowish; petiole of 2nd posterior cell about one-third as long as the cell: veins brownish-black; halteres black.

Described from a type ♂, Pashok, Darjiling District, vi-16 (*L. C. Hartless*), and a type ♀ taken in long grass from Soom, Darjiling District, 3,000—3,500 ft., 15-vi-14 (*Gravelly*); also from two more ♀♀ from Pashok, vi-16, and three ♂♂ and four ♀♀ from above Tura, 3,500—3,900 ft., ix-17 (*Kemp and Mrs. Kemp*).

Types in Indian Museum.

***Tipula flavithorax*, sp. nov.**

♂. Cochin State. Long. 14 mm. from tip of nasus to tip of genitalia.

Head, proboscis and palpi brownish-yellow, latter slightly paler; nasus and palpi with numerous black hairs. Antennae bright yellow, base of all segments except 1st scapal jet black, the colour gradually fading away before the middle of each segment. Occiput greenish-grey.

Thorax and scutellum wholly bright brownish yellow.

Abdomen similar, 7th and 8th segments black. Belly similar, a little darker towards hind part of each segment. Genitalia large, conspicuous, brownish-yellow, with some concolorous pubescence; the moderate sized dorsal plate cut away in centre of hind margin, ending in two

points rather turned down; 2nd joint of claspers in the shape of a long curved tooth, drawn out into a very long slender horny point.

Legs brownish-yellow; femora with a rather broad brown apical ring, indistinctly defined proximally.

Wings yellowish-grey; costal cell yellow; stigma yellowish-brown: veins very distinct, dark brownish-black: 2nd posterior cell long and narrow, twice as long as its petiole, which latter is subequal in length to the discal cell: halteres yellow, clubs blackish.

Described from a single ♂ in the Indian Museum from Parambikulam, Cochin State, South India, 1,700—3,200 ft., 16—24-ix-14 (*Gravelly*).

***Tipula fasciculata*, sp. nov.**

♂ ♀. Darjiling.

Long. 14 mm.

♂ *Head*.—Front of head and proboscis yellowish or yellowish-grey; occiput and frons dull greenish-grey, the colour extending forward in a point to between the antennae; occiput bearing some black hairs. Palpi brownish-yellow, last joint black. Antennal scape yellow, 1st flagellar joint yellowish, the remainder black.

Thorax dull yellowish or greyish; three dorsal stripes of the usual pattern, the median one narrowly divided, and the dorsal surface behind the suture pale dirty brownish-grey. Pleurae dull yellowish-grey, with almost a greenish reflection, a little yellowish contiguous to dorsum. Scutellum more whitish-grey, metanotum dull greenish with whitish-grey reflections.

Abdomen.—1st segment and from the 5th to the 8th blackish; 2nd, 3rd and 4th yellowish with a median dark stripe and a narrow side stripe. Belly mainly as dorsum. Genitalia rather large, a large square, curved dark brown dorsal plate with a pointed black piece bearing bright yellow hairs on each side, projecting below it. The claspers are tightly closed, the basal joint blackish grey with scattered bright yellow short hairs, the 2nd joint is brownish-yellow and there is a keel-shaped ventral plate.

Legs.—Coxae brownish-yellow, more or less grey in front, especially on fore pair; femora brownish-yellow, with a rather broad apical black ring; tibiae rather darker than femora; tarsi blackish.

Wings distinctly brownish, slightly darker along 5th longitudinal vein, no darker anteriorly; stigma almost imperceptibly darker. A pale curved streak from costa just before stigma and anterior cross vein, over basal half of discal cell, thence curving outwards along bases of 2nd, 3rd and 4th posterior cells, and faintly continuing along veinlet dividing 4th and 5th posterior cells. A similar streak embracing the 6th vein throughout its length. Halteres black.

♀. Body more greyish, nearly wholly so—including the whole abdomen; ovipositor shining chestnut brown with long yellow terminal sheaths.

Described chiefly from a type ♂ from Darjiling, 7,000 ft., 25-v-10 (*Brunetti*). A second ♂ is from Tonglu, Darjiling District, 10,000 ft., 21-iv-10 (*Beebe*); a third from Senchal, Darjiling District, 8,000 ft., v-13 (Lord Carmichael's coll.). A single (type) ♀ from the latter locality. All specimens in the Indian Museum.

Tipula brevis, sp. nov.

♂ ♀. Shillong, Assam. Long. ♂ 12 mm.; ♀ 15 mm. from tip of nasus to tip of ovipositor. Length of each wing 15 mm.

Head and proboscis brownish-yellow; labella with dark brown margins; palpi dirty yellow, gradually darkening to black at tips, black pubescent. Antennae yellowish, base of all scapal joints except 1st jet black, the colour fading away at about middle of each segment. In the ♀ the black is confined to a narrow basal ring. Occiput brownish-yellow, with narrow brown median stripe and some black pubescence towards eye margins.

Thorax.—Ground colour pale brownish-yellow; three olive brown stripes of the usual form, the centre one narrowly divided except on anterior margin; side stripes shorter anteriorly but extending to posterior margin. An obscure stripe extends in the ♀ from the neck to just below the wing base.

Abdomen in ♂ brownish-yellow, with a narrow blackish irregular dorsal stripe dying away at about middle of abdomen (type ♂); or dark mahogany brown with the dorsal part nearly black, and the last two or three segments wholly so. Belly brownish-yellow, tip blackish.

In ♀ abdomen brownish-yellow, with distinct and complete dorsal black stripe without well defined edges. Belly darker brownish-yellow. Genitalia in ♂ brownish-yellow, dorsal plate V-shaped with rounded edges bearing yellow pubescence; 2nd joint of claspers ending in a pair of broad thumb-like processes; ventral plate reduced to a long narrow style-like piece with yellow pubescence at tip.

Legs in ♂: coxae and femora yellowish, latter with a broad dark brown apical ring; tibiae and tarsi dark brown. In ♀, tibiae concolorous with femora, the apical ring on latter barely perceptible.

Wings pale grey; stigma brownish, ill defined; a barely perceptible pale streak just beyond stigmatic suffusion reaching from costa to discal cell; similar barely perceptible paler patches in 1st basal cell dividing it approximately into three parts; two or three similar pale spots on hind border of wing (two in 1st axillary and one in 2nd axillary cell). Costal cell very slightly yellowish. A small, just perceptibly darker grey spot at base of 2nd longitudinal vein and another contiguous proximally to the stigmatic suffusion. Halteres yellow, knobs blackish.

Described from 4 ♂ ♂ and one ♀ (the latter apparently rather immature) in the Indian Museum from Shillong, Assam, 4,900 ft., 10—12-x-14 (*Kemp*).

On **TIPULODINA**, Ender.¹

There is a small group of species of *Tipula* with snowwhite to yellowish rings on the femora or tibiae or both, and long white tarsi, and though closely allied I have been able to distinguish six valid forms, *pedata*, W.,

¹ Since writing this page I have seen that Alexander noted in 1913 that *Tipulodina* was unquestionably a Tipuline, but I had overlooked his paper. He does not definitely state whether he regards it as a good genus or not.

venusta, Walk., *patricia* and *gracillima*, Brun., and two new ones, *contigua* and *simillima*. *T. inordinans*, Walk., *cinctipes*, Meij. from Borneo and *Tipulodina magnicornis*, End. also belong here. For this group Enderlein has set up the genus *Tipulodina*,¹ with the type species *magnicornis*, sp. nov., from Sumatra. The venation in this group, on which the new genus is partly founded, is merely that of *Tipula* itself.

In *Tipula* the auxiliary vein turns down very distinctly into the 1st vein a little beyond the origin of the praefurca, with no cross vein between it and the costa, though in some species a slight darkening of the inner end of the stigma or a fractional thickening of both costa and auxiliary at the same spot creates the impression of the presence of such a cross vein.

Out of many hundreds of good specimens of Tipulae examined I have never found any such cross vein.² The subcostal cross vein is invariably absent in *Tipula*. The 1st vein ends very distinctly in the 2nd either (1) where the latter forks, (2) immediately before the fork, or (3) in the upper branch of the fork just beyond its base, and in the latter case this short basal section may be mistaken for a cross vein, and the rest of the upper branch mistaken for the ending of the 1st vein. This view is wrong and I am compelled to consider Enderlein's reading of the venation in *Tipulodina* wholly incorrect. The costal cross vein is normally present in *Tipula* but often weak, possibly absent. In most of the species of the group under discussion the auxiliary vein lies so close to the 1st vein as to be easily overlooked, and this is especially the case in the form I provisionally identify as *pedata*, W. In my *gracillima* the 2nd vein is not forked quite in the ordinary way, the upper branch being abortive, short, whitish, thickened, lying along the outer margin of the stigma, and liable to be overlooked. In this species the costal cross vein is weak, situated just before the end of the stigma. In the very closely allied *simillima* the 2nd vein is forked in the usual way.

As regards the relative length of the 4th palpal joint, which in Enderlein's type species is said to be only a little longer than the 3rd, a better case is made out for the erection of a separate genus and its removal to another subfamily, but having carefully re-examined all the specimens of the six species at my disposal, I find the 4th joint in them varies from $1\frac{3}{4}$ to over twice the length of the 3rd, or in other words about as long as the 2nd and 3rd joints together, generally much thinner and always of the so-called "whip-lash like" or peculiarly tipuliniform nature.

Though the Tipulinae are theoretically separated from the Limnobiinae by the 4th palpal joint being "as long as or longer than the other three together," as a matter of fact in some species it is only as long as the preceding two, or slightly longer, and this closes the gap so far as the palpi go between this subfamily and the Limnobiinae in which it is theoretically "as long as the 2nd and 3rd together or slightly longer." Normally the 4th palpal joint may be regarded as as long as the preced-

¹ *Zool. Jahr.* XXXII, p. 30 (1912). It may be noted that Enderlein places his genus in the Amalopini ("Pediinae") Section of the subfamily Limnobiinae, and that Bezzi would refer it to the Dolichopezini.

² Of course, the humeral cross vein excluded.

ing three in Tipulinae and as long as the preceding two in Limnobiinae. This being so I think *Tipulodina magnicornis*, End. would be better placed in the present group of the genus *Tipula* as an abnormal species, and abnormal in the matter of the palpi only.

Moreover, the nasus in this group of Tipulae is very pronounced and this character is considered one of primary importance in the Tipulinae.

The fault of the Comstock-Needham system of venation is that it endeavours to enforce a similar interpretation of the veins in both Tipulinae and Limnobiinae. There is nothing illogical in a certain vein normally turning upwards at the tip in the one subfamily and normally downwards in the other, and if the courses of the auxiliary vein and 1st vein be studied in genera where the subcostal cross vein, costal cross vein and marginal cross vein are absent, it will be found they both turn downwards at the tip in the Tipulinae and upwards in the Limnobiinae, exactly as stated by Osten Sacken, in spite of Needham's effort to prove to the contrary and his statement that the great dipterologist's terminology has "served its day and generation." Osten Sacken also particularly warned students against forcing the same reading into different groups and skilfully pointed out the close analogy of the venation of both subfamilies; but what is the end of a certain vein in one subfamily is a cross vein in the other, and *vice versa*.

The species in this group may be tabulated thus¹: —

- | | |
|--|---------------------------------|
| A. A brownish spot over both basal cells (not conspicuous but quite obvious and apparently constant). | |
| B. Femora without pale rings. (Anterior tibiae brownish basally, remainder black, with broad white ring towards tips; all tarsi wholly white except basal third of metatarsus, but tarsi tips a little brownish and extreme tips black) | <i>patricia</i> , Erun. |
| BB. Anterior femora with broad, subapical yellowish ring. (Ring yellowish, broader, less well defined; ring on anterior tibiae broad, subapical; tarsi wholly white except about basal half of anterior metatarsi and basal third of hind metatarsi) | <i>venusta</i> , Walk. |
| AA. No brownish spot over basal cells. | |
| C. Femora unringed. (Anterior tibiae more uniformly concolorous dark brown (fore pair) or black (middle pair), with narrow white ring just beyond middle; anterior tarsi wholly brownish-yellow (fore pair) or dark brown (middle pair)) | <i>contigua</i> , sp. nov. |
| CC. Femora ringed; at least front pair. | |
| D. Front femora alone ringed. (The ring moderately broad, yellowish, apical; tarsi wholly white except basal half of anterior and basal third of hind metatarsi black; extreme tips of tarsi may be brown or black). Costal cell wholly deep black. | <i>pedata</i> , W. ² |
| DD. Anterior femora very distinctly ringed (indistinctly also on hind pair, the ring subapical). Costal cell wholly clear. | |

¹ As the legs were broken off in *magnicornis*, Hend. it is impossible to include it in the above table.

² My identification of this species still requires *absolute* confirmation. Meijere recognises it from Java on several occasions and says the front femora are not white ringed, but Osten Sacken says they have a subapical yellowish-white ring, Wiedemann noting only the tibial rings. The femoral ring is not conspicuous, but is obvious enough if looked for. Osten Sacken's note of the very close approximation of the auxiliary vein to the 1st longitudinal will also apply to other species in this group and to some Tipulae of other groups also.

E. Origin of 2nd vein hidden by stigma filling all marginal cell; upper branch of 2nd vein very short, abortive, thickened, whitish. Femoral rings very narrow, more whitish; tarsi all white except basal part of metatarsi

gracillima, Brun.

EE. Origin of 2nd vein easily seen, as stigma fills only apical half of marginal cell; 2nd vein forked in the ordinary way; femoral rings twice as broad as in *gracillima*, more yellowish; tarsi with base of 2nd joint broadly and distinctly black, more narrowly so on hind pair

simillima, sp. nov.

In reading "tarsi all white", etc., in above table it must be remembered that the *extreme* tips may be brownish or blackish, this point having no material value.

Venusta, Walk. is extremely like *pedata*, W. but they may be differentiated as follows:—

Costal cell all black; no spot over basal cells
Costal cell clear; a spot over basal cells

pedata
venusta.

I now consider my first impression of *venusta*, Walk. probably correct and that my figure of it ¹ really represents that species.

LONGURIO, Lw.

Berl. Ent. Zeits. XIII, p. 3 (1869).

GENOTYPE: *L. testaceus*, Lw., sp. nov.

rubriceps, Edw., *Ann. Mag. Nat. Hist.* (8) XVIII, p. 261 ♂, pl. xii, 9, genitalia (1916). Shiuten, Formosa, 400 ft. (*Shiraki*). The unique type in the British Museum.

BRITHURA, Edw.

Ann. Mag. Nat. Hist. (8) XVIII, p. 262 (1916).

GENOTYPE: *B. conifrons*, Edw., sp. nov.

conifrons, Edw., *loc. cit.*, p. 263, ♂, pl. xii, 10, tip of abdomen, 11, tip of wing (1916). Arisan, Formosa, 8,000 ft., 10-x-12 (*Nitobe*). Unique type in British Museum.

crassa, Edw., *loc. cit.*, p. 264, ♂, pl. xii, 12, abdomen tip (1916). Described from a unique ♂ in the British Museum, labelled "East Indies," (? India).

PACHYRHINA, Macq.

In my "Fauna" volume were added the following new species, *serricornis*, p. 341 ♂, India (var. locs.); *puncticornis*, p. 343 ♂, Siliguri, Bengal; *pleurinotata*, p. 343 ♂ ♀, Ceylon; *demarcata*, p. 344 ♂ ♀, Darjiling; *concolorithorax*, p. 346 ♂ ♀, Khasi Hills, Sylhet; *gamma*, p. 347 ♀, Assam-Bhutan Frontier: the types of all (except *concolorithorax* ♂ in the Pusa coll.) being in the Indian Museum.

speculata, Meij., *Nova Guin. Res.* IX, p. 314 ♀ (1913). Papua.

ochripleuris, de Meij., *Tijd. v. Ent.* LVI, Supp. p. 6 ♂ ♀, 1913 (Mar. 1914). Java.

¹ *Fauna Brit. Ind. Dipt.*, pl. v, fig. 5, wing.

citrina, Edw., *Ann. Mag. Nat. Hist.* (8) XVIII, p. 265 ♀, (1916). Taihoku, Formosa (*Shiraki*). Unique type in British Museum.

parva, Edw., *loc. cit.*, p. 266, ♂ (1916). Arisan, Formosa, 8,000 ft., 10-x-12 (*Nitobe*). Unique type in British Museum.

formosensis, Edw., *loc. cit.*, p. 267, ♀ (1916). Kammotu, Formosa, 10-iv-10 (*Nitobe*). Unique type in British Museum.

Tipula cinerea, Brun. and **T. elegans**, Brun.

Mr. Alexander writes me that these names should be altered on account of *Tipula cinerea*, Fab. which = *Trichocera maculipennis*, Mg. and *Tipula elegans*, Fab. which is a *Pachyrhina*, but this seems carrying the principle of renaming a little too far.

Pachyrhina javensis, Dol.

A ♀ from Coonoor, Nilgiri Hills, vi-12 (*Capt. Sewell*) in the Indian Museum differs from the three ♀ ♀ referred by me to this species by having a black spot on the sternopleura as in *pleurinotata*. The fore femora are nearly black except for the pale basal fourth and a slightly lighter space before the tip, sufficient to give the impression of a broad black median ring. The posterior femora are brownish-yellow with a moderately broad distinct apical ring. The 2nd posterior cell is not petiolate. The scutellum is wholly shining black. Two further ♀ ♀ from the same locality (1 and 4-ix-11, *Howlett*) shew other minor differences, so the species is evidently a variable one. Three ♂ ♂ also from Coonoor (4 and 5-ix-11, *Howlett*) may possibly belong here; they are rather smaller than the ♀ and I have not seen any ♂ that could definitely be referred to *javensis*. Edwards records this species with notes (*Ann. Mag. Nat. Hist.* (8) XVIII, 266) from Kotosho Island, near Formosa, 20-vii-12 (*Shiraki*).

Two ♀ ♀ from Tura, Garo Hills, Assam, 1,400 ft., ix-17 (*Mrs. Kemp*) have the thoracic dorsum almost entirely shining black, and the front femora shew no trace of black, yet they are probably this species.

Pachyrhina bombayensis, Macq.

This species is common at Pusa, Bihar, in July, August and September.

Pachyrhina serricornis, Brun.

A small series from Pusa, February, September and December. One specimen from Shillong, 19-x-11.

Pachyrhina pleurinotata, Brun.

A second ♂ and ♀ in the Indian Museum also from Namoya, Ceylon, the ♀ having an abnormal, broad, blackish band in the middle of the fore femora.

***Pachyrhina dorsopunctata*, Brun.**

A ♂ from Mangaldai, Assam-Bhutan Frontier, 30, 31-xii-10 (*Kemp*). Two ♀♀ Dinapore, Bengal, 16-xii-14 to 23-i-15 (*Caunter*); Pusa, Bengal, 5—10-ii-15 ♂ ♀ *in cop.* (*Gravelly*).

The species is common at Pusa in February and March.

***Pachyrhina consimilis*, Brun.**

Cherrapunji, Assam, 4,400 ft., 2-3-x-14 (*Kemp*); Shillong, 5,500—6,400 ft., 29-viii to 5-ix-15 (*Kemp*); near Ghoom, above Darjiling, 6,000—7,000 ft., 11-vi-14 (*Gravelly*); Kurseong, 4,700—5,000 ft., 19-vi-10; 4-ix-09 (both *Annandale*); Kalimpong, Darjiling District, 600—4,500 ft., 24-iv—10-v-15 (*Gravelly*); Pashok, Darjiling District, 2,000—3,500 ft., 23-iv—11-v-15 (*Gravelly*). I found it abundant at Darjiling during the first week in June, 1917.

***Pachyrhina gamma*, Brun.**

This must temporarily be regarded as an indefinite species of which the description may require modification as further specimens have turned up which may belong to it and which would give it a considerable amount of variation. The inverted Y-mark mentioned in the type is on the *face* and not on the frons as described.

***Pachyrhina virgata*, Coq.**

Prcc. U. S. Nat. Mus. XXI, p. 306 (1898).

Edwards records this, with notes (*Ann. Mag. Nat. Hist.* (8) XVIII, p. 266) from Arisan, Formosa, 8,000 ft., 10-x-12 (*Nitobe*).

***Pachyrhina fuscoflava*, sp. nov.**

♀. Punjab, India. Long. 18 mm. to tip of ovipositor.

Head.—Brownish-yellow, with a little black pubescence; base of flagellar joints of antennae narrowly black.

Thorax brownish-yellow, the usual three darker stripes rather indistinct, the outer ones not produced forward or downward.

Abdomen darker brownish-yellow with brownish or blackish markings; ovipositor shining lighter brown.

Legs brownish-yellow; tips of femora, of tibiae, and of 1st and 2nd tarsal joints blackish; remainder of tarsi wholly black.

Wings pale yellowish-grey; a whitish streak from costa just beyond tip of 1st longitudinal vein, downwards to a little below discal cell; also a similar paleness at tip of costal cell and base of marginal cell. A less distinct whitish spot lying over both basal cells at about two-thirds of their length, with a still fainter one at about one-third of their length. No distinct stigma but stigmatic region a little brownish. Halteres brownish-yellow, the centre of the clubs darker..

Described from two ♀ ♀ sent by Mr. Bainbrigge Fletcher from the Hazara District, Dungagali, 8,000 ft., 21-24-v-15. *Type* presented by Mr. Fletcher to the British Museum, cotype in the Pusa collection.

A species quite distinct from the others but yet possessing no strikingly distinctive character.

***Pachyrhina parvinotata*, sp. nov.**

♂ ♀. N.-W. Indian Frontier. Long. 15 mm. to tip of ovipositor.

This species bears a considerable resemblance to my *dorsopunctata*, but differs essentially as follows.

♀. The outer thoracic stripes curve distinctly downwards at their tips and are brown not black, in some specimens less distinct than the median stripe; the abdominal marks are small and rounded, not triangular (in *dorsopunctata* they sometimes nearly cover the dorsum of the segment); the 2nd posterior cell is much shorter, barely twice as long as the discal cell.

These differences appear constant in the four females before me, three coming from Taru, Peshawar District, 16—29-v-15 and one from Haripur Hazara, North-West Frontier 27-v-15.

What is no doubt a male of the same species has the abdomen almost wholly brownish-yellow, without distinct spots, the last two segments being black above. It is from Taru taken in company with the females.

Type ♂ and ♀ presented by Mr. Fletcher to the British Museum, cotypes in Pusa collection.

***Pachyrhina hypocrites*, sp. nov.**

♂ ♀. Darjiling. Long. 10-11 mm.

Head, palpi and antennae black, but frons more or less dull brownish-orange.

Thorax and *abdomen* bright orange, last three or four abdominal segments and *genitalia* black.

Legs black; coxae, trochanters and femora for a short distance at base orange.

Wings moderately dark grey, stigma distinct but not conspicuous, blackish; halteres blackish.

Described from 3 ♂ ♂ and 2 ♀ ♀ from Sureil, Darjiling District, 5,000 ft., iv-v-17 (*Kemp*). In the Indian Museum.

This species is extraordinarily like a specimen taken at the same time which I have identified as probably *Tipula melanomera*, Walk. only the different venation and structure of the *genitalia* separating them.

Section *DOLICHOPEZINI*.

MITOPEZA, Edw., gen. nov.

Ann. Mag. Nat. Hist. (8) XVII, 1 p. 349 and 350, ♀ fig. 1, p. 356, *genitalia* (1916).

nitidirostris, Edw., *loc. cit.*, Kedah Peak, 3,200 ft., Malay Peninsula (*Dr. Stanton*). Unique type in British Museum.

Tanypremna omissinervis, Meij.

Dr. de Meijere now refers this to *Tipula*.

Alexander (*Proc. U. S. N. M.* XLIV, p. 487) sinks *Stegasmonotus*; Ender. (*Zool. Jahr.* XXXII, p. 1, fig. i; 1912) as an absolute synonym of *Tanypremna*.

DOLICHOPEZA, Curt.

orientalis, Brun., *Fauna Brit. Ind. Dipt.*, p. 354 ♂ ♀ (1912).

Kurseong.

I found this species not uncommon at Darjiling during the second week of July 1916, flying low and slowly over wet grass and plants on the hillside in the town.

obscura, Brun., *loc. cit.*, p. 355 ♂ ♀ (1912). Kurseong.

postica, *id.*, *loc. cit.*, App. p. 564 ♂ ♀ (1912). Darjiling District.

infuscata, *id.*, *loc. cit.*, App. p. 565 ♂ (1912). Nilgiri Hills.

Types of above four species in Indian Museum.

pallidithorax, Meij., *Tijd. v. Ent.* LVI, Supp. p. 4 ♂, pl. i, 3, 1913 (Mar. 1914). Java.

Dolichopeza costalis, sp. nov.

(Plate viii, fig. 6.)

♂. Cochin, S. India.

Long. just over 5 mm.

Head yellowish; frontal bump well developed. Proboscis dirty brownish-yellow, with a few bristly black hairs; palpi brownish-yellow, paler at emarginations. Antennae pale yellowish with soft white pubescence, a little blackish at emarginations; 1st joint pale brownish, with bristly hairs.

Thorax and scutellum wholly pale brownish-yellow

Abdomen yellowish at base, remainder of segment smoke-brown, paler on basal part of each segment. Genitalia distinct, smoke-brown.

Legs (one only remaining). Femora yellowish, tip distinctly brown, tibiae and tarsi whitish, tip of former narrowly black; tarsi $1\frac{1}{2}$ times as long as tibiae.

Wings pale grey; costa smoke-brown, the colour broadening towards and broadly enclosing wing tip, filling apical half of 1st and apical third of 2nd posterior cell. Wing brown at base; a blob attached to the costal darkening placed a little beyond the basal dark part; a 2nd blob over origin of 2nd longitudinal vein, a 3rd over anterior cross vein and base of 1st posterior cell. The posterior cross vein is narrowly brown suffused, and there is a minute concolorous spot placed at each of the three hindmost veinlets of the 4th vein, also at tips of 5th and 6th longitudinal veins.

A slightly paler spot than the ground colour on costa just beyond tip of 1st vein and one each at tips of submarginal and 1st posterior cells.

Described from a unique ♂ in the Indian Museum from Kavalai, 1,300—3,000 ft., Cochin State, S. India, 24—27-ix-14 (*Gravelly*).

Apart from only one leg remaining the specimen is in good condition but I should have refrained from setting up a legless type if the species

had not been such a striking one by the wing markings, and the genus so limited.

NESOPEZA, Alex.

Can. Ent. XLVI, p. 157 (1914).

Alexander makes Meijere's *Dolichopeza gracilis* the type of this genus.

Nesopeza albitarsis, sp. nov.

(Plate vii, fig. 1.)

♂ ♀. Darjiling.

Long. about 8 mm.

Head.—Occiput and frons brownish-grey; former with a few short stiff hairs and traces of a median dark stripe; remainder of head brownish-yellow; proboscis with some black stiff hairs above; palpi blackish-grey.

Thorax, scutellum and metanotum uniformly brownish-yellow; pleurae paler and more greyish. Two well separated dorso-central stripes of short pale hairs.

Abdomen blackish, with inconspicuous whitish pubescence which is longer and more yellowish on hinder segments. Base of abdomen and posterior margins of hinder segments slightly paler. Genitalia in ♂ of moderate size, brownish-yellow, with yellowish pubescence, apparently complex; ovipositor shining yellowish-brown.

Legs.—Femora brownish-yellow, darker at tips; tibiae much darker, pale at base, blackish at tips; tarsi all white to extreme tips.

Wings pale yellowish-grey; stigma well defined, a small paler contiguous spot in front of and beyond it. Halteres yellow, knobs blackish.

Described from a unique pair in the Indian Museum from Lord Carmichael's collection; the ♂ from Lebong, Darjiling District, 6,000—6,600 ft., 13-vi-14 (*Gravelly*), the ♀ from between Darjiling and Soom, 5,000—7,000 ft., 14-vi-14 (*Gravelly*). This species apparently comes in *Nesopeza* although the 2nd longitudinal vein originates more distally than in *gracilis*, in fact only immediately before the origin of the 3rd.

Nesopeza longicornis, sp. nov.

♂. Assam.

Long. 9 mm.

Body wholly dark dull nut-brown; a little brownish-yellow about nasus and underside of head. Antennae longer than whole body, brown; flagellum of ten very elongate subequal joints with very short erect pubescence and two moderately long verticils on each placed respectively just after the base and just beyond the middle; 11th joint very minute. Traces of a divided pale median stripe on dorsum of thorax. Hind segments of abdomen narrowly and indistinctly black; genitalia of moderate size. Femora black, tibiae pale yellowish, becoming white at tips; tarsi wholly snow-white, longer than femora and tibiae together. Wings pale yellowish-grey; stigma black, the ground colour of the wing on each side of it whitish. 2nd vein originating some distance before 3rd; 2nd posterior cell truncate at base, as long as 3rd; discal cell small,

indistinct at base, lower side wholly formed by 4th posterior cell; posterior cross vein a little before base of discal cell. Halteres dark brown.

Described from three ♂♂ in the Indian Museum from above Tura, Garo Hills, Assam, 3,500—3,900 ft., vii-1917 (*Kemp*).

Nesopeza picticornis, sp. nov.

♂. Southern Shan States.

Long. 9 mm.

Head brownish-yellow; a median blackish stripe on frons extending back across most of occiput; nasus dirty brown, palpi blackish. Antennae bright yellow, base of all flagellar joints except 1st black ringed at base, also slightly swollen there; apical joint exceedingly minute, yellowish.

Thorax.—Collare blackish; dorsum yellowish with three distinct but not clear-cut stripes of the usual pattern; the median one extending to anterior margin and continued downwards over shoulders; posterior calli dark brown, the intermediate depression yellowish, as is also the rather square shaped scutellum. Sides of thorax brownish-yellow; an indistinct blackish streak from prothorax across the pleurae and joining the dark abdominal side streak. Metanotum large, shield-shaped, brownish-yellow with black edges.

Abdomen brownish-yellow, hind margin of each segment with a distinct bluish-black band; belly similar; sides with a narrow blackish line from base nearly to tip. Genitalia small, brownish-yellow.

Legs.—Coxae and femora brownish-yellow, latter dark brown tipped; tibiae and tarsi very dark brown or black.

Wings moderately dark grey; veins distinct, black; subcostal cell blackish; stigma clear-cut, oval, black; posterior cross vein slightly suffused; anterior, outer and hinder sides of discal cell rather faint. Halteres yellowish, clubs blackish with white tips.

Described from a single ♂ in the Indian Museum from Inle, Southern Shan States, 3,000 ft., 18-ii-17 (*Gravelly*). This is a more robust species than *albitarsis*, and the legs are relatively shorter.

SCAMBONEURA, Os. Sac.

quadrata, de Meij., *Tijd. v. Ent.* LVI, Supp. p. 8, 1913 (Mar. 1914). Java.

Subfamily LIMNOBIINAE.

Section *CYLINDROTOMINI*.

STIBADOCERA, Ender.

Zool. Jahr. XXXII, p. 83 (1912).

GENOTYPE: *S. bullans*, sp. nov.

bullans, Ender., *loc. cit.*, p. 84 ♂ (1912). Sumatra. The unique type in the Stettin Zoological Museum.

metallica, Alex., *Proc. U. S. Nat. Mus.* XLIX, p. 178 (1916).
Java.

Alexander states in this paper that my *Cylindrotoma quadricellula* is a *Stibadocera*.

GENERA IN CYLINDROTOMINI.

An examination of the genera and species in this group reveals a remarkable elasticity of characters and substantiates its intermediate position between Tipulinae and Limnobiinae.

This was quite evident to Osten Sacken who,¹ in comparing the European *Cylindrotoma distinctissima* with the North American *americana*, also the European *glabrata* with the North American *nodicornis*, wrote "The fact is that these species represent a gradation which baffles every attempt at a generic arrangement." He retained *Phalacroceratipulina* and the European *P. replicata* in the same genus in spite of the important difference that in the former the 1st vein ends in the 2nd vein, with the marginal cross vein absent, whilst in *replicata* the 1st vein ends in the costa with the marginal cross vein present. He kept all the species known at that time in the three genera recognised by Schiner, *Cylindrotoma*, *Phalacroceratipulina* and *Triogma* "in order to avoid the establishment of a new genus for almost every species known, which would probably necessitate a similar process for every species to be discovered hereafter." He notes that even the absence of the anterior cross vein (when it is normally absent) is not always constant in the same species, as out of twenty-one examples of *Liogma nodicornis* examined it was absent in seventeen and present, though short, in four, so he retains *nodicornis* and *glabrata* (in which latter the vein is present) in the same genus *Liogma*.

The characters of this group which exhibit such unusual variation are: (1) the exact manner in which the auxiliary vein terminates, with the presence or absence of the subcostal cross vein, or the presence or otherwise of a short cross vein between the tip of the auxiliary vein and the costa; (2) the exact manner in which the 1st vein terminates, with the presence or absence of what I call in my Fauna volume the costal cross vein; (3) the point at which the 2nd and 3rd veins diverge, and, (4) the presence or absence of the anterior cross vein. Other characters though variable are definite one way or the other, such as the number (four or five) of posterior cells, the punctulate nature of the thorax or otherwise, and some minor ones. All the tibiae are spurred in the three species before me.

The material before me, apart from literature, consists of a single specimen of *C. distinctissima* (with one wing only), the three original specimens of my *C. 4-cellula*,² and four ♂♂ and one ♀ of my new species *latefurcata*. These exhibit the following comparative characters.

¹ *Monog. N. Am. Tipulidae*, p. 295.

² This is a *Stibadocera* as Alexander notes. I had not seen Enderlein's paper, nor an earlier paper by Alexander on Neotropical Limnobiinae in which he doubts the Cylindrotomine character of the genus, though he admits its position here in his subsequent paper on Javan Tipulidae.

Cylindrotoma distinctissima, Mg.—Auxiliary vein ends free, a trace of subcostal cross vein towards but not at tip. (Extreme tip of wing missing, but intact up to the point at which costal cross vein occurs when present, and there is no sign of it.) 2nd and 3rd veins diverge immediately but distinctly before anterior cross vein. Antennae with moderately long verticils, inconspicuous as such. Thorax quite smooth, unpunctured.

Stibadocera 4-cellula, Brun.—Auxiliary vein distinctly turns down into 1st vein, without weakening, no trace of a cross vein uniting it with costa. 1st vein dark brown till near tip, where it turns down into 2nd vein, this last section of it pale yellow. A dark brown cross vein (my costal cross vein) joins it to costa at the point where it suddenly pales. Therefore if it is contended that in this case the 1st vein ends in the costa, the pale apical section will be the marginal cross vein, but the former theory strikes me as the more correct. 2nd and 3rd veins diverge exactly at anterior cross vein. Thorax towards sides of dorsum distinctly punctulate. Antennae very long with exceptionally long and conspicuous verticils.

Stibadocerella pristina, sp. nov.—Auxiliary vein may be considered to end in costa with subcostal cross vein present, both of equal strength and distinctness, though it is impossible to decide with certainty which is the actual ending of the vein. The 1st vein obviously turns down into the 2nd; no trace of costal cross vein. The peculiarity of this species is that the 2nd and 3rd veins diverge so late, half way between anterior cross vein and wing tip. The 2nd vein at point of divergence turns abruptly upwards and then rather sharply outwards, the last section appearing to be the end of the 1st vein, being in a straight line with it. 3rd vein forming with praefurca a gently bisinuate line. Rest of veins as in *4-cellula*.

Antennae in ♂ as in *4-cellula*; longer than whole body; in ♀ less than half as long, very shortly and inconspicuously pubescent. Thorax very smooth, no trace of punctulation.

The variation of the characters in question may be summed up as follows.¹

Auxiliary vein.—Ends (1) free, with subcostal cross vein indistinctly present (*Cylindrotoma*); or (2) ends very distinctly in the 1st vein without any cross vein above or below, and as three out of the six genera in this section are identical in this it may be regarded as the normal ending (*Triogma*, *Liogma*, *Stibadocera*); or (3) ends in costa with subcostal cross vein present (*Stibadocerella*). It may be contended in the latter case that it ends in the 1st vein, with a supernumerary cross vein between its tip and the costa, but such a cross vein is very rare in the diptera.

1st longitudinal vein.—Normally ends in 2nd vein.² When the costal cross vein is absent this fact is unimpeachable, therefore Enderlein's contention that it ends in the costa with a cross vein between it

¹ Only the conclusions are given here, as my full comparative notes on the genera would occupy too much space.

² Occasional exceptions may be admitted: *vide note antea* p. 280, *Phalacroccra*.

and the 2nd vein (which would be the marginal cross vein) must be incorrect.

Osten Sacken admits a "more or less indistinct cross vein connects the 1st vein with the costa."

This is my costal cross vein which is present (*Cylindrotoma*, indistinctly; *Stibadocera*), or absent (*Triogma*, *Liogma*, *Stibadocerella*).

2nd and 3rd veins.—These diverge at varying distances, as is the case in many other groups, either just before, or at, or a little beyond the anterior cross vein (all genera except *Stibadocerella*) or else half way between the anterior cross vein and the wing-tip as in the latter genus.

Anterior cross vein.—Normally present, but absent in *Triogma* and *Liogma*, effectually characterising these genera though, as has been stated, it is not always constant even in the same species.

Number of posterior cells.—Four in all genera except *Cylindrotoma*, which has five.

Antennae.—These have conspicuously long and copious verticils in *Stibadocera* and *Stibadocerella*, but they afford no characters out of the common in the other genera.

Punctulation of thorax.—This very unusual character in Tipulidae exists only in *Triogma*, *Liogma* and *Stibadocerella*.

On the above general conclusions the following table of genera may be offered :—

A. Anterior cross vein absent ¹ : thorax punctulate.	
F. Flagellar joints subglobular ²	<i>Triogma</i> .
BB. Flagellar joints subcylindrical, elongate	<i>Liogma</i> .
AA. Anterior cross vein present : thorax not punctulate except in <i>Stibadocera</i> .	
C. Five posterior cells	<i>Cylindrotoma</i> .
CC. Four posterior cells.	
D. Thorax punctulate	<i>Stibadocera</i> .
DD. Thorax not punctulate.	
E. Verticils of antennae very short : 2nd and 3rd veins diverging at about anterior cross vein	<i>Phalacrocer</i> .
EE. Verticils of antennae very long and conspicuous : 2nd and 3rd veins diverging half way between anterior cross vein and wing tip	<i>Stibadocerella</i> .

In Osten Sacken's figure of his *Liogma nodicornis* ³ he shews the auxiliary vein distinctly ending free without any trace of a cross vein above or below, but Needham's figure of the same species shews the auxiliary vein as distinctly ending in the costa with a very distinct subcostal cross vein present. I cannot decide which is correct.

Enderlein's interpretation of the venation in *Stibadocera* is open to doubt. He speaks of the 2nd vein being joined to the 1st by a cross vein (which would, of course, be the marginal cross vein, though he does not recognise it as such). What he considers the tip of the 1st vein is really the costal cross vein, the 1st vein really ending in the 2nd as normally in this section. Alexander's figure of *S. metallica*, sp. nov. agrees in venation with Enderlein's species, *bullans*, from Sumatra.

¹ Present occasionally in individual specimens in one species.

² The difference between *Triogma* and *Liogma* is weak but no other appears to have been put forward. Osten Sacken gives no definite character by which to separate them.

³ "*Cylindrotoma* " *nodicornis*, Monog., pl. i, 7.

I contend it must be admitted that the 1st vein normally and actually ends in the 2nd, because whenever the costal cross vein is absent it most obviously does so end.

