

XIII NOTES ON ORIENTAL SYRPHIDAE
WITH DESCRIPTIONS OF
NEW SPECIES.

PART II.

By E. BRUNETTI.

(Plate xiii.)

My previous paper on this family appeared in April, 1908 and revised our knowledge of certain oriental genera up to that date, including descriptions of thirty-nine new species.

In the present paper thirty-five additional species and some new varieties or "forms" are described, and those set up by other authors recorded, with such synonymical and other notes as appear of interest.

Two or three genera are, perforce, treated herein tentatively, such as *Sphaerophoria* and *Eumerus*, whilst many species of *Syrphus* and *Eristalis* are still imperfectly understood. Dr. Meijere has made much progress in identifying and redescribing several of the older authors' species of *Eristalis* and offers a valuable tabulation of those known to him.

Subfamily SYRPHINAE.

PARAGUS.

One new species *rufiventris* recently described by me (Rec. Ind. Mus., viii, 157, ♂ 1913) from Assam, the Western Himalayas and Ceylon. *Type* in Indian Museum.

Paragus serratus, F.

This common and widely distributed species extends to Assam; Sadiya, 23-xi-11, and Dibrugarh, 17-19 xi-11. I have it in my own collection, taken by myself from Cawnpore 29 xi-04, Calcutta 1-ii-07 and Rangoon 9-ii-06. It is common at Pusa in Bihar.

Paragus indica, Brun.

Pipizella indica, Brun., Rec. Ind. Mus. II, 52.

This species was wrongly placed by me in *Pipizella*. Further specimens in the Indian Museum are from Darjiling, Matiana, and Tenmalai (Travancore), 21-xi-08. It is perhaps identical with *Paragus politus*, W. described from China. The sides of

the thorax are not whitish as in Wiedemann's species, but bear some long white hair anteriorly.

***Paragus atratus*, Meij.**

One ♂ specimen from Bijrani, Naini Tal District, 19-iii-10, in the Indian Museum, agrees exactly with a specimen in the collection from Java, sent by Dr. Meijere. He records further specimens of both sexes from Java.

***Pipizella rufiventris*, mihi, sp. nov.**

♂ Western Himalayas.

Long. 7 mm.

Head.—Vertex aeneous black, with violet reflections, and black hairs; ocelli concolorous. Frons and upper part of antennal prominence shining blue black, with black hairs; a broad grey dust band from eye to eye across middle of former. Tip of antennal prominence, just between the antennae, pale. Antennae black, 3rd joint large and elongate, arista black. Face yellowish, with whitish pubescence, a little darker about mouth opening; a black narrow median stripe. Eyes brown, with short distinct grey pubescence; occiput black, with yellow hairs around margin.

Thorax aeneous black, shining, with soft yellowish grey pubescence, which is more whitish and ragged on the sides. Scutellum luteous, semi-translucent, a little darker in middle, pale yellow pubescent.

Abdomen reddish yellow, basal segment, central basal part of 2nd segment, a moderately narrow band on hind borders of 2nd and 3rd segments, apical half of 4th and all the 5th segment, black. Dorsum of abdomen with pale yellowish grey pubescence, which is longer and thicker about sides of 2nd segment. Belly yellowish, a broad black transverse band on 2nd segment, apical part of abdomen black.

Legs.—Coxae, basal half of anterior femora and basal three-fourths of hind femora, black; also median half of hind tibiae, though less well defined; and upper sides of all tarsi. Rest of legs brownish yellow; underside of hind tarsi with golden brown pubescence.

Wings clear, subcostal cell pale yellowish; squamae pale yellow; halteres yellow.

Described from a perfect ♂ in the Indian Museum, presented by Col. Tytler, taken by him at Kousanie, 6075 ft., Kumaon District, 22-vii-14.

***Psilota cyanea*, mihi, sp. nov.**

(Plate xiii, fig. 1.)

♀ Eastern Himalayas.

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

Head.—Frons and face brilliantly shining violet black; the vertical triangle demarcated by an impressed line; antennal

prominence very slight. Some erect brown hairs on vertex. Frons and face with sparse whitish soft hairs. Viewed from above, a just perceptible whitish dust spot about the middle of the frons, contiguous on the eye margin each side, and the edges of the face with vague whitish reflections in certain lights. Upper mouth border distinctly produced¹; proboscis short, brownish black. Antennae brownish yellow, under side of 3rd joint much paler. Eyes of exactly the same vertical height as the head, dark brown, very shortly but rather thickly pubescent; occiput slightly produced behind the vertex, aeneous black, with a fringe of short white hairs.

Thorax shining cyaneous black with a faint violet tinge, scutellum concolorous, both with sparse very short whitish pubescence; some rather long whitish hairs at sides, anteriorly.

Abdomen of three obvious segments only, the first very narrow, the 2nd, 3rd and 4th subequal, the 5th barely visible; all wholly cyaneous black, with short soft pale pubescence, belly similar.

Legs black; knees, tibiae tips and anterior tarsi brownish orange, hind tarsi darkened above. Hind femora and all tibiae with a little pale pubescence.

Wings almost clear; stigma pale yellow; halteres reddish brown.

Described from two ♀♀; Gangtok, Sikkim, 6150 ft., 9-ix-09, *type*; and Kurseong 10—26-ix-09. In Indian Museum

***Chrysogaster (Orthoneura) indica*, mihi, sp. nov.**

♂ Punjab.

Long. 6 mm.

Head.—Vertex very small, with a little dark brown hair. Eyes contiguous for a moderate space, about half the height of the frons, dark brown, bare. Frons shining blue black, with light brown or greyish hairs; antennal prominence slight. Face shining blue black with a little whitish hair, mouth border well produced. Proboscis and palp blackish brown. Antennae rather dark brown, 3rd joint ovate, arista almost basal. Occiput blackish, not at all produced beyond upper half of eye and only slightly so on lower half, which bears a fringe of white hairs.

Thorax cupreous, with brownish or yellowish hairs; scutellum aeneous, similarly pubescent. Sides of thorax cupreous, with a little greyish hair.

Abdomen cupreous, with moderately thick soft whitish pubescence, which is thicker at the sides and on the belly.

Legs wholly black, with the usual amount of greyish pubescence, undersides of tarsi reddish brown.

Wings pale grey, stigma yellowish, halteres orange.

Described from a unique ♂ in the Indian Museum from the Kangra Valley, 4500 ft., xi-09 [*Dudgeon*].

¹ A generic character according to Verrall.

CHILOSIA, Mg.

One new species *apicalis* ♀ recently described by me (Rec. Ind. Mus. viii, 158, 1913) from Rotung, 1400 ft. (N. E. Front. Ind.) 4—13-iii-12. Type in Indian Museum.

***Chilosia hirticineta*, mihi, sp. nov.**

♂ Darjiling.

Long. 9-10 mm.

Head.—Eyes covered with dense brownish yellow pubescence, touching for a considerable space, leaving a very small vertical triangle, blackish, with three or four long black hairs intermixed with the long brownish yellow ones. Frons sharply demarcated from face, very convex, aeneous blackish, with only a very narrow grey-dusted eye border, and an indistinct median similar line; the whole frons covered with long black hair.

Face moderately prominent, central bump small, mouth border not very prominent, extremely narrowly orange, the face blackish, with very short, almost microscopic pubescence. Eye margins greyish, with long yellowish grey hair. Occiput and lower part of head grey, with yellowish grey hairs. Proboscis black. Antennal first two joints, black, 3rd black, with, visible in certain lights, a greyish dust; rounded, but with rather truncate tip; arista bare, black. The depression in which the antennae are set, brownish yellow.

Thorax and scutellum shining aeneous with rather long and thick brownish yellow hair with which some black hair is intermixed. No stiff bristly hairs on either thorax or scutellum. Sides of thorax cinereous grey (the colour extending almost over the shoulders), with rather long brownish yellow hair.

Abdomen aeneous black, shining, with long yellowish hair; the third segment with all black hairs on the dorsum.

Legs.—Femora blackish with long yellowish hair, extreme tips orange. Tibiae black, the base broadly, the tips less broadly orange or brownish yellow; with yellow or golden yellow short pubescence on front side of front pair. Tarsi blackish above, with a little yellowish brown hair, under side with rich golden brown or golden yellow close pubescence, the first two joints of the middle pair brownish yellow.

Wings pale grey, a little yellowish on basal half anteriorly, in one specimen slightly yellowish in the neighbourhood of the veins. Halteres and tegulae brownish yellow.

Described from 3 ♂♂ in the Indian Museum from the Darjiling District [Lynch].

This species is easily known by the conspicuous, wholly black haired 3rd abdominal segment.

***Chilosia nigroaenea*, mihi, sp. nov.**

♂ ♀ Simla District.

Long. ♂ 7 ♀ 6 mm.

Head.—Eyes in ♂ contiguous for about one-third of the distance from extreme vertex to root of antennae, vertical triangle

blackish, with some long black hairs. Eyes with rather thick short yellowish grey pubescence, which when viewed from certain directions appears quite white. Frons as in *hirticincta*, the dust on the eye margins less distinct. Face with the central knob somewhat large, conspicuous and rounded; aeneous black, shining, with very sparse and short, almost microscopic greyish pubescence, the central knob and the space immediately below it very shining black. Mouth border narrowly orange, moderately produced, with a small bump on each side of it. Eye margins dull blackish, with sparse rather short greyish hairs. Occiput grey with short greyish hairs. Antennae dull dirty brownish grey, arista bare, black.

In the ♀ the frons not much narrowed on vertex, and about one-third the width of the head just above the antennae is shining black with a little grey pubescence.

Thorax and scutellum shining black, with rather thick brownish yellow pubescence, a few black bristly hairs intermixed in front of wings, and on hind margin of scutellum, where these black hairs are much longer than the general pubescence. Sides moderately dark shining greyish, with yellowish grey hair.

Abdomen all shining black, with close, pale yellowish grey pubescence; belly similar.

Legs blackish, with pale yellowish grey pubescence. Extreme tips of femora, base of tibiae rather narrowly in ♂ and to the extent of basal third in ♀, brownish yellow. Tarsi blackish, with pale hairs above and thick rich golden brown or golden yellow pubescence below; base of middle tarsi above more or less brownish yellow.

Wings very pale grey, ♂, practically clear, ♀; stigma pale yellow, halteres yellowish.

Described from a single ♂, Matiana and ♀, Simla 7-v-10 in the Indian Museum [both *Annandale*].

Chilosia plumbiventris, mihi, sp. nov.

♀ Simla.

Long. 8 mm.

Head.—Frons and face shining aeneous black, almost with a deep indigo tinge, the frons widening gradually from vertex to about one-third the width of the head above the antennae. Frons slightly prominent above the antennae from eye to eye, giving the appearance of an elongate transverse callus. Above this callus-like prominence is an oval, yellowish grey dust spot each side touching the eye margins. Frons, except the dust spots, wholly covered with thick black hairs. Face shining black, the central knob large and prominent, the mouth border but slightly produced, very narrowly orange; a little almost microscopic pubescence at the sides of the mouth but not extending just below the eyes. Eye margins distinct, grey, widened immediately below antennal prominence, and on this wider part on each side of the face are three elongate notches as though impressed with a knife.

Vertical margin, occiput and lower part of head aeneous black, but the facial eye margins are continued narrowly round the eyes to the vertex, bearing a fringe of yellowish grey hairs, and similarly coloured hairs also cover the lower part of the head below and behind the eyes. Antennal first two joints brownish yellow, 3rd large, broadened, rounded, darker and duskier brown; arista concolorous, bare.

Thorax dark aeneous black, shining, covered rather closely with very short brownish yellow pubescence, which, viewed at a low angle from in front, appears uniform and continuous over the whole dorsum, but viewed from behind appears to form three longitudinal stripes, the median one narrowly divided in the middle and attaining the front margin; the exterior ones fore-shortened. Sides of thorax concolorous, with very sparse and short, brownish yellow hair. Scutellum concolorous, with short, brownish yellow pubescence and a single pair of well separated apical long black bristles.

Abdomen shining lead colour with almost microscopic pale yellow pubescence; a dull black broad band, half the length of the segment, on the hind margins of 2nd and 3rd segments, narrowed to a point at the sides of the segment, and very slightly notched in the middle in front. These transverse black bands are best seen from behind.

Legs dark reddish brown: femora with a moderate amount of pale yellow pubescence; extreme tips of all femora, basal half of all tibiae, tips of middle tibiae and first three joints of middle tarsi, brownish yellow, the posterior margins of these three joints blackish. Under sides of fore and hind tarsi with golden brown pubescence.

Wings very pale grey, stigma pale yellow, halteres bright orange.

Described from a single ♀ in the Indian Museum from Simla 7-v-10 [Annandale].

The shining lead colour of the abdomen will easily distinguish this species.

Chilosia ? *grossa*, Fln.

A ♂ and ♀ taken at Binsar, Kumaon District, 28-v-12, by Dr. A. D. Imms, sent to me for examination appear to be this rather widely distributed European species.

Unfortunately no specimens are at hand for comparison, but the only discrepancies from Verrall's description are as follows. The antennae are dull dark reddish brown, not blackish; the vertex and frons have an admixture of black hairs in the pubescence, which is not the case in *grossa*; the tibiae are mainly black (not orange) in both sexes, with the base broadly, and the tip much less broadly orange, the black part beginning always distinctly before the middle, whilst of *grossa* Verrall says "blackish ring just below the middle." The halteres are wholly orange yellow, not with blackish knobs. In the ♀ the 4th and

5th abdominal segment shew no trace of black hairs (though the pubescence is considerably worn off).

In *grossa* the whole of the 5th segment, and the major part of the 4th segment are entirely black haired.

On the other hand, the special points of similarity, in addition to a very close general agreement with Verrall's description, are the shape of the face in profile, the three faint channels on the frons in the ♀, and the distinctly more reddish colour of the pubescence on the head and thorax in the ♀ specimen. The size also agrees, ♂ 10 ♀ 11 mm.; Verrall giving "about 11 mm."

MELANOSTOMA, Sch.

Melanostoma ambiguum, Flin.

Melanostoma dubium, Zett.

These two European species were introduced in my previous paper on Oriental Syrphidae, on a single example of each from the Simla District. The former, represented by a ♂ from Matiana, is truly identified, agreeing in every particular with Verrall's very faithful description, but the specimen referred by me to *dubium* proves on a closer examination to be only a melanoid *Platychirus albimanus*, F. There is the less excuse for this error, seeing that I knew this species to occur in the Himalayas.

Melanostoma orientale, W

(Plate xiii, fig. 2.)

In my notes on diptera from Simla (Rec. Ind. Mus. i, 168) were included *M. mellinum*, L. and *M. scalare*, F., both common European species. The examples referred to *scalare* are only *orientale*, and as regards those supposed to be *mellinum* there is ample room for doubt as to their identity. In fact *mellinum* in typical form may possibly not occur in the East at all, although as it is so abundant throughout the whole of Europe it will be curious if it is not found in the Himalayas.

However, it seems to me highly probable that *orientale* is not specifically distinct from *mellinum*, a species it is more akin to than *scalare*.

The principal alleged difference is the grey-dusted frons and face in *orientale*, but numerous specimens occur in which this is much less conspicuous than usual, thereby closely approximating to *mellinum*. Among the males, specimens occur which are hard to definitely assign to either species, and three Darjiling specimens in the Museum taken by me may really be true *mellinum*.

The females in *orientale* are more easily recognised by the dust spots on the frons being more closely approximate, so that the vertex and the lower part of the frons are more clearly demarcated, but a near approximation to this is not infrequently met

with in *mellinum* ♀ Meijere's redescription of the species is wholly applicable to the specimens referred by me to *orientale*. It was my impression at first that the facial bump was not so large or conspicuous as in *mellinum*, but an examination of a large number of specimens shews that there is no difference. Moreover, such examination has revealed the existence of an apparently undescribed form (pl. xiii, fig. 3) with a facial profile intermediate between *orientale* and *univittatum*, in which the central bump though distinct is much less conspicuous than in *orientale*. This form is represented by a dozen females from the Simla and Darjiling districts, the United Provinces, Bengal and Bangalore. It is further distinguished from the specimens representing my final view of *orientale* ♀ by the 1st pair of abdominal spots being larger than in *orientale*, oval, and carried over the side of the 2nd segment below the base. Also the hind femora are all yellow, the hind tibiae bearing only an indistinct median dark band which is frequently absent.

Meijere reports the 1st pair of spots in *orientale* as smaller, more rounded and "petty" as compared with *mellinum*, whilst Wiedemann describes them as obliquely placed.

These twelve specimens approach my *univittatum* ♀, but the presence of the small though perfectly distinct facial bump at once separates them. When all the specimens are examined in conjunction with a series of *univittatum* ♀ they are seen to be almost certainly specifically distinct. I am at a loss to satisfactorily dispose of them, but as there are no males with the same characters, to set them up as a new species would be premature.

Melanostoma univittatum, W ♂ ♀

(Plate xiii, figs. 4-6.)

? *Syrphus planifacies*, Macq.