STIBADOCERELLA, gen. nov.

Near *Stibadocera*, Enderl. Antennae with similar very long and conspicuous verticils the whole length of the flagellum, which consists of 13 joints, the last three not so distinctly demarcated as the others; scape as in *Stibadocera*. Thorax absolutely without trace of punctulation. All tibiae with very small spurs. Palpi comparatively short, all the joints apparently subequal. Auxiliary vein turning up very distinctly into costa; subcostal cross vein distinctly present; 1st vein turning down into 2nd as usual in this section; no trace whatever of costal cross vein; 2nd and 3rd veins diverging very late, half way between anterior cross vein and wing tip. As the wing is absolutely colourless (in the type and only species) all the veins stand out with striking clearness.

GENOTYPE: *S. pristina*, sp. nov. ♂ ♀ from Assam.

Stibadocerella pristina, sp. nov.

♂ ♀. Assam.

Long. 10 mm.

Head pale yellowish, face with a greenish tinge; palpi brownish, paler at tip; antennae scape yellowish, flagellum brown.

Thorax pale brownish-yellow, very smooth and shining, traces of three shining, rather dark brown median, subcontiguous stripes, less distinct in ♀.

Abdomen dirty brown, hind margins of segments narrowly whitish, more distinct in ♂, and broader on the long 2nd and 3rd segments. (There seems no clear demarcation between what are apparently the first three segments.) Tip of abdomen blackish; genitalia in ♂ small but distinct; in ♀ comparatively large, bulbous at base, the valves black, shining.

Legs.—Coxae greenish (light verdigris colour); rest of legs brown. Femora a little pale at extreme base, and slightly thickened towards tips; tibiae with a very narrow white ring at extreme base (in one ♂ the ring is greenish); front tibiae with broad white ring at tip, where the pubescence is longer and thicker. Tarsi snow-white, anterior metatarsi brown except extreme tips, hind metatarsi brown to just beyond middle.

Wings absolutely colourless, veins extremely distinct, in accordance with the generic diagnosis; halteres black, stem comparatively long.

Described from four ♂ ♂ and one ♀ in Indian Museum from Tura, Garo Hills, Assam, 3,500—3,900 ft., vii-17 (*Kemp*).

Section *LIMNOBIINI*.

DICRANOMYIA, Steph.

In my Fauna volume (1912) I described the following species.

Marmoripennis, p. 369 ♂ ♀, Darjiling¹; *demarcata*, p. 370 ♀, Kurseong; *absens*, p. 372 ♀, Kurseong; *pulchripennis*, p. 376 ♂ ♀, E. and W. Himalayas; *puncticosta*, p. 377 ♂ ♀, Kurseong; *fraterna*, p. 378 ♀, Darjiling; *fascipennis*, p. 379 ♀, Kurseong; *subfascipennis*, p. 380 ♂ ♀, Kurseong; *ornatipes*, p. 380 ♂, Travancore; Puri; Dawna Hills; *cinerascens*, p. 381 ♂ ♀ Darjiling; Kurseong; *cinctiventris*,² 382 ♀, Kurseong; *sordida*, p. 382, Darjiling; Kurseong; *delicata*, p. 383 ♂ ♀, Darjiling; *flavobrunnea*, p. 384 ♂ ♀, Calcutta; *simplex*, p. 384 ♀, Calcutta; *fortis*, p. 385 ♂, Darjiling; *nigrithorax*, p. 385 ♂, Darjiling; *subtessellata*, l. c., App. p. 565 ♂ ♀, Ceylon; *bicinctipes*,³ App. p. 566 ♂, Dawna Hills; *columbina*, App. p. 567 ♀, Ceylon; *approximata*, App. p. 567 ♀, Darjiling District; *innocens*, App. p. 568 ♂ ♀, Kumaon District. All the types in the Indian Museum.

debeauforti, de Meij., *Bijdr. tot. Dierk.* XIX, p. 47, ♂ ♀ (1913).

Saonek, Indo-Australian archipelago.

alta, de Meij., *Tijd. v. Ent.* LVI, p. 341 ♂ (1913). Java.

nongkođadjarensis, *id.*, l. c., p. 343 ♂ (1913). Java.

Types of the latter two species in Amsterdam Museum.

novae-guineae, de Meij., *Tijd. v. Ent.* LVIII, p. 101 (*Thrypticomysia*), (1915). North Papua.

tinctipennis, de Meij., *Tijd. v. Ent.* LVIII, Supp. p. 66, 1915 (1916). Sumatra.

Alexander describes the following new species from Java (*Proc. U. S. Nat. Mus.* XLIX, 1916): *albitarsis*, p. 159 ♂; *atrescens*, p. 160 ♂; *erythrina*, p. 161 ♂; *excelsa*, p. 161 ♂ ♀; *simplissima*, p. 162 ♀; *carneotincta*, p. 162 ♂.

Dicranomyia fullowayi, Alex.

Can. Ent. XLVII, p. 79 (1915).

Edwards records this species (*Ann. Mag. Nat. Hist.* (8) XVIII, p. 245) from Arisan, Formosa, 8,000 ft., 10-x-12 (*I. Nitobe*). Described originally (*Can. Ent.* XLVII, p. 79) from Guam I., one of the Ladrone Islands.

Edwards also describes in the same paper (p. 246) *D. alticola*, sp. nov. ♀, pl. xii, 1, ♀ genitalia), Arisan, 10-x-12 (*I. Nitobe*); Horisha, Formosa, v. 1913 (*M. Maki*). Type in British Museum.

Dicranomyia cuneiformis, de Meij.

A few of each sex referable to this species from Castle Rock, Bombay, 11—26-x-16 (*Kemp*). In addition there is a ♂ with the marginal cell twice as much longer than the submarginal as the latter is longer than the 1st posterior. The whole wing tip is brownish infuscated as far basally as a line from the well marked stigma through the discal cell to just before the tip of the 5th longitudinal vein. Two other specimens have the marginal cell still longer proportionately and no trace of apical infuscation of the wing. All are from Castle Rock or neighbourhood, taken at about the same time.

¹ This species was taken in Japan at Otsu, near Kyoto, x-15, by Dr. Annandale.

² This is a *Limnobia*, with *L. vitripennis*, Brun. as a synonym.

³ Also described as new in *Rec. Ind. Mus.* VII, 447; the *Fauna* record ant dates this by about a month.

***Dicranomyia bicolor*, sp. nov.**

♂. Assam.

Long. $6\frac{1}{2}$ mm.

Head, proboscis, palpi and occiput dirty dark brown; antennae similar with a little pale pubescence.

Thorax pale yellowish; whole dorsum (except anterior margin broadly and the humeri), scutellum and metanotum shining black. Pleurae just above anterior coxae faintly blackish.

Abdomen.—Dorsum shining black, hind margins of segments yellowish; belly wholly yellow. Genitalia large, conspicuous, 2nd joint of claspers with two (if not three) hook-like appendages; a narrow long ventral plate.

Legs yellowish, gradually darkening to tarsi tips; tips of femora with a moderately broad blackish ring.

Wings pale grey very iridescent. 2nd longitudinal vein originating rectangularly and forming a right angle near its base, which is enclosed in a rather large blackish square spot. A similar spot over marginal cross-vein, continued narrowly over base of 3rd vein. Halteres pale yellow, knobs blackish.

Described from a unique ♂ in the Indian Museum, Cherrapunji, Assam, 4,400 ft., 2—8-x-14 (*Kemp*).

Allied to *D. nigrithorax*, Brun.

***Dicranomyia prominens*, sp. nov.**

♂ ♀. Goa.

Long. 3—4 mm.

Head set very low on thorax, on long neck; yellowish, as are also antennae, proboscis and palpi.

Thorax brownish-yellow, unusually humped and projecting forward considerably over the long neck.

Abdomen in ♂ wholly brownish-yellow, hind margins of segments barely darker; in ♀ wholly black except tip and genitals brownish-yellow.

Legs brownish-yellow.

Wings pale grey, without trace of stigma or markings; 4th longitudinal vein with both branches unforked; discal cell absent; halteres dirty yellow.

Described from 1 ♂ and 3 ♀♀ in the Indian Museum from Mormugao, Goa, ix-16 (*Kemp*).

This species is noticeable on account of the unusual convexity and prominence of the anterior part of the thorax which almost overhangs the neck. Another unusual character is the unforked nature of both branches of the 4th vein, which it possesses in common with *D. tenella*, de Meij., described from Java and not known from India. The latter has a distinct stigma, blackish-brown antennae and palpi, yellowish abdomen in both sexes and dark brown legs.

***Dicranomyia niveiapicalis*, sp. nov.**

♂. S. W. India.

Long. 4 mm.

Head yellowish-grey, vertex blackish; scapal joints of antennae very large, 1st much longer than usual; base of flagellum forming an

elongated cone, joints not easily separated, apical half of flagellum with very attenuated joints, of which the verticillate hairs are very long. Palpi black.

Thorax with dorsum somewhat sharply delimited from lower part, rather bright yellowish-grey, microscopically tomentose. A transverse row of four narrow vittae in front of suture, also an anterior pair towards front margin; a slightly curved similar pair just behind suture. Scutellum and metanotum concolorous, latter blackish in middle.

Abdomen blackish with a rather broad median brownish-yellow stripe throughout its length. Genitalia brownish-yellow.

Legs yellowish, coxae pale whitish-yellow; femora browner towards tips with a rather narrow apical snow-white ring.

Wings yellowish-grey; small blackish suffusions over bases of 2nd and 3rd veins and tip of 1st vein, anterior and posterior cross veins, proximal and distal sides of discal cell, and tips of all veins. A much fainter sub-apical short stripe from costa reaching 1st posterior cell, costal cell distinctly yellowish; halteres brownish-yellow with darker tips.

Described from a single perfect ♂ in the Indian Museum from the North Canara District, S. W. India, 11—26-x-16 (*Kemp*).

The yellow colour of this species, with the spotted thorax and snow-white tipped femora make this a very conspicuous one.

Dicranomyia, sp.

A ♂ in the Indian Museum from Mormugao, Goa, ix-16 (*Kemp*) may represent a new species or an abnormality. It has the upper branch of the 4th longitudinal vein simple, the lower branch forked, and the discal cell coalescent with the 2nd posterior.

Dicranomyia pictipes, sp. nov.

♂ ♀. S. W. India.

Long. $3\frac{1}{2}$ mm.

Head and appendages all black.

Thorax.—Dorsum cinnamon-brown with narrow median pale stripe from about the suture, carried uninterruptedly over scutellum and metanotum to basal segments of abdomen. Lower part of thorax all white, except a large oval black spot on the sternopleura.

Abdomen blackish-brown, a narrow median pale stripe of irregular length on basal segments. Belly yellowish, emarginations of segments blackish, genitalia black.

Legs.—Coxae white; femora brownish yellow, tips very narrowly blackish; tibiae and tarsi snow-white to tips, former with two narrow dark brown rings placed just before the first and the second thirds of the length.

Wings grey, iridescent, veins very distinct, venation normal. Discal cell absent; anterior branch of 4th vein forked, posterior branch simple. Anterior cross vein and posterior cross vein both in a line with the base of the open discal cell, which is coalescent with the 3rd posterior cell. Stigma rather large, dark brown, over marginal cross vein, sometimes elongated downwards as far as 1st posterior cell. A small suffusion over base of 2nd vein, sometimes continued narrowly along the cross

veins ; posterior cross vein often narrowly suffused. Halteres obscurely yellowish with black clubs.

Described from a series (containing many immature examples) from Mormagao, Goa, ix-16 (*Kemp*).

A very striking species easily recognised from all others by the snow-white tibiae with the two narrow dark rings. It seems related to the snowwhite-legged species forming the *Thrypticomys* group, but the cells are not crowded towards the wing tip as in Skuse's genus.

GERANOMYIA, Hal.

flavicosta, Brun., *Fauna Brit. Ind.* (1912), p. 389 ♀. Ganges Delta.

circipunctata, *id.*, *loc. cit.*, p. 390 ♂ ♀. Bengal (various localities) ; Madras.

tridens, *id.*, *loc. cit.*, p. 391 ♂ ♀. Ganges Delta.

pulchripennis, *id.*, *loc. cit.*, p. 393 ♀. Kurseong.

Types of the above species in Indian Museum.

notatipennis, Brun., *Rec. Ind. Mus.* VIII, p. 152 ♂ (1913). N. E. Assam. The unique type in the Indian Museum.

10-guttata, de Meij., *Tijd. v. Ent.* LVI, p. 345 ♂ ♀ (1913). Java. Types in Amsterdam Museum.

brunnescens, de Meij., *loc. cit.*, LVIII, Supp. p. 10 ♂, 1915 (1916). Sumatra. Unique type in Amsterdam Museum.

7-notata, Edw., *Ann. Mag. Nat. Hist.* (8) XVIII, p. 246 ♀ (1916). Arisan, Formosa, 8,000 ft., 10-x-12 (*I. Nitobe*). Unique type in British Museum.

linearis, Alex., *Proc. U. S. Nat. Mus.* XLIX, p. 163 ♂ (1916). Java.

javanica, *id.*, *loc. cit.*, p. 164 ♀. Java.

cornigera, *id.*, *Ins. Menstr.* I, p. 137. Pettit Barracks, Luzon, Phillippine Is. (*Ludlow*).

Geranomyia genitalis, Brun.

Two ♂ ♂ from the Pashok Spur, Darjiling District, 2,000—3,500 ft., 23-iv—11-v-15 (*Gravelly*). These cannot satisfactorily be separated from typical specimens except that they appear less robust, the legs thinner and the wings clearer.

Geranomyia nigronotata, sp. nov.

♀. Malabar district, Madras Presidency.

Long. $4\frac{1}{2}$ mm.

Head blackish, frons with greyish reflections ; antennae brownish-yellow, with grey pubescence ; proboscis and palpi blackish-brown.

Thorax.—Dorsum bright chestnut-brown, blackish on middle of anterior margin ; a rather large round dead black spot in front of each wing-base ; the posterior calli large, rounded, shining black. Scutellum and just behind wing base brownish-yellow. Sides of thorax (except the brownish-yellow sternopleurae), and metanotum with bluish-grey reflections.

Abdomen dark brown, belly a little more reddish ; ovipositor brownish yellow.

Legs yellowish, tips of femora and tarsi barely darker.

Wings very pale grey ; stigma oval, small, darker grey ; halteres brownish.

Described from a unique ♀ from the Pusa collection, Cherambadi, Wynaad, x-13 (*Howlett*) "in jungle." Type presented to the British Museum by Mr. T. B. Fletcher. The species is easily recognised by its clear wings (except for the grey stigma) and the black spots on the thorax.

***Geranomyia flaviventris*, sp. nov.**

(Plate. vii, fig. 2.)

♂. Darjiling.

Long. $4\frac{1}{2}$ —5 mm.

Head blackish-grey ; antennae and proboscis black ; palpi placed at about middle of latter, which is about as long as the head and thorax together.

Thorax brownish-yellow on dorsum, with three longitudinal blackish stripes. At the suture the median one becomes very narrow, but continues more broadly over scutellum and metanotum. The outer stripes broaden behind the suture into a pair of large dark spots. Lower part of thorax dull brownish-yellow ; hinder part of pleurae and the metanotum wholly blackish-grey.

Abdomen black with short pubescence ; belly rather bright yellow ; genitalia conspicuous, 2nd joint of claspers of considerable length.

Legs blackish, coxae and more or less of the femora yellowish.

Wings pale grey with darker grey spots, a larger one over stigma, its centre extending downwards into the submarginal cell ; three smaller elongate ones placed transversely occur along the costa anterior to the larger stigmatic spot ; these are approximately equidistant, and extend more or less into the 1st and 2nd basal cells and submarginal cell. A similar spot over tip of 2nd longitudinal vein ; the "cross veins" in one specimen are just perceptibly suffused ; a small grey spot at tip of 7th vein. All these spots apparently variable in size and intensity. Halteres black, stems yellowish at base.

Described from three ♂♂ in the Indian Museum from Pashok, Darjiling District, 3,000 ft., 14-vi-16 (*Gravelly*).

The general appearance of this species is very like *tridens*.

GERANOMYIA Halid. and APOROSA, Macq.

Kertész gives the latter as synonymous with the former in his catalogue, and Speiser has doubted their distinctness, but Bergroth points out that the true distinction is the position of the palpi, placed far from the tip of the proboscis in *Geranomyia*, and close to the tip in *Aporosa*. Upon re-examining all my oriental species of *Geranomyia* they prove to truly belong to that genus, the palpi in all of them being placed at about the middle of the proboscis. The latter is about as long as the head and thorax together in all the species except *circipunctata*, in which it is barely half that length,

Aporosa aurantia, sp. nov.

♀. Assam.

Long. 9 mm. to tip of ovipositor.

Body wholly bright orange. 2nd scapal joint of antennae, flagellum and proboscis black, latter nearly as long as whole body, palpi at its extreme tip very minute. A few isolated black hairs on occiput. Flagellum of antennae with long verticils. A barely perceptible darkening of hind border of abdominal segments, and traces of a narrow dark line on extreme side edge of tergites. Halteres and legs, including basal two-thirds of metatarsi, black; rest of tarsi white, tip of 4th joint and the 5th joint a little brown.

Wings very pale yellowish-grey; stigma elongate, small, indistinct, brown; venation normal, except that the 2nd vein takes a sudden bend upwards immediately before origin of 3rd vein.

Described from four ♀♀ in the Indian Museum from above Tura, Garo Hills, 3,500—3,900 ft., vii-17 (*Kemp*).

LIMNOBIA, Mg.

My Fauna volume (1912) contains the following new species: *festiva*, p. 400 ♂, Kurseong; *tinctinervis*, p. 401 ♀, Darjiling; *indica*, p. 401 ♂ ♀, Bengal (various localities); *trimaculata*, p. 402 ♂ ♀, Kurseong; *longinervis*, p. 403 ♀, Kurseong; *centralis*, p. 403 ♂ ♀, Kurseong; *niveipes*, p. 404 ♀, Darjiling; *nigra*, p. 404 ♂ ♀, Travancore; *vitripennis*, p. 405 ♀, Darjiling; *triangularis*, p. 406 ♀, Simla.

Types of all these in Indian Museum.

annulifemur, de Meij., *Tijd. v. Ent.*, LVI, p. 344 ♂ (1913). Java. The unique type in Amsterdam Museum.

crocea, Edw., *Ann. Mag. Nat. Hist.* (8), XVII, p. 353 ♂ ♀ (1916). Sungkei, Perak, 9-ii-02 (*Robinson* and *Annandale*). Types in British Museum.

nitobei, *id.*, *loc. cit.*, (8) XVIII, p. 247 ♂, pl. xii, 2, genitalia tip (1916). Arisan, Formosa, 8,000 ft., 10-x-12 (*I. Nitobe*). Unique type in British Museum.

Limnobia festiva, Brun.

The auxiliary vein ends distinctly though not greatly beyond the origin of the 2nd longitudinal vein, and not opposite to it as stated in my description.

Limnobia cinctiventris, Brun.

This was erroneously described as a *Dicranomyia*. *Limnobia vitripennis*, Brun. is synonymous.

Limnobia flavocincta, sp. nov.

♀. W. India.

Long. 5 mm.

Closely allied to *cinctiventris* but with hind margins of upper side of each abdominal segment broadly yellow, the whole belly being yellow in one specimen, the basal part of some of the segments being black in the type. Upper part of dorsum shining blackish-brown with a pale

median space, which with the rather paler transverse suture divide this part apparently into four subequal shining dark spaces when viewed from above. Two fine, well separated black lines run from the anterior dark spaces nearly to the front margin. Humeri yellowish. Scutellum yellowish, metanotum shining blackish-brown, the middle third yellowish. Tarsi yellowish-white, except about basal two-thirds of metatarsi.

Described from two ♀ ♀ in the Indian Museum from Mahabaleshwar, Satara District, 4,200 ft., 13—16-iv-12 (*Gravelly*).

***Limnobia marginata*, sp. nov.**

(Plate viii, fig. 7.)

♀. Assam.

Long. 8 mm. to tip of ovipositor.

Body brownish-yellow; 1st scapal joint, proboscis, palpi and upper part of occiput and neck black or blackish. A large shining black spot at base of each abdominal segment, narrowed behind and reaching hind margin so that all the spots are united into a more or less angulated dorsal stripe, variable in extent, as in one specimen the black colour fills nearly all the surface and in another the spots are barely connected. Ovipositor rather large, brownish on upper side and basal section of lower valves. Femora yellowish, a broad black apical ring; tibiae dull brown; tarsi black.

Wings pale grey; costal and subcostal cells black, the colour carried round costa into submarginal cell at about which point it dies away. A black spot over origin of 2nd vein, over marginal cross vein and divergence of 2nd and 3rd veins, from which spot a narrow dark streak runs along the "cross veins" ending at tip of 5th vein in hind margin of wing. Halteres yellowish.

Described from five ♂ ♂ in the Indian Museum from above Tura, Garo Hills, Assam, 3,500—3,900 ft., vii-vii-17 (*Kemp*).

The very conspicuous costal black band should easily identify this species from all except *costalis*, W., and this latter species has a median dark line on the thorax and the legs all yellow.

***Limnobia confinis*, sp. nov.**

♂ ♀. Assam.

Long. 9 mm.

Very near *indica*, Brun. in general appearance but much larger and more robust. No dorsal black stripe on thorax. Dorsum of abdomen blackish-brown. Femora yellow, with moderately broad black apical ring; tibiae dull brownish-yellow; tarsi black. Wing much as in *indica*; auxiliary vein ending much before base of 3rd vein and distinctly before half way between base of 2nd vein and marginal cross vein. In *indica* the auxiliary vein ends distinctly *beyond* base of 3rd vein and a little beyond half way between base of 2nd vein and marginal cross vein. This difference in the two species is very constant. There is no suffusion over base of 2nd vein or only perceptible under close examination, but in *indica* there is an obvious though small suffusion at this spot.

Described from four of each sex from above Tura, Garo Hills, Assam, 3,500—3,900 ft., vii-viii-17 (*Kemp*). In Indian Museum.

***Limnobia bipunctata*, sp. nov.**

♂. Assam.

Long. about $5\frac{1}{2}$ mm.

Head dark grey; proboscis, palpi and antennae dark brown; latter with scape a little paler; flagellum with whitish pubescence.

Thorax wholly brownish-yellow, except dorsum, scutellum and metanotum which are shining black.

Abdomen moderately shining black; traces of pale hind margins to some of the middle segments, visible sometimes only towards the sides. Belly blackish-grey, hind margins and sides of segments paler. Genitalia rather large and complex.

Legs blackish-brown; femora yellowish with moderately broad blackish apical ring.

Wings pale grey, very shining; a rather large dark brown spot over base of 2nd vein and another over the stigma; a narrow dark streak from latter along the "cross veins" including outer side of discal cell. Auxiliary vein ending nearly half way between base of 2nd vein and marginal cross vein; 3rd posterior cell and discal cell subequal in length; 2nd posterior cell a little longer. Anterior and posterior cross veins at base of discal cell; submarginal cell very little longer than 1st posterior.

Described from three ♂♂ in the Indian Museum from above Tura, Garo Hills, 3,500—3,900 ft., vii-viii-17 (*Kemp*).

***Limnobia tritincta*, sp. nov.**

(Plate viii, fig. 9.)

♂ ♀. Assam.

Long. 5 mm.

Head blackish-grey; antennae slightly more yellowish.

Thorax brownish-yellow; a distinct but not clearly outlined median brownish dorsal stripe; the post-sutural swellings, scutellum and metanotum obscurely brown.

Abdomen blackish, paler at base; hind margins of segments broadly paler, also tip of abdomen; belly much as upper side. Genitalia in ♂ dark brown, of moderate size; in ♀ moderately short, brown.

Legs pale yellowish; tarsi brown.

Wings very pale grey, long, with cells in distal part very elongated, *Libnotes*-like. As the 2nd vein originates in its usual course and the 2nd and 3rd posterior cells are equal in length it belongs to *Limnobia*.¹ Auxiliary vein ending half way between base of 2nd vein and marginal cross vein; endings of 2nd, 3rd and 4th veins practically parallel; anterior cross vein at base of discal cell, nearly in a line with base of 3rd vein; 2nd and 3rd posterior cells from $1\frac{1}{2}$ to $1\frac{3}{4}$ times as long as discal cell; posterior cross vein at middle of discal cell. A very small brownish

¹ See note on venation under *Libnotes*, p. 294.

suffusion over base of 2nd vein, tip of auxiliary vein and marginal cross vein. Halteres dark.

Described from a pair *in cop*, another ♂ and three other ♀♀ from above Tura, Garo Hills, 3,500—3,900 ft., vii-viii-17 (*Kemp*). In Indian Museum.

***Limnobia 5-notata*, sp. nov.**

(Plate viii, fig. 8.)

♂. Assam.

Long. 5 mm.

Head blackish-grey; antennae greyish-brown with pale pubescence.

Thorax yellowish-brown, with three narrow median stripes from anterior margin to suture, the outer ones thereat continued round the post-sutural swellings; side margins of dorsum also narrowly margined. Scutellum and metanotum brownish-grey.

Abdomen dull greyish brown; genitalia blackish, the inner parts pale yellow.

Legs obscure brown.

Wings pale grey. Five small brown spots over base of 2nd vein, tip of auxiliary vein, marginal cross vein, tip of 2nd vein, and base of 3rd vein. Anterior cross vein, inner and outer sides of discal cell and posterior cross vein very narrowly suffused. Auxiliary vein ending half way between base of 2nd vein and marginal cross vein, latter quite perpendicular, placed a considerable distance before tip of 2nd vein. Anterior cross vein distinctly beyond bases of both 3rd vein and discal cell; 2nd posterior cell shorter than discal cell; 3rd posterior cell much longer than 2nd by encroaching on discal cell; posterior cross vein at base of discal cell or just beyond. Halteres black.

Described from one ♂ in the Indian Museum from above Tura, Garo Hills, 3,500—3,900 ft., viii-17 (*Kemp*).

***Limnobia longipennis*, sp. nov.**

♂. Assam.

Long. 8 mm.

Head.—Eyes practically contiguous above for a considerable distance; frons blackish; proboscis pale dirty yellowish; palpi black; antennae dull dark brown; occiput grey, with long hairs.

Thorax brownish-yellowish.

Abdomen yellowish, a blackish band at base of each segment, narrowed towards sides; belly similar. Genitalia of moderate size, brownish yellow, black-haired; a large square ventral plate; a pair of brownish yellow horny cylindrical appendages just above it; 1st joint of claspers with a finger-like prolongation on inner side.

Legs.—Femora brownish-yellow with subapical black, not very well defined ring; remainder of legs black.

Wings yellowish-grey, very long, tip of genitalia barely reaching base of discal cell; auxiliary vein ending half way between base of 2nd vein and marginal cross vein; submarginal cell distinctly longer than 1st posterior cell; anterior cross vein, base of discal cell and posterior cross vein almost in a line; 2nd and 3rd posterior cells and discal cell subequally long. Small but obvious dark suffusions placed as follows:

at base of 2nd vein, tip of auxiliary vein, marginal cross vein, with a narrow streak from base of 3rd vein along anterior cross vein, base of discal cell and posterior cross vein. Halteres black.

Described from a ♂ in the Indian Museum from above Tura, Garo Hills, 3,500—3,900 ft., vii-17 (*Kemp*).

This species is near my *longinervis*, in which the wings are equally long, but in that species the cells in the apical third of the wing are extremely elongated, almost as much so as in *Libnotes*. When the two species are placed side by side their distinctness is obvious at a glance.

***Limnobia nigrescens*, sp. nov.**

♂. Assam.

Long. about $4\frac{1}{2}$ mm.

Wholly dull black. Wings dark grey; auxiliary vein ending half way between base of 2nd vein and marginal cross vein, which latter is at tip of 2nd vein; anterior cross vein at base of discal cell, distinctly beyond base of 3rd vein; 2nd and 3rd posterior cells subequal, a little longer than discal cell; posterior cross vein a little beyond base of discal cell. Halteres black.

Described from three ♂♂ in Indian Museum from above Tura, Garo Hills, 3,500—3,900 ft., vii-viii-17 (*Kemp*).

This must be near *aterrima*, Walk. but in that species the antennae are described as setaceous and the wings are said to be black. In *nigrescens* the antennal joints are very distinct. There is also apparently a discrepancy in the venation as the figure Walker refers to shows the 2nd vein forked, in which case *aterrima* cannot be a *Limnobia*.

***Limnobia punctithorax*, sp. nov.**

♂. S. W. India.

Long. 5 mm.

Head brownish-yellow; eyes nearly contiguous above; antennae dark brown except the long 1st scapal joint brownish-yellow, the 2nd scapal joint being similar to the 1st flagellar.

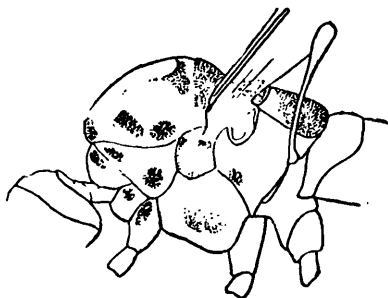


FIG. 1.—Thorax of *Limnobia punctithorax*, sp. nov., side view

Thorax rather elongate, brownish-yellow; pleurae pale yellowish; two rather large approximately oval blackish spots behind suture; scutellum blackish with a median pale stripe; metanotum blackish. A conspicuous feature of this species is the presence of a number of small more or less round black spots on the anterior and lower part of the thorax, situated as follows. Two, almost contiguous, on anterior margin; a row of four lower ones along prothorax; one in the small pit

behind the shoulder, another rather behind and below it; three above front coxae; one each on pteropleura and sternopleura.

Abdomen brownish-yellow, basal half of all segments blackish-brown.

Legs brownish-yellow, tarsi tips slightly darker.

Wings pale grey, stigma small, over marginal cross vein.

Described from a single ♂ in the Indian Museum from Talewadi, near Castle Rock, N. Kanara District, 9—10-x-16 (*Kemp*).

The conspicuous spots on the anterior part of the thorax distinguishes this species from all others.

RHIPIDIA, Mg.

Ceratostephanus, Brun., *Rec. Ind. Mus.* VI, 271 (1911).

This synonymy is evident, and I cannot understand how I came to overlook Meigen's genus.

My *C. antennatus* therefore comes here. Alexander would also sink my *Atypophthalmus* in *Rhipidia*, but it is certainly distinct as the antennae are normally constituted, without the appendages as in *Rhipidia*.

bioculata, de Meij., *Tijd. v. Ent.* LVIII, Supp. 11, 1915 ♂ (1916). Sumatra.

rostrifera, Edw., *Ann. Mag. Nat. Hist.* (8) XVII, p. 352 ♂ (1916). Kedah Peak, 3,200 ft., Malay Peninsula (*Dr. Stanton*). The unique type in the British Museum.

DAPANOPTERA, Walk.

GENOTYPE: *D. perdecora*, Walk. by present designation.

lorentzi, de Meij., *Nova Guin. Res.* IX, p. 307 ♂ ♀ (1913).

fascipennis, *id.*, *l. c.*, p. 307, ♂ (1913).

pallida, *id.*, *l. c.*, p. 307 ♂ (1913).

Types of these in Amsterdam Museum.

pulchra, de Meij., *Tijd. v. Ent.* LVIII, p. 103 ♂ (1915). North Papua.

LIBNOTES, Westw.

This genus is simply a *Limnobia* with the distal cells conspicuously elongated, but two other venational characters appear to be tolerably constant. The 2nd vein originates not in the usual curve as in *Limnobia* but is straight in its basal section, and the base of the submarginal cell is in the same straight line, and at the origin of the 3rd vein the 2nd turns very sharply upwards at an acute angle. The other character is that the 2nd posterior cell is generally considerably longer than the 3rd by encroaching extensively on the upper outer corner of the discal cell. Osten Sacken, however, mentions seven species in which this is not the case.

Both *L. thwaitesiana*, Westw. and *L. poeciloptera*, Meij. were inadvertently omitted from my "*Fauna*" volume. The former has been taken in Calcutta, 5-viii-08 (*Annandale*) and at Peradeniya, Ceylon,

13 and 17-vii-10 (*Gravelly*) and x-xi-1911 (*F Edwards*). The latter species has been taken by Mr. E. E. Green also at Pundaluoya.

L. punctipennis also occurs in Darjiling, Ceylon and Assam.

fuscinervis, Brun., *Fauna Brit. Ind. Dipt.*, p. 411 ♂ (1912). Darjiling.

notatinervis, *id.*, *loc. cit.*, p. 412 ♀ (1912). Darjiling.

Types of both species in Indian Museum.

affinis, de Meij., *Nova Guin. Res.* IX, p. 308 ♀ (1913). Papua. Unique type in (?) Amsterdam Museum.

punctatissima, de Meij., *Tijd. v. Ent.* LVIII, p. 102 ♂ (1915). North Papua. Unique type in Amsterdam Museum.

scutellata, Edw., *Ann. Mag. Nat. Hist.* (8), XVIII, p. 353 ♂ ♀, fig. 2, p. 356, genitalia (1916). Talum, Perak, 18-i-02 (*Robinson and Annandale*). Types in British Museum.

stantoni, *id.*, *loc. cit.*, p. 354 ♀; **limpida**, *id.*, *loc. cit.*, p. 355 ♀; **lutea**, *id.*, *loc. cit.*, p. 357 ♀.

All these three species taken by Dr. Stanton at Kedah Peak, 3,200 ft., Malay Peninsula; the unique types in the British Museum.

regalis, *id.*, *loc. cit.*, (8) XVIII, p. 248 (1912). Taihoku, Formosa, a unique much damaged specimen. In the British Museum.

transversalis, de Meij., *Tijd. v. Ent.* LIX, p. 198 ♂ (1916). Gedah, Java, 1,625—2,400 metres, May (*Konigsberger*). Type in (?) Amsterdam Museum.

montivagans, Alex., *Proc. U. S. Nat. Mus.* XLIX, p. 166 ♂ ♀ (1916).

nigricornis, *id.*, *loc. cit.*, p. 166 ♂ ♀.

opaca, Bezzi, *Phil. Jour. Sci.* XII, Sect. D, p. 116 ♂ (1917). Luzon (*Baker*).

marginalis, *id.*, *loc. cit.*, p. 116 ♂ (1917). Luzon (*Baker*).

Libnotes fuscinervis, Brun.

I am uncertain as to the limits of this species, which seems variable in the presence or absence of the additional cross vein and in the wing markings. In one specimen from Cochin State the veins are not at all suffused but the bases of all the cells, with the marginal and posterior cross veins, are very distinct in comparison with the rest of the veins, and these "cross veins" are similarly deeply outlined (though not thickened) in specimens which possess the suffusions. The short sections towards the tips of some of the veins which are also deeply outlined in normal forms are the same in the Cochin specimen. An example from the Garo Hills recently collected by Mr. Kemp has the additional cross vein and the exact suffusions of the normal form but all the legs are wholly black, whilst another from the same source has normal legs, and no additional cross vein nor trace of suffusions but all the veins deeply and uniformly outlined.

Section **RHAMPHIDINI**.

RHAMPHIDIA, Mg.

Three new species described in my Fauna volume (1912): *ferruginosa*, p. 418 ♂, Dawna Hills; *unicolor*, p. 419 ♂, Darjiling; *inconspicua*,

p. 419 ♂, Kurseong. All described from unique types in the Indian Museum, but further specimens of *ferruginosa* have been obtained.

kampangani, de Meij., *Tijd. v. Ent.* LVI, p. 346, (1913). Java.

apicalis, Alex., *Proc. U. S. Nat. Mus.* XLIX, p. 167 ♂ ♀ (1916). Java. Types in U. S. Museum.

nigriceps, Edw., *Ann. Mag. Nat. Hist.* (8) XVII, p. 358 ♂ ♀ (1916). Siam.

rufescens, *id.*, *loc. cit.*, p. 358 ♀. Selangor.

Types of these two species in the British Museum.

Rhamphidia unicolor, Brun.

In this species the auxiliary vein ends distinctly in the 1st longitudinal.

Rhamphidia fratella, sp. nov.

Considerably like *ferruginosa*, Brun., but a smaller and more delicate species. The abdomen is blacker as are also the femora; the tarsi nearly whitish. The veinlet between the 2nd and 4th posterior cells three or four times as long as the discal cell instead of only about twice as long as in *ferruginosa*. Discal cell relatively much smaller; posterior cross vein more proximal, generally just before base of discal cell, though its position is not quite constant in either species.

Extreme length from frons to tip of genitalia, ♂ 4 mm.; ♀ to tip of ovipositor $5\frac{1}{2}$ mm.

Described from 2 ♂ ♂ and 2 ♀ ♀ from Castle Rock, N. Kanara District, 11—26-x-16 (*Kemp*). In the Indian Museum.

Rhamphidia abnormalis, sp. nov.

(Plate vii, fig. 3.)

♀. Assam.

Long. $4\frac{1}{2}$ mm.

Head mainly brownish-yellow, tip of the proboscis, the palpi and antennae brown; latter with long pale verticils; basal joints of flagellum not incrassated; scape less conspicuously enlarged than in the other Indian species.

Thorax and *abdomen* brownish-yellow, dorsum of former a little darker, both with sparse pale pubescence.

Legs long: coxae brownish-yellow; femora and tibiae rather dark brown, former paler at base and narrowly snow-white at tips; latter broadly snow-white at tips; tarsi shorter than tibiae, snow-white, becoming yellowish at tips; metatarsus twice as long as rest of tarsus.

Wings clear, highly iridescent. *3rd vein* originating some distance beyond anterior cross vein, the latter uniting 2nd vein with discal cell. Auxiliary vein ending in costa opposite basal end of discal cell; subcostal cross vein at its tip; posterior cross vein at middle of discal cell. Halteres brownish-yellow, clubs darker.

Described from one ♀ in the Indian Museum. Cherrapunji, Assam, 4,400 ft., 2-3-x-14 (*Kemp*).

The abnormality in this species consists of the peculiarly late origin of the 3rd vein, and the consequent connecting of the 2nd

vein with the discal cell by means of the anterior cross-vein, a singularity occurring with extreme rarity in Tipulidae, and normally in only one oriental genus, *Amalopsis*. It is by no means certain that a new genus should not be set up for the present species.

EURHAMPHIDIA, Alex., subgen. nov.

Proc. U. S. Nat. Mus. XLIX, p. 168.

A new subgenus of *Rhamphidia*, with *Rhamphidia niveitarsis*, Skuse as type. Alexander records the species (*loc. cit.*) from two places of high altitude in Java.

RHAMPHOLIMNOBIA, Alex., gen. nov.

Proc. U. S. Nat. Mus. XLIX, p. 169.

Near *Elephantomyia*; type species *R. reticularis*, sp. nov., *loc. cit.*, p. 169 ♀, Java. Type in the U. S. Museum.

The *Elephantomyia* group.

The two or three genera with enormously produced rostrums, up to nearly or quite as long as the body, may be considered separately from the rest of the sub-family though they do not necessarily form a separate group. Though they possess this character in common they vary in important other characters, in the presence or absence of the submarginal cell, and in the number of the antennal joints. The genera concerned are *Toxorhina*, Loew; *Elephantomyia*, Os. Sac.; *Limnobiorthynchus*, Westw., and a new genus *Conithorax*.

Whether the two first are synonymous I have no means of determining but it seems probable, judging from Osten Sacken's remarks in his Monograph of the North American Tipulidae, since he referred Loew's three fossil species of *Toxorhina* to his own genus *Elephantomyia*. In the event of synonymy, *Toxorhina* takes precedence. The exact application of the name *Toxorhina* is discussed further on.

If the claim of *Toxorhina* to stand for the fossil species be admitted there remains the question of a name for *fragilis* and its allies, and Bergroth would resuscitate *Limnobiorthynchus*, Westw. for these. The justness of this seems obvious, although the name is applicable only to the ♀ of Westwood's genotype *brasiliensis* for which latter a new specific name will now be required, since the name *brasiliensis* must be retained for the ♂, now referred to *Geranomyia*. I therefore propose *westwoodi* for the ♀ of Westwood's *brasiliensis*, and it will of course be the type species of *Limnobiorthynchus*.

The respective characters of the genera in question may be tabulated thus:—

- | | |
|---|---|
| <p>A. Submarginal cell absent. (Antennae 12-jointed; long hairs on last two joints only; pronotum distinctly produced over neck; submarginal cell <i>absent</i>; posterior cross vein at base of discal cell; 6th vein very close to 5th for basal third of its length)</p> | <p><i>Limnobiorthynchus</i>,
Westw.</p> |
| <p>AA. Submarginal cell present.</p> | |

- B. Antennae 12-jointed. (Antennae 12-jointed; long hairs on last two joints only; pronotum produced over neck; submarginal cell *present*; posterior cross vein at base of discal cell; 6th vein very close to 5th for basal third of its length) . *Conithorax*, gen. nov.
- BB. Antennae 15-jointed. (Antennae 15-jointed; verticils on all joints equally long; pronotum *not* produced over neck; submarginal cell *present*; posterior cross vein at *middle* of discal cell; 6th vein *not* lying close to 5th] *Elephantomyia*, Os. Sac. and *Toxorhina*, Loew.

LIMNOBIORHYNCHUS, Westw.

Ann. Soc. Ent. France IV, p. 683, ♀ only (1835).

Type: *L. westwoodi*, nom. nov. for *L. brasiliensis*, Westw. ♀ only.

Recognition of this genus having been given, according to the argument adduced under *Toxorhina*, the following species will fall in it.

westwoodi, nom. nov. (*L. brasiliensis*, Westw. ♀ only) from Brazil.

fragilis, Lw. (*Toxorhina id.*) from Porto Rico.

magna, Os. Sac. from North America (*Toxorhina id.*).

muliebris, Os. Sac. from North America (*Toxorhina id.*).

incerta, Brun. (*Toxorhina id.*) from India.

Loew's figure of *fragilis* (*Toxorhina id.*)¹ shews a conical production of the thorax over the neck, though to a less extent than in *Conithorax latifrons*. In Needham's figure of *muliebris*, Os. Sac. (*Toxorhina id.*) the auxiliary and 1st longitudinal veins are shewn united though Osten Sacken mentions the existence of both auxiliary vein and subcostal cross vein.

Limnobiorhynchus incertus, Brun.

(*Toxorhina incerta*, Brun.).

This is undoubtedly a *Limnobiorhynchus* although it does not possess every character of the genus, as the pronotum is not at all produced over the neck, and the posterior cross vein is at a little before the middle of the discal cell instead of being at its base. Only the two last antennal joints (not four, as stated in my description) bear very long verticils, the remaining joints having them very short. The discal cell is present in the right wing and open in the left; the course of the single vein between the 1st vein and upper branch of the 4th may be unscientifically described as composed of the praefurca and the 3rd vein, with the 2nd vein absent. In this it is an exact replica of "*Toxorhina*" (= *Limnobiorhynchus*) *muliebris*, Os. Sac. The auxiliary vein is present but almost coalescent with the 1st, though it is quite obvious at both base and tip, but it is impossible to decide whether the subcostal cross vein is present or not.

CONITHORAX, gen. nov.

Allied to *Limnobiorhynchus*, Westw. in the very elongated proboscis, about as long as the whole body, with palpi at tip; in the 12-jointed antennae with very long verticils on last two joints only, the other joints bearing very short ones; in the two or three basal joints of the flagellum being more or less united in the form of a cone; also in the

¹ *Linn. Ent.* V, pl. ii, 17, full insect; 16, antenna; 18, wing; 22, head.

front part of the thorax being prominently produced over the neck, and in the posterior cross vein at the base of the discal cell and the 6th vein lying very close to the 5th for about one-third of its length. The radical difference is the presence of the submarginal cell; the 2nd vein is short, turning into the costa at an angle of 45° just beyond tip of 1st vein: 3rd vein bisinuate, more or less parallel with upper branch of 4th vein. Auxiliary vein very close to 1st, ending in costa opposite origin of praefurca; subcostal cross vein present, a little before tip of auxiliary vein. The eyes are distinctly or very widely separated on the frons, contiguous or distinctly separated below.

Type species: *C. latifrons*, sp. nov.

This genus is practically a *Limnobiorhynchus* with the submarginal cell present, or in other words it possesses the typical venation of the subfamily with the peculiar characteristics of *Limnobiorhynchus*, that is, the enormously prolonged rostrum about as long as the whole body, the conically produced thorax over the neck and the long verticils on the last two antennal joints only.

There are two species, distinguished by a great difference in the width of the frons, though they are obviously congeneric.

Eyes separated above by a very broad frons, about one-third the width of the head, with parallel sides; contiguous on under side of head

latifrons, sp. nov.

Eyes separated above by a comparatively narrow frons, about one-eighth the width of the head with very convex sides; on under side separated by one-fifth the width of the head

brevifrons, sp. nov.

***Conithorax latifrons*, sp. nov.**

♀. Malay States.

Long. about $3\frac{1}{2}$ mm. along curve of body to tip of ovipositor.

Head.—Frons and face forming nearly one-third of head, with parallel sides, ash grey; eyes contiguous on lower part of head; antennae

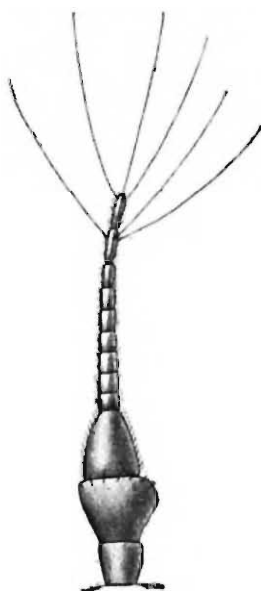


FIG. 2.—*Conithorax latifrons*, sp. nov., antennae.

brownish, last two joints with a verticil of three long whitish hairs on

each, rest of flagellum with very short hairs ; proboscis black, as long as front femur, nearly as long as whole body.

Thorax greyish-brown, metanotum darker with a little grey dust.

Abdomen light brown, hinder half of segments distinctly darker ; ovipositor large, basal part dull yellowish ; valves long, shining brown.

Legs dull brown, femora subapically a little blackish ; extreme tips pale ; tarsi black.



FIG. 3.—Wing of *Conithorax latifrons*.

Wings clear grey ; halteres yellowish.

Described from a unique ♀ in the Indian Museum from Bidai, Selangor-Pahang Boundary, Malay States, April 1917 (*C. Boden Kloss*).

Conithorax brevifrons, sp. nov.

♀. Assam.

Long. 5 mm.

Head ash grey. Frons only one-eighth width of head, sides very convex ; eyes separated below by one-fifth width of head. Proboscis, palpi and antennae black or blackish-brown ; 1st scapal joint yellowish.

Thorax and *abdomen* dark brown ; pleurae and genitalia brownish-yellow. *Legs* dark brown, under side of femora a little paler. *Wings* with 2nd longitudinal vein a little less erect than in *latifrons*, ending more distally than anterior cross vein. In *latifrons* it ends before the cross vein. Posterior cross vein just beyond base of discal cell instead of just before it as in *latifrons*.

Described from a unique ♀ from above Tura, Garo Hills, Assam, 3,500—3,900 ft., viii-17 (*Kemp*). Type in Indian Museum.

ELEPHANTOMYIA, Os. Sac.

fuscmarginata, Ender., *Zool. Jahr.* XXXII, p. 64 ♂ (1912).

Sumatra. Unique type in Stettin Zoological Museum.

egregia, de Meij., *Tijds. v. Ent.*, LVI, p. 347 ♂ (1913). Java.

Unique type in Amsterdam Museum.

In both the above species the wings are figured as decidedly more cuneiform than in Osten Sacken's *E. westwoodi*, and the 3rd vein is in a line with the praefurca, the 2nd vein appearing to emerge from it at a considerable angle ; the auxiliary vein being shewn distinctly in *fuscmarginata* but not in *egregia*.

TOXORHINA, Loew.¹

GENOTYPE : *T. longirostris*, Loew (fossil) by present designation.

The question as to which of two groups of species this name should apply dates back to 1868, originating with Schiner's objection to Osten Sacken's application of the name.

¹ Spelt thus by Loew and Scudder. Osten Sacken and Kertész emend to *Toxorhina*, but Bergroth, the latest authority, reverts to the original spelling.

In preparing my "Fauna" volume I relied mainly on Osten Sacken's decision, one in which Kertész apparently acquiesces in his catalogue of the World's Diptera, but Professor Bergroth's recent plea¹ for the retention of the name in Loew's original sense seemed so convincing that I have felt constrained to examine exhaustively the whole controversy afresh.

The argument briefly is as follows.

Loew in 1850² proposed the name *Toxorhina* for a genus (only characterised by its position in a table) of three fossil species which he named but did not describe. In 1851³ he published a paper from which generic characters could be drawn up as applying to one or more of these three species, but gave no formal generic description alone. He also added to the genus a living species, *fragilis*.

Now Westwood in 1835 had set up *Limnobia*⁴ for *brasiliensis*, sp. nov. ♂ ♀ and *canadensis*, sp. nov. ♂. In 1859, Osten Sacken took what he thought to be *canadensis* in considerable numbers at Trenton Falls, New York, and ascertaining it could not be congeneric with *brasiliensis*, judging by the description of the latter, he set up a new genus for it, *Elephantomyia*.⁵

Later on, Osten Sacken wrote a further paper on North American *Tipulidae*⁶ where he characterised *Toxorhina*, on Loew's living species *fragilis*, adding two new ones from North America. Schiner objected⁷ to the application of *Toxorhina* to *fragilis*, as he considered that Loew intended it primarily for his three fossil species. Osten Sacken in his Monograph of the North American *Tipulidae*⁸ contests Schiner's objection at considerable length but rightfully enough states that the fossil species and *fragilis* cannot be congeneric. He also considers Loew's "generic description"⁹ to apply almost entirely to *fragilis*, as the fossil species possess a submarginal cell, which latter is absent in *fragilis*.

By this time he had inspected the types (♂ ♀) of *L. brasiliensis* in Westwood's own cabinet and found that they represented different genera, the ♂ being a *Geranomyia*, the ♀ belonging to what Osten Sacken called *Toxorhina*, that is to say, the group comprising *fragilis* and which is to-day without a name.

The antennae in the three fossil species have fifteen joints, in *fragilis* twelve only, Loew concluding therefore that in his living species, of which he had several specimens, the last three joints had been broken off. On the strength of these two important characters Osten Sacken again

¹ *Ann. Mag. Nat. Hist.* (8) XI, p. 580 (1913).

² "Bernstein v. Bernstein fauna" in *Prog. Konig. Realschule zu Meseritz*, p. 26 (Sept. 1850).

³ *Linn. Entom.* V, p. 400 (1851).

⁴ *Ann. Soc. Ent. France* IV, p. 683 (1835).

⁵ *Proc. Acad. Nat. Sci. Philad.* p. 220 (1859). Incidentally there is no positive means available to me of knowing whether this paper was actually published in 1859. It was read at the August meeting of 1859, and may have been published then, or the whole volume (which bears a printer's date of 1860) may have been published entire in 1860. It does not affect any question of synonymy.

⁶ *Proc. Ent. Soc. Philad.* p. 277 (1865). I have not been able to see this paper.

⁷ *Reise d. Novara*, p. 33 (1868).

⁸ *Monog. Dipt. N. Amer.* IV, in *Smith. Misc. Coll.* VIII, p. 112 (1869).

⁹ Referring presumably to the table of genera (1850) or the characters distributed amongst the four species (1851).

referred Loew's fossil species to his own genus *Elephantomyia* having also recognised his supposed *canadensis*, Westw. to be a different species from Westwood's, and calling it *westwoodi*, and he retained *Toxorhina* for *fragilis*, including in it his two North American species. Scudder, comparatively recently,¹ supports Schiner's view, and Kertész in his "Katalog" follows Osten Sacken, but Bergroth has reopened the controversy and his view appears to be just.

A continual difficulty in this discussion is that opposite views may be held at almost every stage, leading naturally to exactly opposite final results. According to present day standards *Toxorhina* was at best but weakly characterised, but it must be remembered that in Loew's time very few Tipulidae with excessively long rostrums were known and it could in those days be easily recognised.

Secondly, it may certainly be claimed that as he at the erection of the generic name (1850) neither nominated a known species nor described any one of his three fossil ones the genus was simply a *nomen nudum*.

However, in his next paper (1851), though he still gives no purely generic description,² he sufficiently characterises the three fossil species (*longirostris*, *pulchella* and *brevipalpa*), and from these characters those of the genus can be gleaned. In this paper he adds a description of a living species, *fragilis*. He says nothing about a submarginal cell being present or absent in the fossil species; he figures the palpus of each fossil species, the tip of the proboscis of one (*longirostris*) and also figures *fragilis* (full insect, wing and other parts).

Osten Sacken contended that the generic characters apply wholly to *fragilis*³ and therefore he retained the name *Toxorhina* in his monograph for it, plus his two American species, and relegated Loew's three fossil species to *Elephantomyia*, Os. Sac.

Now the whole tenor of Loew's writings on *Toxorhina* convinces me that he intended the name to apply mainly to the three fossil species, firstly because when he set up the genus he mentioned no others but them and secondly because all these are mentioned first in his descriptive paper (1851), *fragilis* being added in a succeeding paragraph as a new species. Osten Sacken also notes (Monog. p. 113) that Loew, speaking at a meeting of German naturalists at Königsberg, mentioned having discovered a genus which he had called *Toxorhina* for three fossil species, continuing "afterwards I became acquainted with a living representative of the same genus." From the priority given to the fossil species both in his paper and his speech it is quite evident that Loew in his own mind regarded *Toxorhina* as definitely established before the discovery of *fragilis*, that is to say, established for his three fossil species.

Though Osten Sacken did not see the fossils themselves, he examined drawings of them lent him by Loew, and these drawings shew the presence of a submarginal cell, which cell is absent in *fragilis*.

¹ *Proc. Amer. Philos. Soc.* XXXII (1894). Reprinted as "Tertiary Tipulidae."

² *Linn. Entomologica*, V, p. 400.

³ "This description applies to *T. fragilis* only and not to the three fossil species." (Osten Sacken.)

Fragilis, therefore, cannot be congeneric with the other species and Loew must have not only overlooked the presence of the submarginal cell in his fossil species but *must have necessarily been under the impression that it was absent*, from his observation that his genus was "remarkable for the abnormal venation of its wings." Such an observation would quite apply to a fly in which he thought the submarginal cell was absent because such an instance was certainly remarkable, whereas at least one submarginal cell or two such cells are normally present in the great majority of Tipulidae. There is no other abnormality in the venation of *T. fragilis*, and it could only have been by some unaccountable oversight that Loew regarded his fossil species as possessing similar venation. Loew's own figure of *fragilis* clearly indicates that no submarginal cell is present in at least that species. It might, of course, be contended by those disposed to argue that even the drawings were incorrect, and the submarginal cell introduced inadvertently, in which case *fragilis* and the fossil species might venationally be congeneric, but the difference in both number and structure of the antennal joints in the two groups again effectually separates them generically.

It being thus obvious that *fragilis* could not be congeneric with the three fossil species, Osten Sacken adopted *Toxorhina* for the former, and relegated the latter to *Elephantomyia*, Os. Sac. with the species of which they possess other agreements than that of the venation only.

Their principal character in common is that of the antennae, which are 15-jointed in the living species of *Elephantomyia* and also in Loew's fossil species, bearing verticils on all the joints. In *fragilis* and the two new North American species that Osten Sacken included under his *Toxorhina* the antennae are 12-jointed only, and bear verticils on the last two joints only.

It may be as well to mention here an apparent discrepancy with regard to the palpal joints. Loew said that the last joint of the palpus was "not so long as, or scarcely longer than those which precede, taken together," and Scudder adopted that author's statement. Now, apart from whether the words "those which precede" mean only the two preceding joints or *all* the preceding joints (4), the last joint in all the three fossil species is figured as considerably shorter than even the preceding joint only.¹ There is evidently some oversight here that escaped Scudder, whilst Osten Sacken does not comment in his Monograph on the respective length of the joints, and his description of these organs when setting up his *Elephantomyia* shews they are therein very close to Loew's figures of his fossil species.

In conclusion, the argument adduced by Osten Sacken in favour of reserving *Toxorhina* for *fragilis* and its living North American allies does not appear sound, and if he hesitated to "differ from the eminent dipterologist," (Loew), I would also have experienced still more diffidence in disagreeing with Baron Osten Sacken were it not for Prof. Bergroth's recent concise statement of the case.

Toxorhina, in the present interpretation of the genus, is not oriental, and is confined to Loew's three fossil species unless it is proved that

¹ In Loew's figures of the palpi of his three fossil species two possess five joints and the third four joints only.

Elephantomyia is synonymous with it. As *longirostris* is the first noted species by Loew it may be taken as the type of the genus.

STYRINGOMYIA, Loew.

Pycnocypris, Ender., *Zool. Jahr.* XXXII, p. 57 (1912): synonymy by Alex., *Pr. U. S. Nat. Mus.* XLIV, p. 487 (1913).

GENOTYPE: *S. venusta*, Lw. (fossil, in copal) by original designation.

All the known species of this genus have been recently revised by Edwards.¹ In that paper he finds that in my description of what I afterwards took to be his *ceylonica*² (though it was drawn up a year or more before his description was published), two or more species are included. The description of *ceylonica*, therefore, both in my Fauna volume and elsewhere³ must not be relied on. Mr. Edwards also notes that my *obscura* is a ♀, not a ♂ as stated.

He describes the following species⁴: *nigrofemorata*, p. 215 ♀, Taiping, Malay States; unique type in British Museum: *formosana*, 219 ♂ ♀, Formosa; type in Deuts. Ent. Mus. Berlin; paratypes in British Museum: *javana*, 220 ♂, Java; *jacobsoni*, 220 ♂ ♀, Java; types of the two latter species in Amsterdam Museum; *fryeri*, 221 ♂ ♀, Peradeniya, Ceylon; type in British Museum; *himalayana*, 221 ♂ ♀, base of E. Himalayas; *nepalensis*, 222 ♂ ♀, Nepal; types of both species in Indian Museum.

Dr. Annandale, whilst touring the East, took a ♂ and ♀ *in cop* of *S. crassicauda*, Spies. (*ceylonica* Edw.) at Singgora, Siam, 27-i-16. Prof. Riedel has recorded this species from Formosa. *Pycnocypris annulipes*, Ender. is synonymous.

A very interesting short paper by Edwards,⁵ entitled "On the so-called new Tipulid subfamily Ceratocheilinae, Wesché," gives the relationship between *Styringomyia* and *Ceratocheilus*, and their difference from *Toxorhina* in Osten Sacken's sense of the latter, which I herein regard as *Elephantomyia*, Os. Sac.⁶

TEUCHOLABIS, Os. Sac.

Teucholabis fenestrata, Os. Sac.

This species shews considerable variation in the thickening of the femora tips, in the coloration of the wing, which is sometimes almost entirely pale brown, and in the shape of the second posterior cell, which is sometimes strongly petiolate. When these three characters vary in the same individual they almost give the impression of specific distinctness and there are three such specimens in the Indian Museum from Bhim Tal. These characters, however, vary individually.

¹ *Trans. Ent. Soc.*, 1914, pp. 206-227.

² *Ceylonica* has subsequently been admitted by Edwards as synonymous with *S. (Idiophlebia) crassicauda*, Speiser.

³ *Rec. Ind. Mus.* VI, p. 298.

⁴ *Trans. Ent. Soc.*, 1914.

⁵ *Ann. Mag. Nat. Hist.* (8) VIII, p. 279 (1911).

⁶ See p. 303.

The dorsum of the thorax in two out of the three is nearly black, as it is sometimes in otherwise normal specimens. The species was common at Tura 1,200—1,500 ft. and above Tura 3,500—3,900 ft., Garo Hills, Assam, June to October 1917 (*Kemp*).

insignis, Brun., *Fauna Brit. Ind. Dipt.*, p. 430 ♂ (1912). Travancore. Unique type in Indian Museum.

biannulata, *id.*, *loc. cit.*, p. 430 ♂ (1912). Kurseong; N. E. Indian Frontier. Type in Indian Museum.

plecioides, de Meij., *Tijd. v. Ent.* LVI, p. 348 ♀ (1913).

glabripes, *id.*, *loc. cit.*, p. 349 ♂ (1912).

Both species from Java; the unique types in Amsterdam Museum.

femoratus, de Meij., *Tijd. v. Ent.* LVIII, Supp., p. 67 ♂, 1915 (1916). Sumatra.

nigerrima, Edw., *Ann. Mag. Nat. Hist.* (8) XVIII, p. 248, ♂ (1916). Horisha, Formosa, 10-v-13 (*Maki*); Taihoku, Formosa (*Shiraki*). Type in British Museum.

Teucholabis cyanea, Edw. is referred to my *Gymnastes*.

***Teucholabis angusticapitis*, sp. nov.**

(Plate viii, fig. 11.)

♂. Assam.

Long. 5 mm.

Head.—Neck very long, blackish; head narrow, elongate, occiput and frons on same level, bluish ash grey with a few short hairs; proboscis, palpi and antennae dark brown.

Thorax moderately dark shining brown, a little paler in front; pleurae with a suspicion of blue grey dust.

Abdomen dark brown, considerably dark pubescent; paler along median line: genitalia of moderate size, concolorous, shining.

Legs uniformly dark brown, conspicuously pubescent.

Wings pale blackish-grey, scarcely darker anteriorly; two narrow pale cross bands reaching nearly from anterior to posterior margins, the first just before tips of basal cells, the second contiguous to outer side of discal cell.

Described from a unique ♂ in the Indian Museum from above Tura, Garo Hills, 3,500—3,900 ft., viii-17 (*Kemp*).

***Teucholabis ornata*, sp. nov.**

♂. Ceylon.

Long. 6½ mm.

Head shining black, set on a rather long neck; antennae black with a little pale pubescence.

Thorax.—Prothorax much developed anteriorly, dark shining brown, bare; mesothorax shining black, bare, with a tinge of shining brown behind the suture; metanotum shining black; pleurae blackish.

Abdomen black, with sparse short hairs and a little longer hair at the sides; hind part of 2nd and 3rd segments broadly reddish-brown, of the remaining segments more narrowly yellowish. Genitalia black with yellowish parts.

Legs.—Coxae reddish-brown; femora and tibiae brownish-yellow, former broadly black at tips, latter more narrowly so; tarsi brownish, darkening to black at tips. All legs with short pale pubescence.

Wings pale yellow, a yellowish-brown suffusion over tip of 1st vein, carried downwards along the cross-veins as far as the 5th longitudinal vein; a similar small suffusion over base of 2nd vein. Costal cell yellowish; halteres bright brownish-yellow.

Described from a unique ♂ in the Indian Museum from Peradeniya, Ceylon, 11-viii-10.

***Teucholabis ornata*, Brun., var. *assamensis*, nov.**

This differs from the typical form from Ceylon simply by the wings being marked only by the deep black stigma with barely a suggestion of suffusion along the transverse veins. The femora are black for about their apical third and the tibiae and tarsi wholly black.

One ♂, Shillong, 5,500-6,400 ft., 29-viii—5-ix-15 (*Kemp*).

? *Teucholabis*, sp.

An interesting ♀ specimen in the Indian Museum from Parambikulam, Cochin State, 1,700—3,200 ft., 16—24-ix-14 (*Gravelly*), presents the venation of this genus except that the submarginal cell is considerably longer than the 1st posterior. The antennae, apparently 16-jointed, differ from the *Teucholabis* form; the basal joints of the flagellum are very indistinctly separated, and covered with minute pubescence which renders their separation more difficult; the more distal ones are much longer and more easily defined. The legs (only one leg, a hind one, remains) are long and slender, much more so than is usual in this genus. The wings are yellowish, with numerous small brown marks, the thorax yellowish with two long median black stripes and two outer shorter ones; the pleurae very dark brown with a narrow pale horizontal stripe along the middle. The abdomen is yellowish-brown; the coxae nearly white; the legs brownish-yellow, becoming white on the tarsi; tips of hind femora white, with a narrow dark ring preceding it. Long. nearly 6 millim. to tip of ovipositor.

? *Teucholabis*, sp. nov.

A single damaged ♂ taken by Mr. Kemp at Castle Rock, N. Canara District, 11—26-x-16, shews the peculiarity of the 2nd longitudinal vein being forked just beyond the marginal vein, the fork ending in the costa just beyond the tip of the 1st longitudinal. It is a yellow species; the thorax with a rather broad deep black median stripe and a black spot towards each side behind the suture; the abdomen with the basal half of each segment black; the antennae black except the scape; the wings as in my *insignis*, with the difference that the costa is clear except from the stripe that extends over the cross veins to the tip of the wing, which is broadly suffused, as far basally as the distal side of the discal cell. The only two remaining legs (detached) are black, the femora slightly thickened towards tips and with a sub-apical yellow ring. Long. 6 mm.

GYMNASTES, Brun.

Alexander regards this genus as synonymous with *Teucholabis*, Os. Sac. One of the principal characters of my genus was the absence of a distinct neck, which in *Teucholabis* is obviously elongate as stated by its founder.

This is the case in the three oriental species of *Teucholabis* before me: *fenestrata*, Os. Sac., *insignis* and *biannulata*, mihi. Also, none of these species have any incrassation of the hind femora. The close approximation of the auxiliary vein to the 1st longitudinal seems a good character in *Gymnastes*. Alexander says some species of *Teucholabis* approach my genus in venation. However, Mr. Edwards has pointed out¹ a character which had escaped me and on which he thinks the genus can stand at least provisionally, i.e., the presence of small scales covering the legs. My *G. violaceus* is synonymous with his *Teucholabis cyanea*, a species which may now be referred to *Gymnastes*, to which genus he also adds a new species and refers *Gnophomyia ornatipennis*, de Meij.² The species belonging to the genus now are as follows:

1. **cyanea**, Edw., *Ann. Mag. Nat. Hist.* (8) VIII, p. 61 (*Teucholabis*) July (1911).
Gymnastes violaceus, Brun., *Rec. Ind. Mus.* VI, p. 282 (Dec. 1911). India.
2. **ornatipennis**, de Meij., *Tijd. v. Ent.* LIV, p. 47 (*Gnophomyia*), (1911). Java; Formosa. Riedel records it from Formosa also.
3. **pictipennis**, Edw., *Ann. Mag. Nat. Hist.* (8) XVII, p. 358 ♂; fig. 4 (p. 356), genitalia (1916). Siam.
4. **bistriatipennis**, sp. nov. N. Canara.
5. **pennipes**, sp. nov. Assam.

Gymnastes bistriatipennis, sp. nov.

♂. S. W. India.

Long. $3\frac{1}{2}$ —4 mm.

Head brownish-yellow, frons with a median blackish stripe and often a transverse one also; palpi and antennae black, scape brownish-yellow.

Thorax.—Dorsum shining black; shoulders broadly brownish-yellow, the colour extending more or less anteriorly and as far hindward as the transverse suture. Sides of thorax dull brownish-yellow with darker parts; scutellum and metanotum black.

Abdomen dull black with short dark pubescence; genitalia concolorous. The latter consist of a pair of conical dark brown, long-haired claspers somewhat attenuated towards tips, a large oblong slightly curved brownish-yellow ventral plate from the centre of the hinder margin of which projects a concolorous cylindrical style as long as the claspers.

Legs.—Ground colour brownish-yellow with very short black pubescence, but almost entirely covered with small black scales so that they

¹ *Ann. Mag. Nat. Hist.* (8) XVII, p. 358 (1916).

² Edw., *Ann. Mag. Nat. Hist.* (8) XVIII, p. 249. Two ♀♀ from Arisan, Formosa 8,000 ft., 10-x 12 (*Nitobe*).

appear black or dark brown with a yellow (unscaled) subapical ring on all the femora, the latter more or less yellowish on basal half, due to the scales being less numerous or absent there. All the femora gradually thickened towards tip.

Wings moderately dark brown with two rather narrow pale transverse bands from costa to hind margin, dividing the wing into three subequal areas, base more or less pale; halteres black with pale yellow tips.

Described from a long series of ♂♂ only taken by Mr. Kemp at Talewadi, near Castle Rock, North Canara District, 3—10-x-16. *Type* and other specimens in Indian Museum; cotypes in my collection.

Gymnastes pennipes, sp. nov.

(Plate viii, fig. 10.)

♂. Assam.

Long. $3\frac{1}{2}$ mm.

Head.—Frons very broad, more than $\frac{1}{3}$ width of head, shining violet blue; antennae, proboscis and palpi dark brown.

Thorax shining violet blue; pleurae slightly white dusted; a milk-white longitudinal stripe just below dorsum.

Abdomen shining violet blue; genitalia also apparently constructed as in *cyanea*.

Legs.—Coxae black; hind pair with a conspicuous oval white spot in front; femora moderately dark brown, the distinctly clubbed tips of hind pair broadly dark brown, preceded by a narrow bright yellow ring without clear edges. Anterior femora barely thickened at tips, the yellow ring very faint. Anterior tibiae and tarsi dark brown; hind tibiae brownish-yellow, nearly the apical half shining violet with conspicuous long stiff black pubescence. Hind metatarsus with basal half yellow, rest of tarsus black. Some scales towards tip on inner side of hind femora.

Wings as in *cyanea* but 2nd vein distinctly forked, the upper branch short, ending in costa just beyond tip of 1st vein. The apical transverse band very faint. Halteres black, tip of clubs milk-white.

Described from a single ♂ from above Tura, Garo Hills, 3,500—3,900 ft., vii-17 (Kemp).

ATARBA, Os. Sac.

flava, Brun., *Fauna Brit. Ind. Dipt.*, p. 435 ♂ ♀ (1912). Darjiling. Types in Indian Museum.

pallidicornis, Edw., *Ann. Mag. Nat. Hist.* (8) XVIII, p. 249, ♀ (1912). Arisan, Formosa, 8,000 ft., 10-x-12 (*Nitobe*). Unique type in British Museum.

fuscicornis, Edw., *l. c.*, p. 250, ♀, from same locality and collector. Unique type in British Museum.

javanica, Alex., *Proc. U. S. Nat. Mus.* XLIX, p. 171 ♀ (1916). Java. Type in the U. S. Museum.

Alexander says (*loc. cit.*) that *A. flava*, Brun. is the only other oriental species of the genus,¹ the remainder probably belonging to *Leiponeura*;

¹ That is to say, other than *javanica*.

these being *nebulosa*, *pilifera* and *diffusa* (all Meij. from Java), adding that *A. lamellaris*, Spies. from Africa is also an *Atarba*.

ORIMARGA, Os. Sac.

peregrina, Brun., *Fauna Brit. Ind. Dipt.*, p. 424 ♂ (1912). Kurseong. Pashok, Darjiling District, 3,500 ft., vi-16 (*L. C. Hartless*). Type in Indian Museum.

Two ♂♂ and 1 ♀ from hills near Taiping, Perak, taken by Dr. Annandale, 26—30-xii-15. My figure of this species ("Fauna," pl. viii, 11) is somewhat incorrect, as the auxiliary vein ends just beyond half way between the origin of the 2nd longitudinal vein and the marginal cross vein, as indeed is stated in my description.

The type specimen has darkened with age until it is now nearly black, but three ♂♂ from Ghumti, Darjiling District, viii-11 (*Gravelly*) appear to be this species, agreeing well with the description.

javana, de Meij., *Tijd. v. Ent.* LVI, p. 348 ♀ (1913). Java. The unique type in the Amsterdam Museum.

ANTOCHA, Os. Sac.

indica, Brun., *Fauna Brit. Ind. Dipt.*, p. 426 ♂ ♀ (1912). N. India ; Assam (var. locs.).

unilineata, *id.*, *loc. cit.*, p. 427 ♀ (1912). W. Himalayas.

Types of both species in Indian Museum.

javanensis, Alex., *Proc. U. S. Nat. Mus.* XLIX, p. 171 ♀ (1916). Java. Type in the U. S. Museum.

Section ERIOPTERINI.

RHYPHOLOPHUS, Kol.

geniculatus, Brun., *Fauna Brit. Ind., Dipt.*, p. 441 ♂ (1912). Kurseong.

pulcher, *id.*, *loc. cit.*, p. 442 ♀ (1912). Simla ; Kumaon.

Types of both species in Indian Museum.

MOLOPHILUS, Curt.

inconspicua, Brun., *Fauna Brit. Ind. Dipt.*, p. 444 ♂ ♀ (1912). India (var. locs.).

assamensis, *id.*, *loc. cit.*, p. 445 ♂ (1912). Sylhet.

Types of both species in Indian Museum.

costalis, Edw., *Ann. Mag. Nat. Hist.* (8) XVIII, p. 251 ♀ (1916). Arisan, Formosa, 8,000 ft., 10-x-12 (*Nitobe*). Unique type in British Museum.

ERIOPTERA, Mg.

My Fauna volume (1912) contains the following new species : *E. punctipennis*, p. 449 ♀, Kurseong ; *ferruginea*, p. 450 ♂, Travancore ; *distans*, p. 451 ♂, Kurseong ; *incerta*, p. 452 ♂, Darjiling ; *parallela*,

p. 453 ♀, Kurseong; *orientalis*, p. 453 ♂ ♀, Darjiling; *subtineta*, p. 455 ♂ ♀, Darjiling; *flava*, p. 455 ♂ ♀, Bengal (var. locs.); *grandior*, p. 456 ♀, Simla; *genitalis*, p. 456 ♂ ♀, Kumaon.

My *E. brevior* (loc. cit., p. 452, ♂ ♀) must be referred to *Empeda* with my *Empeda inconspicua* (loc. cit. p. 475 ♂ ♀) as a synonym of it.

My *Erioptera halterata* (loc. cit., p. 457 ♂ ♀) is synonymous with *flava*, the halteres varying in colour, and the 7th vein being equally sinuous in both forms.

Types of all in the Indian Museum, several species represented by uniques.

fusca, de Meij., *Tijd. v. Ent.* LVI, p. 351 (1913). Java.

nigripalpis, *id.*, loc. cit., p. 351 ♂ ("♀" lapsus).

The unique types in Amsterdam Museum.

insignis, Edw., *Ann. Mag. Nat. Hist.* (8) XVIII, p. 251 ♂ ♀ (1916). Arisan, Formosa, 8,000 ft., 10-x-12 (*Nitobe*), also in the British Museum from Tokyo. *Type* in British Museum.

alboguttata, Edw., loc. cit., p. 252 ♂ (1916). Arisan, Formosa, 10-x-12 (*Nitobe*). Unique type in British Museum.

ACYPHONA, Os. Sac.

GENOTYPE: *Erioptera venusta*, Os. Sac. by present designation.

fenestrata, de Meij., *Tijd. v. Ent.* LVI, p. 352 ♀ (1913). Java.

The unique type in Amsterdam Museum.

MESOCYPHONA, Os. Sac.

GENOTYPE: *Erioptera caloptera*, Say, by personal designation. (Fauna, 1912).

nigripes, Brun., *Fauna Brit. Ind. Dipt.*, p. 458 ♂ (1912). Kurseong, Darjiling. *Type* in Indian Museum.

Mesocyphona gracilis, sp. nov.

♀. Assam-Bhutan Frontier.

Long. 3 mm.

Head and *thorax* moderately dull blackish-brown, with slight whitish reflections; *pleurae* with a slightly pinkish-brown tinge with whitish reflections; *scutellum* slightly yellowish.

Abdomen nut-brown, posterior margins slightly darker.

Legs.—Coxae pinkish-brown, remainder brownish-yellow, *tarsi* a little darker.

Wings clear, stigma barely perceptibly yellowish. Base of 3rd vein, anterior cross vein, base of (open) discal cell and posterior cross vein practically in a line. 1st submarginal and 2nd posterior cells subequal in length. Halteres dirty brown.

Described from a unique ♀ in the Indian Museum from Bhoirakund, Assam-Bhutan Frontier, Darrang District, 18—22-x-12 (*Kemp*).

A slender, graceful species compared with *nigropes*, Brun. the only other species known from India.

EMPEDA, Os. Sac.

My *Erioptera brevior* (*Fauna*, p. 452 ♂ ♀, 1912) is an *Empeda*, and my *Empeda inconspicua* (*loc. cit.*, p. 475 ♂ ♀) is identical. Both are from the Darjiling District and the types of both are in the Indian Museum. An additional specimen from Pashok, Darjiling District, 3,500 ft., vi-16 (*L. C. Hartless*).

Gonomyia antica, Brun. (*Fauna*, p. 568, 1912) is an *Empeda*, as pointed out by Bergroth. The relative positions of the tip of the auxiliary vein and origin of the 3rd vein vary in *Gonomyia*, *Empeda* and *Leiponeura*.

GONOMYIA, Mg.

In my *Fauna* volume (1912) the following new species are described: *incompleta*, p. 471 ♂ ♀, Bengal (var. locs.); E. Himalayas; *flavomarginata*, 472 ♂ ♀, Darjiling District; *affinis*, 472 ♂ ♀, Darjiling District; *aperta*, 473 ♂, Bengal; *proxima*, 474 ♂ ♀, Bengal and Nepalese Himalayas. Types of all the species in Indian Museum.

In the Appendix to the above volume (p. 568) is described *G. antica* from the Darjiling District, which is an *Empeda*. The demarcation of the dorsum from the sides of the thorax in *flavomarginata* seems to fade considerably after death. A better distinction between these two species than that given in the "Fauna" is as follows, but the relative position of the posterior cross vein must not be relied upon too closely.

Basal section of 3rd vein very short, even punctiform, at most one-fourth the length of the anterior cross vein.

1st posterior cell conspicuously narrowed at tip

incompleta.

Basal section of 3rd vein of considerable length, from one-half to nearly as long as anterior cross vein. 1st posterior cell only slightly narrowed at tip

flavomarginata.

I am glad to see that Alexander does not remove from *Gonomyia* those species with only one submarginal cell. Some regard these as a separate genus (*Leiponeura*, Skuse) and would refer them to the Rhamphidini, and Bergroth would thus refer my *G. incompleta* and *flavomarginata*, but *Gonomyia* in the wide sense forms a natural group.

Alexander describes *bryanti*, sp. nov. (*Proc. U. S. Nat. Mus.* XLIX, p. 173 ♂, 1916) from Java. Type in the U. S. Museum.

Edwards records *G. nebulosa*, de Meij. from Arisan, Formosa, 8,000 ft., 10-x-12, two ♀ ♀ (*Nitobe*), including it in the subgenus *Lipophleps*.¹

The MONGOMA group.

It seems advisable to erect two new genera in this group for forms in which the 2nd longitudinal vein is unforked. The venation appears quite constant in the three genera into which *Mongoma* has already been split up.