Wiedemann described only the ♂ of this species, nor have I seen any mention of the ♀ having been described. Nine specimens in the Indian Museum can hardly fail to be that sex of this species. They possess the smooth face without any trace of a central bump so characteristic of *univittatum*, and the peculiarity of the 1st pair of spots being fully as large as the others, with their bases on the anterior border of the segment or enclosing the anterior angle of it, or carried over the side just below the base. These front spots are sometimes whitish in colour, and occasionally occupy the whole of the segment, the colour extending well over the base of the 3rd segment also. The 1st pair of spots in *univittatum* ♂ also occupy nearly all the 2nd segment, and have their bases on the anterior border of that segment; although a more suitable description would be to regard the abdomen as reddish yellow, with a narrow black median line and the posterior borders of the segments narrowly black, the colour extending slightly forward towards the sides. The hind

legs are wholly yellow except for an indistinct median dark band on the tibiae, and this is often absent.

As regards *planifacies*, Macq. I think it may also be regarded as the ♀ of *univittatum*. The sole disagreement in Macquart's description is the colour of the thorax and frons, which he says is greenish black. Although in the nine ♀♀ that I refer to *univittatum* the thorax and frons are aeneous black as it normally is in the ♂, some ♂♂ in the collection exhibit a distinctly greenish tinge. One of the ♀ examples (from Bangalore) agrees exactly with Macquart's plate, and his remark that the pale colour at the base of the abdomen extends to the side borders agrees with the nine specimens referred to. The legs in these specimens agree with those of my male *univittatum*.

Meijere records three *planifacies* from Singapore, Sumatra and Queensland respectively but no ♂

The ♂ *univittatum* specimens in the Indian Museum come from Darjiling, Katmandu, Dibrugarh, the Assam-Bhutan Frontier, Mergui, Travancore, Bangalore and Coromandel; whilst the 9 ♀♀ hail from Bhim Tal, the Assam-Bhutan Frontier, Sadiya, Travancore, Bangalore, Coromandel and Sarawak, the localities of both sexes thus supporting the view that they are the same species. Its range of distribution is evidently very wide.

***Melanostoma cingulatum*, Big.**

This can hardly be a *Melanostoma*, the yellow scutellum and side stripes to the thorax throwing it out of this genus altogether. Bigot says it resembles *Syrphus consequens*, Walk., which latter has been referred to *Asarcina*, a totally different group of species. Bigot, in fact, did not understand the genus *Melanostoma* and introduced, with a query quite a number of species. In the Indian Museum are two specimens marked "*Melanostoma, hemiptera*, Big." in that author's handwriting which are merely the common *Syrphus* (*Asarcina*) *aegrotus* F.

***Platychirus manicatus*, Mg. var. *himalayensis*, mihi, nov. var.**

Three ♂♂ from Garhwal differ from the European *manicatus* sufficiently to rank them as at least a very distinct variety, if not a distinct species. The dilatation of the first two joints of the front tarsi is more conspicuous, and more produced forwards on the inner side of the 1st joint. The hind metatarsus is distinctly less thickened in the middle though obviously broader throughout than the femur or the remaining tarsal joints.

The present form is 11.5 millimetres long, as against 9 to at most 10 millimetres in *manicatus*, and the abdominal yellow spots are smaller, more quadrate and of uniform size, the first pair being as large and as square as the others.

The close similarity in all other characters causes me to refrain from considering this form distinct, at least until further specimens are available.

Dideoïdes ovata, Brun.

One ♂ Sikkim v-1912; one ♀ Shillong 10—12-x-14 [*Kemp*].

ASARCINA, Macq.

This is not a good genus but I collect under this heading the species referred to it. Meijere regards it as a subgenus, Bezzi as a valid genus.

Syrphus (Asarcina) aegrotus, F.

One of the commonest species in the East, and easily recognized by the broad blackish band across the middle of the wings. This band sometimes extends to the base of the wing, and a specimen of this nature in the Indian Museum bears a label *Melanostoma hemiptera*, Big. Meijere records it from several places in Java and the Indian Museum has it from a wide range of localities.

Syrphus (Asarcina) ericetorum, F.

S. salviae, Wied.

S. salviae, W., is identical with *ericetorum*, F., described originally from Africa, and the latter name will have to be used for it. Meijere records it from Java, the Indian Museum has it from many localities and I took two at Colombo in June, 1904. Two were taken at Simla viii-14 by Capt. Evans, R.E., and two at Cherrapunji, Assam, 4400 ft., 2—8-x-14 [*Kemp*].

Syrphus (Asarcina) consequens, Walk.

Meijere records this species from Sumatra, Java and Papua, and confirms Osten Sacken's suggestion that *striatus*, Wulp, is synonymous.

The following two species have been recently described as belonging to *Asarcina*.

A. biroï, Bezzi, Ann. Mus. Hung. vi, 902 (1908).

A. morokaensis, Meij., Tijds. v. Ent. li, 308 ♂ ♀, pl. viii, 33 (1908), Papua.

Meijere records *biroï* from several localities in Papua.

SYRPHUS, F.

Dr. Meijere gives a table of a number of species of *Syrphus* and records *serarius*, Wied., from Pattipola, Ceylon (200 metres), [*Biro*].

Syrphus balteatus, DeGeer.

Very common in the Himalayas and also in the plains of India and Assam, extending to Java, China and Japan.

The following new species were described by Meijere recently (Tijd. v. Ent. li, 1908):—

- luteifrons**, p. 304, ♂, pl. viii, 37, Moroka (1300 metres), Papua [*Loria*]. Type in Genoa Museum, a unique specimen.
triangulifrons, p. 305, ♂ ♀, pl. viii, 36, Moroka, Papua [*Loria*]. Types in Genoa Museum, a unique pair.
circumdatus, p. 306, ♂ ♀, pl. viii, 35, Moroka, Papua [*Loria*]. Types in Genoa Museum.
longirostris, p. 307, ♂, pl. viii, 34, Moroka, Papua [*Loria*]. Type in Genoa Museum.
morokaensis, p. 308, ♂ ♀, pl. viii, 33, Moroka, Papua [*Loria*]. Types in Genoa Museum. Referred to the subgenus *Asarcina*.
elongatus, p. 309, ♂ ♀, pl. viii, 32, Moroka, Papua [*Loria*]. Types in Genoa Museum.

Four species taken on the Abor Expedition were described as new by me in Rec. Ind. Mus., viii (1913). Types in Indian Museum.

- aeneifrons**, ♂, p. 159, N.E. Front. India, 1100 ft., 17-iii-12; 4000 ft., 18-iii-12.
transversus, ♀, p. 160, Sadiya, 28-xi-11, a unique specimen.
fulvifacies, ♀, p. 161, Rotung (N.E. Front. Ind.), 26-ix-11, a unique specimen.
maculipleura, ♀, p. 162, Rotung, 25-xii-11, a unique specimen.

***Syrphus distinctus*, mihi, sp. nov.**

(Plate xiii, fig. 7).

♂ Western Himalayas.

Long. 14—15 mm.

Head.—Frons, face and under side of head covered with pale orange yellow tomentum, being more dusky towards the frons. A broad median blackish stripe. Frons with black hairs. Vertex blackish with black hairs. Antennae and arista wholly black. Back of head dark grey with short yellow hairs, some black ones behind the vertex.

Thorax.—Blackish on dorsum, yellowish grey at sides, mainly covered with brownish yellow pubescence. Scutellum orange yellow with black hairs in the middle and yellowish white ones on anterior and posterior margin and below the latter.

Abdomen.—Blackish, 1st segment yellowish, hind margins of 2nd, 3rd and 4th segments pinkish grey, with a rather narrow cross band of the same colour across the middle of each; that of the 4th segment lying just before the middle. Dorsum of abdomen with rather thickly placed black hairs except on the 2nd segment, on the pale band on the 3rd and at the sides of the whole abdomen where the pubescence is whitish yellow. Belly blackish, yellowish at base and along the hind borders of the segments,

covered with yellow or black pubescence according to the colour of the surface.

Legs.—Anterior pairs principally orange yellow; anterior femora black on about the basal half; hind legs principally black, knees broadly brownish yellow as are the last four tarsal joints. Anterior femora with some moderately long yellowish or brownish yellow hairs on under side, with black hairs intermixed towards tips of fore pair and generally on underside of middle pair. Conspicuous thick but short black hairs on hind femora, longest on underside, and on front and hind sides of hind tibiae.

Wings yellowish grey, stigma brown; squamae yellowish brown with fringe of the same colour.

Described from 3 ♂ from Tolpani, Garhwal District, 9500 ft., 23-iv-14 to 13-v-14.

The unbroken pinkish grey bands on the abdomen easily separate this species from all other Oriental ones, and from all European or North American species known to me.

SPHAEROPHORIA, St. Farg.

Few genera offer more complexities than this, as regards the limits of the species.

The present notes must therefore be regarded as simply a contribution towards a better knowledge of the Oriental species; and apart from the two perfectly good species *scutellaris*, F., and *javana*, W., the four forms recognized and described herein are termed and understood as "forms" only, although it seems probable that *viridaenea* will eventually prove specifically distinct.

In working out the fairly good series of specimens in the Indian Museum I adopted the plan of dividing them into "forms" previous to consulting any of the descriptions, treating the ♂ ♂ first and the ♀ ♀ subsequently, moreover in each case without any reference to the localities of the specimens.

By this method one avoids being prejudiced in favour of pairing off ♂ ♂ and ♀ ♀ according to the localities, and a more trustworthy result is likely to ensue.

In the present instance the six male forms sorted themselves readily enough and were backed up in every case by females from the same localities; proving to be the two well marked and known species *scutellaris*, F., and *javana*, W., with four remaining forms of which I have ventured to give names to three.

One point noticeable about them all is that the yellow markings of the abdomen are almost always definite bands and not pairs of spots more or less resolving into bands as in the European species.

Apart from *scutellaris*, F. (with *aegyptius*, W., *longicornis*, Macq., *splendens*, Dol., and *Melithreptus novaeguineae*, Kert., as synonyms), and *javana*, W. (with *Melithreptus distinctus*, Kert., as a synonym) the only other two described species are *bengalensis*, Macq., and *indianus*, Big.

Macquart's *bengalensis* may be anything; he separates it from *taeniata*, Mg., on the shorter abdomen, with wider (yellow) bands, the 4th segment being tawny with a dorsal line. Though no individual specimen answers to this amongst those before me it may very well be my "Form 1."

Bigot's description of his *indiana* (σ), from Bengal, though more lengthy is very inconclusive and may easily be the same form again. His "derniers segments des tarses un peu brunâtres" cannot be regarded as pointing to my *nigritarsis*, in the three σ σ of which the tarsi are very distinctly wholly deep blackish or blackish brown.

The characters studied in the present differentiation of forms are as follows:—

(1) Length of 3rd antennal joint. This is always simply elongate or almost rounded, except in *scutellaris*, F., a very distinct species which may be recognized at once by this character alone.

(2) Markings on frons and face, or absence of same.

(3) Thoracic dorsum with pale grey stripes or not.

(4) Scutellum with yellow or black hairs, or both. The best way to decide this is to view this part from behind and slightly above. If wholly yellow haired, hardly any pubescence can be seen at all at this angle, whereas any dark hairs are visible at once.

(5) Abdominal markings.

(6) Comparative length of wing and abdomen. One or two of the older writers spoke of the wing being longer than or equal in length to, the abdomen. It is the abdomen, which in some species (*scriptus*, L., of Europe, for instance) is abnormally long, that varies, the proportional length of the wings to that of the rest of the body being the same in all the forms now treated of.¹ Moreover it appears to vary within reasonable limits, and if "form 2" is the same species as my "*flavoabdominalis*" form, the proportionate length of wing to abdomen will prove to be of less value still.

(7) Coxae all yellow, or black marked. This hardly affects the Indian forms at all.

(8) Hind tibiae mainly yellow or mainly black. This character only serves to separate the second well known and distinct species *javana*, W., which has them wholly black except for a clear cut median yellow band of some little width; all the other forms possessing entirely yellow hind tibiae. It is true that *scutellaris* often has an indistinct obscure ring about the middle, but the very elongate 3rd antennal joint will always distinguish that species.

¹ If there is any exception to this it is in my "*flavoabdominalis*" form amongst the Indian ones, and in *scriptus*, L., with its varieties, amongst the European ones.

(9) Hind tarsi distinctly black or dark brown above, or mainly yellow. This only separates my form *nigritarsis* from the remainder, after eliminating *scutellaris* and *javana*. Occasional individuals of various forms may have them a little brownish, or a deeper orange yellow, but never sufficiently darkened to be mistaken for *nigritarsis*.

Table of Oriental species and 'forms' of SPHAEROPHORIA.

- A Antennal 3rd joint very elongate,
about twice as long as broad. sp. 1. *scutellaris*, F., ♂ ♀
- AA Antennal 3rd joint simply oval or rounded.
- B Hind tibiae wholly black except a well marked yellow median not very wide ring. sp. 2. *javana*, W., ♂ ♀
- BB Hind tibiae wholly yellow.
- C Face without black stripe. Thorax blackish with two obvious though faint grey stripes.
- D Hind tarsi all yellow.
- E Abdomen all yellow after 2nd segment, shorter than wings in ♂, generally also in ♀
"Form 1." *flavoabdominalis*, mihi, ♂ ♀
- EE Abdomen with 3rd and 4th segments black at base and tip to a varying extent. Abdomen as long as wings ♂ ♀ "Form 2." mihi. ♂ ♀
- DD Hind tarsi all black above, anterior tarsi more or less so. "Form 3" *nigritarsis*, mihi, ♂ ♀
- CC Face with distinct black median stripe. Thorax aeneous green, absolutely unstriped. "Form 4." *viridaenea*, mihi, ♂ ♀

It will be seen that four "forms" are recognized in addition to the two well marked species *scutellaris*, F., and *javana*, W., which have been known for nearly a century. To three of the "forms" I have ventured to give names tentatively, to facilitate reference to them, and it seems probable that *viridaenea* will prove specifically distinct.

"Form 1, *flavoabdominalis*", mihi.

♂ ♀ Baluchistan, Persia, Simla, Nepal, Punjab, Bushire.

♂ *Frons* and face all yellow, rarely a very small black mark on or near central knob or mouth border; an individual aberration only. *Thorax* normally distinctly though faintly striped on at least anterior half, but occasionally the dorsum is quite dull and the stripes absent even in perfect specimens. *Scutellum* all yellow haired.

Abdomen with 1st segment shining aeneous, often appearing like a prominent triangle on each side of the base of the 2nd segment. The 2nd segment black, with a broad, clear cut, bright yellow transverse uninterrupted band forming about one-third of the segment; remainder of abdomen normally orange yellow, unmarked, and though there are generally a few irregular obscure markings there is nothing in the nature of transverse black bands or pairs of spots. Abdomen distinctly shorter than the wings. *Coxae* all yellow (in only one specimen the hind pair show a slight darkening); remainder of legs wholly yellow, the hind tarsi a little deeper orange.

Long. 6—7 mm.

Baluchistan, Bushire, Katmandu (Nepal), Dharampur (Simla Hills), 5000 ft., 6—8-v-07 [*Annandale*]; Agra, 4-iv-05; Ferozepore (Punjab), 28-iv-05 [*Brunetti*].

♀ Differing from the ♂ only as follows. Vertex shining black or dark aeneous, with a concolorous stripe, narrowing considerably and approximately reaching the antennae.

Abdomen about as long as the wings, 3rd and 4th segments with a wide black band on posterior margin.

I took this form in abundance at both Agra and Ferozepore, in company with the ♂ ♂ referred to, during April, 1905 in fields of dry grass, stubble and general vegetation.

One ♂ from Purneah (Bengal), 8—9-iii-09 [*Paiva*] agrees technically, but the wings and abdomen are equally long, and it is a little more robust. *Long.* 7 mm.

It is difficult to differentiate this form from *scriptus*, L., yet it seems quite a distinct local race. Verrall notes the partiality of this species to form local races. Apart from size the ♂ in the present form is exactly like *scriptus* with all yellow abdomen after the 2nd segment, a form that species very often takes in European specimens, but on the other hand the ♀ does *not* so closely resemble the ♀ *scriptus*, the abdomen being mainly yellow, with black bands, instead of mainly black, with interrupted narrow yellow bands.

“Form 2”, mihi.

♂ ♀ Shanghai, Simla, Nepal, Bengal.

♂ This differs from Form 1 only in the 3rd and 4th abdominal segments in the ♂ having a narrow black band at the base and a broad one at the tip of each. The wings are as long as the abdomen.

Long. 6 mm. Shanghai, 17-iv-06 [*Brunetti*]; Songara, Bengal, 3—5-iii-07.

♀ Agreeing with ♂ but the scutellum sometimes has some black hairs on the hinder part. The abdominal black bands are broader. Vertex shining aeneous black, frons with a broad black stripe to the antennae, this stripe sometimes of uniform width, sometimes narrowing anteriorly.

Shanghai, in company with ♂; Noalpur (Nepal), 21-ii-08; Dharampur, Simla, 5000 ft., 6—8-v-07 [*Annandale*]; Katihar, N. Bengal, 8—9-iii-09 [*Paiva*]; Bhanwar, Bengal, 26-ii-07.

This form seems to me practically identical with *S. menthrastri*, L. (*taeniata*, Mg.), the females agreeing exactly, but unfortunately there are no ♂ *menthrastri* specimens available for comparison, and there are several minor discrepancies between Verrall's descriptions of this sex and my ♂ ♂

"Form 3, nigritarsis", mihi

♂ ♀ Simla, Kurseong.