Alexander calls my attention to an error in my first Tipulidae paper (*Rec. Ind. Mus.* VI). On p. 291 it is stated that *australasiae*, Skuse is a strict *Mongoma*, and on p. 296 that it is congeneric with *Paramongoma*. The latter is an error; it belongs to *Mongoma*, *sensu strictu*. He also says there are intermediate species which throw all the genera formed

¹ See note under *Atarba*, p. 308, respecting three species that Alexander would refer to *Leiponeura*.

out of *Mongoma* into one. If so, well and good, but I have seen specimens or figures of most of the oriental species and figures of wings of a number of others and they all fall easily into one of the five genera admitted in this paper. Of non-oriental species, *fragillima*, Westw. from Africa, *australasiae*, Skuse from Australia and *disjuncta*, Alex. from Brazil, belong to *Mongoma* (s. str.); *manca* and *pallida*, both Williston, from North America, *longifusa*, *extensa* and *niveitarsis*, all Alex. from Brazil, Panama and Porto Rico respectively belong to *Paramongoma*; and *exornata* Bergr. from Africa, *gracilis* Ender. from Madagascar and *zambesiae*, Alex. from the Zambesi River to *Trentepohlia*.

His *disjuncta* has the anal cell open instead of closed, but this is not suggested as a generic character any more than the open or closed nature of the discal cell in those genera in which this character is understood to be variable. His *metatarsata* from Panama and his *leucozona*¹ belong to *Trentepohlia* with open instead of closed anal cell.

As the *Mongomyiae* form a definite natural group there can be no harm in regarding its sections as subgenera if desired.

Table of genera.

A. Four posterior cells (discal cell present; 3rd vein present; anal cell closed). ²	
B. 2nd longitudinal cell forked	<i>Mongoma</i> , Westw. (sensu str.).
BB. 2nd longitudinal vein simple	<i>Plesiomongoma</i> , gen. nov.
AA. Three posterior cells.	
C. 2nd longitudinal vein forked.	
D. Discal cell present; 3rd longitudinal vein absent or very short; anal cell open	<i>Paramongoma</i> , Brun.
D. Discal cell absent; 3rd longitudinal vein of normal length; anal cell closed or open	<i>Trentepohlia</i> , Big.
CC. 2nd longitudinal vein simple	<i>Anchimonogoma</i> , gen. nov.

MONGOMA Westw.

cariniceps, Ender., *Zool. Jahr.* XXXII, p. 60 ♂ (1912). Sumatra. Type in Stettin Zoological Museum.

pallidiventris, Brun., *Fauna Brit. Ind. Dipt.*, p. 481 ♀ (1912). Travancore. Type in Indian Museum. This is synonymous with *tenera*, Os. Sac.

obscura, de Meij., *Bijdr. tot Dierk.* XIX, p. 48 ♂ (1913). Waigou.

albipennis, id., *Tijds. v. Ent.* LVI, p. 353 ♀ (1913). Java.

Types (uniques) of both species in Amsterdam Museum.

Table of Oriental species.

A. Middle tibiae with conspicuously thickened tips through the presence of short snow-white pubescence	<i>pennipes</i> , Os. Sac.
AA. Middle tibiae not so ornamented.	
B. Tibiae snow-white except middle third black (long 10 mm.)	<i>splendida</i> , sp. nov.
BB. Tibiae not nearly so extensively snow-white.	
C. Wings with distinct suffusion over tip of 2nd vein and at tip; costal cell yellow	<i>kempi</i> , sp. nov.
CC. Wings clear; costa never yellow. ³	

¹ I have seen no reference to the description of this species.

² Only open in one species known to me *M. disjuncta*, Alex. from Brazil.

³ Except in *flava* in which the whole insect is yellow, wings as well.

- D. Long. 13-14½ mm.; 2nd, 3rd and 4th posterior cells equally long *cariniceps*, Ender.
 DD. Long. at most 9 mm.; 4th posterior cell always longer than 3rd.
 E. Legs without any white colour.
 F. Pale brownish-white species; long 8 mm. *albipennis*, de Meij
 FF. Wholly yellow species; long 5 mm. *flava*, sp. nov.
 EE. Legs with at least the tarsi white.
 G. 2nd and 3rd posterior cells equally long, 4th always longer than both *tenera*, Os. Sac. (*pal-
lidiventris*, Brun.)
 GG. 2nd posterior cell as long as 4th, both distinctly longer than 3rd *obscura*, de Meij.

***Mongoma splendida*, sp. nov.**

♂ ♀. Assam.

Long. 10 mm.

Head.—Occiput and the very narrow frons ash-grey; proboscis yellowish; palpi and antennae dark brown, base of former pale.

Thorax.—Dorsum, scutellum and metanotum dark brown; pleurae and space between post sutural swellings yellowish.

Abdomen blackish-brown, hind margins of segments a little darker; a little yellowish towards sides. Belly normally pale yellowish, hind margins of segments paler, belly sometimes dark.

Legs.—Coxae orange; femora dark brown, paler towards base, tips with moderately broad snow-white ring (one-twelfth the length); tibiae snow-white, middle third dark brown; tarsi snow-white, extreme tips a little yellowish.

Wings moderately dark grey, extreme tips barely perceptibly darker; costal cell just perceptibly yellowish. Subcostal cross vein in a line with base of discal cell; 2nd vein forking at or just beyond marginal cross vein; 2nd posterior cell distinctly but only slightly longer than 3rd; 4th longer than 2nd, lengths of these three cells not exactly constant but very nearly so. Posterior cross vein at base of discal cell or fractionally before or after it. Halteres blackish.

Described from several of both sexes from above Tura, Garo Hills, 3,500—3,900 ft., vii, viii-17 (*Kemp*).

A beautiful species, quite distinct from all others.

***Mongoma kempi*, sp. nov.**

♀. Assam.

Long. 9—10 mm.

Head orange-brown; proboscis and palpi dark brown, latter paler at base; antennae yellowish-brown, paler at base.

Thorax wholly orange-yellow.

Abdomen brownish orange; an indefinite blackish dorsal stripe on 2nd and 3rd segments with the hind margins more or less blackish; hind margins of 4th to 7th segments pale yellowish. Belly brownish-yellow, the segments more or less blackish apically. Ovipositor orange yellow.

Legs orange-yellow; trochanters blackish in front; tips of femora and extreme bases and tips of tibiae black. A row of about ten minute spines at base on underside of femora; smaller and fewer spines on front pair.

Wings grey, costal and subcostal cells yellow. 2nd vein forking immediately beyond marginal cross vein; 2nd and 4th posterior cells

subequal in length, 3rd slightly shorter. A blackish suffusion extending over tip of 1st vein and marginal cross vein. Tip of wing a little blackish suffused, the colour extending inwards for less than half way to the discal cell. Veins distinctly black except as follows : proximal half of basal section of 2nd vein, its 2nd section, upper branch and basal half of lower branch ; tip of 5th vein, apical half of 6th vein, and all veins at extreme base of wing yellowish. Halteres yellow.

Described from two ♀ ♀ from above Tura, Garo Hills, 3,900 ft., viii-17 (*Kemp*). In Indian Museum. A very handsome species.

Mongoma flava, sp. nov.

♀. Assam.

Long. 5 mm. to tip of ovipositor.

Body all pale brownish-yellow ; flagellar joints not so distinct as in the other species. Legs yellow, extreme tips of femora black.

Wings yellowish, veins yellow. Costal and subcostal cells a little deeper yellow. 2nd vein forking at marginal cross vein ; 2nd and 4th posterior cells of equal length, longer than 3rd ; posterior cross vein fractionally before base of discal cell. Halteres yellow.

Described from a unique ♀ in the Indian Museum from above Tura, Garo Hills, 3,500-3,900 ft., viii-17 (*Kemp*). The wholly yellow colour of this species distinguishes it from all others.

PLESIOMONGOMA, gen. nov.

Differing from *Mongoma* only in the 2nd longitudinal vein not being forked. *Type-species* : *P. venosa*, sp. nov.

Plesiomongoma venosa, sp. nov.

♀. Shillong.

Long. 9 mm.

Head and appendages (except eyes) wholly yellowish ; occiput slightly brownish. *Thorax* wholly yellowish, a little darker towards sides of dorsum ; pleurae paler.

Abdomen dark brown, hind margins of segments blackish ; base of abdomen dirty yellow ; belly and ovipositor yellowish.

Legs (hind pair missing) wholly bright yellow to tips ; anterior femora with moderately broad black ring at tip.

Wings pale grey. Costal cell distinctly though not deeply, yellow. All the veins deep black and very distinct ; transverse veins very narrowly suffused, as is also base of 2nd longitudinal vein and the whole wing tip somewhat narrowly. Halteres yellow, with dirty black knobs.

Described from a unique ♀ in the Indian Museum from Shillong, 5,500—6,400 ft., 29-viii—5-ix-15 (*Kemp*), in perfect condition except for the missing hind legs. A very distinct species by the prominence of the veins as well as the difference in venation from *Mongoma*.

PARAMONGOMA, Brun.

Enderlein's *Mongomella* (*Zool. Jahr.* XXXII, p. 61, 1912) is an absolute synonym of my genus. *Albitarsis*, Dol. still remains the only oriental species.

TRENTEPOHLIA, Big.

Mongomioides, Brun. (1911).

GENOTYPE: *Limnobia trentepohlii*, W. by original designation.

Though Bigot's original description of this genus is quite valueless, Edwards recently noted¹ one of the true generic characters, the three posterior cells only, but I had overlooked his paper.

Trentepohlia trentepohlii, W.

Six specimens taken at Lampam, Patalung, Siam, 12-i-16, by Dr. Annandale.

marmorata, Brun., *Fauna Brit. Ind. Dipt.*, p. 483 ♀ (*Mongomioides*) (1912). Calcutta.

nigroapicalis, *id.*, *loc. cit.*, p. 483 ♂ (*Mongomioides*) (1912). Lucknow; Ceylon.

albogeniculata, *id.*, *loc. cit.*, App. p. 569 ♂ (*Mongomioides*) (1912) and *Rec. Ind. Mus.* VII, p. 448 (1912).²

speiseri, Edw., *Ann. Mag. Nat. Hist.* (8) XII, p. 204 ♂ ♀; (1913) *nom. nov.* for *Mongoma exornata*, Speiser (*nec* Bergr.). Peradeniya, Ceylon. Type in British Museum.

saucia, Alex., *Proc. U. S. Nat. Mus.* XLIX, p. 174 ♀ (1916). Java. Type in U. S. Museum. Described under *Mongoma* with the note that it comes in the *trentepohlii* group.

pictipennis, Bezzi, *Phil. Jour. Sci.*, XII, Sect. D, p. 115 ♂ (1917). Luzon (*Baker*).

Trentepohlia ornatipennis, sp. nov.

♂. S. W. India.

Long. 5 mm.

Head, including proboscis and antennae, brownish-yellow, palpi more brownish.

Thorax.—Dorsum bright brownish-yellow; a median narrow stripe, the inner sides of the post sutural depression, the scutellum and metanotum brown. Under side of thorax brownish.

Abdomen blackish, an indistinct pale dorsal stripe; belly more or less pale.

Legs.—Coxae brown, tips pale yellow; remainder of legs wholly pale yellow, tarsi paler still except the brownish extreme tips.

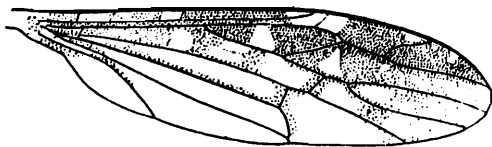


FIG. 4.—Wing of *Trentepohlia ornatipennis*, sp. nov.

Wings.—Anterior half to 4th longitudinal vein moderately dark brown, posterior half to 4th vein grey, the 5th vein and posterior cross

¹ *Ann. Mag. Nat. Hist.* (8) VIII, p. 63 (1911).

² The first reference antedates by about a month.

vein distinctly though narrowly suffused; the 6th and 7th veins with traces of being very narrowly suffused also. On the anterior part of the wing are a number of pale spots placed as follows. A squarish one just before middle of 1st basal cell with a small costal spot in front of it. One just beyond middle, and one nearly at tip of 1st basal cell, both of them squarish and subequal in size. A sub-triangular one in marginal cell just in front of the space between the two last-named spots. An oval one on costa at tip of 1st longitudinal vein with a small projection on hinder side nearly reaching a triangular spot placed with its base on the 3rd vein immediately in front of the inner side of the (open) discal cell. Two approximately equidistant smaller ones on costa placed between the last-named costal spot and tip of 2nd vein. Two roundish spots at tip of wing, subcontiguous. One at base of 2nd posterior cell, with a small elongate one in the cell in front of it. One at base of and one just beyond middle of 3rd posterior cell, both squarish.

Described from a unique male in the Indian Museum from Castle Rock, N. Kanara District, 11—26-x-16 (*Kemp*).

The tip of the 1st longitudinal vein is so extremely faint as to be almost invisible. The marked wings separate the species easily from all others in this group.

ANCHIMONGOMA, gen. nov.

Differing from *Paramongoma* and *Trentepohlia* by the 2nd vein being unforked. *Type-species* : *A. simplex*, sp. nov.

Anchimongoma simplex, sp. nov.

♂ ♀. S. W. India.

Long. 5 mm.

Head.—Frons and occiput blackish-grey; proboscis, palpi and antennae brownish-grey.

Thorax considerably arched and elevated, anterior part projecting well over neck, shining dirty brown, moderately dark; scutellum and metanotum concolorous; post-sutural dorsum divided by a rather deep median furrow. Lower part of thorax yellowish-white.

Abdomen dark olive brown, hind margins of segments barely perceptibly darker; belly in ♂ pale yellowish, emarginations narrowly black, belly in ♀ barely paler; genitalia concolorous in ♂, apical part in ♀ shining brown, tips of valves yellowish.

Legs.—Coxae and base of femora yellowish, rest of femora brown, becoming paler towards tips; tibiae dirty yellowish, tarsi whitish.

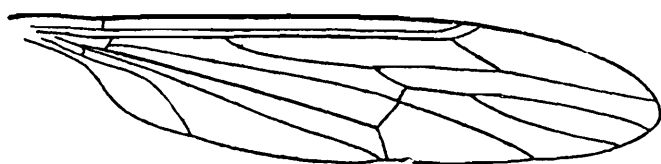


FIG. 5.—Wing of *Anchimongoma simplex*, sp. nov.

Wings pale grey; 2nd longitudinal vein not forked; discal cell absent, coalescent with 3rd posterior cell; anterior branch of 4th vein

forked, posterior branch simple; 3 posterior cells; anal cell distinctly open. Halteres blackish.

Described from a unique pair in the Indian Museum from Castle Rock, N. Kanara District, 11—26-x-16 (*Kemp*).

It seems necessary to erect a new genus for this species on the character of the unforked 2nd longitudinal vein, all the species of the three allied genera having it forked.

The absence of a discal cell is not necessarily a generic distinction from *Paramongoma*.

***Lechria bengalensis*, Brun.**

The thorax seems to darken with age in this species, as a specimen from Calcutta, 30-v-12 (*Gravelly*) has it wholly shining dark brown, as is now the case in the type ♀, though the latter was described as having it yellowish.

leucopeza, Meij., *Tijd. v. Ent.* LVI, Supp. 1913, 3 ♀, pl. i, 2, wing (Mar. 1914). Semarang, Java.

***Lechria nepalensis*, sp. nov.**

♀. Nepal.

Long. $2\frac{1}{2}$ mm.

Head.—Frons ash-grey with a few stiff hairs; proboscis and palpi brownish-yellow, joints in distal half of former considerably elongate; antennal joints in apical half of flagellum long and thin.

Thorax brownish-yellow, a little whitish shimmer below shoulders and on lower part of pleurae; transverse suture deep, hind part of dorsum with a rather deep longitudinal suture; scutellum blackish.

Abdomen dark brown, posterior margins of segments and ovipositor brownish-yellow. Belly yellowish.

Legs pale yellowish.

Wings yellowish-grey, base of 3rd vein a little before midway between tip of auxiliary vein and fork of 2nd vein, and in a line with and about as long as anterior cross vein, so that the 2nd submarginal cell and 1st posterior cell are about equal in length and shape. Anterior cross vein at base of, and posterior cross vein at middle of discal cell, which is wholly beyond middle of wing, with truncate base and three short outer sides. 1st longitudinal vein turning down into 2nd as in *bengalensis*. Halteres yellowish with dark clubs.

Described from a unique ♀ in the Indian Museum from Katmandu, Nepal.

This species differs radically from *bengalensis* by its venation, but as it presents the unusual generic character of the 1st vein ending in the 2nd it is retained under *Lechria*. If a second species with similar venation to *nepalensis* and similar antennae occurs a new genus may be erected.

The venational differences from *bengalensis* are the angular base of the 3rd vein, its junction thereat with the anterior cross vein instead of the latter joining the praefurca, this cross vein being at the base instead of at the middle of the discal cell, and the position of this cell beyond the middle of the wing as well as its shape and shortness.

In *bengalensis* the flagellar joints of the antennae are more or less uniform in size, except for the usual tapering towards the tip, but in *nepalensis* those on the apical half are considerably attenuated and lengthened.

CLYDONODOZOS, Enderl.¹

Zool. Jahrb. XXXII, p. 5 (1912).

GENOTYPE : *C. multistriatus*, sp. nov., by original designation.

multistriatus, Enderl., *loc. cit.*, p. 57 ♂ ♀ (1912).

punctulatus, *id.*, *loc. cit.*, p. 59 (sex ?) (1912).

Both species from Sumatra ; types in Stettin Zoological Museum.

griseiceps, de Meij., *Tijd. v. Ent.* LVIII, Supp. p. 11 ♀, 1915 (1916). Sumatra. Unique type in Amsterdam Museum.

GNOPHOMYIA, Os. Sac.

This genus was imperfectly understood by me in my "Fauna" volume, and my thanks are due to Mr. Alexander for pointing out several errors. *G. longipennis*, Brun. = *Rhaphidolabis fascipennis*, Brun. ; *G. aperta* and *incompleta* belong to *Rhaphidolabis* ; *G. genitalis* and *furcata* to *Limnophila*. *G. strenua* and *nigra* are true *Gnophomyia*.²

G. ornatipennis, Meij. is referred by Edwards to *Gymnastes*, whilst Alexander places it in *Paratropeza*, Sch. Riedel records a ♂ of this species from Formosa.

Edwards records (*Ann. Mag. Nat. Hist.* (8) XVIII, p. 250, 1916) *G. orientalis*, Meij. from Arisan, Formosa, 8,000 ft., 10-x-12 (*Nitobe*), and describes a new species *similis* (p. 251) from the same locality and collector, the unique type being in the British Museum.

DASYMALLOMYIA, Brun.

According to Alexander this genus is identical with a group of thick-set, tropical American species of *Gnophomyia* with short, hairy legs and some other characters.

Mr. Edwards more recently proposes to retain the genus provisionally for species of the group mentioned, and describes three new species from the Malay Peninsula : *maculipleura* (*Ann. Mag. Nat. Hist.* (8) XVII, p. 360 ♂ ♀, fig. 5, p. 356, genitalia, 1915) ; *fraterna*, *l. c.*, p. 361 ♂, fig. 6, p. 356, genitalia, Selangor ; *nigrescens*, *l. c.*, p. 361 ♀, Talum, Perak ; the types of all three species being in the British Museum.

Dasymallomyia signata, Brun.

Edwards records a ♀ from Horisha, Formosa, 10-v-13 (*Maki*).

¹ Alexander says that Edwards doubts if this is distinct from *Conosia*.

² *G. longipennis*, Brun., "Fauna", p. 489, pl. ix, 17 ; *aperta*, p. 492, pl. x, 1 ; *incompleta*, p. 493, pl. x, 2 ; *genitalis*, p. 490, pl. ix, 16 ; *furcata*, p. 491, pl. ix, 8 ; *strenua*, 492, pl. ix, 19 ; *nigra*, p. 494, pl. x, 3 (1912).

OXYDISCUS, Meij.

Tijd. v. Ent. LVI, 350 (1913).

GENOTYPE: *O. nebulosus* Meij. by original designation.

nebulosus, de Meij., *loc. cit.*, p. 351 ♀. West Java. Unique type in Amsterdam Museum.

umbrosus, Edw., *Ann. Mag. Nat. Hist.* (8) XVII, p. 361 ♀ (1916). Kedah Peak, 3,200 ft. Malay Peninsula (*Dr. Stanton*). The unique type in the British Museum.

Conosia irrorata, W.

A ♀ of this widely distributed species taken by Dr. Annandale at Otsu, near Kyoto, Japan, x-15. Also recorded recently from Kotosho I., Formosa, 5-viii-12 (*Shiraki*).

CLADURA, Os. Sac.

My *C. flavescens* is almost certainly a *Cladura* in Osten Sacken's sense, agreeing with his description and with Needham's figure of the wing, so I think Alexander is in error in claiming that my species is generically wrongly placed.

Cladura interrupta, sp. nov.

♀. Darjiling.

Long. $3\frac{1}{2}$ —4 mm.

Head yellowish-grey; antennal scape and base of flagellum yellow, remainder blackish.

Thorax brownish-yellow.

Abdomen very dark brown with short pubescence; ovipositor long, brownish-yellow towards tip.

Legs wholly pale yellow, distinctly pubescent throughout; coxae black.

Wings yellowish-grey with numerous black spots, of which the deepest is over the stigma, nearly oblong in shape, emarginate on hinder side; a minute well defined costal spot near the base. Three narrow, transversely placed costal spots nearly equidistant, extending posteriorly to (1) hind margin of 2nd basal cell, (2) hind margin of 1st basal cell, and (3) to the anterior cross vein. A good sized spot at tip of upper branch of 2nd vein, more or less connected with round spots in the 2nd submarginal and 1st posterior cells, and with another at the fork of the upper branch of the 4th vein, and one at the tip of the 3rd posterior cell, forming altogether a slightly bent band across the wing. A spot at tip of lower branch of 2nd vein and one at tip of all the 4th vein endings, at tips of 5th, 6th and 7th veins, and over inner and outer sides of discal cell. Ground colour of wing slightly darker grey over basal half or thereabouts of both basal cells and of the anal and axillary cells. Halteres dirty yellowish. The 1st submarginal cell is divided a little beyond the middle by a supernumerary cross vein.

Described from two ♀♀ in the Indian Museum from Pashok, 3,500 ft., 26-v—14 vi-16 (*Gravelly*).

CLADUROIDES, Brun.

This will be synonymous with *Rhaphidolabis*, Os. Sac. if the apparent discrepancy in the number of joints in the antennae can be satisfactorily accounted for, otherwise it is a perfectly valid genus.¹

PARACLADURA, Brun.

Alexander says this genus has no relationship with *Cladura*, Os. Sac., but he does not say where he would place it; presumably in the Amalopini.

Its characters are : (1) no tibial spurs, the closest examination revealing no trace of them, (2) subcostal cross vein near middle of wing, some distance after origin of praefurca, (3) eyes minutely but obviously pubescent,² (4) no *frontal* gibbosity but the *face* very distinctly gibbous, (5) antennae with the scapal joints very short, sub-globular; the flagellum of 15 elongate joints, (6) five posterior cells, the 4th distinctly pointed at base.

The 17-jointed antennae makes the genus rather abnormal, wherever placed. The absence of tibial spurs would relegate the genus to the Eriopterini, but if exceptions to this character are admitted it must fall either in the Amalopini or the Limnophilini.

Paracladura agrees and disagrees respectively with the various characters of the Eriopterini and Amalopini as shewn in the following table :—

ERIOPTERINI.	<i>Paracladura</i> .	AMALOPINI.
Agrees in—		Agrees in—
1. No tibial spurs.		1. 5 posterior cells, especially in pointed base of 4th.
2. No frontal bump.		2. Pubescent eyes.
3. 5 posterior cells.		Disagrees in—
4. Position of subcostal cross vein.		1. No tibial spurs.
Disagrees in—		2. No frontal bump.
1. Pubescent eyes.		3. Position of subcostal cross vein. ³

As regards the Limnophilini, *Paracladura* has little or nothing in common; the absence of tibial spurs, the position of the subcostal cross vein and the pubescent eyes all separate it.

Apparently, therefore, although rather abnormal, it agrees best with the characters of the Eriopterini, where it may remain for the present.

Section *AMALOPINI*.**TRICHOCERA**, Mg.

punctipennis, Brun., *Fauna Brit. Ind., Dipt.*, p. 511, ♂ ♀ (1912).
Simla.

¹ See note under *Rhaphidolabis*, p. 322.

² In my description this fact was not stated, the pubescence being overlooked; close examination is required to detect it.

³ That is to say, according to Osten Sacken's characterisation of the section. If *Trichocera* be allowed to remain in the Amalopini, *Paracladura* will not disagree in this character.

flava, *id.*, *loc. cit.*, p. 512 ♀ (1912). Darjiling.

montana, *id.*, *loc. cit.*, p. 513 ♂ (1912). W. Himalayas.

Types of all three species in Indian Museum.

AMALOPIS, Hal.

glabripennis, Brun., *Fauna Brit. Ind. Dipt.*, p. 515 ♂ (1912).

Darjiling and North-East Indian Frontier.

elegans, *id.*, *loc. cit.*, p. 516 ♂ ♀ (1912). Kurseong.

Types of both species in Indian Museum.

As regards the right of *Amalopsis* or *Tricyphona*, Zett. to stand Bergroth's recent argument¹ appears just and I agree with it, but it seems inadvisable to change generic names that give their names to families, sub-families or sections, and for that reason it is retained here.²

Amalopsis spectralis, sp. nov.

(Plate vii, fig. 4.)

♂. Darjiling.

Long. 6 mm.

A very peculiar whitish ghost-like fly.

Whole body pale yellowish; thorax whitish, indistinctly shewing a darker surface below; proboscis and palpi dark; antennae snow-white, the minute similarly coloured pubescence making determination of the exact number of joints impossible. Neck rather long. Abdomen a little darker towards tip; genitalia large and conspicuous, pale yellowish-brown with long pale hairs; a large curved dorsal plate; a very elongate, ventral, curved plate turning upward at the tip, which is bifid; claspers of moderate size.

Legs wholly nearly snow-white except tips of femora and of tibiae broadly black; tarsi tips a little brownish.

Wings clear, very iridescent; veins whitish. 3rd vein issuing from the very short space between the anterior cross vein and the fork of the 2nd vein, and parallel with the branches of the latter, so that both submarginal cells and the 1st posterior are about subequal. Basal section of 2nd vein, marginal cross vein, and a line formed of the basal portion of upper branch of 2nd vein, the anterior and posterior cross veins, also the veinlet forming outer side of discal cell, very narrowly but deeply suffused. Halteres yellowish-white.

Described from a single nearly perfect ♂ in the Indian Museum. Pashok, Darjiling District, 3,000 ft., 26-v—14-vi-16 (*Gravelly*).

ULA, Hal.

javanica, Alex., *Proc. U. S. Nat. Mus.*, XLIX, p. 176 (1916).

Java. Type in U. S. Museum.

¹ *Ann. Mag. Nat. Hist.* (8) XI, p. 583 (1913).

² Mr. Bergroth draws attention to the use in my Fauna volume of *Pleciomyia* in place of *Crapitula*, Gimm. in the family Bibionidae. This was not an arbitrary proceeding on my part, as he assumes. The description of *Crapitula* is not accessible in India and the Kertész catalogue gives it as a synonym of *Plecia*. Recognising the distinctness generically of *melanaspis* it appeared necessary to erect a new genus for it.

RHAPHIDOLABIS, Os. Sac.

? *Claduroides*, Brun., *Rec. Ind. Mus.* VI, p. 288 (1911).

Five species recently described by me belong to this genus.

sordida, Brun., *Rec. Ind. Mus.* VI, p. 290 ♂ ♀ (*Claduroides*) (1911). Simla; Kurseong. Types in Indian Museum.

fascipennis, *id.*, *loc. cit.*, p. 289 ♂ ♀ (*Claduroides*) (1911).

Gnophomyia longipennis, Brun., *Fauna Brit. Ind.*, p. 489 ♀ (1912). *Rhaphidolabis fascipennis*, *id.*, *loc. cit.*, p. 519 ♀ (1912). Darjiling; Kumaon and Simla Districts. Types of all the forms in the Indian Museum.

aperta, Brun., *Fauna Brit. Ind. Dipt.*, p. 492 ♂ (*Gnophomyia*) (1912). Darjiling. Edwards changes the specific name (*Ann. Mag. Nat. Hist.* (8) XVIII, p. 254) to *brunetti*, through preoccupation by Coquillett. He records a ♀ from Arisan, Formosa, 8,000 ft., 10-x-12 (*Nitobe*).

incompleta, *id.*, *loc. cit.*, p. 493 ♂ (*Gnophomyia*) (1912). Kurseong. The types of both these species in the Indian Museum. Alexander has noted that *incompleta* would come in *Plectromyia*, Os. Sac., which is now generally considered synonymous with *Rhaphidolabis* or at most a subgenus of it.

indica, Brun., *Fauna Brit. Ind.*, p. 519 ♂ ♀ (1912). Simla District. Types in Indian Museum.

It must be noted that in all the above five species before me the antennae contain 15 joints. Alexander, in relegating my *Claduroides* to a synonym of *Rhaphidolabis*, overlooks the fact that the latter genus has only 13-jointed antennae. I noted this discrepancy in referring my *indica* and *R. fascipennis* to this genus. Possibly Osten Sacken was in error, but this is unlikely, or possibly he wrote "antenna" in mistake for "flagellum"; and possibly Williston (*Manual N. Amer. Dipt.*) merely copied him in the table of genera, but I have seen no correction of the original statement of a 13-jointed antenna. If *Rhaphidolabis* really has only 13-jointed antennae, *Claduroides* must stand as a valid genus.

TIPULODINA, Ender.

Erected for a small group of Tipulae with white-banded legs and white tarsi and referred by its author to this section. I have endeavoured (p. 270) to shew they are merely *Tipulae*, and the species are noted under that genus.

Section **LIMNOPHILINI**.**LIMNOPHILA**, Macq.

Six of my recently described species belong here.

genitalis, Brun., *Fauna Brit. Ind. Dipt.*, p. 490 ♂ ♀ (*Gnophomyia*) (1912). Kumaon District. Only the type ♂ and ♀ are known.

furcata, *id.*, *loc. cit.*, p. 491 ♂ ♀ (*Gnophomyia*) (1912). Darjiling.

pallidicoxa, *id.*, *loc. cit.*, p. 523 ♀ (1912). Kumaon and Darjiling.

simplex,¹ *id.*, *loc. cit.*, p. 523 ♀ (1912). Kumaon District. Unique.

multipunctata, *id.*, *loc. cit.*, App. p. 569, (sex ?) (1912). Darjiling District.

honesta, *id.*, *loc. cit.*, App. p. 570 ♀ (1912). Kumaon District.

claripennis, *id.*, *Rec. Ind. Mus.* VIII, p. 153 ♀ (1913). North-East Indian Frontier.

quartarius, *id.*, *loc. cit.*, p. 154 ♂ ♀ (1913). North-East Indian Frontier.

Types of all above species in Indian Museum.

apicalis, de Meij., *Nova Guin. Res.* IX, p. 309 ♀ (1915). Papua.

javana, de Meij., *Tijd. v. Ent.* LIX, p. 198 ♂ ♀, pl. vii, 11 (wing) (1916). Gedeh, Java, 1,500—2,000 metres, June (*Konigsberger*).

amica, Alex., *Proc. U. S. Nat. Mus.* XLIX, p. 175 ♂ (1916). Java.

palmeri, *id.*, *loc. cit.*, 175 ♂. Java.

Types of both these species in the U. S. Museum.

Table of Oriental species of LIMNOPHILA.

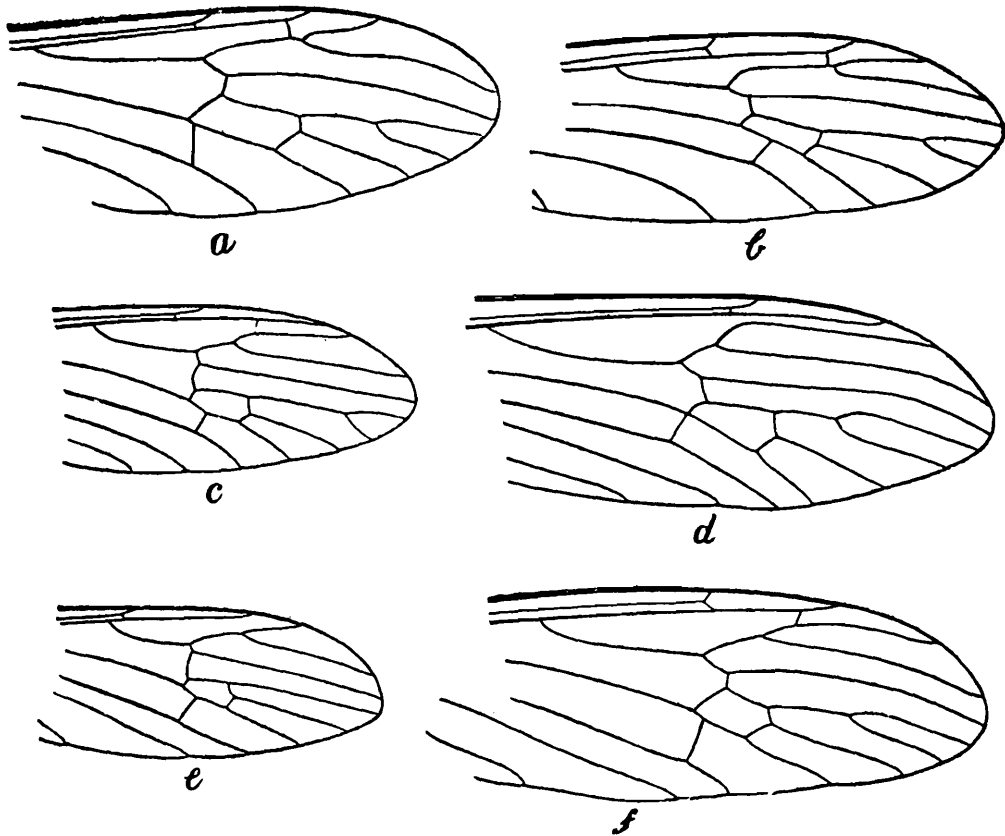
A. Wings very conspicuously marked.

- | | |
|---|--------------------------------|
| (a) Wings blackish, with base, a middle band and tip white | <i>tresignata</i> , Walk. |
| (b) Wings cinereous, veins black, bordered with black | <i>selectissima</i> , Walk. |
| (c) Wings brownish-yellow, with very numerous minute black dots | <i>multipunctata</i> , Brun. |
| (d) Wings brownish-grey, with numerous small white spots | <i>ornatipennis</i> , sp. nov. |
| (e) Wings distinctly yellowish with brown markings | <i>flavipennis</i> , sp. nov. |
| AA. Wings quite unmarked; stigma present or absent. | |
| B. Four posterior cells. | |
| C. Marginal cross vein present; discal cell at least twice as long as broad. | |
| D. Marginal cross vein joining praefurca | <i>honesta</i> , Brun. |
| DD. Marginal cross vein joining 2nd vein before the fork | <i>amica</i> , Alex. |
| DDD. Marginal cross vein joining upper branch of 2nd longitudinal vein. | |
| E. 2nd submarginal cell as long as 1st posterior; legs unringed | <i>quartarius</i> , Brun. |
| EE. 2nd submarginal cell much longer than 1st posterior. | |
| F. Femora with subapical yellowish ring on all femora | <i>annulipes</i> , sp. nov. |
| FF. Femora without such ring | <i>inconsequens</i> , sp. nov. |
| CC. Marginal cross vein and stigma both absent; discal cell barely longer than its greatest breadth | <i>parvicellula</i> , sp. nov. |
| CCC. Marginal cross vein absent ² ; stigma present even if weak. | |
| G. Discal cell present | <i>palmeri</i> , Alex. |
| GG. Discal cell absent | <i>incompleta</i> , sp. nov. |
| BB. Five posterior cells. | |
| H. Larger species, 12 mm. long | <i>contingens</i> , Walk. |
| HH. Smaller species, at most 8 mm. long. | |
| I. Marginal cross vein present. | |

¹ The name *simplex* preoccupied by Alexander but as my *simplex* is synonymous with *genitalis*, Brun. it may be allowed to lapse.

² Alexander does not state its absence, but it is not apparent in his figure, and he states its presence in the previous species, *amica*.

- J. 2nd longitudinal vein forking *after* marginal cross vein ; posterior cross vein at base of discal cell ; thorax yellowish-brown . *pallidicoxa*, Brun.
- JJ. 2nd longitudinal vein forking almost exactly *at* marginal cross vein ; posterior cross vein at middle of discal cell ; thorax ash grey *genitalia*, Brun.
(*simplex*, Brun.)
- JJJ. 2nd longitudinal vein forking *before* marginal cross vein.
- K. 2nd posterior cell small, triangular ; legs all pale yellow ; small delicate species with clear, slightly iridescent wings, stigma indistinct ; veins pale *furcata*, Brun.
- KK. 2nd posterior cell of normal size, oblong ; legs (except paler basal part of femora) all dark, especially towards tips of femora.
- L. Head and thorax mainly rather bright brownish-yellow ; wings very glabrous, stigma black, distinct. Long $5\frac{1}{2}$ mm. *glabra*, sp. nov.
- LL. Head grey, thorax yellowish-brown with thin median black line ; wings less glabrous, stigma practically absent ; long 4 mm. *fusca*, sp. nov.
- II. Marginal cross vein absent (2nd vein forking soon after origin of 3rd, both branches parallel nearly to tips ; 1st submarginal cell nearly as long as 2nd) *claripennis*, Brun.

FIG. 6.—Wings of *Limnophila* spp.

- a.—*L. pallidicoxa*, Brun
b.—*L. genitalis*, Brun.
c.—*L. furcata*, Brun.
d.—*L. claripennis*, Brun.
e.—*L. parvicellula*, sp. nov.
f.—*L. glabra*, sp. nov.

***Limnophila annulipes*, sp. nov.**

♂. S. W. India.

Long. 7 mm.

Head and palpi rather dark brown ; antennae brownish-yellow, 2nd scapal joint more yellowish ; 1st flagellar joint cup-shaped, next

five joints short, cylindrical, about as long as broad, the remainder gradually lengthening.

Thorax cinnamon brown, the considerably depressed humeral region blackish. Sides of thorax moderately light grey, with a black lateral stripe just below dorsum; under side also black; metanotal region a little paler.

Abdomen cinnamon brown, sides of segments blackish, ovipositor brownish-yellow; belly more or less yellowish.

Legs.—Coxae pale yellowish-white; femora yellowish, apical part blackish with a distinct subapical yellowish ring; tibiae and tarsi yellowish-brown.

Wings brownish-grey, considerably iridescent; 4 posterior cells; stigma moderately distinct; marginal cross vein apparently present though extremely faint, joined to the very short upper branch of 2nd longitudinal vein; 2nd submarginal cell considerably longer than 1st posterior. Anterior cross vein at base of discal cell; posterior cross vein at just beyond one-third; 2nd and 3rd posterior cells rather longer than discal cell.

Described from a single ♂ in the Indian Museum from Talewadi, near Castle Rock, N. Kanara District, 3—10-x-16 (*Kemp*).

This is the only species known to me with distinct rings on its legs.

***Limnophila parvicellula*, sp. nov.**

♂. S. W. India.

Long. $3\frac{3}{4}$ mm.

Head moderately dark brown; antennae similar; flagellar joints all elongate and slender, only the first two or three slightly thicker.

Thorax and *abdomen* brownish-yellow; dorsum darker brown; genitalia brownish-yellow.

Legs dark brown, nearly black.

Wings grey, iridescent; 4 posterior cells; marginal cross vein absent; upper branch of 2nd vein short, as long as from tip of praefurca to fork of 2nd. Anterior cross vein exactly at origin of 3rd vein and at base of discal cell, the latter unusually small, about one-third as long as 2nd posterior cell; posterior cross vein a little before middle of discal cell. Halteres obscure.

Described from a single ♂ from Talewadi, near Castle Rock, N. Kanara District, 3—10-x-16 (*Kemp*).

The absence of the marginal cross vein and small size of the discal cell are the chief characters of this species.

***Limnophila glabra*, sp. nov.**

♂. S. W. India.

Long. $5\frac{1}{2}$ mm.

Head set on a rather long neck; brownish-yellow below, occiput (bearing some rather long black hairs) and frons blackish-grey; proboscis brownish-yellow; palpi black; antennae blackish-brown, basal half of 1st scapal joint yellowish; flagellar joints elongate and very narrow except the basal two or three slightly thicker.

Thorax rather bright brownish-yellow; dorsum shining blackish-brown, metanotum shining brown with bluish-grey reflections viewed from behind.

Abdomen.—Dorsum blackish, shining; belly wholly bright brownish-yellow; genitalia brownish-yellow, pubescent.

Legs.—Coxae bright brownish-yellow; femora brownish-yellow at base, gradually darkening to black at tips; tibiae and tarsi dark yellowish-brown, nearly black.

Wings grey, very shining and iridescent; 5 posterior cells; marginal cross vein present, 2nd vein forking distinctly before that cross vein, its upper branch long and slightly diverging throughout its length from lower branch. 2nd submarginal cell distinctly longer than 1st posterior; 2nd posterior cell rather longer than its pedicle; discal cell not much longer than broad; anterior cross vein placed at upper angle of that cell; posterior cross vein just beyond its base. Halteres dirty yellowish-brown.

Described from a single ♂ in the Indian Museum from Castle Rock, N. Kanara District, 11—26-x-16 (*Kemp*).

***Limnophila fusca*, sp. nov.**

♂ ♀. Darjiling.

Long. about 5 mm.

Head rather dark grey; antennal scape blackish, basal flagellar joint yellowish, remainder blackish, the joints considerably elongated, with long verticils.

Thorax moderately dark yellowish-brown; a narrow median dark line; pleurae a little lighter here and there; scutellum and metanotum concolorous.

Abdomen.—Dorsum and belly concolorous with thorax; segments very distinct; genitalia moderate in size.

Legs dull yellowish-brown, coxae and the femora for a considerable distance from base (in certain lights) paler; legs in ♀ rather paler than in ♂.

Wings grey; 2nd vein forked soon after origin of 3rd vein; marginal cross vein a little beyond the fork; stigma practically absent; 2nd posterior cell twice as long as its petiole; 5 posterior cells.

Described from 2 ♂ ♂ and 1 ♀ in Indian Museum from Sureil, Darjiling District, 5,000 ft., iv, v-17 (*Kemp*).

***Limnophila incompleta*, sp. nov.**

♂. Darjiling.

Long. 4 mm.

Whole body dark brown; flagellar joints of antennae oval, verticils rather short. Abdominal segments distinct, roughened. Legs dirty brown. Wings grey; marginal cross vein absent; 2nd vein forked at about usual place; *discal cell open*, coalescent with 3rd posterior cell; 2nd posterior cell considerably longer than its petiole; 4 posterior cells.

Described from three ♂ ♂ in Indian Museum from Sureil, Darjiling District, 5,000 ft., iv, v-17 (*Kemp*).

***Limnophila inconsequens*, sp. nov.**

♂. S. W. India.

Long. 5—6 mm.

Head brownish-yellow; antennae and palpi dark brown, base of former more or less and to an irregular extent pale.

Thorax and *abdomen* brownish-yellow, hinder half of segments of latter blackish, sometimes all the dorsal surface of abdomen blackish; genitalia brownish-yellow.

Legs wholly dull brownish-yellow; femora rather darker towards tips.

Wings grey, shining, moderately iridescent; four posterior cells. Marginal cross vein present, joined to the short oblique upper branch of 2nd vein; 2nd submarginal cell distinctly longer than 1st posterior. Anterior cross vein at base of discal cell; posterior cross vein at or just before its middle. Halteres obscurely yellowish, tips darker.

Described from a short series of ♂♂ from Castle Rock, N. Kanara District, 11—26-x-16 (*Kemp*).

This species is without any special character, but may be easily recognised from the table of species.

It bears considerable resemblance to *glabra* but possesses only four posterior cells.

***Limnophila flavipennis*, sp. nov.**

(Plate viii, fig. 14.)

♀. Darjiling.

Long. $15\frac{1}{2}$ mm. to end of ovipositor.

Head and proboscis greenish-grey with a brown irregular median stripe from neck to antennae; palpi and antennae dark brown, scapal joints paler. Neck and collare pale yellowish-grey with a dark brown stripe each side of former.

Thorax wholly greenish-grey with the three usual dorsal stripes olive green.

Abdomen dark brown with hind margins of segments and sides narrowly rather light brown; belly similar.

Legs.—Coxae greenish-grey, rest of legs blackish-brown, base of fore femora paler brown.

Wings yellowish with dark brown markings. A transverse streak just beyond humeral cross vein, carried along bases of both basal cells, narrowing gradually; a moderately narrow stripe from costa to 4th vein, situated at one-third the length of the wing; a similar stripe widening hindwards, from costa to 4th vein, passing over base of 3rd vein; an apparent continuation of this stripe, only narrower, beginning at 5th vein and reaching hind border of wing; a stripe, comprising within it some clear spots, beginning on costa at tip of 1st vein, continuing over the "cross veins" to 5th vein, where it turns slightly outwards, ending irregularly on wing border; this stripe being wide enough to include a comparatively clear narrow space on each side of the "cross veins"; a branch of this stripe diverging at 3rd vein, continuing over distal side of discal cell, where it divides, the ends reaching the wing border over tips of two last endings of 4th vein in the shape of spots with a clearer centre; a similar spot over tip of 2nd posterior cell; a short vertical stripe from costa over marginal cross vein ending at lower branch of 2nd vein; a similar one over tip of 1st submarginal cell and a small spot at extreme wing tip. Veins dark brown; halteres yellowish.

Described from a unique ♀ in my own collection taken by me at Darjiling, 6,900 ft., 17-v-17.

***Limnophila ornatipennis*, sp. nov.**

(Plate vii, fig. 5.)

♂ ♀. Darjiling.

Long. 8—9 mm.

Head.—Frons, face, occiput and proboscis orange, a little darker here and there, and with scattered pale hairs; a row of black stiff hairs across the vertex; epistome with several rather long stiff brown hairs; palpi dark brown, hairy. Antennal scape dark brown; basal joint of flagellum enlarged, bright chrome yellow, remaining joints light brown.

Thorax, including the distinct ring-like collare, scutellum and metanotum brownish-yellow; pleurae rather darker and more brownish; a little whitish shimmer on mesopleura and sternopleura.

Abdomen rather dark brown ochre tinged with yellow about discs of segments; sparsely pale pubescent and with a whitish shimmer on dorsum and sides in certain lights. Genitalia in ♂ dark brown; a broad dorsal plate, the centre elevated sharply like an inverted V; a large bright yellow basal joint with concolorous hairs and comparatively small brown hook-like 2nd joint. Ovipositor brownish-yellow.

Legs brownish-yellow, hind coxae rather darker; a just perceptible pre-apical darker band on all femora; tips of tarsi brownish.

Wings rather dark brownish-grey, rather darker over stigma, bifurcation of 2nd and 3rd veins, apical two-thirds of 3rd vein and tips of veins in its vicinity, and along 5th vein. Small pale spots are distributed as follows. Costal cell divided by transverse dark narrow lines into about ten small pale spots, some quite clear, others pale grey; the two largest and clearest at about middle of costa, with a similar spot contiguous, just below auxiliary vein. A semicircular spot just below stigma, nearly reaching 3rd vein, and beyond it on the costa a triangular one in 1st submarginal cell; one in 2nd submarginal cell and one at tip of each posterior cell, and three or four in each basal cell. 1st posterior cell with a larger basal and two central smaller spots; 2nd posterior cell with only the apical spot and a faint very small one at base; 3rd posterior cell with a larger one near base; 4th posterior cell with a basal smaller one. Discal cell with a larger middle one and a smaller one at base and tip; anal cell with three larger approximately equidistant ones and a small one at tip; 1st axillary cell with a large basal one extending to the middle, and a rather large one connecting with 3rd spot in anal cell, and contiguous with wing-margin; 2nd axillary cell with one before the middle and one at tip. Halteres pale yellow with cream yellow knobs.

Described from a type ♂ from Soom, Darjiling District, 4,000–5,000 ft., 14-vi-14 and type ♀ Darjiling, 7,000 ft., 12-vi-14 (both *Gravely*).

The above description of the wing applies to the ♂; the ♀ shewing slight differences, but not enough to prevent the species being recognised without doubt.

Note on ? gen. nov. near *Limnophila* from Japan.

In addition to 7 ♀ ♀ of a *Limnophila* with a ♂ that may belong to the same species which latter I am unable to identify, Dr. Annandale captured four ♂ ♂ at Otsu, near Kyoto, Japan, 6-x-15, which I fail

to place generically. These four specimens (further specimens in spirit) represent a conspicuous species with a very unusual venation, yet undoubtedly allied to *Limnophila*, though no tibial spurs are perceivable. The costa is broadly yellowish; a narrow brownish-yellow curved streak from fork of 2nd vein, embracing the discal cross vein and reaching the hind margin of the wing. Another similar streak from the fork of the 2nd vein, suffusing the anterior and posterior cross veins. Body and legs practically wholly pale yellow. This species was found by Dr. Annandale dancing in a small swarm about a foot and a half from the ground at dusk in a shady lane near Kyoto, Japan, 6-x-15. There are several genera in Limnophilini that I am unable to compare, the works in which they are described not being accessible in India.

EPHELIA, Sch.

fascipennis, Brun., *Fauna Brit. Ind. Dipt.*, p. 526 ♂ (1912). Kurseong; Pashok, Darjiling District, 3,500 ft., vi-16 (*L. C. Hartless*). Edwards records a ♀ from Arisan, Formosa, 8,000 ft. (*Nitobe*) as probably this species, and Mr. Kemp took one at Tura, Garo Hills, Assam, 1,200–1,500 ft., vi-17. The apical femoral rings are quite black.

ornata, Brun., *Fauna Brit. Ind. Dipt.*, p. 527 ♀ (1912). Kumaon District.

Types of both above species in Indian Museum.

DICRANOPHRAGMA, Os. Sac.

pulchripennis, Brun., *Fauna Brit. Ind. Dipt.*, p. 524 ♂ (1912). Darjiling District.

A specimen from Bhoirakund, Assam-Bhutan Frontier, Darrang District, 18—22-x-12 (*Kemp*), has the wing markings slightly different, also the legs bear much longer and more distinct pubescence.

gracilis, *id.*, *Rec. Ind. Mus.* VIII, p. 156 ♀ (1913). N. E. Indian Frontier.

Types of both species in Indian Museum.

remota, de Meij., *Tijd. v. Ent.* LVI, Supp. 1913, 1 ♂ ♀, pl. i, 1, wing (Mar. 1914). Java.

Dicranophragma multipunctipennis, sp. nov.

(Plate viii, fig. 17.)

♂. Darjiling.

Long. 7 mm.

Head.—Occiput dark yellowish-grey; frons darker brown, a narrow regular median stripe along both; proboscis and palpi dark brown; antennae yellowish, 1st scapal joint dark brown.

Thorax.—Dorsum yellowish-grey, considerably sunken on each side just behind anterior border, with (seen from in front) a curved dark

brown stripe and a small black spot below it, both in the sunken space. Scutellum and metanotum yellowish-grey; sides of thorax moderately dark brown.

Abdomen brownish-yellow with yellow pubescence; hind margins and sides of segments broadly but rather irregularly dark brown. Belly similar; genitalia concolorous.

Legs (front and hind pair missing). Coxae dark brown, remainder wholly yellow.

Wings pale grey with four larger (though still comparatively small) brown spots on costa and very numerous minute pale brown spots. The first of the larger spots placed just before one-fourth of the wing, reaching to hind margin of 2nd basal cell; a similar stripe-like spot just before middle of wing reaching to hind margin of 1st basal cell; a darker brown triangular spot over stigmatic region (the largest spot of all) extending, gradually narrowing, over "cross veins," disappearing at wing border over tip of 5th vein; a roughly triangular preapical spot with its apex reaching hind margin of 2nd submarginal cell, and an apical spot extending from tip of 1st submarginal cell to 3rd posterior cell. Very numerous small paler brown elongate or oval dots or spots placed transversely to axis of wing in all the cells, very few being situated actually on the veins. Halteres pale yellow.

Described from a unique ♂ in my own collection taken by me at Darjiling, 15—19-v-17

***Epiphragma kempi*, Brun.**

Edwards has suggested the identity of this with *signata*, de Meij., but though closely allied the wing markings are sufficiently constant to warrant ranking it as distinct. Two ♂♂ and two ♀♀ from the Garo Hills show slight differences but are obviously all of one species. In all of them the extra cross vein in the costal cell is distinctly though narrowly suffused. The new species *vicina* is also closely allied in the wing pattern but I am convinced all three are quite good species.

***Epiphragma klossi*, sp. nov.**

(Plate viii, fig. 16.)

♂. Malay States.

Long. 9 mm.

Head cinereous; 1st scapal joint cinereous, large, long, cylindrical; 2nd dark, short; 1st flagellar joint longer and larger than 2nd scapal, orange; rest of flagellum black; palpi blackish-grey.

Thorax yellowish-grey, a broad transverse blackish band in front of suture, not reaching sides; a median reddish-brown narrow stripe from anterior margin, narrowing hindwards and reaching the transverse band, and on each side of this stripe a longitudinally placed oval blackish spot clear of the margins, and contiguous to another similar spot on lower edge of dorsal margin in front of wing base; hind part of dorsum yellowish-grey with darker marks; scutellum and metanotum grey with tomentose yellow pubescence, former a little blackish basally.

Abdomen dark nut-brown, extreme hind margin of each segment pale; genitals concolorous.

Wings pale grey with a brown pattern much resembling that of *E. kempi*, Brun. The general impression of this pattern is that of three circles with flattened tops; the first near the base, reaching from the costa to the 6th vein, contiguous to the 2nd circle which extends from costa to 5th vein. 3rd circle more nearly oval, placed a little slanting, reaching from 1st to 5th veins, the upper outer part broken in upon by a longitudinal spot filling basal third of 2nd submarginal cell; a similar spot over stigmatic region, ending at tip of 1st vein. Contiguous to inner end of this spot, a very small dark brown circle on costa, and between this small circle and the top of the 2nd large "circle" first described, a short transverse stripe from costa to 1st longitudinal vein, followed (distally) by an inverted V, similarly placed. At tips of upper and lower branches of 2nd longitudinal vein, a narrow spot extending into 2nd submarginal cell; an oval spot over outer side of discal cell, reaching to lower branch of 2nd longitudinal vein, extended downward and curving basally across middle of 5th posterior cell and nearly filling tips of anal and 1st axillary cells. Tips of 3rd vein and all endings of 4th vein with a small spot on each; the first two connected with a spot covering base of 2nd posterior cell, which is itself joined narrowly to the oval spot over outer side of discal cell. Anterior cross vein and base of discal cell narrowly infuscated, forming a short stripe in middle of 3rd "circle." From the 2nd "circle" a stripe passes through anal cell, and bending distally broadens and ends on hind margin over tip of axillary vein. Basal third of 2nd axillary cell brown with a square spot about its middle. Extreme base of wing brown; costa at extreme base clear; humeral cross vein narrowly infuscated, and a short stripe between this and absolute base of costa. A minute dot here and there contiguous to the various spots, or isolated, apparently of irregular distribution. Halteres dark grey.

Described from a unique ♂ in good condition in the Indian Museum from Ginting Bidai, 2,000 ft., Selangor-Pahang Frontier, Federated Malay States, April 1917 (*C. Boden Kloss*).

Easily recognised from *kempi* by the wholly black femora.

***Epiphragma vicina*, sp. nov.**

(Plate viii, fig. 15.)

♀. Assam.

Long. 10 mm. to tip of ovipositor.

Head yellowish-grey; an oval blackish transverse spot on vertex, continued hindwards as a gradually narrowing median stripe on occiput; a post-ocular row of stiff hairs and smaller irregular hairs. Proboscis brownish-yellow; palpi dark brown; antennal 1st scapal joint grey, 2nd black, 1st flagellar joint orange, a little longer than 2nd scapal, remaining joints black.

Thorax rather bright brownish-yellow, prothorax a little paler; collare with transverse dark brown mark above. Dorsum with a very short median dark stripe and two broader and rather longer outer stripes, all connected narrowly on anterior margin; these outer stripes extending nearly to a pair of large dark, more or less squarish spots in front of suture, narrowly separated from one another. Ground colour

behind the suture brownish-yellow, with a dark brown half-moon spot with its convex side hindward; hind margin of dorsum and the scutellum dark brown. Sides of thorax yellowish-grey with dark brown marks; metanotum yellowish-grey.

Abdomen dark mahogany brown, hind borders of segments very narrowly yellowish; belly greyish; genitalia bright shining brown, basal part of lower valves dark brown.

Legs yellow; coxae and trochanters marked with black; a subapical moderately narrow black ring on femora.

Wings pale grey, with a darker pattern resembling that of *kempi*, especially on basal half. In the distal half it is broken up into smaller spots varying slightly in the individual. Halteres dark, clubs pale grey.

Described from two ♀♀ in the Indian Museum from above Tura, 3,500–3,900 ft., vii-17 (*Kemp*): viii-17 (*Mrs. Kemp*), and one ♀ from Sureil, Darjiling District, 5,000 ft., 11–31-x-17 *type* (*Annandale and Gravelly*).

Section *ANISOMERINI*.

GYNOPLISTIA, Westw.

occipitalis, de Meij., *Nova Guin. Res.* IX, p. 310 ♂ (1915).

Papua. The unique type in (?) Amsterdam Museum.

No type species appears to have been selected for this genus; I therefore propose *Ctenophora vilis*, Walk., the first of the two species included by Westwood at the erection of his genus.

ERIOCERA, Macq.

The recent additions in new species to this genus have been very numerous yet probably very many oriental forms remain to be discovered.

ctenophoroides, Edw., *Ann. Mag. Nat. Hist.* (8) VIII, 64 ♂ ♀ (1911). Ceylon.

scutellata, *id.*, *loc. cit.*, p. 65 ♂ ♀ (1911). Ceylon.

tuberculifera, *id.*, *loc. cit.*, p. 66 ♀ (1911). Ceylon.

fusca, *id.*, *loc. cit.*, p. 66 ♂ ♀ (1911). Ceylon.

Types of above four species in British Museum.

angustipennis, Enderl., *Zool. Jahr.* XXXII, 33 ♂ (*Physecrania*) (1912). Sumatra.

pannosa, *id.*, *loc. cit.*, p. 40 ♂ ♀ (1912). Sumatra.

gamma, *id.*, *loc. cit.*, p. 42 ♂ ♀ (1912). Sumatra.

sauteriana,¹ *id.*, *loc. cit.*, p. 42 ♀ (1912). South Formosa.

paenulata, *id.*, *loc. cit.*, p. 43 ♀ (1912). Sumatra.

Types of above five species in Stettin Zoological Museum.

rufithorax, Brun., *Fauna Brit. Ind. Dipt.*, p. 534 ♂ ♀ (1912) (pl. vii, fig. 10). Kandy.

tenuis, *id.*, *loc. cit.*, p. 539 ♂ (1912). Nilgiri Hills.

aterrima, *id.*, *loc. cit.*, p. 540 ♀ (1912). Travancore.

elongatissima, *id.*, *loc. cit.*, p. 542 ♂ (1912). South India.

flavipes, *id.*, *loc. cit.*, p. 544 ♂ (1912). Kurseong.

¹ Edwards records from Kotosho Is., Formosa, 20-vii-12 (*Shiraki*) and from Arisan, Formosa, 8,000 ft., 10-x-12 (*Nitobe*).

testacea, *id.*, *loc. cit.*, p. 548 ♀ (1912). Nilgiri Hills.

nigerrima, *id.*, *loc. cit.*, App. p. 571 ♀ (1912), (pl. vii, fig. 16). Darjiling District.

triangularis, *id.*, *loc. cit.*, App. p. 572 ♂ (1912). Nilgiri Hills.

Types of all species from *rufithorax* to *triangularis* inclusive in Indian Museum.

nigrina, Riedel, *Entom. Mitt.* II, p. 273 (1913). Kankao, Formosa ♂ ♀, vii-ix-1912. Type in Deut. Ent. Mus. Cotype in Riedel coll.

xanthopyga, de Meij., *Tijd. v. Ent.* LVI, Supp. p. 3 ♂ ♀ (Mar. 1914). Java.

unicolor,¹ *id.*, *loc. cit.*, LVIII, Supp. p. 12 ♂ ♀, 1915 (1916).

simalurensis, *id.*, *loc. cit.*, p. 13 ♂ ♀, 1915 (1916).

Both species from Sinabang, Simalur Island, off the west coast of Sumatra. Types in Amsterdam Museum.

rubriceps, Edw., *Ann. Mag. Nat. Hist.* (8) XVIII, p. 253 ♀ (1916). Taipin, Formosa. Unique type in British Museum.

lativentris, Bezzi, *Phil. Jour. Sci.* XII, Sect. D, p. 113 ♂ (1917). Luzon (*Baker*).

crassipes, *id.*, *loc. cit.*; p. 114 ♂ ♀ (1917). Luzon (*Baker*).

In his paper on Javan Tipulidae Alexander notes the following five species: *E. verticalis*, W.; *acrostacta*, W., *basilaris* W., *mesopyrrha*, W., and *cingulata*, Meij. He also gives figures of the wings of the first two and the last one.

***Eriocera verticalis*, Wied.**

Described as a *Megistocera*, from Java. The prominent vertex and frons forming a considerable bump at the top of the head renders this species conspicuous, especially in conjunction with the enormously produced antennae, which are about three to three and a half times as long as the whole body. It is excellently figured by Van der Wulp (*Tijd. v. Ent.* XXXVIII, pl. ii, fig. 6, 7). One ♂ from Bageshwar, Kumaon District, 3,500 ft., 25-v-09 (*A. D. Imms*), and one ♂ from Pusa Bihar, at light, 10-ix-15, the latter in the Pusa collection.

***Eriocera cingulata*, Brun.**

(Plate vii, fig. 7.)

This species, described by me in the Fauna volume, App. 570 ♂, (1912) must be renamed, owing to *E. cingulata*, Meij. The name *cincta* is therefore proposed.

Riedel (*Ent. Mitt.* II) records *E. nigripennis*, Meij. and *E. sauteriana*, Ender. from Formosa.

***Eriocera flavipes*, Brun.**

(Plate vii, fig. 15.)

A ♂ from Sureil, Darjiling District, 5,000 ft., iv-v-17 (*Kemp*) is probably this species. The tibiae are yellowish-brown; the posterior

¹ Edwards records from Horisha, Formosa, 1,000 ft. (*Maki*),

cross vein is at the middle of the discal cell in one wing and near the base in the other. There are traces of gold dust spots towards the sides of three of the middle abdominal segments and I am not altogether satisfied with the identity.

Table shewing general grouping of oriental species of ERIOCERA.

A. Thorax mainly or wholly yellow or reddish, as compared with black or brownish. ¹	
B. Abdomen principally yellowish or reddish	
C. Wings dark, without distinct pale markings.	
(a) Five posterior cells .	<i>plecioides</i> , Walk., <i>angustipennis</i> , Ender., <i>aurantia</i> , sp. nov.
(b) Four posterior cells	<i>nigroapicalis</i> , sp. nov. <i>pachyrhina</i> , Os. Sac., <i>rubescens</i> , Walk., <i>pyrrhochroma</i> , Walk. <i>paenulata</i> , Ender.
(c) Number of posterior cells unstated . .	<i>scutellata</i> , Edw.
CC. Wings dark, always with distinct pale markings . . .	
BB. Abdomen principally black or brown .	
AA. Thorax mainly or wholly black, blackish, brown or dark grey, as compared with yellowish or reddish (in <i>gravelyi</i> sometimes partly or wholly ferruginous red; in <i>pulchrithorax</i> , ash-grey).	
D. Abdomen principally yellowish or reddish. ²	
E. Very small species, 6 mm. .	
EE. Larger species, 12 mm. upwards.	
(a) Five posterior cells	<i>optabilis</i> , Walk.
(b) Four posterior cells	<i>bicolor</i> , Macq., <i>semilimpida</i> , Brun. <i>dichroa</i> , Walk., <i>albonotata</i> , Lw., <i>simalurensis</i> , Meij., <i>testacea</i> , Brun., <i>pulchrithorax</i> , sp. nov., <i>rufiventris</i> , sp. nov., <i>tripunctipennis</i> , sp. nov.
(c) Number of posterior cells unstated .	<i>tuberculifera</i> , Edw.
DD. Abdomen principally blackish or brown; the ground colour never pale (in <i>maculiventris</i> dorsal surface mainly orange except at sides and tip).	
F. Wings absolutely clear .	
FF. Wings dark, with or without pale markings.	
(a) Five posterior cells.	<i>crystalloptera</i> , Os. Sac.
G. Legs black or dark brown . . .	
GG. Legs yellow	
(b) Four posterior cells.	<i>basilaris</i> , Wied., <i>leucotelus</i> , Walk., <i>mansueta</i> , Os. Sac., <i>unicolor</i> , Meij., <i>gravelyi</i> , sp. nov. <i>perennis</i> , Os. Sac., <i>plumbicincta</i> , Brun.

¹ The terms used in this table such as "mainly yellowish or reddish" must not be taken too literally, and allowance must be made for individual variation which is not uncommon in this genus.

² A considerable portion is yellowish in *bicolor*, *semilimpida* and *albonotata*,

H. Wings unmarked	<i>aterrima</i> , Brun. ; <i>caliginosa</i> , sp. nov.
HH. Wings always with yellow or whitish markings.	
I. Very large species, 25 to 31 mm.	<i>tenuis</i> , Brun., <i>kempi</i> , sp. nov., <i>elongatissima</i> , Brun.
II. Species normally below 20 mm. ¹	
J. Legs yellow	<i>albipuncta</i> , Wulp., <i>greeni</i> , Brun., <i>flavipes</i> , Brun., <i>decorata</i> , sp. nov.
JJ. Legs black	<i>nepalensis</i> , Westw., <i>sumatrensis</i> , Macq., <i>gamma</i> , Ender., <i>sauteriana</i> , Ender., <i>rufibasis</i> , Brun.
(c) Number of posterior cells unstated	<i>verticalis</i> , Wied., <i>lunigera</i> , Walk., <i>morosa</i> , Os. Sac., <i>fusca</i> , Edw., <i>nigripennis</i> , Meij.

In the above table a fair amount of latitude must be allowed for, as it is only intended as a rough grouping of species on comparatively easy characters. If a more critical table be attempted, other and more important characters would be adopted. For easy reference it may, however, prove useful if the terms used are not construed too literally.

Eriocera aurantia, sp. nov.

♀. Darjiling.

Long. 12 mm.

Whole body rich deep orange except tip of proboscis brownish and palpi black; flagellum of antennae brown with pale pubescence; frons rather prominent. Some indistinct and irregular brown markings on dorsum of abdomen. Legs dark brown except coxae rich orange and base of femora more or less yellowish.

Wings uniformly rather dark brown; no stigma; anterior cross vein at extreme base of discal cell; posterior cross-vein at middle of discal cell; 2nd posterior cell petiolate; 5 posterior cells; halteres, stems yellowish, clubs black.

Described from two ♀♀ in the Indian Museum from Kalimpong, 600–4,500 ft., 24-iv—10-v-14 (*Gravelly*). What is probably an immature ♂ of this species is represented by a specimen from Darjiling, 7,000 ft 12-vi-14 (*Gravelly*).

Eriocera nigroapicalis, sp. nov.

♀. Darjiling.

Long. 12 mm.

Very like *aurantia* but quite distinct.

Frons very dark brown; proboscis, palpi and occiput black, with scattered hairs; antennae black, with grey reflections. Last four abdominal segments quite black, ovipositor orange. Legs black except about basal third of femora yellowish; tibiae dark brownish-yellow tinged.

Wings uniformly moderately dark brown; stigma distinct, rather large, black; 5 posterior cells. Anterior cross-vein at extreme basal corner of discal cell; posterior cross-vein barely reaching its lower corner as the 5th posterior cell is only in punctiform contact with the

¹ *Nepalensis* sometimes attains a length of 25 mm.

discal cell, the lower side of which is formed wholly by the bases of the 3rd and 4th posterior cells. 2nd posterior cell sessile. Halteres small, black.

Described from a unique ♀ in the Indian Museum from Kalimpong, 24-iv—10-v-14 (*Gravelly*).

***Eriocera pulchrithorax*, sp. nov.**

♀. Cochin.

Extreme length to tip of ovipositor
18 mm.

Head wholly ash-grey, including scape. Proboscis and palpi blackish; flagellum of antennae with two first joints yellowish, remainder black. Scape, frons and occiput with a few black hairs.

Thorax uniformly and wholly ash-grey, with black markings, distributed as follows. A pair of median narrow stripes, nearly contiguous, from anterior margin nearly to suture; behind the suture a large oval spot on each callosity with a distinct round smaller one in front of each. A narrow line just below sides of dorsum; a round spot on mesopleura; a large oval transverse spot on hind margin of scutellum; a large spot on each anterior corner of mesonotum, a small one on each posterior corner, with a narrow median line. All these spots black.

Abdomen.—1st joint black, remainder bright chrome yellow; a narrow reddish hind margin to each segment; last two segments deep velvet black; ovipositor orange.

Legs.—Coxae ash-grey, remainder of legs brownish-yellow, tips of femora, of tibiae and of tarsi joints black.

Wings rather dark brown; extreme tip narrowly white. Anterior cross vein near middle of discal cell, posterior cross vein towards its tip. Four posterior cells; halteres black.

Described from a unique ♀ in the Indian Museum (middle legs missing) taken on the Forest Tramway, mile 10 to 14, 0—300 ft., Cochin State, 28—29-ix-14 (*Gravelly*).

***Eriocera rufiventris*, sp. nov.**

♂ ♀. Cochin.

Long. 17 mm.

Head and *thorax* wholly black; pleurae with slight grey reflections in certain lights; antennae and palpi thinly pilose.

Abdomen.—1st segment black; remainder wholly bright reddish-orange; genitalia concolorous, hypopygium with black hairs; 2nd joint of claspers long, black, hook-like; ovipositor very long, bare.

Legs in ♂ black, coxae and about basal third of femora brownish-yellow; in ♀ dark brownish-yellow, passing at first sight for blackish, tips of femora darker.

Wings moderately dark brown; anterior cross vein at base of discal cell. Four posterior cells; halteres nearly black.

Described from one ♂ and one ♀ in the Indian Museum from Parambikulam, Cochin State, 16—24-ix-14 (*Gravelly*); and one belonging to Mr. Fletcher, taken by him at Coorg, S. India, 24-x—16-xi-15.

This species comes in my table next to *testacea* Brun.

***Eriocera gravelyi*, sp. nov.**

(Plate vii, fig. 9.)

♂ ♀. Darjiling District and Assam.

Long. 14 to (extreme ♀)
24 mm.

Head blackish-grey with short bushy hairs; proboscis shining black, labella dull yellowish at base; palpi and antennae black.

Thorax normally velvet black, including scutellum, metanotum and pleurae, the latter a little duller. Often ferruginous red from anterior margin of dorsum for a considerable distance or even the whole dorsum up to the scutellum, behind which the red is duller and less conspicuous. In some specimens with an all black thorax there is a trace of red sometimes visible if viewed from a low angle in front.

Abdomen velvet black; basal half of 2nd, 3rd, 4th and 5th segments and to a less extent the 6th and 7th segments with a shining steel band which is whitish on its hinder part. Genitalia in ♂ shining black, approximately normal; 1st joint of claspers with short grey hairs, 2nd pointed and curved; a small triangular hairy-tipped ventral style, and a small curved emarginate dorsal plate. In the ♀ basal half of ovipositor bright orange, the remainder shining dark brown.

Legs black or very dark brown, base of femora sometimes brownish.

Wings dark blackish-brown, with a slight violet tinge; both axillary cells distinctly paler. A rather large white spot just beyond the middle lying over both basal cells, and a small one in the marginal cell just above the origin of the 3rd vein. Extreme tip of wing with a small white spot extending over the tips of both submarginal cells and the 1st posterior cell. Marginal cross vein distinctly beyond fork of 2nd vein. Five posterior cells. Halteres black.

Described from several of each sex from Pashok, Darjiling District, 1,000–2,500 ft., 26-v—14-vi-16 (*Gravely*), and from ♂ ♂ and ♀ ♀ from Tura, Garo Hills, Assam, 1,200–1,500 ft., vi, vii and x-17 (*Kemp* and *Mrs. Kemp*).

Types in Indian Museum, cotypes in my collection.

***Eriocera decorata*, sp. nov.**

(Plate vii, fig. 12.)

♂ Darjiling District.

Long. 9 mm.

Head.—Frons and occiput yellowish-grey with stiff black hairs; proboscis and palpi blackish, labella yellowish at base. 1st scapal joint of antennae almost bluish-grey, 2nd joint and flagellum brownish-yellow with black pubescence.

Thorax blackish-grey, ash grey irregularly around margin of dorsum and sides of both scutellum and metanotum; pleurae mainly blackish-grey.

Abdomen blackish; basal half of 2nd and 3rd segments, 4th segment narrowly at base, 5th almost entirely, with grey dust, whilst on the 2nd and 3rd segments the anterior half of the grey band is almost steel-colour. Whole abdomen and belly with soft black pubescence,

Genitalia of moderate size, orange, a narrow dorsal and ventral emarginate plate, claspers apparently normal.

Legs.—Coxae and trochanters black; remainder brownish-yellow with short black pubescence; tips of femora broadly and rather gradually black; tips of tibiae and of first two tarsal joints very narrowly black, rest of tarsi black.

Wings.—Ground colour uniformly dark brown except base of 2nd axillary cell greyish. A large white spot placed just before discal cell, extending over both basal cells, reaching narrowly upwards into marginal cell and also narrowly downwards across anal cell. A smaller whitish spot in marginal cell just beyond marginal cross vein and extending slightly into the cell below. Marginal cross vein (which is very oblique and placed before fork of 2nd vein), anterior and posterior cross veins, and the inner and outer sides of discal cell suffused with yellowish, as is also extreme base of 2nd vein. A small whitish spot just beyond this latter one. A small whitish streak near base of wing from 1st vein, running diagonally across both basal cells. Four posterior cells. Halteres black.

Described from a single ♂ in the Indian Museum from Pashok, 2,000 ft., 26-v—14-vi-16 (*Gravelly*).

***Eriocera tripunctipennis*, sp. nov.**

♂ ♀. South-West India.

Long. 13—15 mm.

Head.—Frons and occiput shining blue-black; proboscis brownish-yellow, black tipped; palpi and antennae black, scape of latter also extreme base of 1st flagellar joint orange.

Thorax, scutellum and metanotum shining deep blue-black with slight grey reflections. Lower edge of dorsum with a rather narrow deep velvet black margin which is shortly interrupted both behind the shoulder (where the black stripe turns distinctly upwards) and in front of wing base. Humeri and prothorax pale livid yellow. Sides of thorax black with more conspicuous bluish-grey reflections, especially on sternopleura.

Abdomen bright orange, 1st segment black on dorsum, remaining segments with narrow black band on posterior margin. Genitalia in ♂ orange, claspers black tipped; in ♀ reddish-brown, tip shining black, the extreme points orange.

Legs.—Coxae orange, base blackish with bluish-grey reflections; femora yellowish at base gradually darkening to black at tips, tibiae and tarsi black.

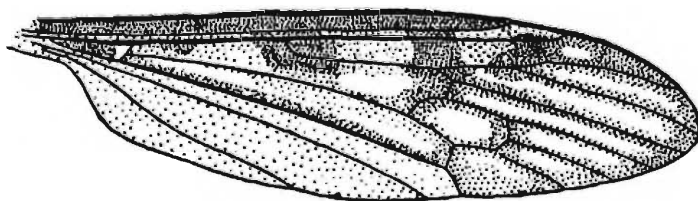


FIG. 7.—Wing of *Eriocera tripunctipennis*, sp. nov.

Wings rather dark grey; four posterior cells; all the veins except 6th and 7th narrowly suffused a little darker; costal cell blackish, a

row of three distinct moderate-sized subequal darker spots placed (1) on base of 2nd longitudinal vein, (2) over marginal cross vein and (3) an intermediate one which is sometimes extended downwards along basal sides of cells as far as 4th longitudinal vein. Distal side of discal cell and posterior cross vein also suffused. Halteres black.

Described from a ♂ and two ♀♀ in the Indian Museum. Castle Rock, 11—26-x-16, *type* ♂; Talewadi, 3—10-x-16, *type* ♀ and second ♀, (both N. Kanara District; *Kemp*).

***Eriocera caliginosa*, sp. nov.**

♀. South-West India.

Long. 9—10 mm.

Head blackish-grey; palpi black; scape of antennae blackish; flagellum dark brown.

Thorax wholly black, moderately shining; metanotum with very dark brown tinge.

Abdomen black, 1st segment with transverse white basal stripe; 3rd and 4th segments with more than basal half of each yellowish, except at sides. Genitalia black.

Legs wholly black.

Wings moderately blackish; four posterior cells; halteres black.

Described from two ♀♀ in Indian Museum from Talewadi, near Castle Rock, N. Kanara District, 3—10-x-16 (*Kemp*).

***Eriocera kemp*i, sp. nov.**

♂ ♀. South-West India.

Long. 25—34 mm.

Head blackish-grey with a deep black band on inner side of eyes, extending over the moderate-sized frontal gibbosity. Proboscis, palpi and antennae black, shortly pubescent, mouth parts sometimes a trifle paler.

Thorax wholly velvet black, a pair of moderately broad closely approximate barely discernible median stripes and also the mesonotal swellings just perceptibly less deep black anteriorly. Sides of thorax dull black, with dark grey reflections in certain lights. Scutellum and metanotum velvet black.

Abdomen, ♂: velvet black; basal third to a half of 3rd segment, and basal half of 4th and 5th segments bright chrome yellow. In the only ♀ present the first yellow band is absent. Genitalia black, moderately shining, small; tip of ovipositor reddish-brown.

Legs all black, microscopically pubescent.

Wings moderately deep blackish; four posterior cells; extreme wing tip whitish; halteres black.

Described from several ♂♂ and a single ♀ in the Indian Museum from Castle Rock, N. Kanara District, 11—26-x-16 (*Kemp*).

An exceedingly handsome species and one of the largest known from the orient.

Eriocera maculiventris, sp. nov.

(Plate viii, fig. 18.)

♂ ♀. Assam.

Long. ♂ $12\frac{1}{2}$, ♀ 15 mm. to tip of ovipositor.

Head blackish-grey with stiff black hairs; proboscis, palpi and antennae blackish, tip of 2nd scapal joint narrowly pale; flagellum black pubescent.

Thorax all black, slightly shining, black pubescent, traces of grey dust on sternopleura.