♂ Differing from Form 1 as follows.

Scutellum with distinct blackish hairs on hinder part; these black hairs being longer than the yellow ones, or than the yellow hairs on the hinder part of the scutellum in Form 1. *Abdomen* with 3rd and 4th segments each normally with a rather narrow black basal band and hind border of broader, but varying width. In one specimen these black bands are indistinct on the 3rd segment and altogether absent on the 4th. *Wings* and abdomen equal in length. *Coxae* wholly yellow in two specimens, in the other two, the front coxae are dusky on the anterior side. *Legs* yellow; hind tarsi wholly distinctly black or dark brown on upper side; anterior tarsi always distinctly brown or dark brown, always much deeper coloured than in Forms 1 and 2. The middle pair of tarsi the least deeply coloured of the three.

Long. 6 mm. Matiana, 28—30-iv-07, Theog, 27-iv-07, Simla Distr., 8000 ft. [*Annandale*].

Two ♀ ♀ from Simla and Kurseong respectively, agree with the ♂ except that the hind tarsi are a little less dark brown on the upper side, and the anterior tarsi are lighter brown but distinctly darker than the tibiae, yet not so dark as in the ♂. The frons has a very broad aeneous black stripe from the similarly coloured vertex to the antennae.

Kurseong, 7-ix-09, Kodiala, Simla Distr. [*Annandale*].

The black or nearly black upper side of the tarsi (always at least the hind pair) will distinguish this form from all the others. It is impossible to identify it with any recognized European variety of which an adequate description is open to me.

"Form 4, viridaenea", mihi.

♂ ♀ Simla, Kurseong.

♂ This form varies from Form 1 very materially and will probably prove a good species.

Frons with a very small frontal triangle; face with distinct *black median stripe*, not very regular in width. *Thorax* with wholly *aeneous green shining* dorsum, clothed with close yellow pubescence, *without any trace of stripes*; scutellum wholly, or at least mainly black-haired. *Abdomen* with 3rd and 4th segments

orange yellow, the posterior border with a moderately broad black band, the anterior border generally black also. *Wings* and abdomen subequal. *Legs* all yellow, but hind tarsi rather darker orange.

Long. 6-7 mm. Simla, 16-v-09, Theog, 2-v-07 [*Annandale*]; Kurseong.

♀ A single specimen from Kurseong, 4-ix-09 [*Annandale*] agrees absolutely with the ♂♂. The vertex is broadly shining dark aeneous green with a broad stripe similarly coloured reaching the antennae.

I feel convinced this is a good species on the strength of the unstriped greenish aeneous thorax and very distinct black facial stripe, yet it seems preferable to rank it for the present as a "form" only.

Sphaerophoria scutellaris, F.

In the Indian Museum from Maho, base of Nepalese Himalayas, 17-iii-09; Ferozepore, 28-iv-05; Agra, 3-iv-05 [both *Brunetti*]; Paresnath, W Bengal, 4300 ft., 15-iv-09 [*Annandale*]; Bhanwar, 26-ii-07; Bettiah, Champaran, 8-iii-08; Dhampur, 24-ii-07; Rajmahal, 6-vii-09; Kulti, Sitarampur, 10-viii-09 [*Lord*]; on launch off Coconada, Madras coast, 15-iv-08 [*Paiva*]; Calcutta, iii, x, xi, common. All the above localities in India. Base of Dawna Hills, Tennasserim, 4-iii-08 [*Annandale*]. I also took it myself at many places in India and the East but exact data are not available.

Sphaerophoria javana, W.

In the Indian Museum from Ukhrul, Manipur, 6400 ft. [*Pettigrew*]; Dawna Hills, 2000-3000 ft., 2-3-iii-08 [*Annandale*]; base of Dawna Hills, 1-iii-08 [*Annandale*]; Sukli, 2100 ft., 22-29-xi-11 [*Gravely*]; Sukna, 500 ft., 1-vii-08 [*Annandale*]; Burma-Siam Frontier, 900 ft., 24-26-xi-11 [*Gravely*].

This species was, by a clerical error of my own, recorded in my paper on the Diptera of the Abor Expedition (Rec. Ind. Mus., viii, 164), as *S. scutellaris*, F. Specimens were taken at Sadiya, Assam, 23-28-xi-11; Rotung, 1400 ft., 29-xii-11, and Kobo, 400 ft., 30-xi-11, the last two places being on the north-eastern Frontier of India.

Eriozona himalayensis, mihi, sp. nov.

♂ Western Himalayas.

Long. 13-14 mm.

Head wholly moderately shining black. Frons with a pale yellowish grey tomentum when viewed in certain lights. Face with more obvious similarly coloured tomentum or minute pubescence; a median rather broad space being bare; some longer black hairs on the cheeks. Proboscis black. Eyes with thick dark brown pubescence. Antennae black, 3rd joint dull, arista black. Occiput blackish grey with yellow hairs around the margins, with which are intermixed some black hairs behind the vertex.

Thorax moderately shining black, with, in certain lights, a slight aeneous tinge: prothorax dull aeneous, covered with light brownish yellow, rather thick pubescence, rest of dorsum covered with black pubescence; scutellum with long thick black pubescence, lower posterior margin with a fringe of short yellowish hairs. Mesopleura and sternopleura with thick yellowish pubescence, rest of sides of thorax with sparser black hairs.

Abdomen shining black, covered thickly with bright red pubescence, which becomes more yellowish on 1st segment and on sides of 2nd. Margins of 3rd and 4th segments, and whole of belly with black pubescence. Genitals dark grey with black hairs.

Legs black, with short black pubescence, which is rather long on under side of femora, the hind pair having in addition two diverging rows of long widely separated hairs.

Wings grey, anterior margin slightly darker; a broad brownish infuscation from around the stigmatic region across the middle of the wing, extending half way to the posterior margin. Halteres yellow, clubs black.

Described from several ♂♂ from the Kumaon District, 20-6-14 to 20-7-14.

This species evidently mimics the bee *Bombus haemorrhoidalis*, Smith.

BACCHA, F.

Meijere tabulates and notes a number of oriental species (Tijd. v. Ent. li, 316) and records the following previously known species: *pulchrifrons*, Aust., from Depok, W. Java, Singapore and Tsushima; *pedicellata*, Dol., from Semarang and Tandjong Priok, Java [*Jacobson*] also ♂♂♀ from Krakatua, and *purpuricola*, Walk., from two Papuan localities and the Key Islands.

I have myself received males of *nubilipennis*, Aust., and *pulchrifrons*, Aust., from Kandy and Peradeniya respectively.

Since Van der Wulp's catalogue, quite a number of new species of this genus have been set up. These are listed here.

rubella, Wulp, Termes. Fuzet. xxi, 423 (1898), Papua.

Meijere notes both sexes from Papua.

mundula, Wulp, *loc. cit.*, 423, ♀, Papua.

Meijere records the ♂ from Sukabumi, Java [*Kramer*], and a ♀ from Dilo, Papua [*Loria*].

circumcincta, Meij., Tijd. v. Ent., li, 320 (1908), ♀, Buitenzorg, Java [*Jacobson*]. Type in Amsterdam, a unique specimen.

pallida, *id.*, *loc. cit.*, 322, ♂ Stephansort, Papua [*Biro*]. Type, a unique specimen, in Hungarian Museum.

loriae, *id.*, *loc. cit.*, 324, ♀ Paumotu, Papua [*Loria*]. Type, a unique specimen, in Genoa Museum.

austeni, *id.*, *loc. cit.*, 325, ♂♀ environs of Buitenzorg, Java [*Jacobson*].

bicincta, *id*, *loc. cit.*, liii, 104 (1910), ♂ ♀, Batavia, Tandjong Priok (Java), Bekassi and from Krakatua [*Jacobson*]. Types in Amsterdam Museum.

chalybea, *id.*, *loc. cit.*, 105, ♂ ♀, Pasuruan, Java and Krakatua [*Jacobson*]. Types in Amsterdam Museum.

***Baccha dispar*, Walk.**

A ♀ specimen in the Indian Museum, without data, identified by Bigot, is certainly this species.

***Baccha robusta*, mihi.**

Three (♂ ♀) have been seen by me from Dehra Dun, sent by Dr. Imms; one ♂ in the Indian Museum from the base of the Dawna Hills, 4-iii-08 [*Annandale*]; and four (♂ ♀) from Sikkim, v-1912.

***Baccha flavopunctata*, mihi.**

The specimens referred to in my description of this species, with the exception of the type, appear to be a different species, which is here described as *elegans*.

Of true *flavopunctata* further specimens have been acquired from Sibpur, Bengal, 4-iv-13 [*Gravely*]; Cherrapunji, Assam, 4400 ft., 2-8-x-14 [*Kemp*]; with an additional apparently immature one from the same locality: All are females.

It is possible that this species is synonymous with *pedicillata*, Dol., though that author's species is described as blackish brown with two semilunar pale bands; and mine as yellowish with black bands on the 3rd and 4th segments. Two specimens in the Indian Museum from Sibpur, Bengal, have the ground colour brown and the black bands a little larger and more extended at the sides of the abdomen, thus making a very close approximation to Doleschall's figure.

His description agrees exactly, except that he does not mention the conspicuous perpendicular yellow stripe on the mesopleura, with the adjoining spot on the sternopleura. His "metathorax luteo cincto" may refer to the conspicuous elongate yellow spot on the metapleura.

The specimens of this species with conspicuous yellow abdomens must bear some resemblance to *vespaeformis*, Dol. *Flavopunctata* differs from Doleschall's species by the presence of the metapleural and sternopleural yellow spots; by the black band at the base of the 3rd abdominal segment; the black rings on the hind legs and the blackish subcostal cell. Doleschall says the wings are clear except for a brownish red fore-border. There is little doubt the two forms are distinct. In the four examples present of *flavopunctata*, two (including the type) have the ground colour of the abdomen yellow, in the other two it is brownish, and in these the shape of the abdomen is also slightly different, the breadth of the 3rd, 4th and 5th segments being greater, and the

widening of the 3rd segment more sudden than in the type and the Cherrapunji specimen, in both of which the greatest width of the abdomen is proportionately less, and the widening more gradual. However, I include all under one species as in every other particular they agree with one another and it is no uncommon thing for the yellow parts of a species of Syrphidae to be replaced in individuals by brownish.

***Baccha elegans*, mihi, sp. nov.**

♂ North Bengal; Lower Burma. Long. 11—12 mm.

Head.—Eyes absolutely contiguous for about half the distance from frontal triangle to vertex; (in one example they are quite distinctly though very narrowly separated). Frons shining violet black, frontal triangle and face wholly deep chrome yellow, with a very distinct median black stripe, broader on upper part, from below antennae to mouth border. No obvious bump on face. Antennae wholly bright orange yellow, antennal prominence hardly noticeable. Occiput whitish grey, cut away in profile behind upper part of eyes; a fringe of short white hairs round entire ocular orbit. Proboscis brownish yellow.

Thorax.—Dorsum shining deep blue, with very short whitish depressed pubescence. Sides dark blue black. Pale callus-like yellow spots are placed as follows: a large one on the shoulder contiguous to a lateral oblong one along the side, just below the dorsum and just touching a large perpendicular oblong one on the mesopleura, which in its turn is sub-contiguous to a round one on the sternopleura. A more or less oval one behind the wings. Scutellum mainly blackish brown, with a well marked pale lemon yellow base, this colour extending over the sides. Metanotum dark bluish black.

Abdomen.—First segment very short, sub-triangular; 2nd exceedingly narrow and elongate; 3rd equally narrow on basal third, thence suddenly widening to three times that width, the whole segment less long than 2nd; 4th distinctly shorter than 3rd, 5th less than half as long as 4th. The enlargement of the abdomen continues to the tip of the 4th segment, the 5th narrowing. The 1st segment is wholly brownish yellow, the rest of the abdomen is shining dark brown, with a vague violet tint, and there is a pale narrow space at the junction of the 2nd and 3rd segments, also broadly at tip of 3rd segment. Genitalia shining brownish yellow, with some obscure markings and a small process below. Belly mainly a replica of upper side. The whole abdomen with a little very short blackish pubescence, some longer, though still short, whitish pubescence at sides of first two segments.

Legs.—Anterior pairs bright brownish yellow, bare except for a little pale hair below the femora; hind legs with coxae obscure above, femora darker brownish yellow, tibiae pale yellow on basal half, black on remainder, as is also the metanotum; hind tarsi tips brownish.

Wings clear, except subcostal cell, from base to tip blackish or blackish brown, the colour carried narrowly along the front margin to tip of 3rd longitudinal vein. Halteres brownish yellow.

Described from several ♂♂ in the Indian Museum from Sukna, 500 ft. 1 and 2-vii-08; and from jungle at base of Dawna Hills, 1-iii-08 [both *Annandale*]; Rungpo, Sikkim, 1400 ft. 6-ix-09. In the latter specimen the face is wholly pale, but it is undoubtedly this species.

This is evidently distinct from *flavopunctata*, though bearing a close resemblance, and at one time I thought it the ♂ of that species. It differs in the distinct blue tinge to the whole thorax instead of the almost cupreous dorsum in *flavopunctata*. Also in the metapleural stripe which is shorter and more truncate at its lower end, instead of longer, elongate oval and sometimes divided transversely. The femora are only slightly browner apically than basally, the tips seldom paler; instead of a deeper brown middle part, the base distinctly pale and the tips always more or less so.

The whole hind metatarsus is black, instead of only at the base; the costal cell quite clear, not yellowish. The abdominal marks appear constant in *elegans* in the five specimens seen, except that the 3rd segment in one of them is all black.

***Baccha apicenotata*, mihi, sp. nov.**

(Plate xiii, fig. 8).

♀ Western Himalayas.

Long. 10 mm.

Head.—Frons shining aeneous black, with a dark blue tinge, narrowest immediately below vertex, thence gradually widening to double that width just above antennae. An elongate grey dust spot at about the middle of the frons each side, contiguous to eye margin. Face grey at sides, leaving a broad median blue black shining stripe; the central bump rather large. Antennal prominence rather large, antennae bright orange. Proboscis brownish yellow. Occiput greyish, ocular orbit with a fringe of whitish hairs.

Thorax.—Dorsum shining dark blue, with sparse short brownish grey pubescence. Sides obscurely brownish, a small greyish shoulder spot, another similar spot half way between the latter and the wing root, contiguous to a perpendicular, similarly coloured oblong spot on the mesopleura. Scutellum shining dark blue with very sparse short pale hairs.

Abdomen only very slightly widened,¹ dark brownish, posterior margins of 2nd, 3rd and 4th segments broadly black, 5th segment mainly so.

Legs.—Anterior pairs wholly yellow; hind pair a little more obscure; coxae darkened, a subapical light brownish ring on

¹ A little may be allowed for the sides curling underneath, but the species is evidently nearly linear in form.

femora and a broad apical band on tibiae, neither of the rings very definite, tarsi wholly yellow.

Wings clear; subcostal cell wholly blackish brown, and beyond tip of cell the colour spreads into an apical wing spot, contiguous to front margin and limited posteriorly by the 3rd longitudinal vein. Halteres brownish yellow.

Described from a single ♀ from Bhowali, 5700 ft., vii-09 [*Imms*], the specimen presented by him to the Indian Museum.

This might easily be taken for the ♀ of *elegans*, but a good structural difference exists. In *apicenotata* the antennae are seen to be set on a rather conspicuous prominence, and the facial bump is also distinct, but in *elegans* there is no obvious antennal prominence and the facial bump is barely noticeable. Other differences consist of the absence of the yellow stripe on the metapleura, the wholly blue scutellum, the wholly yellow hind metatarsus and the more conspicuous wing-tip spot.

There are two further examples in the Museum collection which are apparently additional ♀ ♀ of the present species. The differences in the first are: (1) the frons is a little broader, (2) the abdomen enlarges very suddenly at the base of the 3rd segment and reaches its greatest width at the tip of that segment. The abdomen is black, except for the 1st segment, the extreme base of the 2nd and (indistinctly) the basal half of the 3rd. The black streak on the costa reaches the tip of the 3rd vein, but only weakly, and shows no sign of enlargement into an apical spot as in *apicenotata*. The specimen is from "Jungle at base of Dawna Hills", i-iii-08 [*Annandale*].

The second specimen is an obviously immature one from Cherrapunji, Assam, 4400 ft., 2—8-x-14 [*Kemp*], and differs only in the wholly clear wings.

***Baccha plumbicineta*, mihi, sp. nov.**

♀ Assam.

Long. $8\frac{1}{2}$ mm.

Head.—Frons broad, distinctly but not greatly broader above antennal prominence, where it is nearly one-fourth the width of the head; bluish black, the colour sharply demarcated behind vertex; a little whitish tomentum about the middle of inner orbit of eyes. Face, down to a little above mouth opening, bluish black, slightly grey-dusted, with a central conspicuous black bump. Remainder of lower part of head, including buccal region, uniformly bright yellow. Antennae black, 3rd joint broad, arista black. Occiput grey.

Thorax.—Dorsum and scutellum almost lead colour, shining, with slight coloured reflections when viewed from different angles; minute yellow pubescence; remainder of thorax bright yellow.