Abdomen black; dorsal surface of 2nd, 3rd, 4th and 5th segments mainly orange, the colour occupying basal half of 2nd segment except at sides, and the whole of the 3rd, 4th and 5th segments except for a moderately narrow hind border and side margins. In some specimens the orange colour fills nearly all the dorsal surface of all four segments. Genitalia in ♂ black, pubescent, of moderate size; in ♀ orange, apical half shining brown. Belly black, 3rd and 4th segments considerably orange.

Legs black.

Wings blackish, central part, beginning with marginal cell and extending without definite outline to hind margin, clearer, the pale part limited irregularly by the "cross veins." Traces of a very narrow whitish longitudinal streak in 2nd submarginal and 1st posterior cells. Five posterior cells. In ♀ the pale part more extensive, spreading over major part of hinder half of wing. Halteres black.

Described from seven specimens in the Indian Museum, from Tura, Garo Hills, 1,200–1,500 ft., vii-17 and above Tura, 3,900 ft., vii, viii, x-17 (*Kemp and Mrs. Kemp*).

This must be near *perennis*, Os. Sac. by the orange abdominal bands but it differs by the black antennae, the black ultimate abdominal segment in the ♀, and the black femora and tibiae. In *perennis* also the wing is yellowish at the base and has a yellowish-white cross band.

XXIII. NOTES FROM THE BENGAL FISHERIES LABORATORY.

No. 5. PARASITES OF INDIAN FISHES, WITH A NOTE ON CARCINOMA IN THE CLIMBING PERCH.

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Museum ; and BAINI PRASHAD, M.Sc., Superintendent of Fisheries.

(Plates X-XIV.)

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INTRODUCTION.

With the exception of the first part, describing a carcinoma in the climbing-perch, the following paper deals with a variety of parasites of Indian fishes. All the material was collected in the latter half of the year 1917 and the early part of the year 1918, except the Trematoda described.

I. ON THE OCCURRENCE OF COLLOID CARCINOMA ON THE BODY OF THE CLIMBING-PERCH (*ANABAS SCANDENS*, DALD.).

Plate X.

1. *Introduction*.—During April, 1917 investigations relating to the breeding habits of various fishes were made by the Department, in certain *beels* in the Khulna district, Bengal. On May 4th, 1917 a number of young specimens (about 70) of the climbing-perch (*Anabas scandens*, Dald.) roughly 1 cm long were collected from a *beel* and brought to Calcutta. These were kept in an aquarium. No care whatever was taken of them. Between May 4th and the beginning of October the water in which the fish were placed was only changed once. The specimens were not fed except on five or six occasions when the office attendant casually threw in a handful or so of parched paddy (*khari*). By the beginning of October only twenty fish remained, the rest having died and been eaten by the survivors. They had then grown to a length of 14 centimetres. About the beginning of August, it was noticed that two of the fish had developed conspicuous outgrowths on various parts

of the body. On October 10th three fish were found to be affected. These were preserved. The present account deals with the nature and structure of the outgrowths noted above. Observations on the remaining 17 fishes, which are still living under the same conditions (April 1st), are being continued.

2. *Technique*.—The outgrowths were cut off from one of the living fish and preserved in corrosive acetic solution. This fish, along with the two others, was preserved in 90 per cent. alcohol. One of the outgrowths was teased out and permanently mounted in dilute glycerine. Sections of the tumour were also cut with a Minot's microtome by the ordinary paraffin method. These were stained with Heidenhain's iron haematoxylin followed by eosin.

3. *Appearance and occurrence*.—The outgrowths are remarkable in having a mulberry-shaped appearance. They are much divided, nodular masses (fig. 4) attached to the body of the fish by very short stalks. They vary considerably in appearance and occur in various situations. In one fish two masses were present on the left side, one attached a little above the operculum and the second about half an inch in front of the first (fig. 1). A very small one was developing below the eye, whilst a fourth was present on the mid-ventral line in the region of the throat.

In the second specimen (fig. 2) a large outgrowth had developed above the right eye. A similar but very much smaller one was present over the left eye. A third was to be seen on the right side, about half an inch behind the eye. A small outgrowth was hanging pendant from the upper jaw on the right side; another from the lateral edge of the operculum on the right side. A small one was also present on the fin-rays of the ventral fin.

In the third fish (fig. 3) the main outgrowth was on the tip of the snout. A smaller one was attached to the ventral edge of the operculum, on the ventral side, near the throat. Another was situated a little in front of the pelvic fins, whilst still another large outgrowth was to be seen on the base of one of the spines of the dorsal fin. Another small one was also present on the upper margin of the caudal fin.

4. *Structure*.—The tumours are undoubtedly infiltrating epithelial neoplasms, or malignant epitheliomas, designated as Carcinomas by Orth. They are of an alveolo-tubular type, the greater proportion of these being solid. On teasing out a portion of the tumour it is seen to consist of large polygonal cells filled up almost entirely with large numbers of small glistening drops of colloid substance. The nuclei of these cells could not be distinguished in the glycerine mounts. They were, however, seen in the stained sections. The greater portion of the carcinoma is of a regular formation. The epithelium is closely packed, but very extensively vacuolated. Here and there, particularly where the outgrowths arise from the external surface, we find that the alveoli have coalesced to form large tubular cavities. These tubular cavities are lined by epithelium which also is vacuolated. Around the vacuoles, colloid material can be seen as deeply staining granules filling up the rest of the epithelial cells. The core of these wart-like outgrowths consists of connective tissue; pigment corpuscles are present both in the connective tissue and in the epithelial cells.

5. *General considerations*.—A summary of the history of this disease amongst fishes, and the literature relating thereto, has already been given by one of us (2) and need not therefore be recapitulated. These tumours do not occur in fishes living under natural conditions. They only arise when fish are placed under artificial surroundings, such as occur in aquariums and hatcheries. These artificial conditions react on the fish in such a way that anomalous tissue, of thyroid nature, arises, either as a single tumour (as in trout), or a series of tumours (as in the climbing-perch). It is impossible to say whether these tumours are derived directly from the cells of the thyroid gland or not. A specific organism is suspected, but as yet no such organism has been isolated.

The tumours from the climbing-perch described above differ in certain respects from similar tumours described by other writers from other species of fish.

The colloid carcinomas recorded up to the present are rounded structures with smooth surfaces. Ours, as we have pointed out, may present the appearance of a series of closely approximated nodules, attached to each other, and to the body of the fish, by a short stalk. In other cases the surface of the tumour is rugose and the nodular appearance is less distinct. Quite young tumours are flattish or mushroom shaped.

The colloid carcinoma described by one of us (2) from a trout caught in the Punjab was enclosed in a tough fibrous capsule or cyst. The ones described from the climbing-perch are not encapsuled but merely covered with epithelium. It is clear, therefore, that the tumours may either be encapsuled or not, in accordance probably with their point of origin. Gaylord and Marsh (1) in discussing anomalous deposits of thyroid nature in fishes state that: "as the thyroid is a somewhat diffuse organ one might expect to find instances of remotely placed deposits. We are therefore surprised to find the sharp delimitation to the region already described which appears to exist in our wild specimens, with one marked exception, *i.e.*, the jugular pit to which reference has already been made. It has been assumed by some writers that aberrant thyroid deposits in some region might be frequently expected. This has been due to the development of tumour nodules in regions beyond the normal and usual seat of distribution, such as the lower mouth parts and gill arch region. The only outlying tumours of this sort which may be inferred with certainty to arise from original deposits of thyroid are the so-called pit-tumours."

The observations made on the tumors found in the climbing-perch show that thyroid deposits may occur anywhere in the fish, as internal or external growths. It is, however, impossible to decide at present whether such thyroid deposits are original or secondary.

It will be obvious that in the climbing-perch, the tumors being disposed as masses of tissue over the surface of the body, it is not impossible in some cases for the fish to remove them by rubbing the affected part against a solid substance. The tumors are, however, somewhat firmly attached. Whether removal in this manner would invariably result in spontaneous recovery may be doubted, since the tumours in question have a deep-seated origin.

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II. ON SOME INDIAN MYXOSPORIDIA.

Plate XI.

Except for a short note on a species of *Myxobolus* by one of us (9) practically nothing is known about the Indian Myxosporidia. Whilst working out the collections made by the Bengal Fisheries Department during the last few months we found three new species of the genus *Myxobolus*, Bütschli. Two of the species are unicapsulate forms, whilst the third is bicapsulate. A short note on another Myxosporidian of the genus *Sphaerospora*, Thélohan, in the collection of the Zoological Survey of India, is also included here.

***Myxobolus rohita*, sp. nov.**

This interesting parasite was found infesting the gills of *Labeo rohita* (Ham. Buch.). The fishes in question were caught in the Turag river at Mirpur, district Dacca, on the 2nd of June, 1917. A second lot of specimens was obtained on the 22nd of January, 1918. Unfortunately no observations were made on the living material, but well preserved specimens of the gills have enabled us to make a fairly complete study of the parasite. The infection was of a very heavy nature, involving all the gills of the fish in question, and, as will be seen from fig. 1, the cysts were scattered all over the surface of each of the gills. In one case 53 such cysts were counted on one surface of a single gill. The infection was equally severe over the rest of the gills of both the right and left sides.

Serial sections of the cyst, 3 to 4 μ thick, were cut by the ordinary paraffin method, and stained with Giemsa's solution, or Heidenhain's iron haematoxylin, followed by eosin. Besides sections, cysts were dissected and the spores thus removed were examined unstained, and also stained with Giemsa's solution. The sections of the cysts were found to be quite satisfactory and showed all the necessary stages.

The cyst (fig. 1).—The cysts preserved in spirit are of a creamy-yellow colour, measuring 3.1—3.8 mm. long and 0.8—1.2 mm. broad. They lie with the long axis of the cyst parallel to the gill-filaments. The cyst varies in shape from oval to cylindrical. The ends are rounded while the surface attached to the gill-filaments is flattened. The infected gill-filaments were in no way specially enlarged or different from the other gill-filaments.

The wall of the cyst is formed of a vertically striated portion showing no nuclei. This part takes up the cytoplasmic eosin-stain only. It is covered externally by an epithelium two to three layers thick. Internal to the vertically striated portion of the cyst there is the endoplasmic layer. The layer shows a coarse granular structure; the nuclei, which lie scattered in the cytoplasm, are either round or elongated, and measure 3 to 5 μ in length. No cell limits could, however, be discovered.

In all the cysts examined, spore formation had already proceeded to an advanced stage, and it was clear that the whole of the cavity in the middle of the cyst was occupied by mature spores, whilst the pan-sporoblasts and the immature spores were lying round the periphery. In many cases these pan-sporoblasts were seen lying amongst the nuclei of the endoplasm.

Formation of the spores.—In the endoplasm two sorts of nuclei are to be seen, *viz.*, the vegetative and the generative. The latter always occur in rounded cells, which have been variously designated as “sphères primitives” by Thélohan, “pan-sporoblasts” by Gurley, and “Propagation Zellen” by Keysselitz. They are, as has been described above, of a rounded shape, with a marginally situated nucleus (figs. 2-4). These cells vary in size from 6 to 11 μ , and, in the nucleus, a distinct caryosom can easily be distinguished. The pan-sporoblasts were in all cases seen to divide mitotically into two (figs. 5-9). In this particular the present species differs from *Myxobolus toyamai*, Kudo, where the pan-sporoblasts divide into two or three daughter cells. In the division of the pan-sporoblasts, the chromatin was seen first to form a coiled thread, which later on splits up by mitosis into two parts, one for each of the daughter cells. The next stage that occurs is one in which two cells are united together (fig. 10). These cells are the micro- and macro-gametes, a fact which is evident from the size of the cells. No separate micro- or macro-gametes were found. The next stage in the union of these two cells is the formation of a sinuous chromatin thread in the nucleus of the macro-gamete (fig. 12). The nuclear membrane of the micro-gamete was next seen to disappear. At the same time the nucleus of the macro-gamete showed a chromatin thread, and in the next stage two chromatin spiral threads were to be seen, lying in the cytoplasm of the micro- and macro-gametes respectively. Each of these chromatin threads splits up into two, and four nuclei, two large and two small, are formed in the united cytoplasmic substance of the micro- and macro-gametes (figs. 13-17). In our preparations the next stage seen is a pan-sporoblast cell with five fully formed nuclei, surrounded by definitely marked cytoplasmic areas, and a large chromatin mass lying free (fig. 18). In the final stage ten fully formed nuclei can be distinguished in the mother pan-sporoblast, besides two nuclei for the pan-sporoblast mother cell, and reduction nuclear chromatin particles lying free in the cytoplasm of the mother cell. Intermediate stages are also present. The pan-sporoblast next divides into two daughter cells or sporoblasts, each with five nuclei; two of these unite later on to form the nucleus of the sporoplasm portion of the spore, the one which is seen lying close to a vacuole forms the nucleus for the polar capsule and the other two

are for the spore membrane. Thus the transformation into the adult spore is brought about (figs. 24-25).

Structure of the spore.—A fully formed spore is an elongated pear-shaped body, rounded at the posterior extremity and acutely pointed anteriorly (fig. 26). It is symmetrical bilaterally, but not antero-posteriorly. The size of the spore varies from 30 to 32 μ in length, and from 7 to 8 μ in breadth. The spore-wall is formed of two valves; the point of junction of these valves is distinctly thickened, and can be seen, in a side view, as a slightly raised ridge. The ridge lies parallel to the long axis of the spore. Only one polar capsule is present in each spore. It is of a large size, 22 to 23 μ in length, and has the same shape as the parent spore. In the polar capsule a much coiled thread can be easily seen, as also the opening of the duct for the extrusion of the thread or polar filament at the anterior pointed extremity of the capsule and the spore (fig. 27). The length of the polar filament, in the spores measured, varied from 92 to 97 μ . The nucleus of the capsulogenous cell is seen lying at the periphery of the polar capsule, on one side, near the posterior extremity, as an elongated body. In the protoplasm of the spore itself an iodophilous vacuole, 3.6 μ in diameter, is present. Lying just posterior to it is the nucleus of the spore. A few granules of chromatin were also seen lying scattered in the protoplasm.

Systematic position.—From the preceding description it will be clear that our form is a Myxosporidian. Following Labbe's classification it falls in the Family Myxobolidae, and the genus *Myxobolus*, Bütschli, in having bilateral symmetry and a bi-valve shell, with the valve junction plane parallel to the long axis of the spore, and further in having an iodophilous vacuole in the protoplasm of the spore, and a single polar capsule at the anterior end.

The species of this genus are grouped under two heads, viz., one with a single and the other with two polar capsules. So far, only five unicapsulate species of the genus *Myxobolus* have been recorded. These are :—

- M. piriformis*, Thélohan.
- M. unicapsulatus*, Gurley.
- M. fuhrmanni*, Auerbach.
- M. oculi-leucisci*, Trojan.
- M. toyamai*, Kudo.

Our form, like *M. piriformis* and *M. toyamai*, occurs on the branchiae, and differs in this respect from the other three unicapsulate forms. Compared with all the previously described unicapsulate forms our species is a very large one. The size of the cyst, the spore, and the polar capsule is much larger than in any of the other forms, and these are the characters on which the classification is chiefly based. The shape of the spore slightly resembles that of *M. toyamai*, though the anterior extremity of the spore, instead of being attenuated, is sharply pointed. Calabash-shaped spores, recorded from *M. toyamai*, are not present in our species. For these reasons we consider the present form to be a new one, and have called it *Myxobolus rohita* after the name of the host.

Habitat.—The gills of *Labeo rohita* (Ham. Buch).

Turag river, Mirpur, Dacca district, Bengal, June, 1917. Numerous cysts.

Type specimens in the collection of the Zoological Survey of India (Indian Museum), Calcutta, numbered P $\frac{48}{1}$.

***Myxobolus seni*, sp. nov.**

Cyst (Fig. 28).—Elongated, ellipsoidal, varying in length from 4.7 mm. to 5.4 mm. by 2.9 to 3.7 mm. in breadth. Whitish with black scattered granules on the surface.

Spore (Figs. 29-31).—Body oval, much wider behind than in front and pointed at the anterior end. The size of the spore varies from $13.2\ \mu$ — $13.6\ \mu$ in length and $10.1\ \mu$ — $10.3\ \mu$ in breadth. The spore wall is formed of two valves, the point of junction of these valves is slightly thickened as seen in a side view. There is a single polar capsule about $4\ \mu$ long; in it there is a much coiled polar filament, which in one case measured as much as $43\ \mu$ in length. Iodinophilous vacuole measuring $2.3\ \mu$ is also to be seen.

Habitat.—On the median and caudal fins of *Labeo rohita* (Ham. Buch.) Mirpur, Dacca, 22nd January 1918.

Type specimens in the collection of the Zoological Survey of India, Calcutta, numbered P $\frac{53}{1}$.

Remarks.—This species differs very remarkably from the other species described in this paper as *M. rohita*, in the spores being of a much smaller size, while the cyst is much larger. It differs from all previously described unicapsulate forms in the shape and size of the cyst, the spore and polar capsules.

***Myxobolus nodularis*, sp. nov.**

Cyst (Figs. 32 and 33).—Rounded or slightly elongated, varying in length from 3.5—3.8 mm. and 2.3—2.8 mm. in breadth. Creamy yellow in colour, in one case appearing blackish owing to the large number of black granules scattered in its surface.

Spore (Figs. 34-36).—Ovoidal. The size of a spore is $9\ \mu$ by $7.2\ \mu$. The spore wall is formed of two valves, and the junction of the valves is very thick, as is seen in a lateral view of the spore. There are two capsules of equal size, measuring $3.4\ \mu$ in length. The polar filament in each of the capsules is very much coiled. In a spore in which the filaments were extruded, they measured $18.3\ \mu$ in length.

Habitat.—In the muscles of *Rasbora daniconius* (Ham. Buch.) occurring in two fishes on the sides, and in another as a globular cyst near the anus. Mirpur, Dacca, 7th June 1917.

Type specimens in the collection of the Zoological Survey of India, numbered P $\frac{52}{1}$.

***Sphaerospora* sp.**

We would here record the occurrence of a species of *Sphaerospora*, Thélohan, from Burma. The poor condition of the material did not allow of a complete account of its structure, but the bicapsulate, rounded structure of its spores places it undoubtedly in the genus

Sphaerospora, Thélohan. The cysts occurred in very large numbers, one under each scale. They were found on a specimen of *Barilius barna* (Ham. Buch.) collected in June 1915, by J. Coggin Brown, Esq., of the Geological Survey of India, from the vicinity of the Ruby Mines, Burma.

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III. SOME FISH TREMATODES.

(Plate XII.)

We here describe a new species of the genus *Clinostomum*, Leidy. A small collection of encysted larval Trematodes is also described.

(a) *Clinostomum piscidium*, sp. nov.

Introduction.—The specimens dealt with in this communication were first collected from the mesentery of *Trichogaster fasciatus*, on April 16, 1915, at Khulna, Bengal. Since then specimens have been obtained from the mesentery of *Nandus nandus*¹ (May 1917),

¹ *Nandus marmoratus* of the “Fauna of British India.”

from the same place. On the latter occasion it was found that they were quite common in *T. fasciatus* as well. The specimens were found to be moving freely on the mesentery and were not encysted.

They are flat semi-oval worms (fig. 1), varying in size from 2.8 mm.—5.2 mm. in length by 1.4 mm.—1.8 mm. in breadth. The body is compressed, with a small circular sucker (*s.i.*) at the anterior end, and a much larger spherical sucker-like acetabulum (*s.ii.*) behind the anterior one. The mouth-opening lies within the anterior sucker. There is no pharynx. The alimentary canal is forked, the intestinal caecae (*Int.*) reaching the posterior extremity. These intestinal caecae shew short lateral projections on both sides. The excretory pore (*E. O.*) is situated at the extreme posterior end, connected with a triangular excretory vesicle (*E. v.*), which lies behind the genital organs. The gonads lie in the middle third of the body. The testes (*T*) are roughly pyriform structures with the margins slightly indented, the anterior testis is much larger than the posterior one. From the end of each of the testis the tubular vas deferens (*v. d.*) leads to the base of the large cirrus sac (*c. s.*) situated alongside the anterior testis; the two vasa deferentia here unite to form the slightly swollen vesicula seminalis, which is only the beginning of the much coiled tube lying in the cirrus-sac; the end portion of this tube—the ejaculatory duct—leads into the genital atrium (*G. a.*). The ovary (*ov.*) is an ovoidal structure, with entire margins, lying in between the two testes. From the ovary a thin tubular oviduct after making several loops in the space between the two testes, and receiving a duct from the yolk receptacle, is continued in a straight upward course outside the anterior testis, and then curves inwards to open into the uterus. The uterus (*ut.*) which is a large structure lying in the middle line, and extending anteriorly up to the lower margin of the posterior sucker (*s. ii.*), is constricted posteriorly to open into the genital atrium. The genital atrium (*G. a.*) lies near the anterior edge of the cirrus-sac receiving in its cavity the openings of both the male and the female ducts. The genital pore (*G. P.*), or the opening of the genital atrium, lies in the middle line about the middle of the animal.

The vitelline glands (*v*) lie scattered on the two limbs of the intestine. The vitelline duct (*Vt. d.*) comes from the yolk glands and is seen to be formed of a number of fine branches, the ducts from the two sides meet in the middle to form a sac-like yolk receptacle, which as stated above opens into the oviduct.

A nerve collar (*N. C.*), with two nerves running posteriorly from it, can be seen surrounding the alimentary canal, just before forking takes place.

The hermaphrodite nature of the worm, the two suckers, the position of the acetabulum, the situation of the ovary between the two testes (which are non-digitate), the genital pore being situated posterior to the acetabulum, and the intestine having short lateral projections, place the worm undoubtedly in the genus *Clinostomum*, Leidy (4). The present species, however, differs from all previously described species, and we therefore name it *Clinostomum piscidium*, sp. nov.

Habitat.—The mesentery of *Trichogaster fasciatus*, Bl. Schn., also found on the mesentery of *Nandus nandus* (Cuv. and Val.), Khulna, district Khulna, Bengal, April 1915, and May 1917. Numerous specimens; types in the collection of the Zoological Survey of India (Indian Museum), No. W $\frac{5}{1}$ ⁸.

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(b) ON A SMALL COLLECTION OF ENCYSTED LARVAL TREMATODES OF SOME INDIAN FISHES.

This is a record of the occurrence of encysted cercaria, of five different types, found in various situations in some of the commoner Indian fishes. As the sexual organs were not developed, and as the whole classification of the adult Trematodes is based on the disposition of the generative organs, we are unable to identify them further than to say that they belong to the family Distomidae. The larval characters on which the classification of the redia has been attempted by Lühe (3) and by Lebour (2) do not help in further elucidating the situation of these forms. The classification, according to Lühe, all depends on the different forms assumed by the tails. Lebour's classification depends, on the other hand, on whether the cercariae develop in sporocysts or in redia. As will be clear both these classifications are extremely artificial and are not, in most cases, of much assistance in identification, particularly of encysted forms; in such cases the tail of the cercaria is dropped before encystment and the adult characters have not as yet developed. At the same time we know nothing as to whether the cercaria were developed in sporocysts or in redia.

In all our forms we can distinguish the anterior sucker, and an acetabulum lying near the anterior end on the ventral surface. The alimentary canal is bifurcate and ends blindly, posteriorly. No spines are present. In one of the forms an excretory vesicle is to be seen. From these characters it is obvious that all the forms belong to the Distomidae. We append herewith a table showing the fish-hosts, the size of the parasites, and the situation where found.

Host.	Organ where encysted.	Size.	Locality.
<i>Saccobranchus fossilis</i> , Bloch.	Lateral muscles	0.5 mm. by 0.17 mm. (Fig. 2).	Beel Kola, Khulna, Khulna district, 17th April, 1915.
<i>Ophiocephalus murulus</i> , Ham. Buch.	Wall of intestine	1.2 mm. by 0.3 mm. (Figs. 3 and 3a).	Do.
<i>Ophiocephalus striatus</i> , Bloch.	Lateral muscles	4.1 mm. by 1.7 mm. (Fig. 4).	Do.
Do.	Do.	6.2 mm. by 3.6 mm. (Fig. 5).	Do.
<i>Trichogaster fasciatus</i> , Bl. Schn.	Do.	1.3 mm. by 0.6 mm. (Fig. 6).	Khulna market, Khulna district, 16th April, 1915.

Literature cited—

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2. Lebour, M. V.—A review of the British Marine Cercariae. *Parasitology*. Cambridge, 1912.
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IV NOTE ON *DISCOCEPHALUM PILEATUM*, LINTON.

Our specimens of this tapeworm were collected from *Carcharinus gangeticus*, Müll. and Henle, collected in the Pusser river, Khulna. on October 21st, 1917.

We had 7 specimens.

Length 17 cms.

Number of proglottides in a specimen, counted—100.

Length of neck—5.2 mm.

Last proglottid—

Length—5.2 mm.

Breadth—2.1 mm.

The specimens differed from Linton's in the following particulars—

1. Size.

2. Absence of orange coloured bands.

3. Size and shape of the proglottides.
4. Colour being pure white.
5. Genital pores being irregularly alternate.
6. Uterine cavities being absent.

V TWO NEW SPECIES OF PARASITIC COPEPODS.

***Ergasilus bengalensis*, sp. nov.**

(Plate XIII.)

Female (Fig. 1).—Head and first thoracic segment completely fused, with no indication of the line of union. The resulting cephalothorax is more or less elliptical, a little arched dorsally, and about twice as long as broad. No rostrum. First three free thoracic segments less than half the width of the carapace. The third, fourth and fifth thoracic segments regularly diminishing in length and breadth; all three however are distinct. Genital segment barrel-shaped, with the sides evenly rounded, slightly longer than broad and about one and a half times the breadth of the fifth thoracic segment. Abdomen three-jointed and a little more than half the length of the genital segment. First segment longer than the second, which is slightly smaller than the third. The first segment is also longer than the third. Anal laminae rhomboidal, much longer than the last abdominal joint, each tipped with two setae, the inner seta nearly twice the length of the outer one. Egg sacs cigar-shaped, smaller than the animal in length, and one-fourth the breadth of the carapace with the six longitudinal rows of eggs. About 120 eggs in each sac.

First antennae (fig. 2) six-jointed; joints of unequal length and width, last three segments setose, terminal joint with four setae. Second antennae (fig. 3) four-jointed, first joint roughly triangular, with the base attached to the ventral surface of the carapace. The second joint is attached to the anterior upper surface of the first joint, a little below the apex; it is more than twice as long as the first, and the third joint is attached to its chisel-shaped distal extremity. The third joint is slightly smaller than the second, and considerably narrower. The terminal fourth joint has the form of a curved claw.

Mouth parts (Fig. 4).—Labrum (*La*) large, not reaching the base of the first maxillae. Mandibles (*md.*) with the cutting edge curved upwards and forwards, and with a group of spines at their inner edge; mandibular palps large, triangular, densely covered with setae. Basal portion of the first maxillae (*mx. i.*) is an oval papilla with two large spines, of which the inner one is longer than the outer. The second maxillae (*mx. ii.*) have a broad base with a much smaller distal end, this end bearing a tuft of bristles on its anterior margin only. Labrum (*Lb.*) flap-like, with the ends running to the curved portion of the second maxillae.

First four pairs of swimming legs (figs. 5-8) biramose, all the rami three-jointed, except the exopod of the fourth pair, which has two joints. Fifth pair much reduced, knob-like, with a single spine. Basal joint of all quite broad.

The arrangement of the spines on the first four pairs is as follows :—

First exopod	...	...	...	1—0	0—2	1—4
„ endopod	...	...	...	0—0	0—2	1—5
Second exopod	...	...	...	1—0	0—2	11—5
„ endopod	...	...	...	0—2	0—2	1—3
Third exopod	...	...	...	1—0	0—2	11—5
„ endopod	...	...	...	0—2	0—4	1—4
Fourth exopod	...	...	...	0—0	11—4	
„ endopod	...	...	...	0—2	0—2	1—3

Colour of specimens preserved in spirit milky-white, with minute black pigment spots scattered on the dorsal surface of the carapace.

						mm.
Length	...	...	...	...	...	1.22
Length of carapace	...	...	...	...	...	0.71
Breadth of carapace	...	...	...	...	...	0.39
Length of egg-strings	...	...	...	...	...	1.09
Breadth of egg-strings	...	...	...	...	...	0.14

From the gills of *Wallago attu* (Bl. Schn.), Mirpur, district Dacca, Bengal, 3rd June, 1917.

Many specimens. Types in the collection of the Zoological Survey of India, numbered $\frac{977}{10}^4$.

No males were obtained.

***Ergasilus hamiltoni*, sp. nov.**

(Plate XIV.)

Female (Fig. 1).—Cephalothorax a little more than half the entire length and one and a half times as long as broad. First thoracic segment distinctly separated from the head by a groove. Head transversely elliptical, with evenly rounded anterior margin. First thoracic segment three times longer and a little wider than the head, quadrilateral in outline, with acutely rounded corners. Second, third, fourth and fifth thoracic segments diminishing regularly in length but about the same width. Sixth, or the genital segment, thrice as wide as the fifth thoracic; barrel-shaped, with rounded sides.

Abdomen three-jointed, the segments diminishing regularly in length and width, the terminal one deeply notched in the middle. Anal laminae more or less squarish, smaller in width than the last abdominal segment, and tipped with two setae, the inner of which is three times the length of the outer. Egg sacs two-thirds the length of the entire body, ellipsoidal; eggs large, arranged in five longitudinal rows, 60-65 in each sac.

First antennae (fig. 2) six-jointed, joints diminishing regularly in length and breadth; all segments setose. The second antennae (fig. 3) are attached to the ventral surface just posterior to the bases of the first pair. They are four-jointed, first or basal joint large and swollen, the second joint one and a half time as long as the first, third joint

curved and half the length of the second, the fourth or terminal joint has the usual claw-like appearance.

Mouth parts (Fig. 4).—Labrum (*La*) extensively fused with the head, distinguishable only as a curved line reaching the bases of the mandibular palps. Mandibles (*Md*) with a short and broad basal joint, neck long and narrow, the cutting blade much longer than broad, and armed along the inner margin only. The mandibular palps elongated, with seta on the upper surface only. Basal portion of the first maxillae (*mx. i*) reduced to a circular papilla only, with two stout setae arising from the centre. The second maxillae (*mx. ii*) have a broad basal portion, while the distal portion (which is curved along its outer margin) appears as a second segment, articulating with the basal portion; this distal portion bears setae on its upper free surface. Labium (*Lb*) small, flap-like, and triangular in outline.

First four pairs of swimming legs (figs. 5—8) biramose, all the rami three-jointed, except the exopod of the fourth pair, which has two joints. The fifth pair reduced to an elongated process only. The arrangement of spines on the first four pairs is as follows:—

First exopod	...	...	...	0—0	0—1	11—5
„ endopod	...	...	...	0—1	0—1	11—4
Second exopod	...	...	...	0—0	0—2	11—3
„ endopod	...	...	...	0—1	0—1	11—4
Third exopod	...	...	...	0—1	0—1	11—4
„ endopod	...	...	...	0—1	0—1	11—4
Fourth exopod	...	...	...	0—0	11—4	
„ endopod	...	...	...	0—1	0—2	11—4

Colour of specimens preserved in spirit creamy yellow, with a large number of black pigment spots scattered on the dorsal surface of the animal. Eyes blackish, trilobate, in the middle of the head.

						mm.
Length	...	...	...	...	...	0·8
Length of egg-strings		...	...	...	...	0·52
Breadth of egg-strings		...	...	...	...	0·17

From the gills of the *Anabas scandens* (Daldorf). Gosaba, Sunderbans, Bengal, 11th December 1917.

Three specimens. Types in the collection of the Zoological Survey of India, numbered $\frac{9848}{10}$. This species is named in honour of Sir Daniel Hamilton of Gosaba, in recognition of the help given by him in the work of the Fisheries Department.

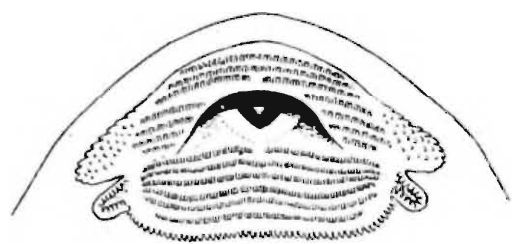
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EXPLANATION OF PLATE X.

- FIG. 1.—Photograph of side view of *Anabas scandens* with Carcinoma.
,, 2.—Photograph of the second specimen.
,, 3.—Photograph of the third specimen.
,, 4.—Enlarged view of the warty Carcinoma, $\times 4$.
,, 5.—T. section of the Carcinoma, outgrowth.



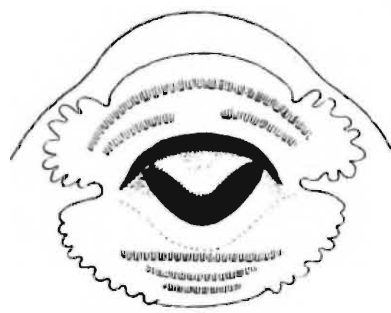
5a x 8.



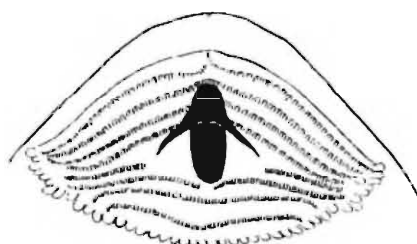
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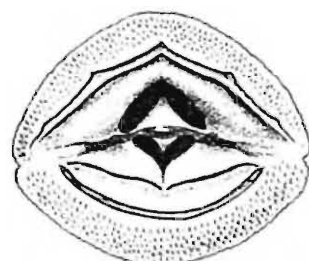
4 x 4.



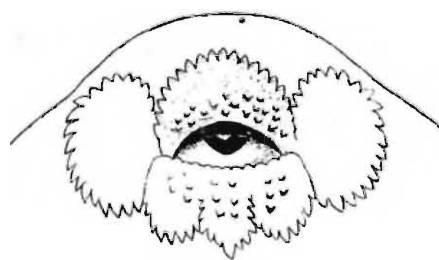
1a x 8.



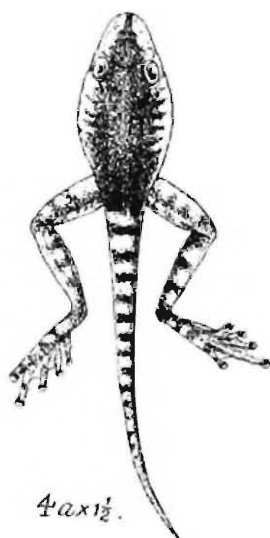
4b x 8.



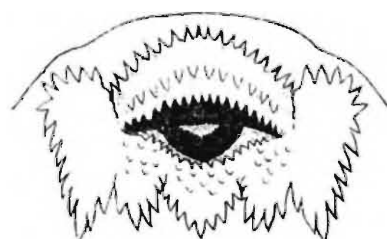
6a x 2.



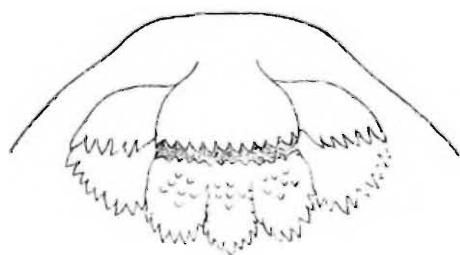
2a x 16.



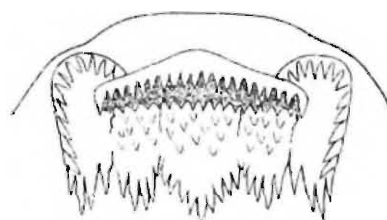
4a x 1½.



3a x 16.



2b x 16.



3b x 16.



3 x 2.



6.



2 x 2.



1 x 2.

EXPLANATION OF PLATE II.

***Rana cyanophlyctis*, Schneider.**

FIG. 1.—Tadpole from Barkuda I., Chilka Lake (nat. size).

***Rana hexadactyla*, Lesson.**

FIG. 2.—Tadpole from Cochin, $\times 1\frac{1}{2}$.

„ 2*a*.—Mouth-disk of tadpole with mouth open, $\times 16$.

„ 2*b*.—The same with the mouth closed.

***Rana tytleri* (Theobald).**

FIG. 3.—Tadpole from northern Bengal (nat. size).

„ 3*a*.—Mouth-disk of tadpole, $\times 8$.

***Bufo fergusoni*, Boulenger.**

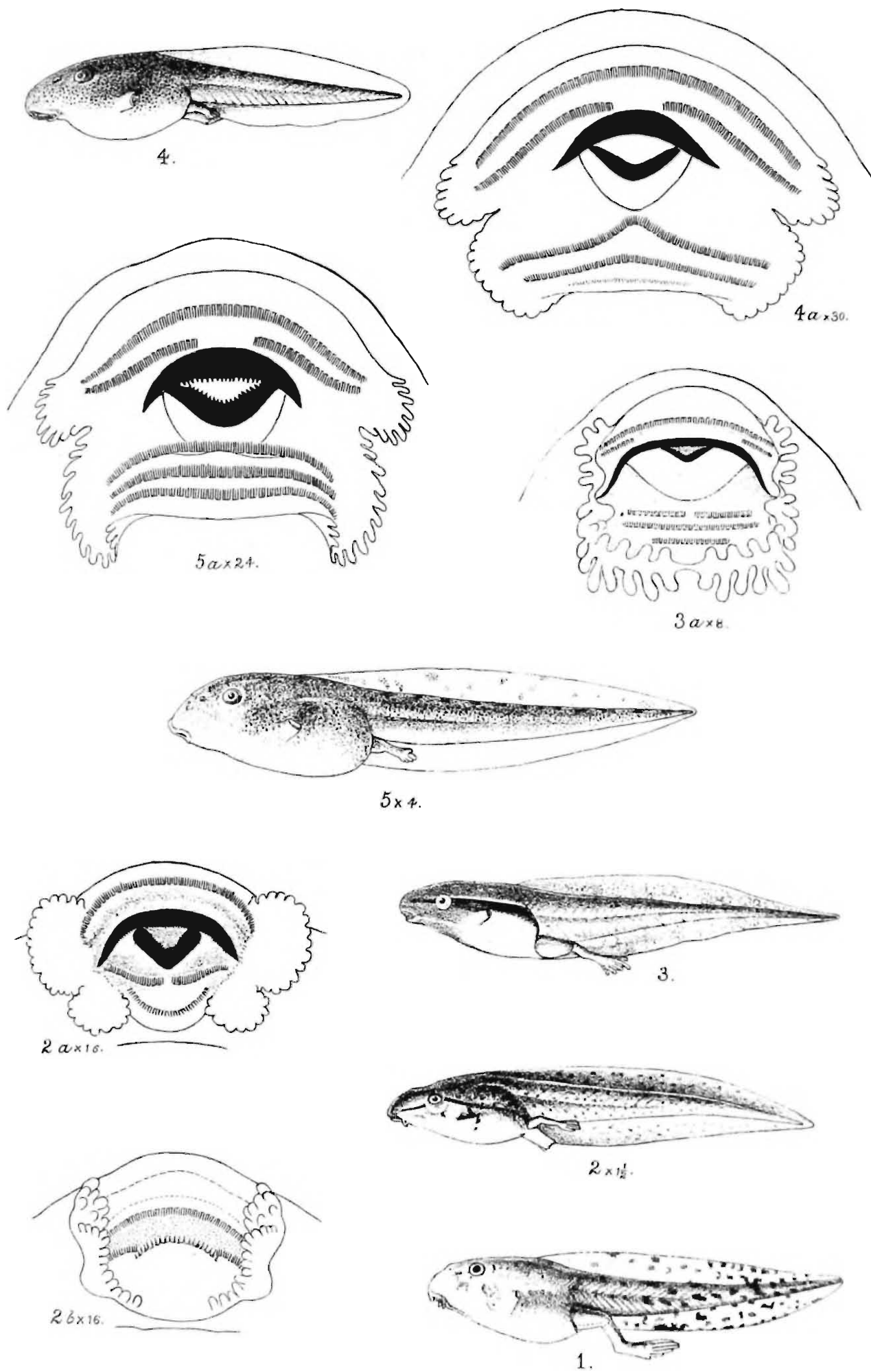
FIG. 4.—Tadpole from Travancore, $\times 4$.

„ —Mouth-disk of tadpole, $\times 30$.

***Bufo stomaticus*, Lütken.**

FIG. 5.—Tadpole from the Punjab, $\times 4$.

„ 5*a*.—Mouth-disk of tadpole, $\times 24$.



A. Chowdhary & S.C. Mondul, del.

A. Chowdhary, lith

INDIAN TADPOLES.

EXPLANATION OF PLATE III.

ABNORMAL INDIAN DUCKS.

Figs. 1, 1*a*.—Hybrid between *Eunetta falcata* (Georgi) and *Chaulelasmus streperus* (Linn.). 2545, Z.S.I.

„ 2, 2*a*.—Hybrid between *Anas boschas*, Linn. and *Querquedula crecca* (Linn.). 20505, Z.S.I.



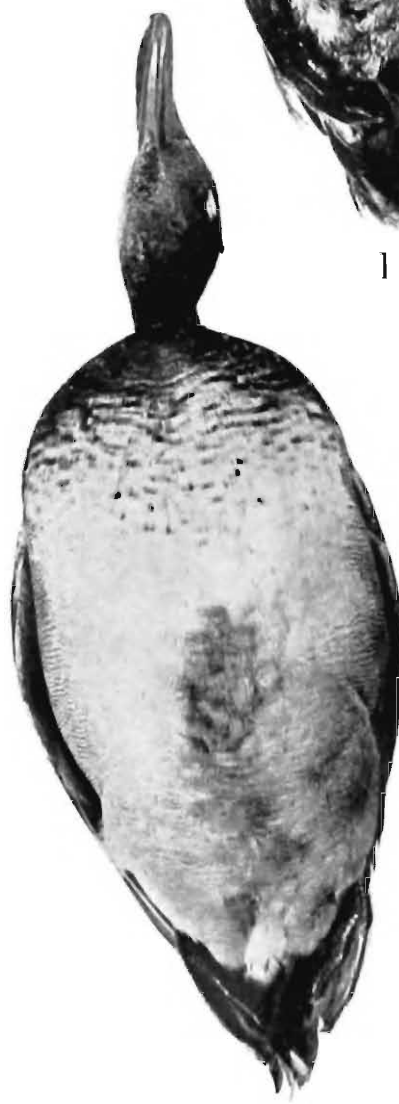
1



1a



2



2a

S. C. Mondul, Phot.

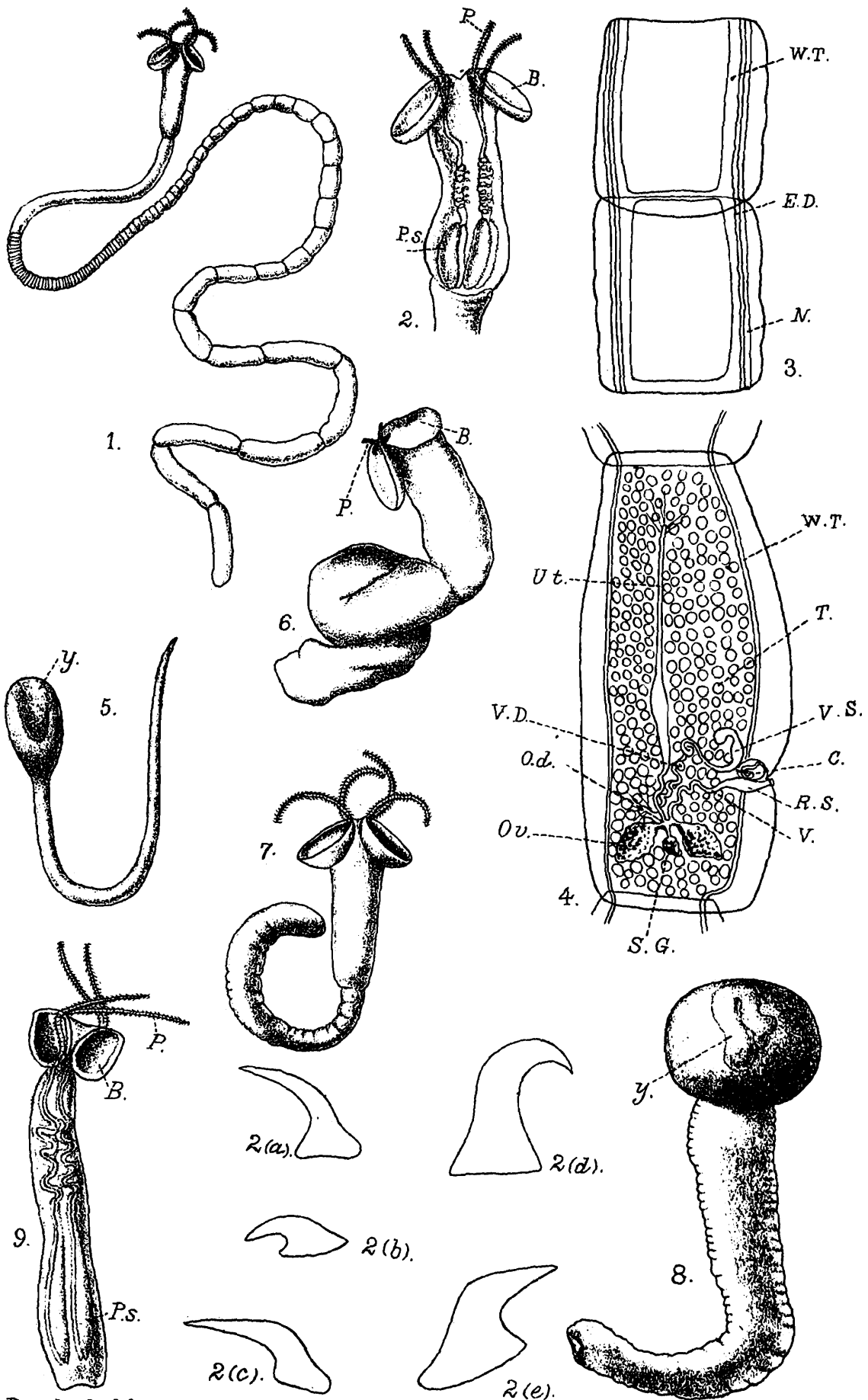
ABNORMAL INDIAN DUCKS.

EXPLANATION OF PLATE IV.

- FIG. 1.—*Rhynchobothrius ilisha*, n. sp. Whole worm.
 „ 2.—Head of the same showing its internal anatomy.
 „ 2 (a)—(e).—Various types of hooks found on the proboscides of *R. ilisha*.
 „ 3.—Two proglottids of the same showing the excretory, water vascular and nervous systems.
 „ 4.—Anatomy of a proglottid of the same.
 „ 5.—Cyst of *R. ilisha* from the lateral muscles of Hilsa.
 „ 6.—Young of *R. ilisha* dissected out of the cyst.
 „ 7.—Young individual of *R. ilisha* from the stomach of the shark.
 „ 8.—Cyst of *Syndesmobothrium filicolle* from the lateral muscles of Hilsa.
 „ 9.—Young of *S. filicolle* dissected out of the cyst with the anatomy.

REFERENCE LETTERING.

B., Bothridium. *C.*, Cirrus-sac. *E.D.*, Excretory duct. *N.*, Nerve cord. *O.d.*, Oviduct. *Ov.*, Ovary. *P.*, Proboscis. *P.S.*, Proboscis sac. *R.S.*, Receptaculum seminis. *S.G.*, Shell gland. *T.*, Testis. *Ut.*, Uterus. *V.*, Vagina. *V.D.*, Vas deferens. *V.S.*, Vesicula seminalis. *W.T.*, Water-vascular tube. *Y.*, Larva in the Cyst.



B. Prashad, del.
& D. Bagchi.

D. Bagchi, lith.

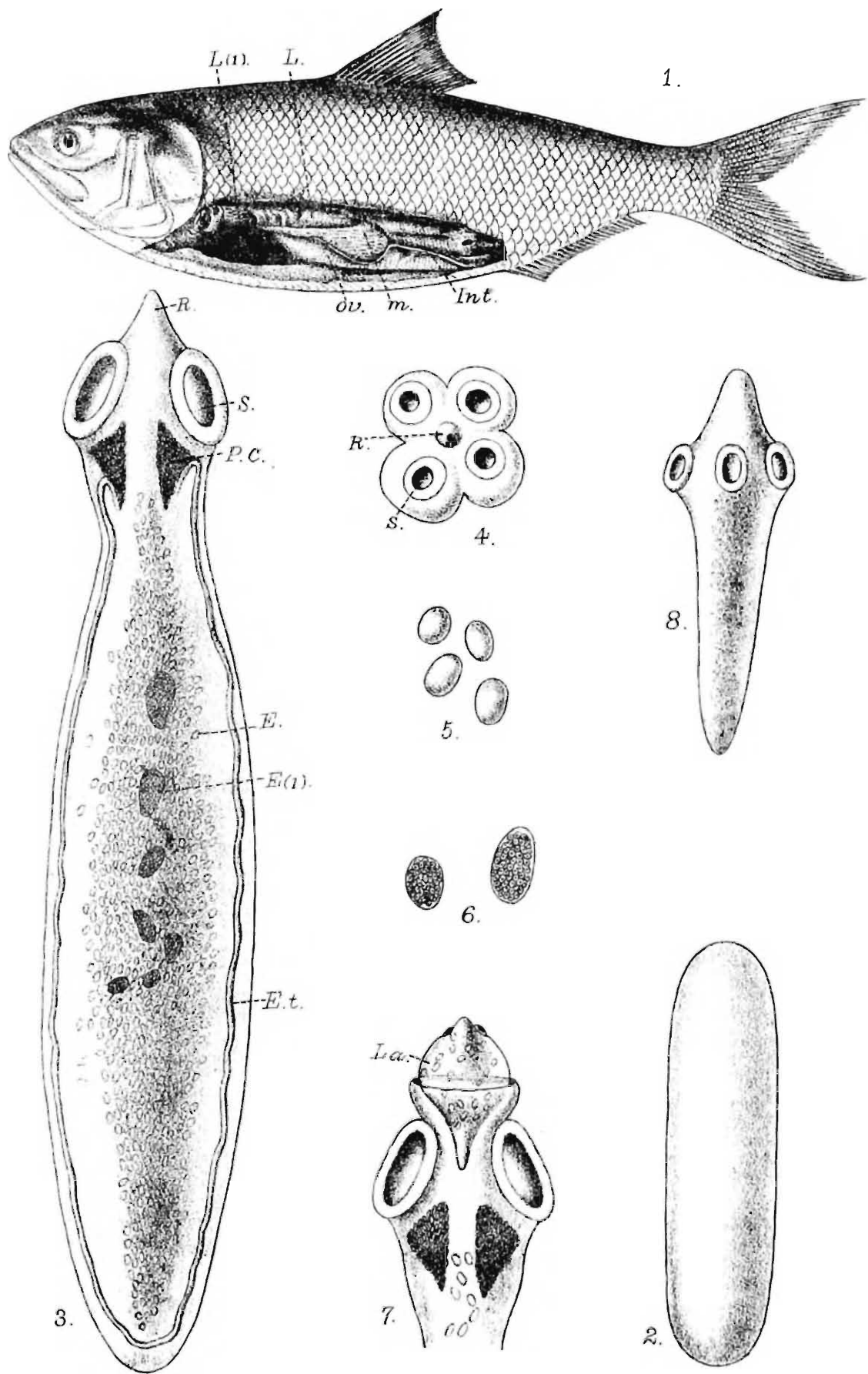
CESTODE PARASITES OF HILSA.

EXPLANATION OF PLATE V.

- FIG. 1.—Lateral view of a dissected female Hilsa to show the infected mesentery and liver, and the other viscera. The heart and ovary of the left side are removed.
- „ 2.—A cyst of *Ilisha parthenogenetica* n. g., n. sp.
- „ 3.—An adult individual of *I. parthenogenetica* dissected out of the cyst.
- „ 4.—Surface view of the rostellum and the four suckers on the anterior extremity of an individual of *I. parthenogenetica*.
- „ 5.—Parthenogenetic eggs of *I. parthenogenetica*.
- „ 6.—Morula stages in the development of the parthenogenetic eggs of *I. parthenogenetica*.
- „ 7.—Anterior extremity of an adult individual of *I. parthenogenetica* with a young one escaping out of it.
- „ 8.—A young individual of *I. parthenogenetica* lying free in the mesentery of Hilsa, before the formation of the cyst.

REFERENCE LETTERING.

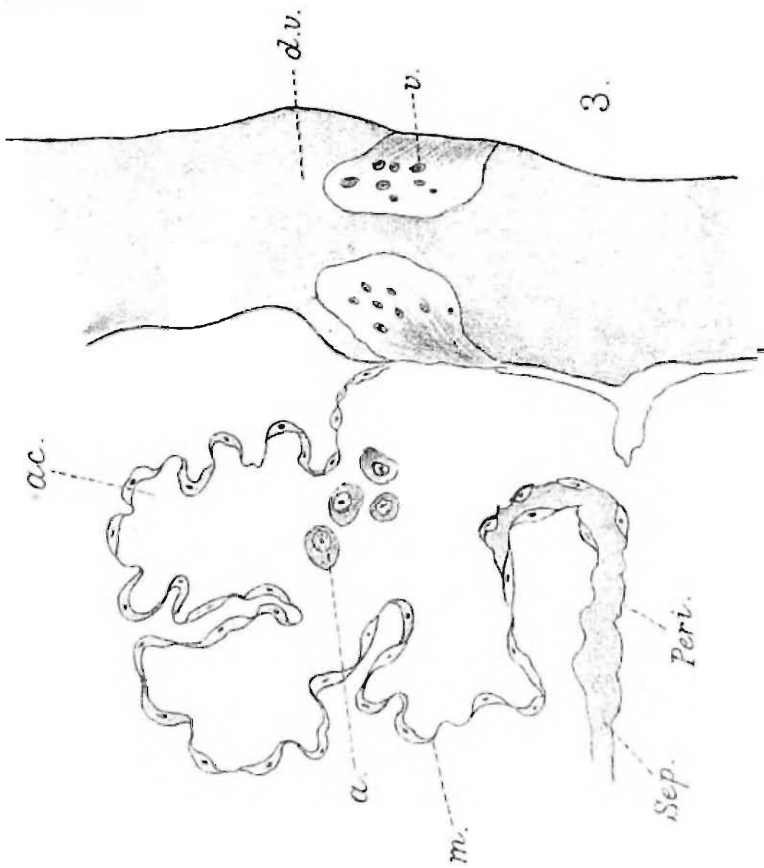
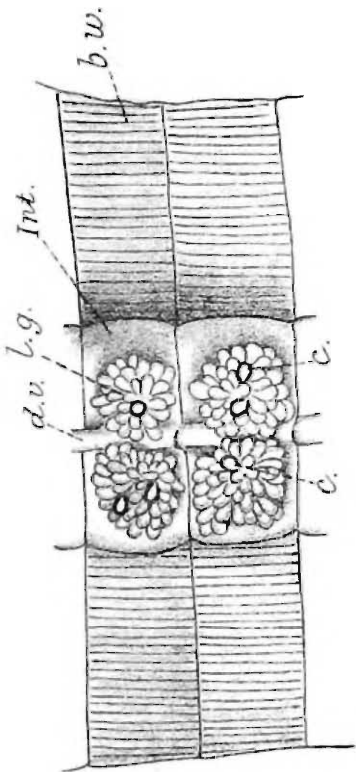
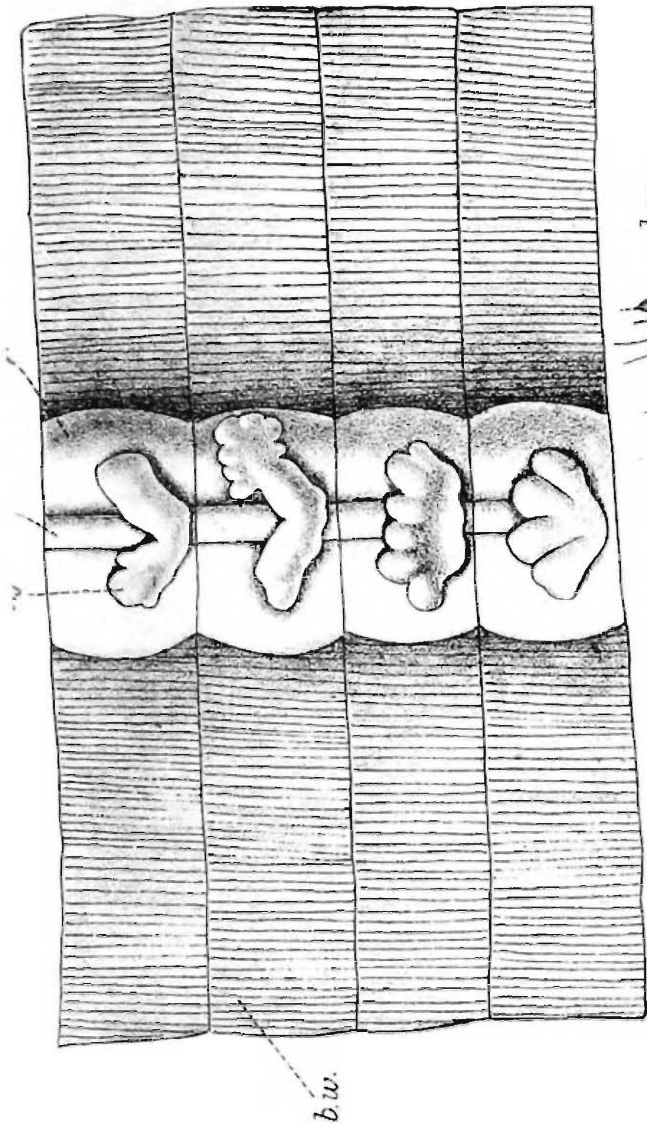
E., Eggs. *E(i)*., Morula stage in the development of eggs. *E.t.*, Excretory tube. *Int.*, Intestine. *L.*, Liver. *L(i)*., Part of the liver infected with cysts of *I. parthenogenetica*. *La.*, Larva escaping out of the mother individual. *M.*, Mesentery infected with *I. parthenogenetica*. *Ov.*, Ovary. *P.C.*, Pigment corpuscles. *R.*, Rostellum. *S.*, Sucker.



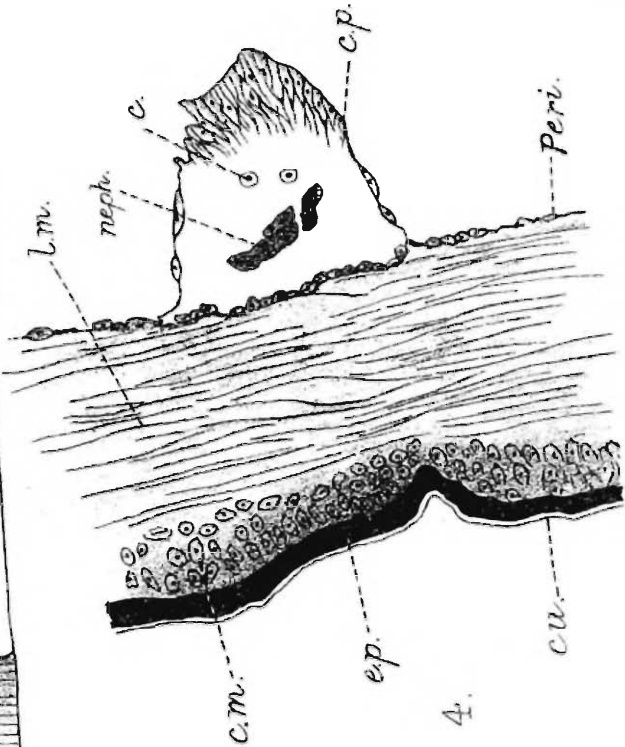
B. Prashad, del.
& A. Chowdhary.

A. Chowdhary, lith.

CESTODE PARASITES OF HILSA.



2.

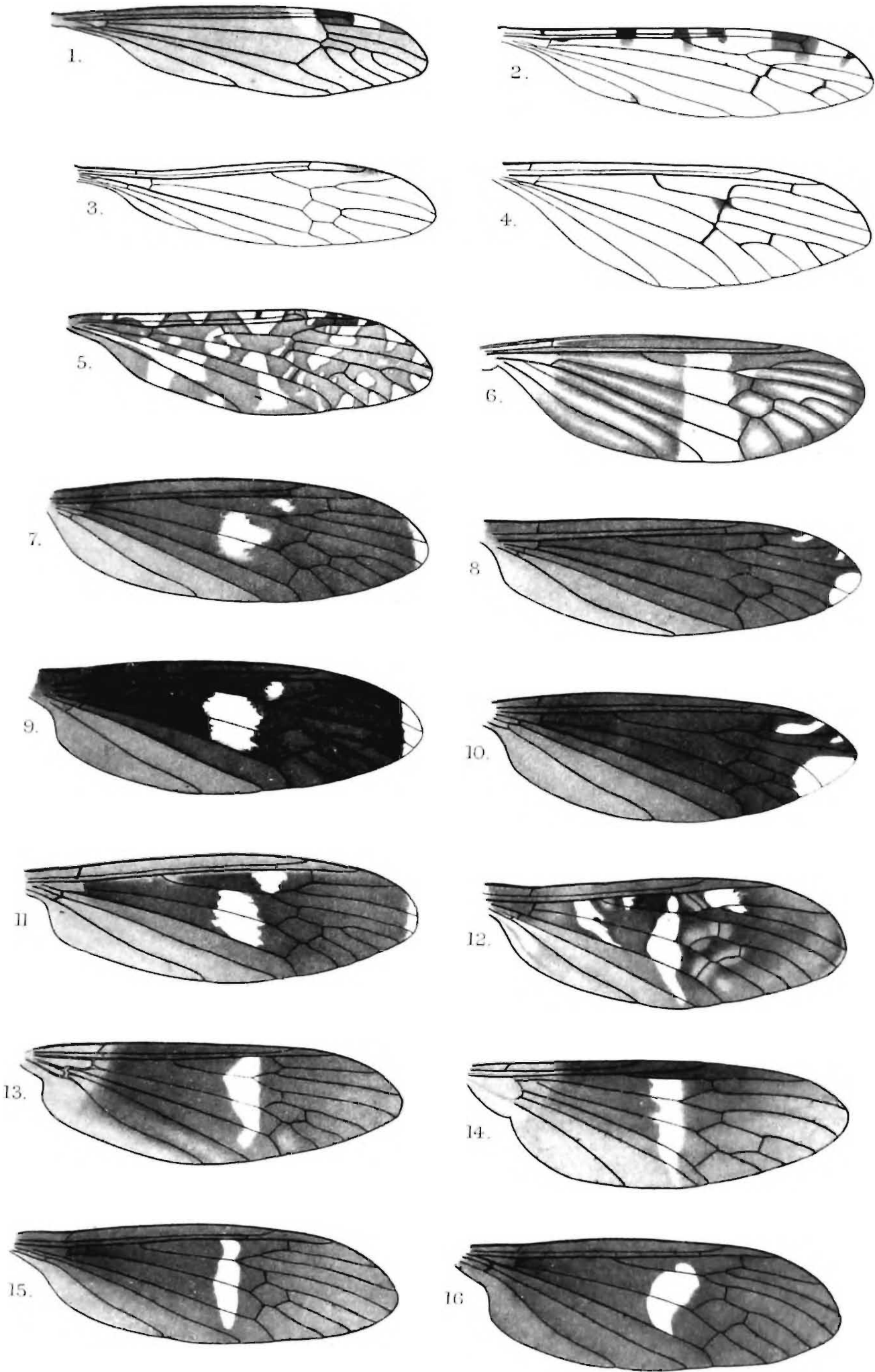


4.

A. Chowdhary lith.

EXPLANATION OF PLATE VII.

- FIG. 1.—*Nesopeza albitarsis*, sp. nov., wing.
,, 2.—*Geranomyia flaviventris*, sp. nov., wing.
,, 3.—*Rhamphidia abnormalis*, sp. nov., wing.
,, 4.—*Amalopsis spectralis*, sp. nov., wing.
,, 5.—*Limnophila ornatipennis*, sp. nov., wing.
,, 6.—*Eriocera bicolor*, Macq., wing.
,, 7.—*E. cincta*, nom. nov. (*cingulata*, Brun. preocc. De Meij.), wing.
,, 8.—*E. greeni*, Brun., wing.
,, 9.—*E. gravelyi*, sp. nov., wing.
,, 10.—*E. rufithorax*, Brun., wing.
,, 11.—*E. plumbicincta*, Brun., wing.
,, 12.—*E. decorata*, sp. nov., wing.
,, 13.—*E. nepalensis*, Westw., wing.
,, 14.—*E. sumatrensis*, Macq., wing.
,, 15.—*E. flavipes*, Brun., wing.
,, 16.—*E. nigerrima*, Brun., wing.

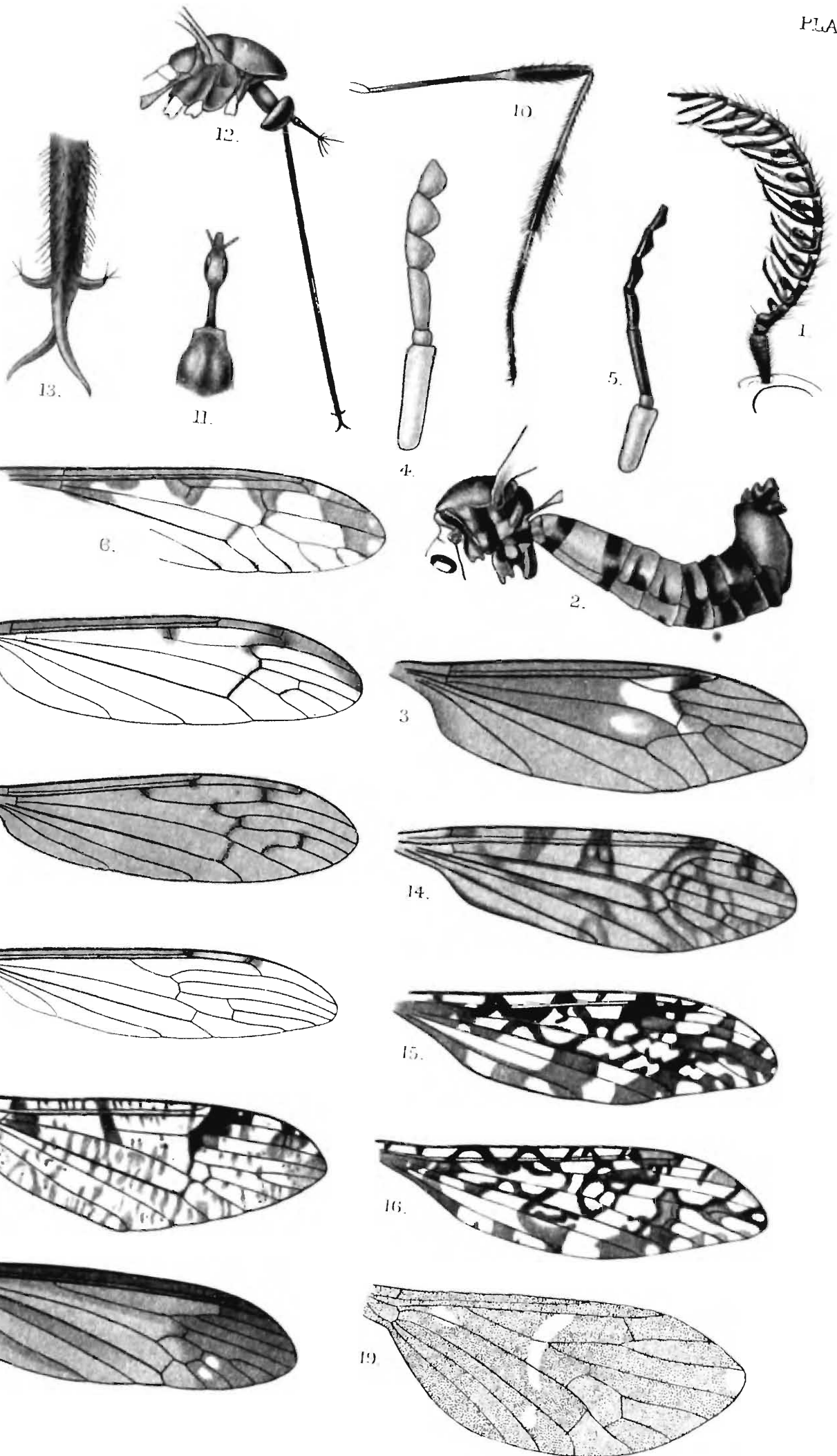


D. Bagchi, del.

Photogravure. Survey of India Offices, Calcutta, 1918.

EXPLANATION OF PLATE VIII.

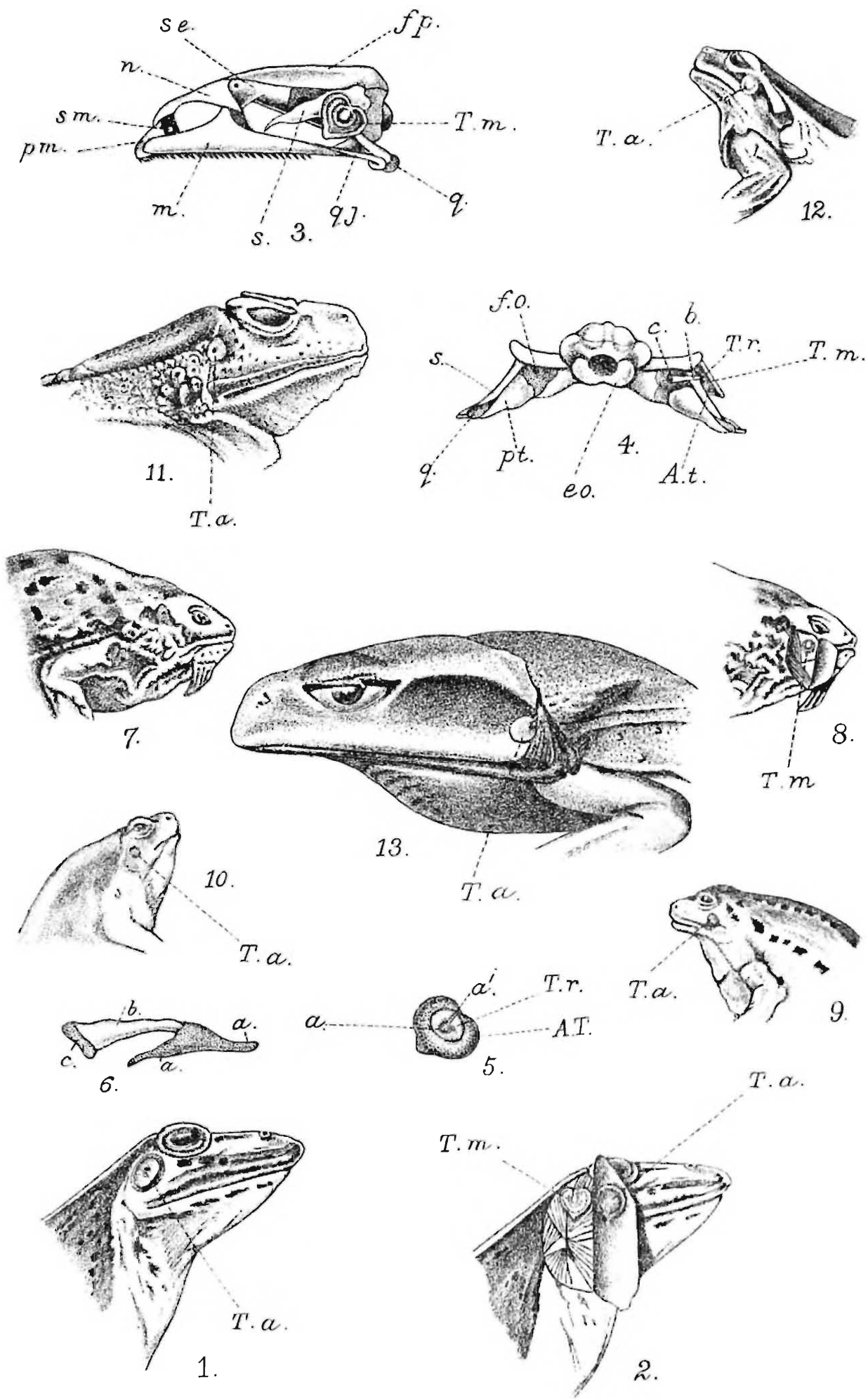
- FIG. 1.—*Xiphura indica*, sp. nov., antenna.
,, 2.—*Pseliophora flavofasciata*, sp. nov., abdomen in profile.
,, 3.—*Id.*, wing.
,, 4.—*Tipula serricornis*, Brun., base of antennae.
,, 5.—*Id.*, sp. nov., idem.
,, 6.—*Dolichopeza costalis*, sp. nov., wing.
,, 7.—*Limnobia marginata*, sp. nov., wing.
,, 8.—*L. 5-notata*, sp. nov., wing.
,, 9.—*L. tritincta*, sp. nov., wing.
,, 10.—*Gymnastes pennipes*, sp. nov., hind leg.
,, 11.—*Teucholabis angusticapitis*, sp. nov., head and thorax, dorsal view.
,, 12.—*Id.*, head in profile.
,, 13.—*Id.*, tip of proboscis.
,, 14.—*Limnophila flavipennis*, sp. nov., wing.
,, 15.—*Epiphragma vicina*, sp. nov., wing.
,, 16.—*E. klossi*, sp. nov., wing.
,, 17.—*Dicranophragma multipunctipennis*, sp. nov., wing.
,, 18.—*Eriocera maculiventris*, sp. nov., wing.
,, 19.—*E. acrostacta*, Wied., wing.



D. B. G. del.

ORIENTAL TIPULIDÆ.

Photogravure. Survey of India Office Calcutta, 1918.

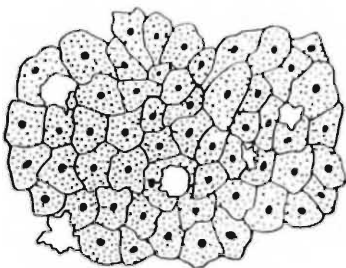


A. Chowdhary lith.

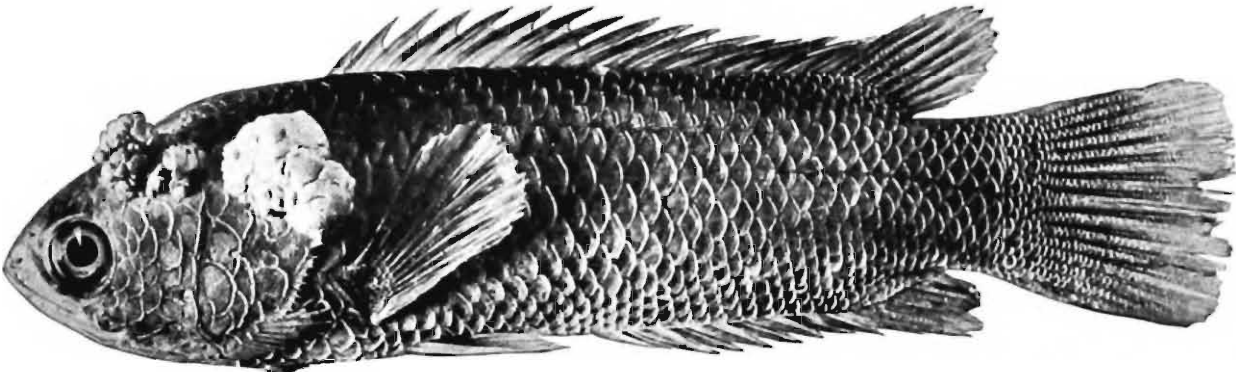
MIDDLE EAR OF INDIAN FROGS.



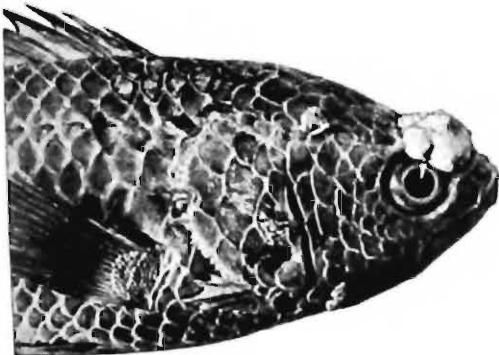
4



5



1



2

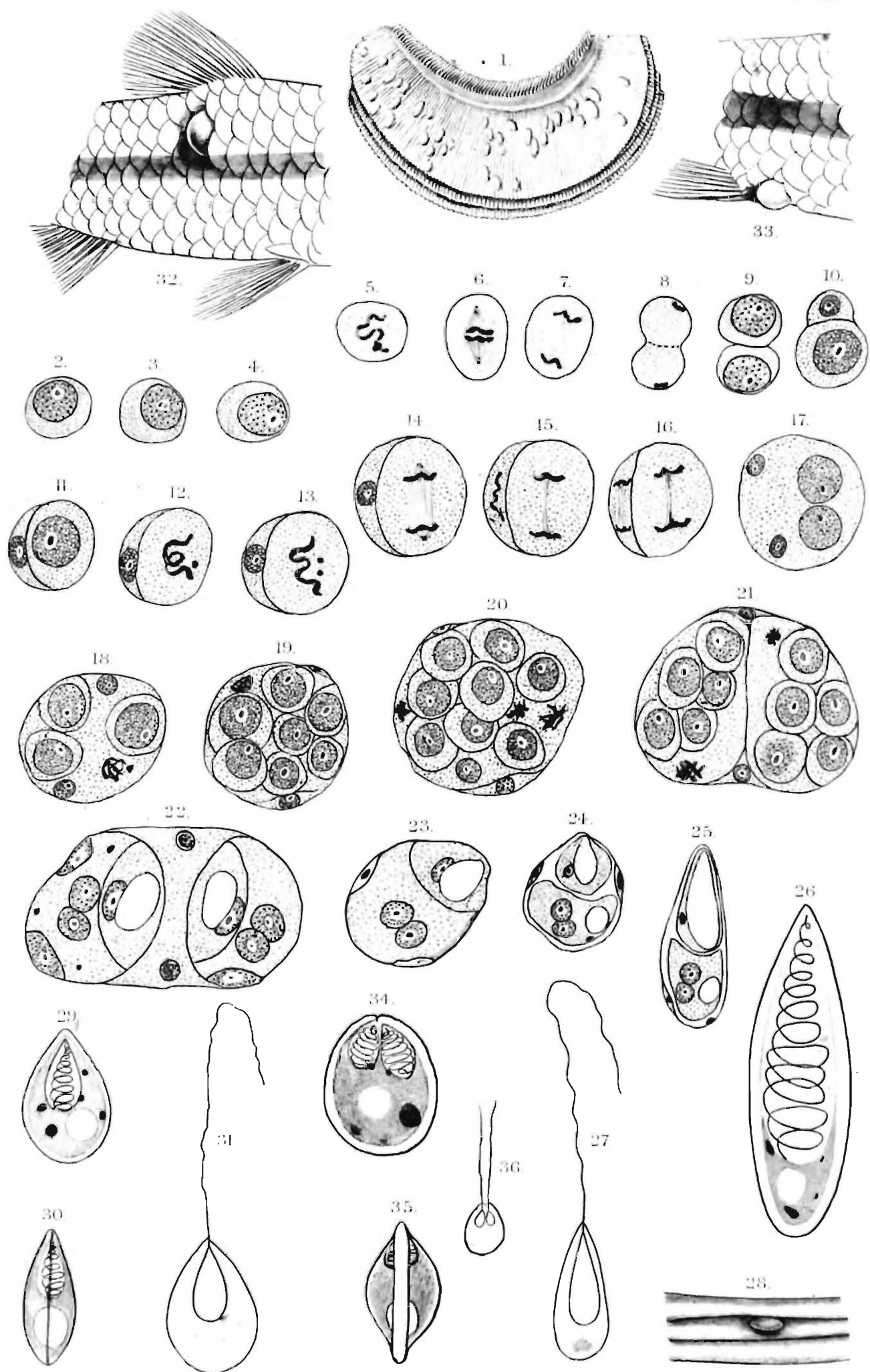


3

CARCINOMA OF CLIMBING PERCH.