Abdomen.—Only slightly contracted on 2nd segment, remainder of segments barely wider, the abdomen at no point quite so wide as thorax, shining bluish black with very short inconspicuous

pubescence, base of 3rd, 4th and 5th segments with a moderately broad lead coloured band.

Legs yellow; an indistinct broad brownish ring on apical half of hind femora; the apical half of hind tibiae blackish except broadly at tip; upper side of hind metatarsi brown, rest of hind tarsi black.

Wings clear; subcostal cell dark brown except on the narrow basal part; halteres yellow.

Described from one perfect ♀ in the Indian Museum from Cherrapunji, 2—8-x-14 [*Kemp*].

SPHEGINA, Mg.

One species described by me recently *tristriata*, ♀, from a unique specimen from Rotung (N.-E. Front India), 6—13-iii-12 (Rec Ind. Mus., viii, 165, ♀, pl. vi, 1913). *Type* in Indian Museum.

Sphegina bispinosa, mihi, sp. nov.

♂ ♀ Assam, E. and W. Himalayas. Long 5½ mm.

This species is remarkably close to the tolerably common and very widely distributed *S. clunipes*, Fln. of Europe, but differs in two essential characters.

In the first place there is a short tooth-like black spine on the side of the basal abdominal joint lying immediately behind the halter. Three or four stiff black bristles lie behind the spine.

The second specific character is that the costa is a little brownish about the middle, the colour spreading slightly over the base of the 2nd longitudinal vein. The turned-up portions of the 4th and 5th longitudinal veins, with the posterior cross vein, are all distinctly brown suffused.

Described from a ♂ (*type*) from Margherita, Assam, a ♀ (*type*) from Darjiling (7000 ft.) taken by me, 29-v-10; also two ♀ ♀ taken by Mr. Innes near Bhowali, Kumaon, Western Himalayas (5700 ft.) in July, 1909.

Type ♂ and ♀ in Indian Museum.

Sphegina asciiformis, mihi, sp. nov.

♀ Darjiling. Long. 4 mm.

Head.—Frons aeneous black, with a little yellowish grey tomentose dust along the eye margins. Antennae with 1st and 2nd joints dark brown, 3rd joint black with long dorsal arista placed at the base of the joint. Mouth parts reddish brown. Occiput dark grey.

Thorax.—Yellowish grey-dusted, a little lighter on the shoulders; three moderately wide dorsal infuscated stripes, separated from each other by less than their own width. Scutellum shining black,

with a little hoary dust. Sides of thorax blackish, with a little greyish dust on upper parts.

Abdomen.—The 1st segment narrow, 2nd very much contracted at base, thence suddenly widened; rich shining deep mahogany brown, nearly black, with very sparse and almost microscopic whitish hairs. Belly yellow ochre; two small black spots in a dorsal line near the base, and a median well marked black line on the apical half.

Legs.—Anterior four bright yellow. Hind femora much incrassated, yellow, a blackish band in the middle (incomplete below), and a complete broad black ring at the tip. Under side with two rows of minute black spines; hind tibiae pale yellow, a long black streak below at base, and a blackish ring (incomplete on upper side) at tip. Hind tarsi brown, their metatarsi distinctly thicker than the tibiae, nearly half as long and about as wide as rest of tarsi.

Wings absolutely clear, brilliantly iridescent; halteres blackish.

Described from a unique ♀ taken by me, 29-v-10, at Darjiling. In the Indian Museum.

From the small size and very contracted base of the abdomen, this species closely resembles an *Ascia*.

Sphegina tenuis, mihi, sp. nov.

♀ Darjiling.

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

Head.—Frons dull black, with grey dust, ocelli distinct, red; the concavity in profile below the antennae well marked. Antennae black, a little dull grey-dusted, arista very curved; mouth parts reddish brown. Occiput grey.

Thorax black, with yellowish grey dust, and three dorsal infuscated stripes, the median one the widest, the outer ones slightly interrupted at the suture, and not reaching the shoulders. A pale grey spot on the latter can be seen if viewed from behind. Sides of thorax blackish, with yellowish grey hair.

Abdomen black, 2nd segment much attenuated and very long, 3rd with a broad yellowish sub-basal band. Genital organs large, globular apparently. Belly black, greater part of 3rd segment brownish yellow.

Legs.—The two first pairs pale yellow with the two last tarsal joints black. Hind coxae black, hind femora considerably incrassate; basal half pale yellow, apical half black. Hind tibiae mainly dark brown, pale at tips, and a narrow band just beyond the middle (which band appears as if in some examples it might be interrupted). Hind tarsi blackish brown, the hind metatarsi thickened, but only one-third as long as the tibiae.

Wings yellowish grey, brilliantly iridescent; stigma long, brown, halteres brownish yellow.

Described from one ♀ from Darjiling, taken by me, 29-v-10. In the Indian Museum.

***Sphegina tricoloripes*, mihi, sp. nov.**

(Plate xiii, fig. 9).

♀ Western Himalayas.

Long. 7 mm.

Head.—Frons blackish grey, nearly one-third the width of the head, uniform in width, vertical triangle not very distinct; face blackish grey. Upper mouth border well produced, proboscis moderately long, brownish yellow. Antennal prominence distinct but small, antennae blackish; 3rd joint slightly produced above at base; occiput blackish grey.

Thorax dull blackish, with two rather narrow, well separated, greyish dorsal stripes from anterior margin to scutellum; shoulders a little greyish. Scutellum rather shining black, with a pair of apical pale bristles, convergent and weak.

Abdomen.—Tawny brown, much contracted at base, widening rapidly from middle of 2nd segment to tip of 3rd, thence gradually narrowing. Upper side of last segment a little obscure. A few long whitish hairs at sides at base of abdomen, the remainder of the dorsal and ventral surfaces practically bare. Belly tawny brown.

Legs.—Front pair with coxae, base and tip of femora, basal half of tibiae and the metatarsi yellow, the remainder black. Middle pair similar, but the very short coxae obscure. Hind pair much enlarged, with obscure coxae. Of the hind femora the basal fourth is bright lemon yellow, the remaining portion having the proximal half black and the distal half reddish brown; the extreme tip is black. Under side beset with several rows of very short spines, and an additional row of about 8 or 9 longer ones. Tibiae distinctly but not greatly curved, pale yellow, rather less than the apical half black; tarsi all black, metatarsi distinctly enlarged and lengthened.

Wings pale grey; subcostal cell yellowish from tip of auxiliary vein; 4th longitudinal vein curved upwards to 3rd in a very rounded loop; 5th vein bent upwards at a slightly obtuse angle; halteres yellow.

Described from a single ♀ in the Indian Museum presented by Dr. A. D. Imms, taken by him at Bhowali, Kumaon District, 5700 ft., 2-vii-10.

***Rhinobaccha gracilis*, Meij.**

One specimen in the Indian Museum taken at Pattipola, Ceylon, 3-vii-10, the exact locality from which the type came, agrees with every generic and specific character as given in Meijere's description.

I am uncertain as to its sex having seen only the one, but it is apparently a ♂.

The genus was described by Meijere in the *Tijd. v. Ent.* li, 315 (1908).

SPHEGINOBACCHA, Meij.

Tijd. v. Ent. li, 327 (1908).

Near *Ascia* and *Sphegina*. One species is referred here, *Sphegina macropoda*, Big. Meijere figures this, *l.c.* pl. viii, 43, and records a ♂ and ♀ from Semarang [*Jacobson*].

RHINGIA.*Rhingia binotata*, Brun.

Only the ♂ was described originally. The ♀ has appeared from the banks of the Siyom River, near Yekshi (N.-E. Front. India), 3-ii-12, taken by Mr. Kemp on the Abor Expedition. In the Indian Museum.

R. sexmaculata, sp. nov. ♀, described by me (Rec. Ind. Mus., viii, 163, 1913) from a single ♀ from Dibrugarh, Assam, 17-xi-11 [*Kemp*]. Type in Indian Museum.

Subfamily **VOLUCELLINAE.***Volucella pellucens*, L.

One ♂ of this very common European species from Takula, Kumaon District, Western Himalayas. Not previously recorded from India. In the Forest Zoology Coll My *basalis* is very near it, but the distinctions stated in my description of the species hold good.

Meijere records *V trifasciata*, Wied, from Semarang and *discolor*, Brun. from Japan.

GRAPTOMYZA, Wied.

Meijere records *G. longirostris*, W., and *brevirostris*, W., from Java, and adds a note on *G. atripes*, Big.; whilst *brevirostris* was taken by Mr. Kemp at Rotung, 1400 ft. (N.-E. Front. India), 25-xii-11. It also occurs in the Nilgiri Hills.

Graptomyza ventralis, W var. *nigripes*, Brun.

Gangtok, Sikkim, 6150 ft., 9-ix-09, one ♀, and Kurseong, 3-vii-08 and 9-ix-09 [*Annandale*]. In Indian Museum. Meijere records *ventralis*, Wied., from near Buitenzorg, Java.

One ♀ from Sadiya, Assam, 27 xi-11 [*Kemp*]. Of the typical form Mr. Kemp took a ♀ at Rotung, 26-xii-11.

Five new species have been recently described by Meijere:

punctata (Tijd. v. Ent., li, p. 280, pl. viii, 28, 1908). Erima, Astrolabe Bay, Papua [*Biro*].

Type in Hungarian Museum, a unique specimen.

longicornis, *l.c.*, p. 281, Sattelberg, Huon Gulf, Papua [Biro].

Type in Hungarian Museum, a unique specimen.

trilineata, *l.c.*, p. 282, ♂, Paumotu-Fluss, Papua [Loria].

Type in Genoa Museum.

jacobsoni, *loc. cit.*, liv, 343 (1911). Telaga Mendjer and Gunung Ungaren, Java [Jacobson].

flavipes, p. 344, Gunung Ungaren [Jacobson].

Graptomyza tinctovittata, mihi, sp. nov.

(Plate xiii, fig. 10).

♀ N. Bengal.

Long. 3 mm.

Head.—Pale lemon yellow, face with a shining brown median stripe from antennae to mouth border. Occiput black, the colour encroaching narrowly on the vertex. Frons with a very large subquadrate blackish brown, moderately shining spot, which occupies nearly all the surface, not contiguous to the eyes, but extending downwards to the root of the antennae; this square spot joined to the vertex by a short, broad stripe embracing the ocelli. Eyes sparsely and microscopically hairy. Antennae brownish yellow, upper side a little brownish, arista bare.

Thorax.—Shining black, with short yellowish grey pubescence; side margins and posterior margin of dorsum narrowly pale yellow. Shoulders with a yellow callus, and there is an elongate perpendicular yellow spot on the mesopleura, just before the wing and united to the yellow margin of the thorax. Scutellum shining black, with two long bristles on each side of margin near the base and a pair of similar, widely separated apical ones.

Abdomen.—Bright yellow, 2nd segment with a broad black band on posterior border, widest in the middle, where it extends nearly to the base of the short and very narrow 1st segment. A similar band on 3rd segment, rest of abdomen black. Belly yellow, with a few blackish marks.

Legs.—Wholly yellow, except the hind coxae rather obscure, a broad dark brown band on hind femora leaving the knees narrowly pale, and hind tibiae blackish brown, with base and tips narrowly yellow.

Wings.—Very pale grey. A brownish very short stripe from tip of auxiliary vein to 2nd longitudinal vein, a second stripe from tip of 1st vein to (and indistinctly including) the upturned end of lower branch of 4th vein, and a 3rd stripe from tip of 2nd vein to, and including, the upturned end of upper branch of 4th vein; all these stripes being narrow and indistinct yet perfectly obvious. The closed anal cell very slightly infuscated at tip. Halteres brownish yellow.

Described from one specimen in the Indian Museum, sex uncertain but probably ♀, from Sukna, 500 ft., 1-vii-08 [Annan-dale].

Subfamily *ERISTALINAE*.**ERISTALIS**, Latr.

This genus was not dealt with in my first paper owing to reluctance to identify closely allied species from descriptions alone. A certain number of interesting notes on some of the species are now added.

Eristalis tenax, L.

This very cosmopolitan species occurs freely in the Himalayas during the summer, the specimens in no way differing from European and North American ones.

The var. *campestris*, Mg., is also common, ♀ ♀ only. *E. tenax* occurs sparingly in the plains (Meerut, 8—14-iii-07; Bareilly, 15—22-iii-07); and it is in the Indian Museum, from Yunnan, China. I have taken it freely at Mussoorie and Darjiling.

Eristalis sepulchralis, F.

This common European species was taken by me at Shanghai, i-v-06 and at Hankow, 22—26-iv-06, at both places being common. The dark spot on the 2nd abdominal segment in the ♂ instead of being of the usual shape takes the form of a broad stripe with a transverse line at base and apex, whilst in the ♀ the spot on the 1st segment is almost reduced to a broad stripe, and that on the 2nd segment to a narrow streak. The antennae in the ♀ are apparently a little darker.

On a ♀ specimen in the Indian Museum from Yange-Hissar taken on the Yarkand Expedition, the abdominal spots are quite normal.

Eristalis arvorum, F.

Meijere makes *E. quadrilineatus*, F., a synonym.

The species is the commonest of the Indian ones and occurs apparently all over the country from the Himalayas to the south; extending also to the East Indian Islands and China. It has been found by Dr. Annandale breeding in rotting seaweed in brackish water at Lake Chilka, Orissa, in February and November.

Eristalis quinquestriatus, F.

Meijere records it from various localities in Java and re-describes both sexes.

Eristalis obliquus, Wied.

Meijere records, figures (pl. vii, 17-18), and notes both sexes, the ♂ from Papua, the ♀ (hitherto unknown) from Batavia. It is closely allied to *arvorum*, F.

***Eristalis orientalis*, Wied.**

Wiedeman described the ♂ only. Meijere records and describes the ♀ from Tosari, Java [*Kobus*]. Some of both sexes are in the Indian Museum from Sikkim and the Darjiling District.

***Eristalis niger*, Wied.**

The ♂ redescribed by Meijere from Sukabumi, Java [*Kramer*]. A ♀, without data, is under this name in the Indian Museum, identified by Bigot, but I cannot be sure that it is this species.

***Eristalis sinensis*, Wied.**

Two specimens from Assam are in my collection purchased some years ago in a miscellaneous lot of diptera at a sale.

***Eristalis taphicus*, Wied.**

A few in the Indian Museum from Karachi, both sexes. Verall claims this to be a variety of the European *aeneus*, Scop., from a series taken at Aden, and this may probably be the case.

***Eristalis splendens*, Le Guillon.**

Apparently generally distributed in the East, Meijere recording it from Erima, Papua [*Biro*]. I possess one specimen from Key Island.

***Eristalis tortuosa*, Walk.**

This species, described in Proc. Linn. Soc. Lond., v, 266 (1861), was omitted from Van der Wulp's Catalogue. The ♂ only is mentioned, coming from Tondano. There is no indications as to where the type is located.

***Eristalis suavissimus*, Walk.**

Meijere records from Meranke, South Papua [*Koch*].

***Eristalis postcriptus*, Walk.**

One in my collection from Papua, but I do not know if the identification is correct.

***Eristalis resolutus*, Walk.**

Recorded from several localities in Papua by Meijere. He redescribes both sexes.

***Eristalis muscoides*, Walk.**

Meranke, Etna Bay, South Papua [*Koch*]. Recorded and noted by Meijere, both sexes.

***Eristalis externus*, Walk.**

A ♂ and ♀ under this name exist in the Indian Museum collection. They were identified by Bigot but, I think, incorrectly, owing to discrepancies in the size, the length of the abdomen and the marks of the latter.

***Eristalis nitidulus*, Wulp.**

Meijere records a ♂ from Semarang, July [*Jacobson*].

***Eristalis solitus*, Walk.**

This species is common in Himalayan localities occurring freely at Darjiling during my two last visits (13—18-ix and 1—11-x-13) and I have taken it as far north-east as Yokohama, 24-v-06. In the Indian Museum from Shillong, Darjiling, Mussoorie, Naini Tal, Simla and Gangtok.

***Eristalis inscriptus*, Dol.**

Meijere records this from Paumotu-Fluss, Papua [*Loria*], noting that it is very near *muscoides*, Walk.

***Eristalis saphirina*, Big.**

This species, placed in the sub-genus *Eristalomyia* and described in Ann. Soc. Ent. Fr. (5) x, 230 (1880) from Papua, was omitted from Van der Wulp's Catalogue. Type in the Bigot collection.

The following new species are set up by Dr. Meijere in the paper from which the above notes by him are taken (Tijd. v. Ent. li, 1908). They are preceded by a very valuable analytical table of over twenty species known to him.

obscuritarsis, p. 250, ♂ ♀, pl. vii, 19, 20. Semarang [*Jacobson*]; Singapore and Bombay [*Biro*].

kobusi, p. 252, ♂ ♀, Tosari, Java [*Kobus*].

kochi, p. 255, ♂ ♀, Meranke, South Papua [*Koch*].

collaris, p. 258, ♂ ♀, Papua, several localities.

Types in Hungarian Museum.

maculipennis, p. 261, ♂, Lawang, Java [*Fruhstorfer*].

Type in Hungarian Museum, a unique specimen.

lunatus, p. 264, ♀, Astrolabe Bay, Papua [*Biro*].

Type in Hungarian Museum.

fenestratus, p. 269, ♀, Friedrich Wilhelmshagen, Papua.