EXPLANATION OF PLATE XI.

- FIG. 1.—Gill of *Labeo rohita* with cysts of *Myxobolus rohita* on the filaments.
- „ 2-4.—Propagative cells of *M. rohita*.
- „ 5-9.—Division of propagative cells.
- „ 10 and 11.—Union of a micro- and macro-gametes.
- „ 12-20.—Division of the micro- and macro-gametes, and the formation of the pan-sporoblast.
- „ 21-22.—Division of the pan-sporoblast into two sporoblast.
- „ 23-25.—Young spores in development.
- „ 26.—Mature spore showing the structure.
- „ 27.—Spore with the polar filament extruded.
- „ 28.—A portion of the caudal fin of *Labeo rohita* with a cyst of *Myxobolus seni*.
- „ 29-31.—Mature spores of *M. seni*.
- „ 32-33.—Side views of two specimens of *Rasbora daniconius* showing cysts of *Myxobolus nodularis*.
- „ 34-36.—Mature spores of *M. nodularis*.

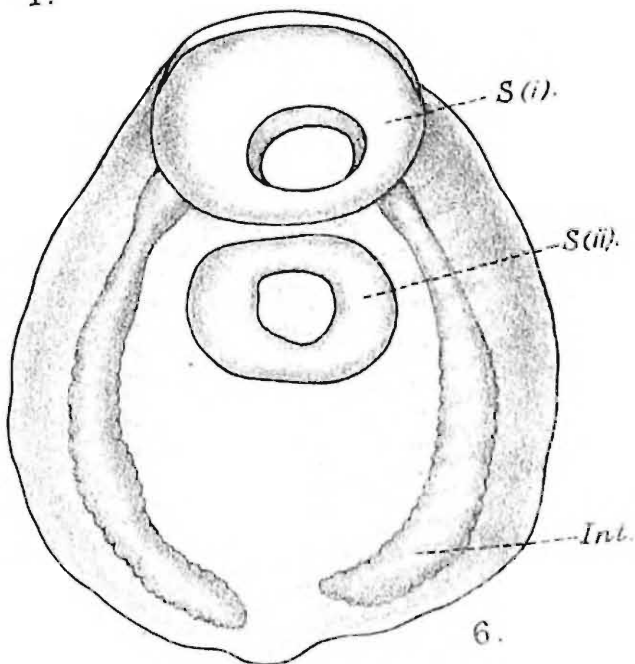
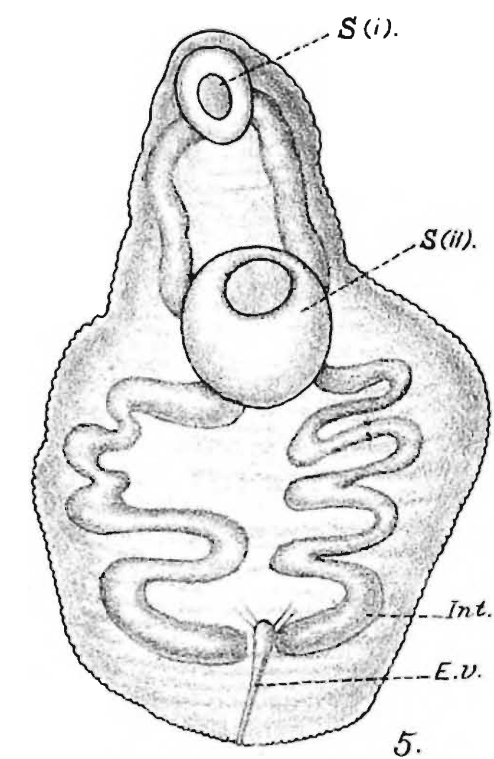
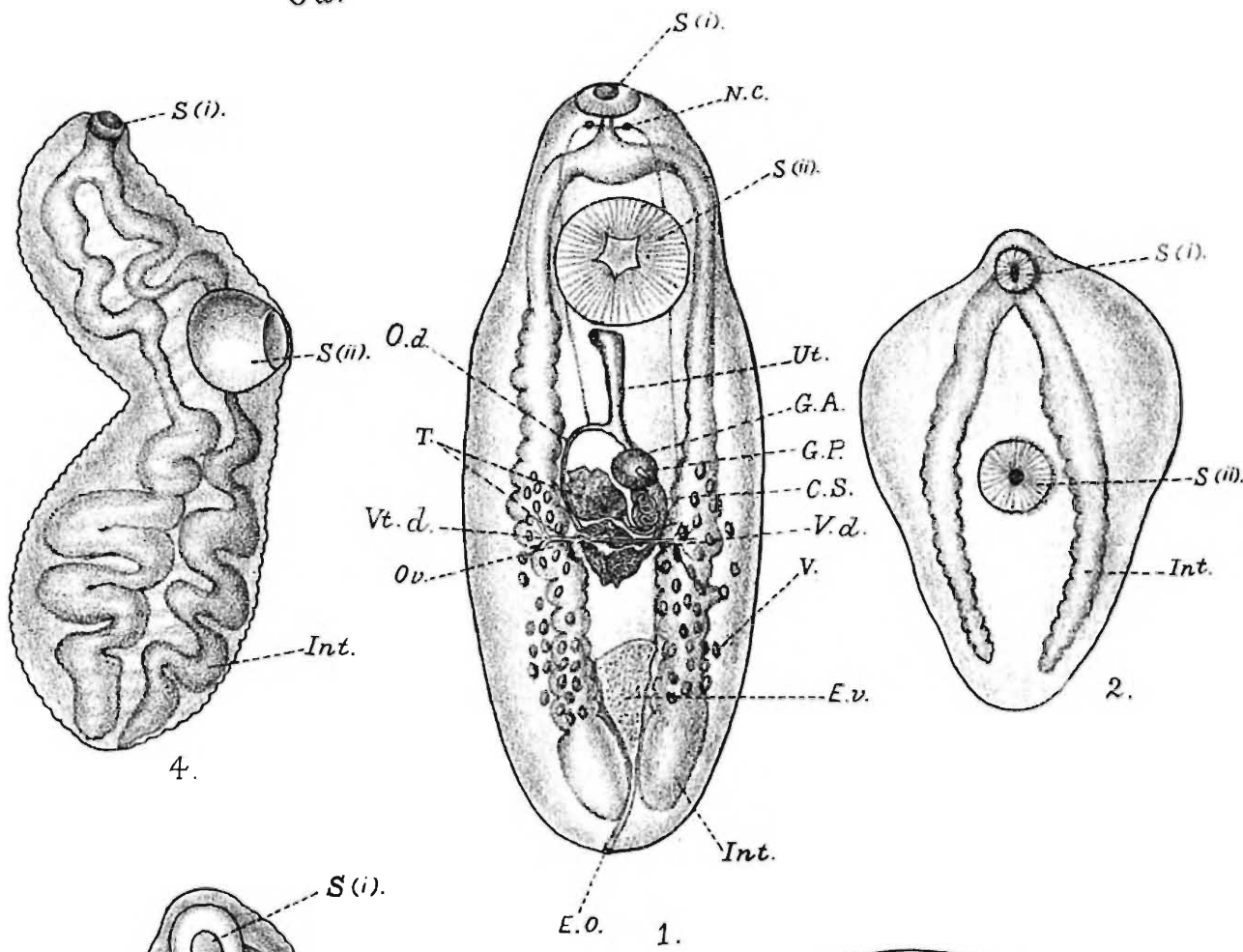
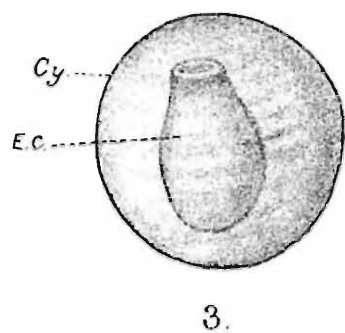
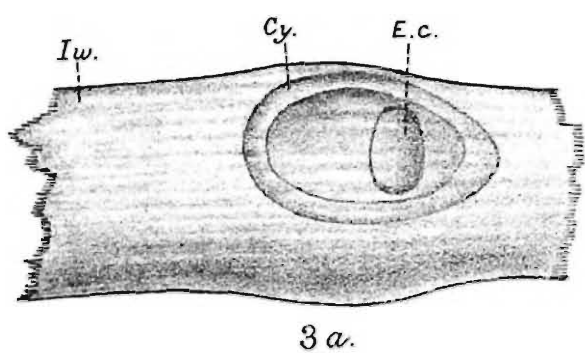


EXPLANATION OF PLATE XII.

- FIG. 1.—*Clinostomum piscidium*. Entire worm showing the anatomy.
,, 2.—Cercaria from the lateral muscles of *Saccobranchus fossilis*.
,, 3.—A cyst containing a Cercaria from the wall of the intestine
of *Ophiocephalus marulius*.
,, 3(a).—Another specimen of the same while still enclosed in the
wall of the intestine.
,, 4.—Cercaria from the lateral muscles of *Ophiocephalus striatus*.
,, 5.—Cercaria from the lateral muscles of *Ophiocephalus striatus*.
,, 6.—Cercaria from the lateral muscles of *Trichogaster fasciatus*.

EXPLANATION OF LETTERING.

C. S. Cirrus Sac. Cy. Cyst. E. C. Encysted cercaria. E. O. Excretory opening.
E. V. Excretory vesicle. G. A. Genital atrium. I. W. Intestinal wall. Int. Intestine.
N. C. Nerve collar. G. P. Genital pore. Ov. Ovary. O. d. Oviduct. S(i) Anterior
sucker. S(ii) Posterior sucker or Acetabulum. T. Testis. Ut. Uterus. V. Vitelline
gland. V. d. vas deferens.



B.P. del.

A. Chowdhary lith.

SOME FISH TREMATODES.

EXPLANATION OF PLATE XIII.

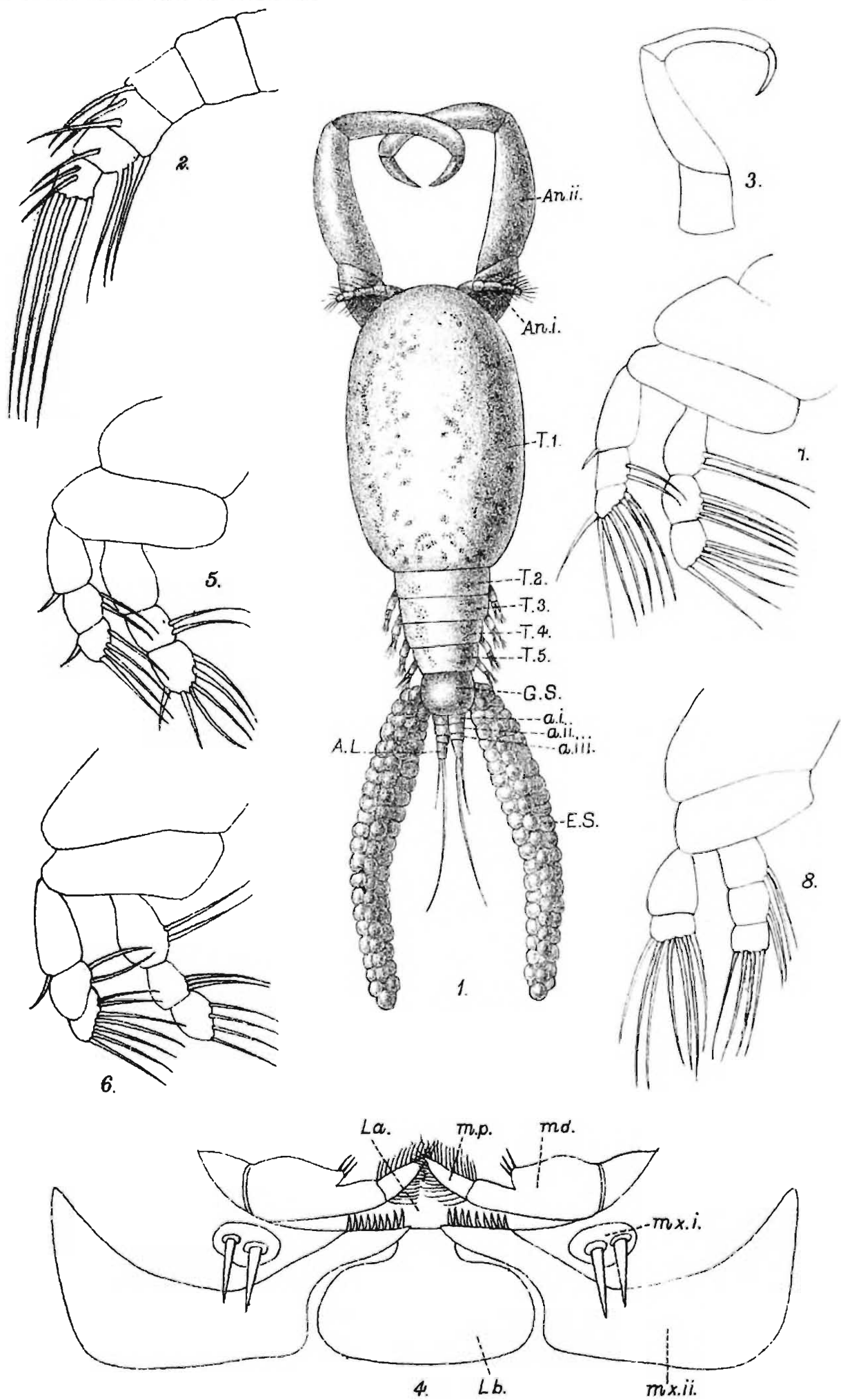
All the figures are of *Ergasilus bengalensis*.

FIG. 1.—Dorsal view of the entire female animal.

- „ 2.—First antenna.
- „ 3.—Second antenna.
- „ 4.—Mouth parts, $\times 1250$.
- „ 5.—First swimming leg.
- „ 6.—Second swimming leg.
- „ 7.—Third swimming leg.
- „ 8.—Fourth swimming leg.

EXPLANATION OF LETTERING.

a. i.—a. iii. First to third abdominal segments. A. l. anal lamina. an. i. an. ii. First and second antennae. E. S. Egg sacs. G. s. Genital segment. La. Labrum. Lb. Labium. Md. Mandible. M. p. Mandibular palp. Mx. i., mx. ii. First and second maxillae. T. 2—T. 5. Second to fifth free thoracic segments.



B.P. del.

D. Bagchi lith.

ERGASILUS BENGALENSIS.

EXPLANATION OF PLATE XIV.

All the figures are of *Ergasilus hamiltoni*; reference lettering same as in plate XIII.

FIG. 1.—Dorsal view of the entire female animal.

„ 2.—First antenna.

„ 3.—Second antenna.

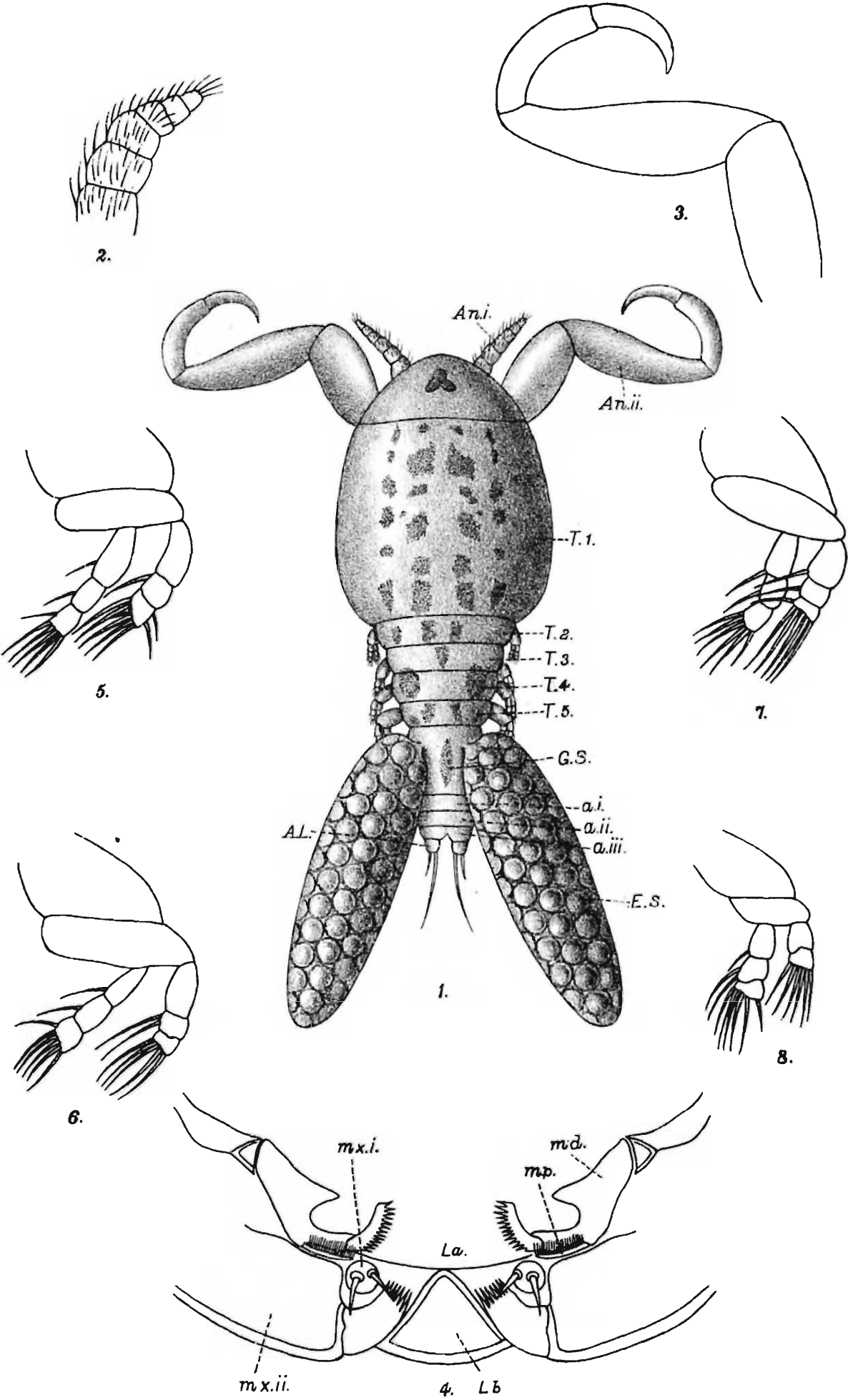
„ 4.—Mouth parts, $\times 1250$.

„ 5.—First swimming leg.

„ 6.—Second swimming leg.

„ 7.—Third swimming leg.

„ 8.—Fourth swimming leg.



B.P. del.

S.C.Mondul lith.

ERGASILUS HAMILTONI.



1



2

3

4

S. C. Mondul, photo.

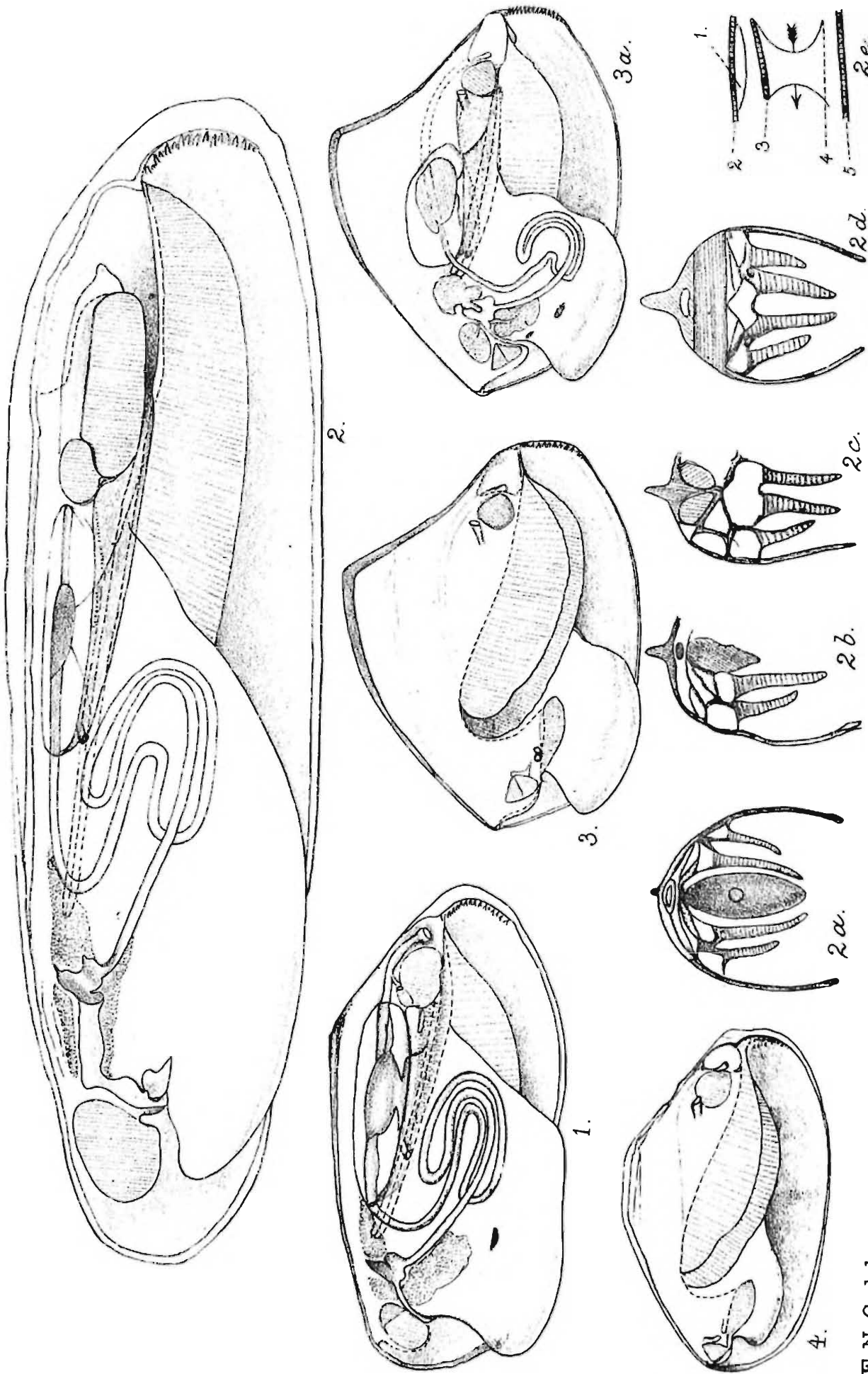
BALAENOPTERA EDENI, ANDERSON.

EXPLANATION OF PLATE XVI.

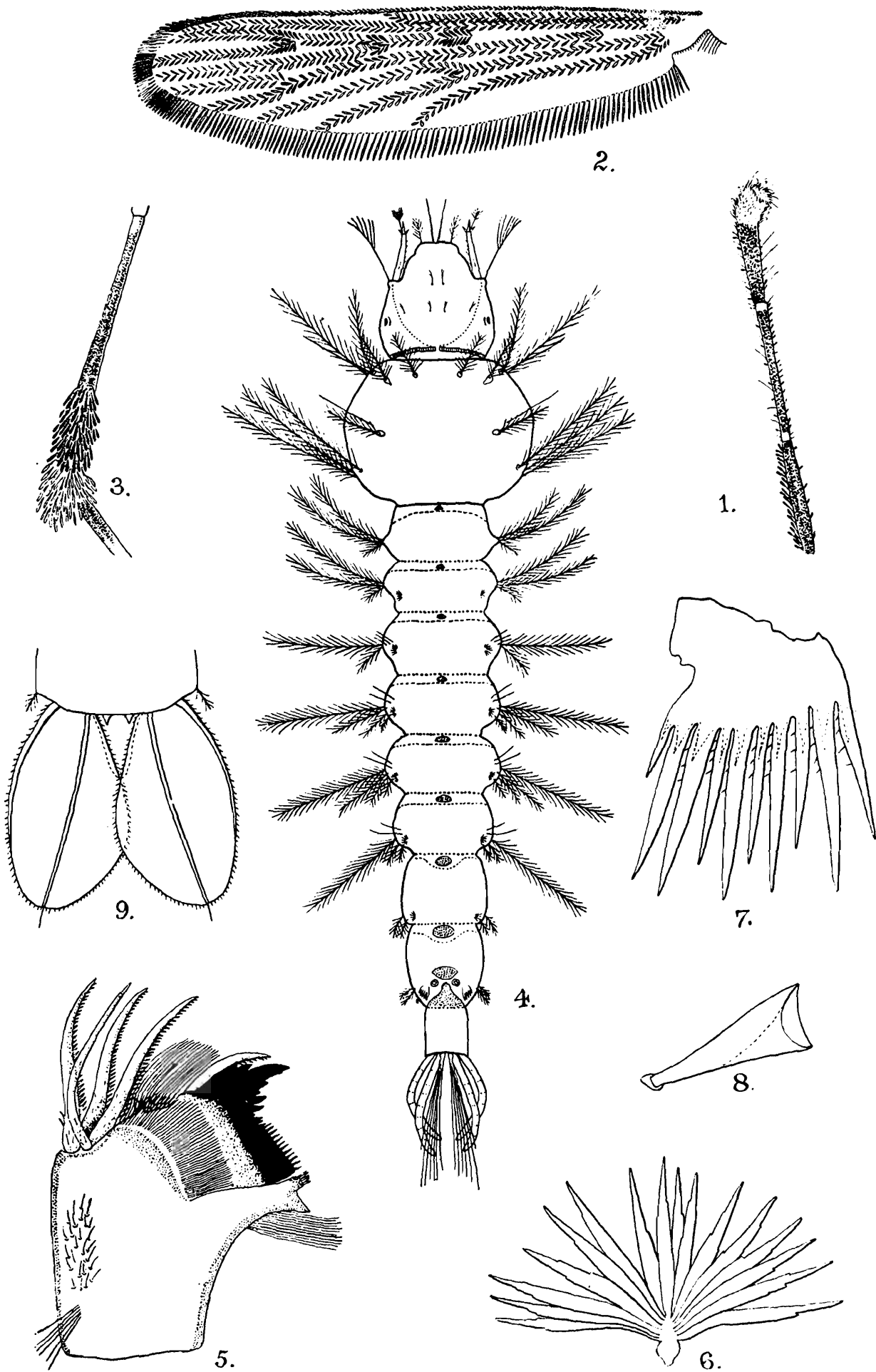
- FIG. 1. *Lamellidens marginalis*, showing the various organs diagrammatically. Nat. size.
- „ 2. *Solenia soleniformis*, showing the various organs diagrammatically. Nat. size.
- „ 2 a-d. Vertical sections through *Solenia soleniformis* showing the relation of the glandular and non-glandular sacs (diagrammatic).
- „ 2 e. Diagram of the communication of the glandular and non-glandular sacs—
1. Opening of the non-glandular sac into the accessory canal.
 2. Cut edge of the mantle lobe.
 3. Attached margin of the membrane to the outer wall of the canal.
 4. Attached margin of the membrane to the inner wall of the canal.
 5. Cut edge of the mantle.
- „ 3. *Physunio ferrugineus*, nat. size, shell and mouth of the left side removed.
- „ 3 a. *P. ferrugineus*, showing the various organs diagrammatically.
- „ 4. *P. micropteroides*, nat. size, shell and mantle of the left side removed.

The attachments of the gills are represented by interrupted lines.

A. Chowdhary lith.



E. N. G. del.



B. P. & D. Bagchi, del.

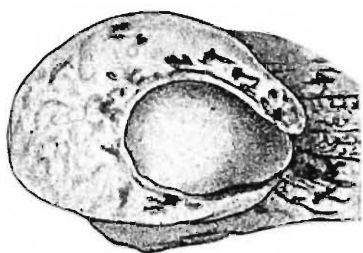
ANOPHELES ANNANDALEI.



1.



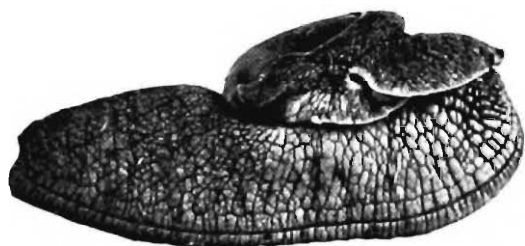
2.



3.



4.



5.



6.



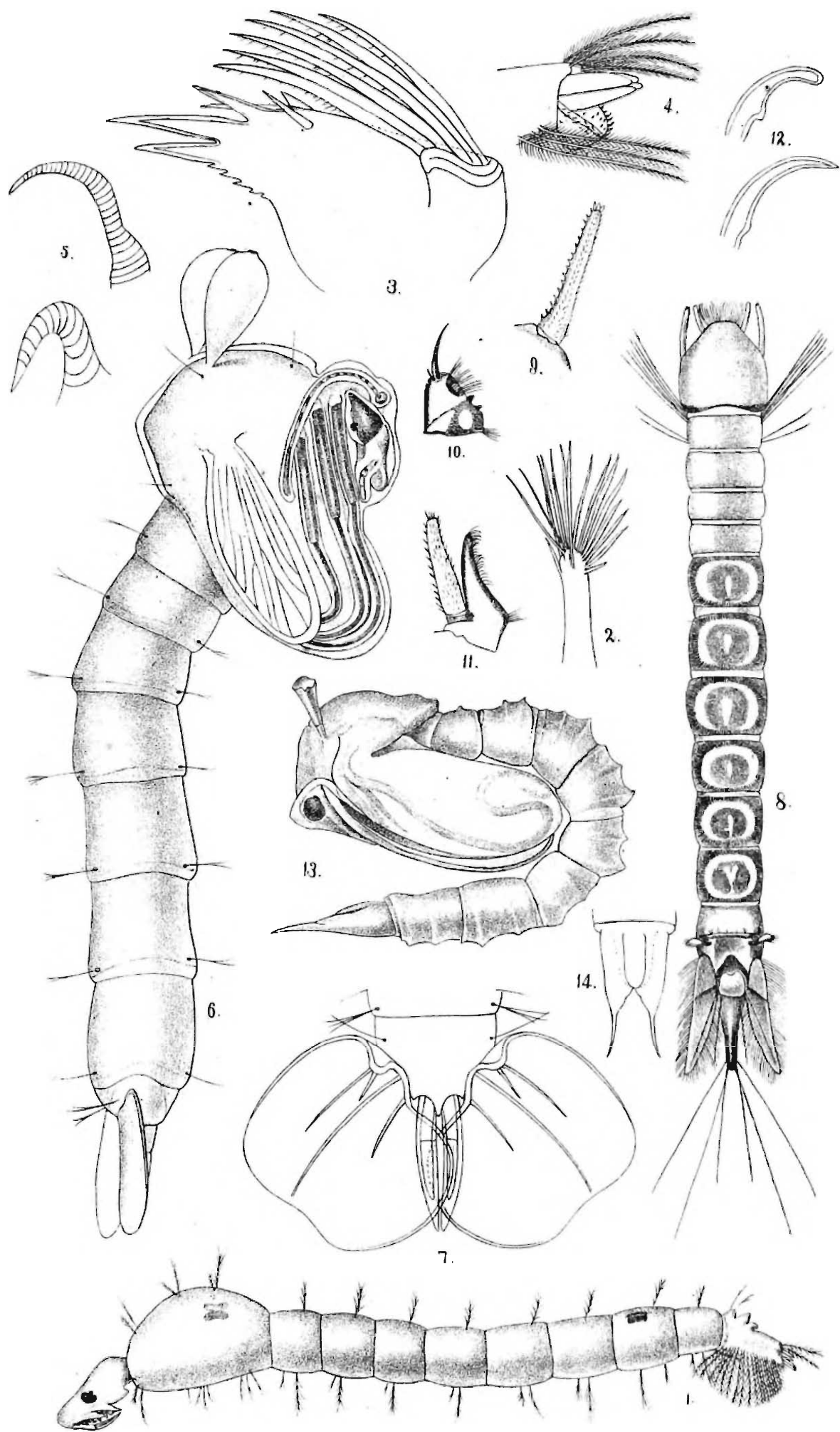
7.



8.

EXPLANATION OF PLATE XIX.

- FIG. 1.—Lateral view of the larva of *Chaoborus manilensis*.
,, 2.—Lateral view of the larva of *C. manilensis*.
,, 3.—Mandible of the same.
,, 4.—Portion of the last abdominal segment of the larva more highly magnified.
,, 5.—The two types of hooks from the abdomen.
,, 6.—Pupa of *C. manilensis*, lateral view.
,, 7.—Tail-fins of the pupa as seen from above.
,, 8.—Larva of *Dixa montana*, dorsal view.
,, 9.—Antenna of the same.
,, 10.—Left mandible of the same as seen from above.
,, 11.—First maxilla of the left side as seen from above.
,, 12.—Two types of hooks from the abdominal feet.
,, 13.—Pupa of *D. montana*, lateral view.
,, 14.—Tail-fins of the pupa as seen in a dorsal view.



EXPLANATION OF PLATE XX.

FRESHWATER SHELLS FROM MESOPOTAMIA.

Melanopsis subtingitana, sp. nov.

- FIG. 1.—Type-specimen (? subfossil), probably from Basra, $\times 2$.
,, 2.—Subfossil shell from lacustrine deposit at Nasariyeh, $\times 2$.

Limnaea tenera (Parreyss), Mousson.

- ,, 3.—A series of subfossil shells from paludine deposit at Nasariyeh, $\times 2$.

Limnaea peregriformis, Locard.

- ,, 4.—Subfossil shell from lacustrine deposit at Nasariyeh, $\times 2$.

Limnaea subpersica, Locard.

- ,, 5.—Subfossil shell from the same deposit, $\times 2$.

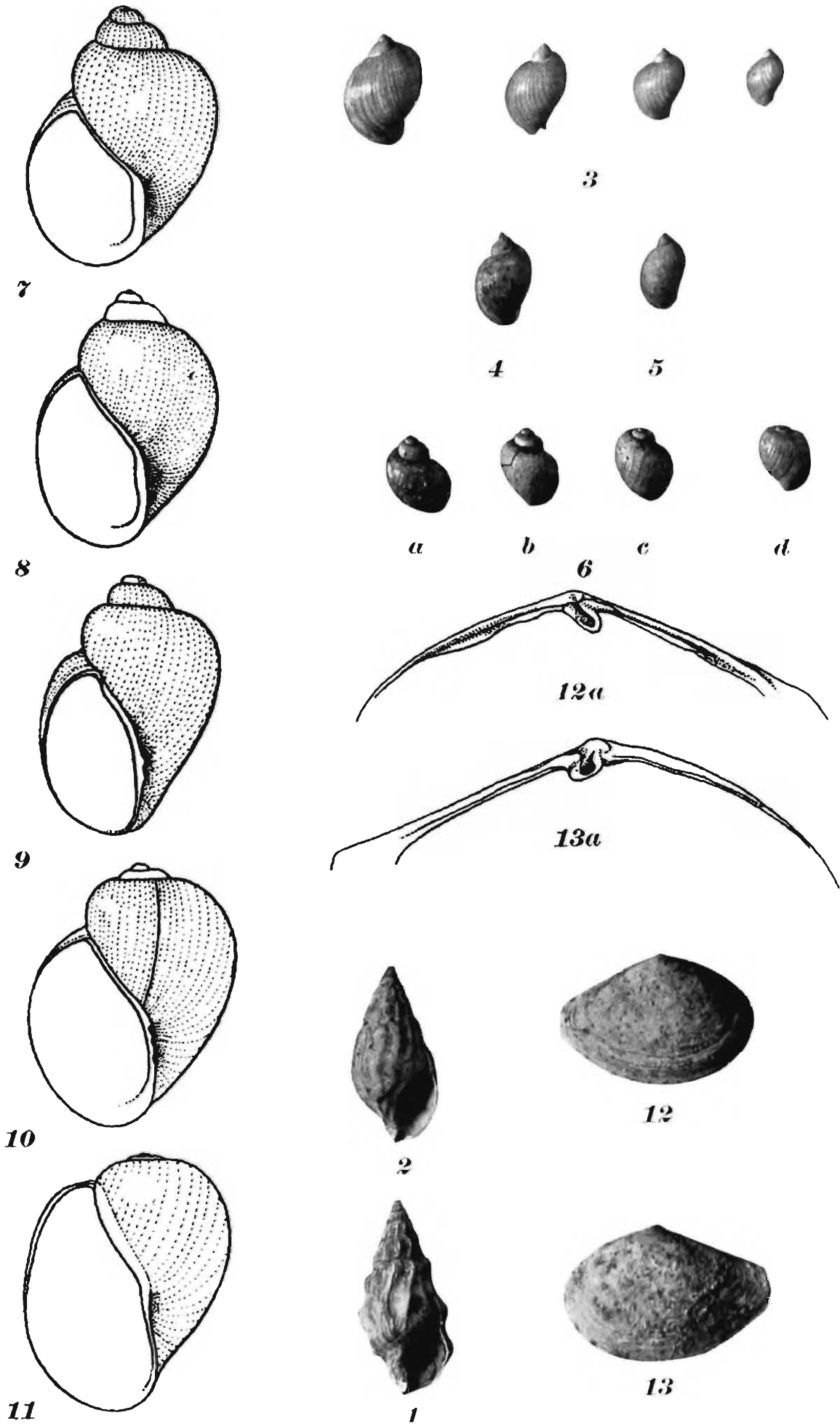
Bullinus contortus (Michaud).

- ,, 6.—A series of shells from Nasariyeh, $\times 2$. *a—c*, shells from lacustrine deposit : *d*, shell from bank of Euphrates.

FIGS. 7-11.—Ventral view (further enlarged but not drawn to scale) of a series of shells from Nasariyeh and Samara. Figs. 7, 8, shells from bed of old tank at Samara ; figs. 9, 10 (6*b*, 6*c*), from lacustrine deposit at Nasariyeh ; fig. 11 (6*d*), from bank of Euphrates at same place.

Corbula (Erodona) mesopotamica, sp. nov.

- FIG. 12.—Right valve of type-specimen (subfossil) from lacustrine deposit at Nasariyeh, $\times 4$.
,, 12*a*.—Hinge of same, further enlarged.
,, 13.—Left valve of type-specimen, $\times 4$.
,, 13*a*.—Hinge of same, further enlarged.



MESOPOTAMIAN SHELLS.