Type, a unique specimen, in Hungarian Museum.

cupreus, p. 271, ♂ ♀, Simbang, Huon Gulf, Papua [*Biro*]; Meranke, Papua [*Koch*].

Types in Hungarian and Amsterdam Museums.

heterothrix, p. 273, ♂ ♀, Tami, Cretin Is., Mahakkam, Borneo [*Nieuwenhuis*].

From the context it is to be gathered that the type ♂ and ♀ are in the Hungarian National Museum and a further specimen in the Leyden Museum.

In *loc. cit.*, liv (1911), the same author describes the following:—
nigroscutatus, p. 337, ♂, Tandjong Priok and Batavia environs [*Jacobson*].

ferrugineus, p. 339, ♂ ♀, Batavia environs [*Jacobson*], a unique pair.

neptunus, p. 340, ♂ a unique specimen, Batavia environs [*Jacobson*].

lucilia, p. 341, ♂, a unique specimen, Semarang [*Jacobson*].

tristriatus, p. 342, ♂, Semarang, Batavia [*Jacobson*].

The types of these species are in the Amsterdam Museum.

MEGASPIS, Macq.

Meijere records *M. chrysopygus*, W., *errans*, F., *zonalis*, F., and *crassus*, F., all from Java and relegates my *transversus* to a synonym of *argyrocephalus*, Macq (*Eristalis*). He adds a table to five species, including *sculptatus*, Wulp. I have seen *M. crassus* and *zonalis* recently from Darjiling—and an *errans* ♀ from Cochin State, 1700-3200 ft., 16—24-ix-14 [*Gravelly*].

Mr. Austen writes me that *Megaspis* is antedated by *Phytomyia*, Guer. (1833), in Belanger's *Voyage aux Indes orientales*, 509, with *chrysopygus*, Wied., as type, but I do not like to change the name after it has stood so long.

HELOPHILUS, Mg.

Meijere gives a table embracing eight species, including the following new ones, in *Tijd. v. Ent.* li (1908):—

niveiceps, p. 236, ♂, pl. vii, 16, Java [*Piepers*].

Type in Amsterdam Museum.

fulvus, p. 237, ♂, Moroka, Papua, 1300 metres [*Loria*].

Type in Genoa Museum.

scutatus, p. 238, ♂, Paumomu Fluss, Papua [*Loria*].

Type in Genoa Museum.

Dr. Meijere redescribes *H. quadrivittatus*, Wied., ♂ ♀, and records it from Semarang; also adding notes on *curvigaster*, Macq., and *vestitus*, W (recording it from Sumatra).

AXONA, Walk.

To this interesting genus I have been able to add a second species, *cyanea* (Rec Ind. Mus., ix, 272 (♂) and 277 ♀, pl. xiv. fig. 3, full insect, 1913), from Darjiling, iv-1913, sent to the Indian Museum by Lord Carmichael. Only one species, *chalcopygus*, W., was previously known.

MALLOTA.**Mallota rufipes, Brun.**

Described from a unique ♂ (Rec. Ind. Mus., ix, 271, 1913) from Singla, Darjiling District, April 1913.

Merodon ornatus, mihi, sp. nov.

(Plate xiii, fig. 11).

♂ Western Himalayas.

Long. 10 mm.

Head.—Vertex wholly occupied by a moderately elevated aeneous black tubercle, bearing the three reddish ocelli. Frontal triangle small, black, with a little yellowish grey tomentum. The eyes contiguous for barely one-third of their total height, as viewed from in front. Whole under side of head yellowish, with whitish reflections, except the projecting face, which is shining black; the oral margin very narrowly reddish brown. Antennae pale brownish yellow, the 1st joint the darkest, the 3rd with whitish dust and a pale yellowish, basal, bare arista. Proboscis blackish. Back of head aeneous black, the upper ocular orbit with short yellow hair, the outer and lower ocular orbits with whitish hair.

Thorax.—Dorsum dull aeneous black, mainly covered with short yellowish hair, but which takes a golden brown hue where it forms two moderately broad dorsal stripes. The yellow hair is a little more prominent below the broadly whitish shoulders, behind the wings and on the entire hind margin of the concolorous aeneous scutellum.

In an indistinct manner, the dorsum of the thorax bears three broad blackish stripes; a median one, and one on each side of it, well separated, commencing just behind the whitish shoulders and continued to the posterior margin, the median dark stripe attaining the anterior margin of the dorsum.

Between these three indistinct dark stripes, the aeneous ground colour is more pronounced, and these spaces bear deeper golden brown hairs. Under side of thorax blackish, slightly aeneous, a patch of white hair between the anterior pairs of legs, immediately below the end of the transverse suture; and a little white hair generally distributed over the ventral surface.

Abdomen.—Black, moderately shining, with an aeneous tinge, which latter is most conspicuous on the unicolorous 1st segment; the 2nd segment has a pair of large yellowish spots, separated by a moderately wide space, and enlarged laterally to the full length of the segment. A similar pair of spots on the 3rd segment, but narrower at the sides, the colour not there reaching the hind margin. The whole surface of the abdomen is covered with short bright yellow hairs. At the sides, the hair is more whitish, especially towards the base, where it is also longer.

Belly mainly black, except on 2nd and 3rd segments, which are yellowish.

Legs.—Coxae black, with a little pale greyish hair, anterior pair grey-dusted; remainder of anterior legs wholly bright pale yellow. Hind femora greatly incrassated as usual, reddish brown; a few short black spines of unequal length on under side towards the tip, the whole limb with short soft yellow hair. Hind tibiae well curved, yellowish, with a tolerably distinct subapical black band with ill defined edges, and a tendency to a sub-basal narrower and still less definitely marked band. The whole limb with very short yellowish hair, but on the inner side is a thick row of very short and stiff black hairs; hind tarsi yellow. Claws, basal half bright yellow, apical half black.

Wings.—Pale yellowish grey, stigma brownish yellow; halteres bright yellow.

Described from one ♂ in the Indian Museum from Bhowali (5700 ft.), Kumaon District, taken by Mr. A. D. Imms, June 1909.

Subfamily MILESINAE.

Myiolepta himalayana, mihi, sp. nov.

(Plate xiii, figs. 12, 13).

♂ ♀ West Himalayas.

Long. 7—8 mm.

Head, ♂.—Eyes bare; contiguous for only a short space, leaving a rather small vertical triangle, which is shining black, with some yellowish grey hairs. Sides of frons narrowly grey-dusted, the whole of the upper part of the face also, that is to say, the part immediately below the rather conspicuously produced antennal prominence, which latter is shining black, the extreme frontal edge narrowly orange. Facial bump very large and conspicuous, the central knob distinct, not cut away below (in profile), but the mouth opening less projecting. The whole protuberance shining black. The lower sides of the face with a little grey dust, and a few stiff long hairs near lower corner of eyes. Antennal third joint rounded, the whole organ pale vinaceous, with a hoary bloom, arista bare, orange at base. Back of head shining black, ash grey behind lower part of eyes, where it is considerably developed, and bearing there a fringe of yellowish hairs. An arc of short bristly brownish black hairs behind the vertex.

In the ♀ the frons, at the level of the antennal prominence, is one-third the width of the head, the frons and face being mainly shining black but narrowly grey-dusted at the sides, and with a little stripe of very short greyish pubescence along the sides from the cheeks to the mouth opening. There is a little grey hair in front of the lower corner of the eyes as in the ♂. Eye margins are present in both sexes as in *Chilosia*.

Thorax and scutellum aeneous black, with short yellowish grey pubescence; anterior margin of dorsum, including humeri, a little

ash greyish. A fringe of long yellowish grey wavy hairs placed transversely in front of the wings.

Abdomen blackish ; 2nd segment nearly wholly orange reddish, the colour encroaching on base of 3rd segment, whilst in the ♀ the posterior border is also reddish. Extreme tip of abdomen orange red. Whole abdomen with short greyish pubescence, which is a little longer at the sides. Belly blackish, with grey pubescence, dull orange reddish for a considerable space about the 2nd segment.

Legs simple but somewhat strong, the femora having small spines below, towards the tips ; black, with fairly dense greyish pubescence. Trochanters, base and tips of tibiae, orange yellow. The underside of the hind tarsi (of which the metatarsus is distinctly though not greatly enlarged), brownish yellow, and the upper side of the 2nd and 3rd joints is brown in the ♂. In the ♂ the first three joints of the middle tarsi are orange yellow, as is the whole middle tarsus in the ♀. The exact limits of the pale colour in the tarsi is probably variable.

Wings pale yellowish grey, stigma yellowish, subcostal cell up to the stigma, brownish ; a barely obvious suffusion immediately before and below the stigma. Halteres pale orange.

Described from a single ♂ and ♀ in the Indian Museum from Matiana taken by Dr. Annandale.

It has been rather difficult satisfactorily to place the present species generically. It has every appearance of a *Chilosia*, even to the eye margins, which are quite as distinct as in many species of that genus. But *Chilosia* should have no trace of pale markings, so that the nearly all orange red 2nd abdominal segment would throw it out. Considering the species as of the Syrphinae, it works down by Verrall's table of genera to *Chrysochlamys*, a genus which it is totally unlike in facies, colour, the shape of the closed 1st posterior cell and in the absence of the thoracic and scutellar bristly hairs.

If the exact position of the anterior cross-vein is not regarded as an absolute character, and Verrall doubted its inviolability,¹ it becomes a *Myiolepta*, which that author puts in the Milesinae, considering its affinities with *Tropidia* greater than those with Syrphinae, and he speaks of the genus as of "rather doubtful location." He says the femora are all swollen, and serrate near the tips below, but as Schiner gives the femora as simply "rather thickened" and there seems to be no further discrepancy, the new species is placed here.

XYLOTA, Mg.

One new species described, *X. aeneimaculata*, Meij., in Tijds. v. Ent. li, 227, 1913 from Moroka, Papua, 1300 metres [*Loria*]; one ♂ in the Genoa Museum. Dr. Meijere adds notes on some of the

¹ British Flies, *Syrphidae*, 572, footnote.

other known species, and I have described an additional species from Darjiling, *annulata* ♂ ♀, v-12 and iv-13 (Rec. Ind. Mus., ix, 270, ♂ ♀, pl. xiv, 11-15, 1913).

***Xylota bistriata*, mihi, sp. nov.**

♂ ♀ Cochin.

Long. 11-13 mm.

Head.—Eyes in ♂ practically contiguous for about lower third of distance from vertex to base of frons. Width of vertex about one-eighth that of head, vertex blackish aeneous with a little pale hair, the small ocelli distinct, reddish. Eyes in ♀ separated by a frons about one-eighth the breadth of the head, widening a little at base of antennae.

Face and frons blackish, covered with yellowish white tomentum; antennae covered with yellowish grey dust, arista black, base brownish yellow. Occiput blackish grey, with whitish dust; some bright yellow short hairs along top of head, intermixed behind vertex with black ones. Ocular orbit with a fringe of short white hairs which are longest on under side of head.

Thorax.—Dorsum greenish aeneous, with short and rather thick bright yellow pubescence. A pair of well separated pale median longitudinal stripes bearing short bright yellow hairs, becoming indistinct posteriorly but just attaining the scutellum, which latter is also greenish aeneous with short yellow pubescence and a fringe of short yellow hairs below hind margin. Sides of thorax blackish aeneous, nearly bare; sternopleura and mesopleura with a grey tinge and bearing some short yellow pubescence. Humeri apparently bare; but if viewed from behind they are seen to bear some short yellow pubescence.

Abdomen.—Blackish aeneous with a dull steel tinge, which on the 2nd segment in the ♀ may occasionally shew, seen from behind, a pale violet reflection; basal segment a little darker; on hind margin of both 2nd and 3rd segments a large dull black (seen from behind) sub-triangular spot, the apex reaching nearly to the base on the 2nd segment, but only to the middle on the 3rd segment. Dorsum of abdomen with microscopic dark hairs, sides with short pubescence, which is longer towards the base and is yellowish in the ♂ and white in the ♀. Genitalia in ♂ globular, of a dull steel colour, with some yellow hairs; ovipositor brownish yellow.

Legs.—Coxae aeneous, grey-dusted; hind pair with soft pale hair below. Anterior legs yellowish with short concolorous pubescence, which is longest on inner side of middle tibiae; tips of middle femora narrowly brown. Anterior tibiae longitudinally streaked irregularly with brown on inner and outer sides, last tarsal joint brown. Hind femora considerably incrassate, brownish yellow with a broad blackish brown median band, and the tips dark brown; a moderately long distinct black spine below at base and on the under side towards tip, an outer row of 6 to 8 black spines of moderate size, gradually diminishing in length posteriorly,

and also an inner row of about four shorter ones of uniform length. A little long soft pale yellow hair on middle of under-side; remainder of hind femora with very short yellow pubescence, which is longest about the middle on the outer side. Hind tibiae considerably curved yellow, with yellow pubescence, inner side mainly black; hind tarsi blackish brown with pale yellow pubescence; golden brown minute pubescence below.

Wings pale grey; subcostal cell pale yellow; halteres pale lemon yellow; anterior cross-vein barely beyond middle of discal cell.

Described from 3 ♂♂ and ♀♀ in perfect condition in the Indian Museum from Parambikulam, Cochin, 1700—3200 ft., 16—24-ix-14 [*Gravelly*].

***Criorhina imitator mihi*, sp. nov.**

(Plate xiii, fig. 14).

♀ Western Himalayas.

Long. 17 mm.

Head produced downwards to a greater length than height of eyes. Frons and vertex blackish, with yellowish grey dust and dark brown hairs, the vertex with long brownish yellow hairs. Antennal prominence shining black, with yellow dust about the sides, and covered with some sparse brownish yellow hair. Face and lower part of head shining black, face with yellowish brown tomentum on each side up to end of snout, leaving an irregular median bare stripe; a few yellow hairs along inner orbit of eyes. Proboscis considerably longer than head, blackish, labella rather large; palpi more than half as long as proboscis, blackish. Antennal 1st and 2nd joints black, 3rd reddish brown, blackish at tip, arista black. Back of head dull shining black with brownish yellow hair, which extends to the vicinity of the cheeks, where it is longer.

Thorax moderately shining black, with a grey tinge anteriorly, covered with thick pubescence, which is mainly black, but is yellow on about the anterior half, and again for a narrow space along the hind border. The shoulders, posterior corners and scutellum are covered thickly with yellow pubescence which extends to the pleura below the shoulders.

Abdomen moderately shining black, with black pubescence. On 2nd segment the pubescence is yellowish, on posterior margins of 3rd and whole surface of 4th and 5th, bright red, long and conspicuous. Belly black, with pale yellow hairs on basal half.

Legs black, some yellow pubescence about the base and sides of all the femora.

Wings pale grey, pale brown tinged on anterior half; a slight infuscation about the stigmatic region, origin of 3rd vein, the posterior cross vein, and most of the veins being just perceptibly infuscated.

Described from one ♀ in the Indian Museum from Onari, Garhwal Distr., 11,000 ft., W. Himalayas, 27-vi-14 (Tytler).

In connection with this species may be noted an interesting case of mimicry. *C. imitator* itself, in the pale pubescence on the anterior part of the thorax and on the scutellum, in the coloration of the abdomen, the black legs and grey wings, distinctly resembles the bee *Bombus trifasciatus*, Smith; but the protective resemblance accorded to a large *Echinomyia*-like Tachinid fly (though not belonging to that genus), 20 mm. long, by the similarity of its appearance to that of the bee, is even more striking. The pubescence of the fly is tolerably dense, black, except for a broad yellowish grey band on the anterior margin of the thorax, and on the scutellum. The apical third of the abdomen bears rather bright red pubescence. No strong bristles are present anywhere, the eyes are bare, the antennae short, the 3rd joint much broadened vertically, notched at the truncate apex. Five specimens are present, taken in company with the Syrphid and one specimen of the bee.

***Lycastris cornutus*, Enderl.**

Described in Stett Ent. Zeit. lxii, 136 (1910), from Formosa. Type in Stettin Zoological Museum.

SYRITTA, St. Farg.

In my previous paper on Syrphidae my impression that there were only three Indian species of this genus was noted, and the further examination of a good number of specimens increases that impression. One of these is the common *S. pipiens*, L., of Europe and North America which occurs commonly in the Himalayas and also more rarely in the Indian plains. One specimen is in the Indian Museum from Mergui.

Of *orientalis*, Macq.¹ and *rufifacies*, Big., I prefer to speak at present, as *forms* only, for two reasons. Firstly because there is primarily *S. indica*, Wied., to be disposed of as the earliest described oriental species; but as his description is so meagre, it is unidentifiable. Still he says "very like *pipiens*, L." from which it may be inferred that the hind femora are practically wholly black. Now in *pipiens* there is normally a pale transverse streak in the middle, on the underside, which is often of considerable width and length, but which also is sometimes barely traceable, so that specimens may quite possibly occur which are practically wholly black. Wiedemann's type, moreover, may have not been in the best condition so that the presence or absence of such a pale streak may not have been easily ascertained, nor, incidentally, considered of much consequence in those days. Therefore,

¹ See Tijds. v. Ent. li, 224 for redescription ♂ ♀

if *indica* should have wholly black hind femora there can be little doubt of its identity with *orientalis*, Macq., the former name taking priority.¹

This form *orientalis* (I call it so until the synonymy is established) is quite a good one and is mainly distinguished by the wholly black hind femora.

Dr. Meijere sinks *Senogaster lutescens*, Dol., as synonymous, whilst *laticincta*, Big., *nom. nud.*, in the Indian Museum from Karachi and Calcutta, is certainly so; moreover *illucida*, Walk., from Celebes is likely to be also identical, the expression "vertex black with an elongated white point on each side" reading as though reference was made to the small portion of the whitish grey occiput visible on each side from above.

S. amboinensis, Dol., from Amboina may or may not be distinct; the anterior legs are obscurely ringed, which may mean anything, and as occasional specimens of both *picipiens* and *orientalis* have a dark streak on the anterior femora, it may be only a variety of the latter.

The form *rufifacies*, Big., is as well marked as *orientalis* and is distinguished by its bright reddish orange hind femora, the apical third being black. Though Dr. Meijere records it as synonymous with *orientalis*, the form is as distinct as that one, several of each sex in the Indian Museum answering exactly to Bigot's description. I have taken it myself at Agra, 4-iv-05.

There are, however, 2 ♂♂ in the Museum collection which appear intermediate between *orientalis* and *rufifacies*, and which may break down the barrier between them. These have dark brown or reddish brown femora and one has the tips more or less darker still. I have one in my own collection taken by me at Agra.

The abdominal markings are but a slight guide, as in both *orientalis* and *rufifacies* the pairs of spots on the 2nd and 3rd segments² are sometimes quite separate and sometimes merged into a transverse band. This happens with each pair of spots independently of one another and is equally variable in both forms.

There appears to be no other character offering any solution of the number of forms existing.

At present my own opinion is towards the following synonymy, regarding them taxonomically as forms only, except *picipiens* and my supposed *indica* of Wiedemann.

¹ There is certainly the possibility that *indica* may be simply *picipiens* after all, but it is hardly to be supposed that Wiedemann would not have recognized it as such, although probably in those days species were not thought to have so wide a distribution.

² Macquart speaks of the spots on the second segment being united into a band, but as it is more usually those on the third segment which are contiguous, I think he must have overlooked the very short 1st segment and was really referring to the 3rd segment.

1. *pipiens*, L.2. *indica*, Wied.*orientalis*, Macq.*lutescens*, Dol. (*Senogaster*).*illucida*, Walk.*laticincta*, Big. *nom. nud.*3. *amboinensis*, Dol.4. *rufifacies*, Big.(Possibly synonymous with *orientalis*).5. *luteinervis*, Meij.

The latter species, recently described (Tijd. v. Ent. li, 226, ♂, 1908), from Papua, is distinguished from *orientalis* by the pale yellow veins, which seems at best a very slender character.

EUMERUS, Mg.

Meijere describes four new species in the Tijd. v. Ent. li (1908).

flavicinctus, p. 15, ♂, Semarang, Java; Medan, Sumatra.

parallelus, p. 217, pl. vii, 12, ♀, environs of Batavia.

niveipes, p. 220, ♂, Batavia; (♀ described by him in *loc. cit.* liv, 335, from Semarang).

peltatus, p. 223, ♂, Friedrich Wilhelmshafen, Papua

Types of the first three species in Amsterdam Museum, type of the last one in the Hungarian Museum.

I have myself described a new species from Darjiling, *E. rufoscutellatus*, ♂ (Rec. Ind. Mus. ix, 269, ♂, pl. xiv, 13).

I had anticipated drawing up a table of oriental species in this genus, but from the descriptions only this is quite impracticable, the species being very closely allied, whilst the few characters that appear most useful taxonomically, *viz.* the width and shape of the frons, the structure of the hind tarsi and the degree of pubescence or bareness of the eyes, are ignored by all the older writers. The presence or absence of an infuscation at the wing tip, the intensity or entire absence of the pale stripes on the thorax, and the proportion of tawny colour in the legs are all characters subject to considerable variation.

It is probable that my *nepalensis* will sink to synonymy, but it is not certain which species it is identical with, as three or four appear very closely allied if allowances for variation are made. These are *macrocerus*, W., *aurifrons*, W., (*splendens*, W.), *nicobarensis*, Sch., and *niveipes*, Meij. Specimens agreeing with the description of my *nepalensis* are in the Indian Museum from Mergui, Margherita, Pallode and Travancore, 15-xi-08 [*Annandale*], these being four males, and from Mergui, Nepal (the type specimen of

nepalensis), and Sibuluan, Sarawak, 2-vii-10 [Beebe], three females, that is seven specimens altogether.

All these appear to come within the range of a single species possessing the following variations of character. The frons in the female from shining black to rich blue black; the antennal 3rd joint may be black on upper side or unicolorous; the dorsal thoracic stripes vary in intensity and the 3rd pair of abdominal spots are wanting in one specimen; the wing tip varies from quite clear to distinctly and broadly brown infuscated; the hind tarsi vary from white to brownish yellow, the upper side of the metatarsus (and sometimes also the basal half of the succeeding joint) may be wholly or partly brown.

Taking all things into consideration the chances are in favour of *aurifrons*, W., being the species at present referred to.

A description of the specimen from Borneo is added, simply as such, as an augmentation of that of my *nepalensis*. In the ♂ of the species under discussion, whatever it may be, the frons is two to three times as broad on the vertex as at the point of nearest contiguity of the eyes. There was an error in my description, the frons not being black but brilliantly shining blue black.

***Eumerus aurifrons*, Wied.**

Dr. Meijere makes *splendens*, W., a synonym of this and redescribes the ♂, recording the species from Batavia, Semarang, Ceylon and the Dammer Is. (Tijd. v. Ent. li, 218). This may be the species described by me as *nepalensis* (*infra*).

***Eumerus nepalensis*, Brun.**

(Description of a specimen from Borneo).

♀ Borneo.

Long. 5—6 mm.

Head.—Frons distinctly narrowed at vertex, measuring at the greatest width, just above the antennae, one-fourth of the head; shining black, with a grey-dusted spot each side about the middle of the eyes and contiguous to these latter, the spots nearly meeting one another in the middle of the frons. Vertex with brown hairs. Back of head behind vertex and upper part of eyes, shining black, narrow, occipital margin imperceptible below middle of eyes, occiput dark grey or blackish. The margins of the face from opposite the base of the antennae, a little grey-dusted, and the face itself with a little yellowish hair. Antennae bright brownish yellow, upper margin of 3rd joint blackish, arista black, base a little pale.

Thorax.—Shining black, with two well separated narrow whitish median stripes from anterior margin to behind transverse suture. Anterior part of dorsum a little aeneous in certain lights. Dorsum with yellow hair which becomes greyish about the shoulders and pleurae. Sides of thorax dull black; scutellum shining black, with yellowish grey hairs.

Abdomen.—Shining black, with almost microscopic greyish pubescence except towards the sides where it is quite distinct. The 2nd segment with two oval yellowish, diagonally placed good sized spots. The 3rd and 4th segments each with two narrow greyish, barely curved lunules, diagonally placed, beginning in the middle of the segment, well separated from one another, and lying towards the posterior corners of the segments. Belly yellowish with a median black stripe.

Legs.—Coxae and anterior femora black, the latter narrowly but very distinctly brownish yellow at tip; anterior tibiae mainly brownish yellow with a more or less distinct wide blackish band beyond the middle; anterior tarsi brownish yellow with whitish reflections. Hind femora much larger than anterior pairs but not incrassated, with a row of about twelve small spines on apical half of underside; and a second row towards the outside of a less number; hind tibiae mainly black, narrowly brownish yellow at base and tip; hind tarsi brownish yellow with whitish reflections, basal half of upper and underside of hind metatarsi black. Anterior femora with grey hair below; anterior tibiae with similar hair but more extensive; hind femora and tibiae covered with moderately short greyish hairs; all tarsi moderately grey pubescent.

Wings.—Very pale grey; stigma yellowish brown, a very slight suffusion over upper part of the upturned section of the 4th longitudinal vein; there is also the suspicion of an appendix in the middle of the outer side of the anterior cross vein. Halteres very pale lemon yellow.

Described from a single perfect ♀ from Sibü, Sarawak, 2-vii-10 [Beebe], in the Indian Museum.

***Eumerus flavipes*, mihi, sp. nov.**

♀ Borneo.

Long. 5 mm.

A single example, taken by Mr. Beebe 10 miles south of Kuching, Sarawak, 24-vi-10, appears to be a closely allied species to the above. The principal difference is in the anterior legs which are all wholly bright orange yellow. The other differences are as follows: the 2nd pair of abdominal spots are yellow, not white; the 3rd antennal joint is wholly bright yellow, without trace of darkening on the upper edge; the greyish stripes on the thorax are absent; the wing tips are distinctly, though not deeply darkened as far inwards as to encroach on the 1st posterior cell, and there is no sign of an appendix to the anterior cross-vein.

***Eumerus halictiformis*, mihi, sp. nov.**

♂ ♀ Bengal.

Long. 5 mm.

Head.—In ♂ eyes quite bare, touching for a short distance only, the front facets a little larger than the others. Frons shining black with greyish dust except for a space bearing the

two upper ocelli a little below the vertex, and a space lower on the frons bearing the 3rd ocellus. Blackish hairs on the frons rather thickly placed. Face and the narrow occipital margin wholly ash grey-dusted, the former with whitish hair. Antennae blackish, 2nd joint wholly and the 3rd joint more or less, dull reddish brown on the basal part.

In the ♀ the frons is barely narrowed at the vertex, and at the level of the antennae is equal to one-fourth the width of the head; the lowest ocellus less far removed from the others than in the ♂. The frons is considerably covered with yellowish grey hair.

Thorax.—The general impression of the dorsum is that of a bluish grey background with four dark spots, one pair of which are more or less rounded ones on the anterior half occupying the greater part of the space, with a second pair, produced posteriorly, behind the suture, less in size than the others; whilst there are two median narrow black stripes from the anterior margin in about the middle. Sides grey with whitish grey hair on pleurae; scutellum aeneous with rather thick brownish yellow hair.

Abdomen.—Shining black, with, on each of the 2nd, 3rd and 4th segments, a pair of diagonally placed grey lunule-like, barely curved spots, beginning almost contiguous to one another in the middle of the segment near the anterior margin, and extending to the posterior corners, which they attain. The whole abdomen covered with very short yellow socketed hairs. Belly dark.

Legs.—Anterior femora and tibiae black, both brownish yellow at both base and tip, the former with greyish white hair behind, and the latter more extensively covered with similar hair. Hind femora considerably incrassated, aeneous, covered with grey hair; hind tibiae aeneous, covered with grey hair; knees and base of hind femora brownish yellow. Anterior tarsi brownish yellow with whitish reflections viewed in certain lights; hind tarsi brown, the hind metatarsi much enlarged, black. The hind tarsi with yellowish grey hair above and rich golden brown pubescence below.

Wings.—Nearly clear; stigma pale brownish yellow; halteres pale brownish yellow.

Described from one ♂ and one ♀ from Puri, Orissa Coast, 1—5-viii-10 [Annandale]. In the Indian Museum.

***Eumerus halictoides*, mihi, sp. nov.**

♂ ♀ E. and W. Himalayas.

Long. 5—6 mm.

Very near *halictiformis* but certainly distinct. The differences are as follows:—

The 3rd antennal joint is rounded above at the tip, instead of being broadly truncate; the thorax is a little, but obviously, cupreous, with two widely separated whitish dorsal lines; the frontal triangle in the ♂ is distinctly yellow, with yellow hairs,

in complete contrast to the whitish face; the hind metatarsus is not greatly thicker than the rest of the hind tarsus and is longer proportionately than in *halictiformis*, in which the hind metatarsus is twice as broad as the other joints, and apparently flatter; lastly the tibiae and tarsi are nearly wholly black except the reddish brown underside of the hind tarsi.

The species is also slightly larger and more robust.

Described from a type ♂ from Darjiling, 2-x-08 [*Brunetti*], and a type ♀ from Simla, 9-v-09 [*Annandale*]; both in the Indian Museum.

***Eumerus pulcherrima*, mihi, sp. nov.**

♀ Darjiling.

Long. 7 mm.

Head.—Frons one-sixth the width of the head, aeneous, darker on vertex, a slightly greenish tinge in front, minutely punctured. Ocelli small, red, well separated from one another and from the eye margins. At each side of the frons, along the eye margins, from the lowest ocellus to just above the antennae, a little yellowish pollinose dusting, which becomes white at the level of the antennae, where it merges in the white-dusted face covered with yellowish white hair.

The frons is covered with a moderate amount of light yellowish hair, which on the vertex is replaced by dark brown hair. Posterior orbits of eyes rather narrow, yellow-dusted, with bright yellow hair behind the vertex. Eyes with dense short brownish grey hairs. Antennae black, with a little hoary bloom, if viewed from in front; the dorsal arista black, curved upwards, a little pale at the base. Proboscis dark brown.

Thorax.—Aeneous, with brilliant cupreous and violet reflections; a little but conspicuously hoary below the anterior margin in front. Three very narrow whitish dorsal lines from the anterior margin, but not reaching the posterior margin; a transverse narrow whitish line follows the transverse suture. Sides below shoulders yellowish white with rather shaggy yellowish white hair. Humeral calli small, aeneous; remainder of thorax below dorsum, grey. Scutellum very conspicuous, bright shining cupreous with dense long reddish orange hair.

Abdomen.—Aeneous violet; a large triangular cupreous spot with yellow hairs in front and with whitish hairs behind, on each side of the 2nd segment. In certain lights the sides of the abdomen towards the tip, and the whole of the last (4th) segment appear more or less cupreous or aeneous. On the middle of each of the 2nd, 3rd and 4th segments are two greyish white, narrow stripes, beginning in the centre of each segment, almost contiguous, and extending diagonally to the posterior corners. The whole surface of the abdomen is uniformly punctured, and is covered with short light yellow hairs, which are depressed, and which are much thicker on the last segment. Belly dull liver brown.

Legs.—Coxae blackish, with hoary bloom and greyish hairs. Anterior femora dull aeneous black, a little brownish yellow at base and tips; a fringe of pale yellow hairs on underside; hind femora considerably enlarged, distinctly aeneous, covered with yellowish grey hair; brownish yellow at base and tips.

Anterior tibiae with basal half brownish yellow, apical half or thereabouts, blackish; the tips brownish yellow, the whole tibiae with yellowish grey hair. Hind tibiae as aeneous as hind femora, considerably larger than the anterior ones, being covered with much more hair. Anterior tarsi moderately bright brown with yellowish grey hairs; hind tarsi blackish above with yellowish grey hairs, bright reddish brown below.

Wings very pale grey; stigma small, dark brown; halteres pale yellow.

Described from a perfect unique ♀ in the Indian Museum from Kurseong, 8-vii-08.

Allied to *splendens*, W., and *albifrons*, Walk. From the former it is distinguished by the black (not brilliant red) antennae, and its larger size; from the second species by the bright reddish orange hair of the scutellum and the black antennae; it is also rather larger and more robust than the specimen of *albifrons*, Walk., sent to the Museum by Herr Meijere. The differences, however, may be sexual and *pulcherrima* may prove to be the ♀ of Walker's species.

It is the most handsome eastern species of the genus known to me.

***Eumerus aeneithorax*, mihi, sp. nov.**

♂ Simla.

Long. 7 mm.

Head.—Eyes contiguous for a comparatively short space only. Frons and vertex brassy aeneous, shewing various tints when viewed from different directions; black hair on lower part of frons, yellow hairs on upper part and on vertex. Face dull blackish grey, with light tomentum which appears yellowish white viewed from above. Face clothed with white hairs. Antennae wholly black, 3rd joint with obtusely rounded tip. Occiput whitish grey with a narrow fringe of whitish hairs round the margins, some yellow hair on the brassy aeneous upper ocular margin, which is moderately puffed out.

Thorax and *scutellum*, shining brassy aeneous, both rather thickly clothed with brownish yellow pubescence; dorsum with a pair of widely separated whitish tomentose stripes and traces of a very narrow median line of the same colour. Pleura dull aeneous with a little greyish hair.

Abdomen dull aeneous black, 2nd, 3rd and 4th segments each with a pair of whitish dust lunule spots of the usual size and shape, placed diagonally; the upper ends approximate to one another above the centre of the segment, the posterior ends of 1st and 3rd pairs reaching the side margin near the posterior angles

of the segment; the 2nd pair of spots not attaining the margin. All the spots bear a little yellowish white hair, which also occurs at the posterior angles of the segments and about the tips of the abdomen. The dark portions of the surface covered with almost microscopic black pubescence. Belly dull aeneous, with some pale yellowish hairs.

Legs.—Femora aeneous black, with rather thick yellowish pubescence on hinder and outer sides, and microscopic pubescence of the same colour on the remainder of the surface. Tibiae aeneous black, rather broadly pale reddish brown at base. Tarsi blackish, emarginations slightly reddish brown; hind metatarsi blackish on disc, reddish brown towards sides and on under-side.

Wings grey, stigma blackish, inconspicuous; halteres pale yellowish.

Described from a single perfect ♂ taken by Capt. Evans, R.E., at Simla in August 1914, and generously presented by him, with other diptera, to the Indian Museum.

***Eumerus sexvittatus*, mihi, sp. nov.**

♀ Western Himalayas.

Long. 8 mm.

Head.—Black, rather dull; vertex and upper part of frons with short black hairs; ocelli small, dull, dark reddish; lower part of frons with yellowish grey hair. Face, seen from below, whitish grey, with whitish grey hair. Back of head black, with a little short whitish hair on the eye orbits. Proboscis black, reddish brown towards tip. Antennae black, rather large, lower part of 3rd joint white-dusted.

Thorax.—Black, rather dull, with very short yellowish brown hair covering all the dorsum and scutellum, and extending over the sides below the shoulders. Sides blackish.

Abdomen.—Black, dull, 1st segment only with a little aeneous tinge, 2nd, 3rd and 4th segments with a pair of diagonally placed whitish elongate spots, each beginning near the centre of the segment, but well separated from one another, and reaching towards but not attaining the hind corners. The abdominal pubescence is black on the black parts and yellowish on the spots; also towards the upper corners of the abdomen and at the sides.

Legs.—Black, with yellowish grey or whitish grey pubescence. Basal half of anterior tibiae (and, apparently occasionally, the extreme tips of the femora), reddish brown, the colour on the hind pair of legs much restricted; middle tarsi reddish brown, except towards tips. Hind femora greatly incrassated as usual, hind metatarsi considerably incrassate.

Wings.—Pale grey, stigma brownish; signs of a very slight brownish suffusion across the middle of the wing. Halteres yellow.

Described from one ♀ from Bhowali, Kumaon District, 5700 ft., October 1909 [*Imms*]. In the Indian Museum.

SERICOMYIA, Mg.**Sericomyia eristoloides, Brun.**

Described from a ♀ (Rec Ind. Mus. viii, 167 ♀, 1913), from near Rotung, 2200 ft., 20-xi-11 [Kemp]. A unique specimen, in the Indian Museum.

Temnostoma nigrimana, mihi, sp. nov.

(Plate xiii, fig. 15).

♂ Western Himalayas.

Long. 16 mm.

Head wholly bright yellow with concolorous tomentum and a little yellow hair along eye margins below antennae. Antennal prominence, facial bump and mouth opening a little more orange. Oral orifice, proboscis and a short black stripe from lower corner of eye reaching half way to end of snout, black. Antennae orange, 1st joint and basal half of 2nd black, arista dull orange. Vertex reddish brown with long black hairs in front and brownish yellow ones behind. Occiput greyish, with a fringe of yellow hairs behind eyes, becoming longer on underside of head and hinder part of cheeks.

Thorax slightly shining black, a trace of a pair of narrow median grey stripes towards anterior margin; humeri conspicuously bright yellow, the anterior margin on inner side of them dull reddish orange. An elongate brownish orange spot on the side of the dorsum just above and in front of the wing, reaching to the similarly coloured posterior calli. A rather small oval bright lemon yellow spot on propleura. Pubescence of disc of dorsum rather thick, black; bright yellow on humeri and on pleura below the lemon-coloured spot; reddish on the marginal spot above the wings and on posterior calli, where there are black hairs intermixed. Scutellum reddish brown, the base black nearly to the middle, long yellow hairs on anterior half and brownish black hairs on posterior half. A large bunch of long reddish orange hair on mesopleura.

Abdomen black; 1st segment with bright brown hair at sides; 2nd with hind border reddish brown, the colour widest towards the sides, a bright chrome yellow, moderately narrow band in front of the middle; 3rd with a similar orange band in front of the middle and another on posterior margin; 4th similar to 3rd but the hinder band much wider; genitalia wholly reddish brown. Pubescence on dorsum of abdomen mainly bright yellow, becoming brown on the black parts of the surface; mainly black on 4th segment and genitalia. Belly black, with a rather narrow yellowish band on posterior margin of segments.

Legs principally orange; coxae, and a broad stripe on under side of hind femora, black; a black streak on front side of middle femora; apical half of fore tibiae and the fore tarsi wholly,

black. Pubescence on legs mainly yellow, bright lemon yellow short pubescence on basal parts of tibiae.

Wings yellowish grey, anterior part brownish yellow as far inwards as to fill both basal cells. Halteres yellow.

Described from 2 ♂♂ in the Indian Museum from the Garhwal District, 11,000 ft., vi-14.

There is a considerable general resemblance at first sight between this species and my *Milesia ferruginosa*, which is not rare in the Kumaon District.

***Arctophila simplicipes*, mihi, sp. nov.**

(Plate xiii, figs. 16—18).

♀ Western Himalayas.

Long. 12—13 mm.

Head.—Frons blackish aeneous, with a transverse groove at base of antennal prominence, which is of the same colour; both frons and prominence covered with rather long yellowish hairs, intermixed on vertex with black hairs. The dull reddish ocelli placed flat on the vertex. Face blackish, with whitish tomentum and microscopic pubescence, and some long soft white hairs along inner orbit of eyes. A nearly bare irregular median stripe on face. Cheeks and underside of head blackish, with soft comparatively short yellowish hairs. Proboscis blackish. Antennae dull dark brown, 3rd joint with greyish tomentum, arista brownish yellow, with 16 or 17 long hairs along the entire upperside and about 12 shorter hairs on apical half of underside. Occiput blackish grey with a little minute yellow pubescence; some long brownish yellow hairs behind vertex and yellowish grey hairs on underside.

Thorax.—Black, barely shining, with a pair of median moderately narrow, barely perceptible greyish stripes and a narrower one between them. The whole dorsum and the scutellum covered with thick long canary yellow pubescence, except narrowly on anterior margin. The pubescence extends thickly over the vicinity of the mesopleura.

Abdomen moderately shining black, with thick yellowish pubescence on anterior corners, and bright red pubescence on major (apical) part of last segment and on the concolorous red genitalia. On the rest of the dorsum the pubescence is black, short and very fine; a little longer on hind border of segments and obviously long and thick on the sides. Belly black, with short sparse yellowish hairs, hind margin of segments narrowly pale, last segment red.

Legs black, tarsi reddish; femora mostly covered with short black pubescence, except on upper side; rest of legs with minute black pubescence, some short yellow pubescence on outer side of middle tibiae.

Wings grey, a moderately wide dark brown band from middle of anterior margin to a little beyond the 4th longitudinal vein. Halteres blackish; squamae brownish, with fringe of brown hair.

Described from several ♀ ♀ in the Indian Museum from the Garhwal District, Kumaon, 11,000 ft., 20-v-14 to 20-vii-14.

Arctophila, according to Schiner, its founder, should have considerably thickened hind femora and curved hind tibiae, but Verrall in describing *A. mussitans*, F., says, "hind femora rather thick, hind tibiae slightly curved", so, as the character is not so pronounced, the present species is referred to this genus though the hind femora and tibiae are but little thicker or more curved respectively than the others. The genus is, however, otherwise sufficiently characterized. Only three other species are known, two from Europe and one from North America.

MILESIA, Latr.

Meijere records *M. macularis*, W., from Sukabumi, Java, one ♂ [*Kramer*]; and I have noted a specimen from Sikkim which may be a variety of this species (Rec. Ind. Mus., ix, 268). Meijere also records *gigas*, Macq., from the environs of Semarang, 1000 metres [*Jacobson*]; and *variegata*, Brun., from Sikkim, one ♂. Among the diptera sent to the Indian Museum by Lord Carmichael were 3 *gigas* (♂ ♀) from Sikkim, v-12 and Singla, Darjiling, iv-13; and a good series of both *variegata*, ♂ ♀ and *balleata*, Kert. ♂ ♀ (with which my *himalayensis* is synonymous, as announced by Meijere), from both these localities. I have seen three ♀ ♀ from the same localities, in the same collection which may be *doriae*, Rond. *M. ferruginosa*, sp. nov., is described by me in Rec. Ind. Mus., ix, 268, ♀, pl. xiv, 12, from the Eastern and Western Himalayas.

Milesia sexmaculata, mihi, sp. nov.

♂ South India.

Long. 23 mm.

Head.—The eyes touching for a distance equal to one-third of the height of the frons which is yellowish; in the form of an elongate isosceles triangle with yellowish hair; the ocelli red, inconspicuous. Eye facets in front for a short space just perceptibly larger than the others. Face moderately projecting with brownish yellow tomentose dusting, becoming paler yellowish about the mouth, the latter black, cheeks black. Occiput dark grey with pale yellowish grey margin, with a row of short grey hairs behind the eyes. Proboscis black, shining, projecting, two-thirds as long as the height of the head. Antennae dull ferruginous brown with concolorous style.

Thorax.—Dorsum dull black; shoulders and a lateral stripe extending above the wings from the shoulders to the scutellum, yellowish brown. Two dorsal median rather thin yellowish grey stripes, a little dilated on the anterior margin, and reaching nearly to the posterior border, on which latter is an indistinct yellow tomentose streak. Scutellum shining black, with a distinct yellowish brown posterior margin; metanotum shining black. Surface of thorax

and scutellum covered with yellow hair. Sides of thorax blackish, apparently a yellowish spot on the mesopleurae. The stigmatic spots yellow.

Abdomen.—Black, shining, 1st segment wholly black; 2nd with a yellow transverse sublunate spot on each side near the base, and contiguous to the side margin; the two spots fairly widely separated from one another. On the 3rd segment a nearly similar pair of yellow spots which are more elongo-conical in shape and are similarly situated; on the 4th segment a pair of yellow nearly triangular spots similarly situated; all the six spots of about the same size and of the same colour. Abdomen with close black pubescence, except that over the spots, which is yellow. Belly black, yellowish at base of 2nd, 3rd and 4th segments, the colour forming two spots on the 2nd segment.

Legs.—Bright brownish yellow; anterior femora with a black streak above and below on basal half; hind femora considerably enlarged, with a conspicuous reddish tooth-like prolongation on underside towards the tip; black, except at tips, the reddish brown colour more extensive on underside.

All the legs with short yellow pubescence, but the hinder side of the middle and hind tibiae with a very thick long fringe of bright yellow hair; (hind tarsi missing).

Wings.—Yellowish grey, subcostal cell brownish yellow. Halteres very small, yellow.

Described from a single ♂ from Trivandrum, Travancore State: in the Indian Museum received from the Trivandrum Museum.

Subfamily *CHRYSOTOXINAE*.

Chrysotoxum convexum, mihi, sp. nov.

(Plate xiii, fig. 19).

♂ Western Himalayas.

Long. 14 mm.

Head.—Frons with yellowish grey dust; antennal prominence shining black, with black hairs, a few of which extend to the adjacent parts of the frons; antennae all black, arista reddish brown on basal portion. Face bright yellow with a broad median black stripe; a black band from the corner of the eye to the mouth border, which latter is reddish and shining. Under side of head yellowish orange; proboscis dark brown with short yellowish hairs. Black hairs on vertex, and a fringe of yellow hairs along posterior orbit of eye.

Thorax moderately shining black with short sparse black pubescence, a few rather bright brown hairs in the middle of the disc. A pair of moderately narrow yellowish grey median stripes on anterior border, extending only for a short distance. Humeri, and posterior calli with a short lateral contiguous narrow stripe, bright yellow; a short stripe on the pleura just below but not touching the humeri, the base of the wings, a duller yellow. Scutellum bright yellowish orange on anterior margin, orange

yellow on hind margin, the remainder, forming the bulk of the disc, moderately shining black.

Abdomen black, slightly shining; posterior border of 2nd, 3rd and 4th segments dull brownish red, the colour extending forwards in the centre of the 2nd and 3rd segments nearly to the middle of the disc. A pair of elongate triangular yellow spots on 2nd segment, placed at the middle of the side, their apices nearly reaching the middle of the disc. A pair of moderately wide, slightly curved, with the convex side placed anteriorly, extending from each hind corner of the 3rd segment to the anterior margin, where their ends nearly meet. The 4th segment similar, 5th mainly yellowish orange, a narrow median line from anterior margin, forking early, the ends not reaching the margin. Base of underside of abdomen yellowish white; a pair of oval yellowish spots placed transversely near anterior margin and near the sides of the 3rd and 4th segments; those on the 4th segment shorter, the hinder part of that segment more or less reddish orange. Dorsal side of abdomen with black hairs except on the yellow; markings, where the pubescence is concolorous. On the belly the whole pubescence is black.

Legs.—Coxae black with black hair; fore femora yellow, about the basal half black; anterior femora reddish brown, middle pair more broadly, hind pair very narrowly black at base. Tibiae and tarsi orange yellow, base of tibiae more lemon yellow. The femora bear short black pubescence, a little longer on the base, the hind pair with some very short yellow pubescence intermixed on lower side; tibiae and tarsi with yellow pubescence.

Wings grey, anterior margin narrowly brownish yellow; halteres yellow; squamae yellowish orange, with deeper edges and yellow fringe.

Described from a single ♂ in the Indian Museum from Andarban, Garhwal Distr., 11,000 ft., W Himalayas, vi-14 (*Col. Tytler*).

This species has a considerable resemblance to the *C. intermedium* of Europe, differing in its larger size and the greater prominence of the buccal region.

It is just possible that it is a variety of the European species.

Subfamily CERINAE.

Dr. Meijere has described three new species, *C.* (he employs the name *Cerioides*, Rond., instead of *Ceria*) *flavipennis* (Tijd. v. Ent. li, 195, 1908), from Minahassa, Celebes, one ♂; *fruhstorferi* (*l.c.* 196, pl. vii, 1-2) one ♀ from Sikkim, and *himalayensis* (*l.c.* 198) one ♀ from Sikkim. He says his *fruhstorferi* is very near *obscura*, Brun., of which species he records a specimen, a ♂, from Sikkim.

He gives a useful table comprising 9 species. The types of his three new ones are in the Hungarian Museum.

Of *C. compacta*, Brun., described by me from a type ♀ in my collection from Mussoorie, I have found another specimen amongst my unnamed material, which is also a ♀ and from

Mussoorie, 4-iv-05. I have seen several specimens of *C. javana*, W., ♀, and *trinotata*, Meij., from Darjiling, v-1912, and have described a new species *triangulifera*, ♂ ♀ (Rec. Ind. Mus., ix, 273, pl. xiv, 10) from the same district and noted some specimens of further undescribed species.

Ceria fulvescens, mihi, sp. nov.

(Plate xiii, figs. 20—21).

♂ Western Himalayas.

Long. 13 mm.

Head.—Hinder orbit of eyes lemon yellow. The whole front part of the head lemon yellow, except for a broad median brown stripe, extending to the mouth, and which is enlarged around the base of the antennae into a diamond-shaped patch which occupies all the upper part, except for the rather narrow lemon yellow border immediately contiguous to the eyes. The side corners of the diamond-shaped brown part just touch the eyes at about half their height, viewed from in front. The cheeks are wholly similarly brown coloured, leaving a broad lemon yellow space between them and the lower part of the median stripe. Ocellar triangle small, brown. Eyes closely contiguous for the short distance that they touch. Antennae with 1st joint reddish brown, or more nearly maroon; 3rd joint brownish yellow, lighter towards tip; style brownish yellow at base, the remainder yellowish white. Back of head more or less yellowish or brownish yellow.

Thorax.—Reddish brown or ferruginous. Humeral calli lemon yellow; a prealar lemon yellow callus at each end of the transverse suture, and lemon yellow coloured marks are placed as follows. Two faint short lines from the anterior margin which nearly meet, and short transverse similar marks placed longitudinally along the transverse suture, one on each side of the middle. An elongate triangular mark on hind margin of dorsum, the base of the triangle coinciding with the margin; a narrow sub-lateral streak towards each side near the wings; a rather large very clearly cut mark on each of the meso- sterno- and metapleurae, the first one approximately oval, the others roughly circular. Scutellum reddish brown, the base and hind margin rather broadly lemon yellow; metanotum reddish brown.

Abdomen.—Reddish brown or ferruginous; a large triangular lemon yellow spot on each side at the base of the very narrowed 2nd segment; posterior margins of 2nd and 3rd segments yellowish, that of the 4th also indistinctly so. Belly reddish brown, a small lemon yellow transverse spot towards the hind margin of 2nd segment.

Legs uniformly ferruginous brown.

Wings.—Pale yellowish; anterior half yellowish brown, the colour filling the marginal cell and extending partly into the 1st basal cell. Stigma a little darker brown. Halteres with yellowish white stems and reddish brown knobs.

Described from one ♂ in the Indian Museum from Bhowali (5,700 ft.), July 1909 [A. D. Imms].

***Ceria ornatifrons*, mihi, sp. nov.**

(Plate xiii, fig. 22).

♀ Nepal.

Long. 9 mm.

Head.—Occipital margin moderately wide directly behind frons and upper part of eyes, but disappearing at about the middle of the eyes. It is bright light reddish brown, with a small lemon yellow triangular spot at the inner corner of each eye. The space between the eyes across the middle of the head equal to nearly half that width. Upper part of frons light red. On each side of the frons, on a level with the antennae, is a semi-circular lemon yellow callus-like spot, its convexity contiguous to the eye margins. Barely separated from the lowermost part of this spot is, on each side, a nearly vertical lemon yellow stripe, contiguous to the eye margins for a short distance, and then, bending inwards, proceeding to the mouth, above which the two stripes meet. At the spots where the stripes quit the eye margin, there is (but on the inner side of each stripe) a finger-like projection (mark) running towards the centre of the face. The whole space around the base of the antennae and of the face comprised between these two pairs of yellow calli-like markings, is moderately dark brown, punctuated by a number of fine black spots. The sides of the head below the eyes (cheeks) are lemon yellow, a broad reddish brown stripe between the cheeks and the yellow vertical facial stripes. Antennal 1st and 2nd joints brownish yellow (3rd joint missing). The head is placed very broadly and squarely on the thorax, no vestige of neck being apparent.

Thorax.—Broad; reddish brown, with a little hoary bloom, viewed from certain directions. Humeral calli lemon yellow; a small oval lemon yellow spot on the mesopleura. Transverse suture very narrowly yellowish. Scutellum wholly dull lemon yellow; metanotum reddish brown.

Abdomen.—The 1st and 2nd segments reddish brown, a conspicuous lemon yellow callus on each side at the base of the 1st segment. An indistinct though obvious circular black spot in the middle of the dorsum of the 2nd segment; 3rd and 4th segments dark reddish brown or brown; posterior margin of each with a thick lemon yellow band, whole abdomen with a slight greyish bloom. Belly concolorous, with an indistinct yellow band on hind margins of 2nd and 3rd segments.

Legs (fore pair missing) light reddish brown with a hoary bloom; knees and base of tibiae a little yellowish in certain lights.

Wings clear; anterior part yellowish brown, the colour reaching to the spurious vein. A subapical blackish spot of some size from the costa, extending posteriorly just below the 3rd vein

and reaching basally to about in a line with the anterior cross vein. The wing tip below this subapical spot lightly blackish. No obvious stigma. Halteres reddish brown.

Described from one ♀, Kumdhik, base of Nepal Himalayas, 22-iii-09. In the Indian Museum collection. This should be near, but quite distinct from *eumenoides*, Saunds., described from North India, the latter is, however, double the length of the present species.

***Ceria crux*, mihi, sp. nov.**

♀ Western Himalayas.

Long. 10 mm.

Head black. A bright yellow, moderate-sized round spot on frons between base of antenna and eye, contiguous to latter but not to former. A broad yellow stripe on each side of face, beginning in a point just below the circular spot, broadening rapidly, thence gradually narrowing to a point at the mouth border. These four yellow spots leave a black cross, viewed from in front of the head, extending from vertex to mouth opening. Antennae black, 1st joint, which is nearly as long as 2nd and 3rd together (these two being subequal), reddish brown, especially on underside. Apical style of 3rd joint conical, with short narrow elongate tip; a little yellowish or greyish pubescence, almost tomentum, behind vertex, some slight grey pubescence on lower ocular orbit.

Thorax black. A bright yellow spot on each humerus, a triangular one at each end of the transverse suture, which itself bears a thin greyish line. A bright yellow vertical stripe on mesopleura and a round similarly coloured spot on sternopleura, both stripe and spot nearly in a line with the spot at the end of the transverse suture. Scutellum bright yellow, black at base.

Abdomen black, anterior corners of 1st segment with a round bright yellow spot; hind borders of 2nd, 3rd and 4th segments with a moderately wide well defined band of same colour. 1st segment contracted distinctly but not greatly towards tip, and 2nd segment equally contracted at base; the contracted part at its narrowest point being one-third as wide as the abdomen at its broadest part.

Legs.—Coxae blackish; anterior legs ferruginous brown, traces of an indistinct blackish ring on all tibiae beyond the middle; hind femora blackish, except at base, tip and underside; tarsi a little darker.

Wings grey; anterior half from base to tip, and as far hindwards as just beyond 3rd longitudinal vein, blackish brown, the colour darker here and there; basal half of 1st basal and whole of 2nd basal cell also dark brown, costal cell clearer. Halteres bright yellow.

Described from a perfect unique specimen in the Indian Museum from Kousanie, 6075 ft., Kumaon, vii-14 [*Col. Tytler*].

Ceria probably contains numerous as yet undiscovered species in the Himalayas. In the Indian Museum are five undescribed

species with 8, 2, 2, 2 specimens, and 1 specimen, respectively, but all in bad condition.

Note on Ceria.

The name *Ceria* is of far too old standing to be changed now. Verrall (British Flies, *Syrphidae*, 665) enquires into the alleged synonymy and substantiates its retention, it having stood unchallenged since 1794. I cannot but agree with "continuity before priority" as did both Osten Sacken and Verrall, two of the greatest systematic dipterologists of recent times. The retrograde nature of the changes of the names of nearly all the old familiar genera (involving in many cases the change of the family name also!), as suggested in Kertész's addenda to Vol. VII of his otherwise admirable catalogue of the world's diptera, consequent on the proposed adoption of the names of genera in Meigen's paper of 1800, is incalculable, and it is most unfortunate that some dipterologists have followed this lead.

The names in question were given up by Meigen himself in a further paper in 1803 and even this latter paper was regarded by him as wholly preparatory, since he hardly ever referred to either paper, as recorded by Verrall (British Flies, *Stratiomyidae*, 285); so that it is a poor compliment to him who has well been called the father of European diptera to ignore his wishes in the matter.

Moreover, as Williston, Aldrich, and others have pointed out no species were accorded to any of the generic names in Meigen's "1800 paper", so that on that score alone they are quite inadmissible. All the names of well-known genera in diptera which have stood unchallenged since the days of Meigen, Schiner, Zetterstedt, Macquart, Loew, Walker and their contemporaries, and more especially still, those which give their names to families or subfamilies must be regarded, in the best interests of zoology, to be *beyond the sphere of priority*, and exempt from change or modification through any cause whatever, and personally I shall most rigorously refuse to accept any such alterations.

The only way to obtain ultimate finality in nomenclature is rigidly to establish it *now* by upholding all time-honoured names and by ruthlessly ignoring the present fevered craze in some quarters for change.

Subfamily *CHRYSTOXINAE*.

Chrysotoxum sexfasciatum, Brun.

Only the ♀ was described by me of this species (Rec. Ind. Mus., ii, 89). A ♂ has since been acquired by the Indian Museum taken by Dr. Annandale at Simla, 9-v-10. It agrees closely with the ♀ but is brighter and more lemon yellow in colour, the eyes are absolutely contiguous for the normal distance, the facial stripe is brownish; the hind femora have a pale brown broad band at the tip, the hind tibiae with a narrow brown

apical ring, and all the tarsi are pale brown. A further ♂ was taken near Rotung (N.E. Front. India) 20-xi-11 [*Kemp*].

Subfamily MICRODONTINAE.

Microdon, Mg.

In the Tijds. v. Ent. li (1908), Dr. Meijere describes the following new species:—

fulvipes, p. 203, ♀ Tandjong Morawa Serdang (Sumatra) [*Hagen*]. Type in Leyden Museum.

fuscus, p. 204, ♀, Medan, Sumatra [*Bussy*].

simplicicornis, p. 205, pl. vii, 6, ♂, Buitenzorg, Java [*Jacobson*].

novae-guineae, p. 206, pl. vii, 5, ♀, Papua, several localities. Type in Hungarian National Museum.

grageti, p. 207, pl. vii, 10, ♂ Graget Is. Papua.

Type in Hungarian National Museum, one ♂.

limbinervis, p. 208, pl. vii, 8, 9, Sattelberg, Huen Gulf, Papua [*Biro*]. Type in Hungarian National Museum, one ♂

tricinctus, p. 208, pl. vii, 7, ♂ ♀, Batavia [*Jacobson*].

vespiformis, p. 210, pl. vii, 7, Batavia [*Jacobson*].

odyneroïdes, p. 213, Simbang, Huon Gulf, Papua [*Biro*]. Type in Hungarian National Museum.

The types of *fuscus*, *simplicicornis*, *tricinctus* and *vespiformis* are in the Amsterdam Museum.

Dr. Meijere records *M. stilboides*, Walk., from Sukabumi (Java) one ♂, and *indicus*, Dol., from Bali.

M. annandalei, Brun.

I described only the ♂ of this. Since then I have seen a ♀ from Bhowali, Kumaon, 2-vii-12 [*Imms*]

M. indicus, Dol.

Meijere records a pair *in cop* from Semarang taken in April [*Jacobson*].

Microdon unicolor, mihi, sp. nov.

♂ Orissa.

Long. 10-11 mm.

Head dark violet, a dark bluish tint behind upper part of eyes; frons and face with rather long yellowish grey hair, leaving the centre of the latter bare. It is also sparser on the vertex and around the ocelli. A few stiff black hairs behind vertex. Middle and lower ocular orbits with short yellowish grey hair. Proboscis brown. Antennal 1st joint distinctly longer than 3rd, nearly as long as 2nd and 3rd together; 3rd three times as long as 2nd, 1st and 2nd joints black, 3rd black with dirty brownish grey dust.

Thorax and scutellum deep violet, only a little shining, with rather thick short black pubescence, which also occurs on the pleura; mesopleura with a little short grey hair.

Abdomen deep violet, a little shining; dorsum with very short black pubescence; longer all grey pubescence at sides, also sparsely on hind margins of segments. Belly deep violet, nearly bare.

Legs blackish violet with minute black pubescence; tibiae with grey pubescence except on inner sides; tarsi with a little grey pubescence above, with which at least on hind metatarsi, some black pubescence at the sides is intermixed.

Wings rather dark brown, a little paler on posterior half; halteres brownish yellow.

Described from a perfect ♂ from near Puri, Orissa, 6-xi-12 [Gravelly]. In the Indian Museum.

The only other violet black species from the East is *sumatranus*, Wulp, which is punctuated freely on the body and legs with white hair spots.

Mixogaster vespiformis, Brun.

Described by me (Rec. Ind. Mus. viii, 169, ♀, pl. vi, 8—10, wing, head, abdomen, 1913), from a unique ♀ in the Indian Museum taken by Mr. Kemp on the Abor Expedition at Dibrugarh, Assam, 17—19-xi-11.

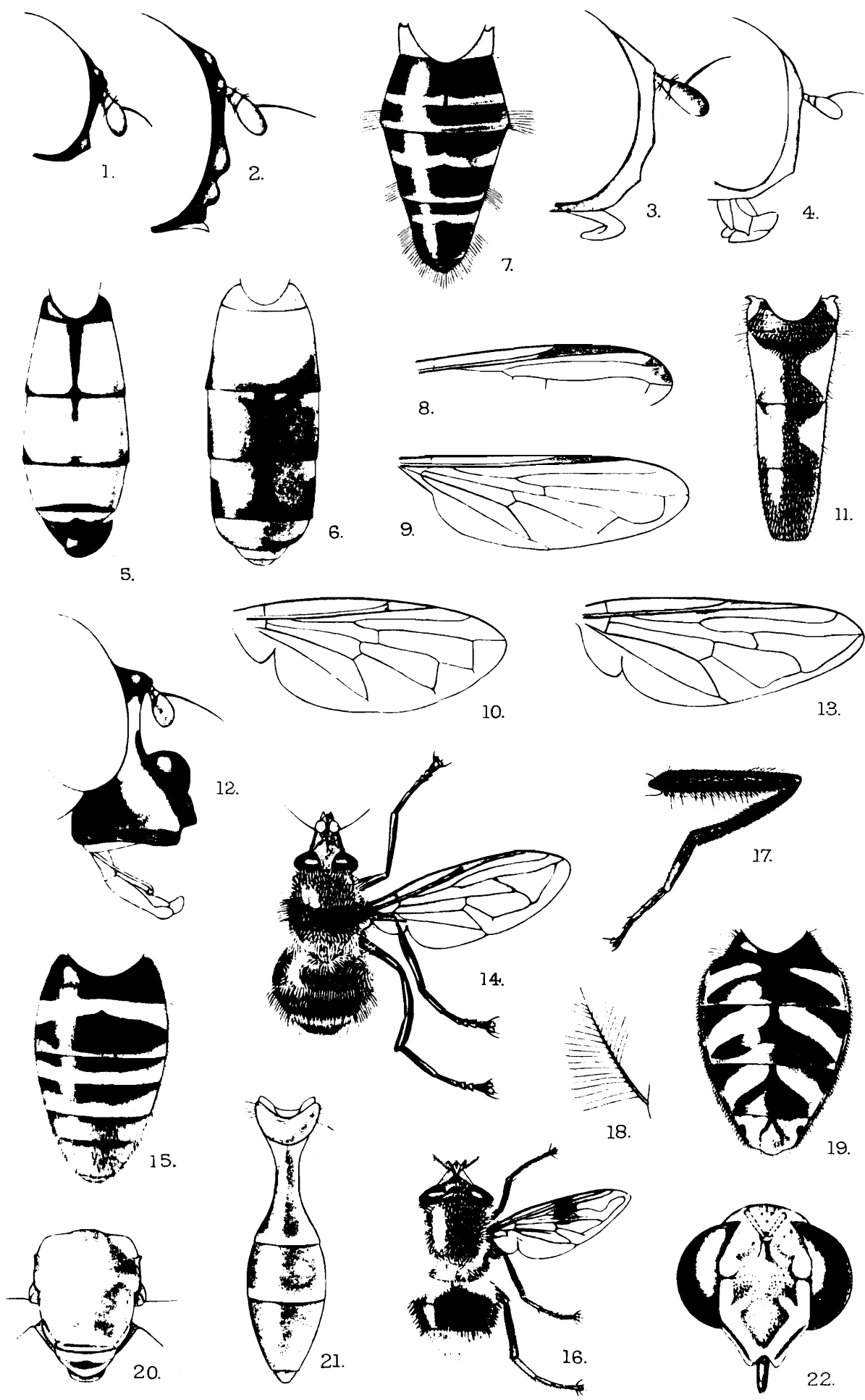
ADDENDUM.

Whilst this paper was passing through the press a long one by Dr. Meijere on Javan diptera has appeared (Tijd. v. Entom. lvii, 1914), in which the following new species have been described.

<i>Xylota decora</i> ,	p. 142,	one ♀
„ <i>strigata</i> ,	142,	♀
<i>Milesia simulans</i> ,	144,	♂ ♀
<i>Eristalis nebulipennis</i> ,	145,	one ♀
„ <i>simpliciceps</i> ,	146,	♀
<i>Graptomyza cornuta</i> ,	149,	one ♂
<i>Chilosia javanensis</i> ,	150,	♀
<i>Syrphus konigsbergeri</i> ,	152,	♂
„ <i>latistrigatus</i> ,	153,	one ♂
„ <i>depressus</i> ,	153,	one ♂
„ <i>torvoides</i> ,	155,	one ♀
„ <i>gedehanus</i> ,	156,	one ♂
„ <i>ichthops</i> ,	157,	one ♂; pl. v. 3. head.
„ <i>cinctellus</i> , Zett. var. nov. <i>strigifrons</i> ,	158,	♂ ♀
„ <i>monticola</i> ,	159,	♀
<i>Chamaesyrphus nigripes</i> ,	162,	♀
<i>Melanostoma 4-notatum</i> ,	163,	♂
„ „ var. nov. <i>gedehensis</i> ,	163,	♂
<i>Sphaerophoria obscuricornis</i> ,	165,	♂
„ <i>javana</i> var. nov. <i>medanensis</i> ,	166,	♂ ♀ (Sumatra)

EXPLANATION OF PLATE XIII.

FIG.	1.—	<i>Psilota cyanea</i> , Brun. sp. nov.	head in profile.
„	2.—	<i>Melanostoma orientale</i> , W	„
„	3.—	<i>Melanostoma</i> undescribed form	„
„	4.—	<i>Melanostoma univittatum</i> , W	„
„	5.—	„	abdomen ♂
„	6.—	„	„ ♀
„	7.—	<i>Syrphus distinctus</i> , Brun. sp. nov.	abdomen.
„	8.—	<i>Baccha apicenotata</i> , „ „	part of wing.
„	9.—	<i>Sphegina tricoloripes</i> , „ „	wing.
„	10.—	<i>Graptomyza tinctovittata</i> , „ „	„
„	11.—	<i>Merodon ornatus</i> , „ „	abdomen.
„	12.—	<i>Myiolepta himalayana</i> , „ „	head in profile.
„	13.—	„ „ „	wing.
„	14.—	<i>Criorhina imitator</i> , „ „	full insect.
„	15.—	<i>Temnostoma nigrimana</i> , „ „	abdomen.
„	16.—	<i>Arctophila simplicipes</i> , „ „	full insect.
„	17.—	„ „	hind leg.
„	18.—	„ „	arista.
„	19.—	<i>Chrysotoxum convexum</i> , „ „	abdomen.
„	20.—	<i>Ceria fulvescens</i> , „ „	thorax
„	21.—	„ „	abdomen.
„	22.—	<i>Ceria ornatifrons</i> , „ „	front view of head.



D. Bagchi, del.

Bumrose, Colla, Derby

XIV. NOTES ON INDIAN MYGALOMORPH SPIDERS

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

(Plate XV).

The present is intended to be the first of a series of papers on Indian spiders, based on the collections in the Indian Museum.

The earliest descriptions of species in this collection were published by Stoliczka, in the *Journal of the Asiatic Society* for 1869. He pointed out in a most forcible manner the extraordinary neglect with which the study of so important and fascinating a group as the Indian Arachnida had met, a neglect which he set himself to remedy. The variety of other groups with which he was occupied can have left him little time for such work, and he only published two papers¹ in connection with it. But he collected specimens vigorously right up to the time of his early death in 1874. The whole of his private collection was bequeathed to the Indian Museum, where most of it still remains in good condition.

Since Stoliczka's death several Orders of Indian Arachnids have been investigated by Kraepelin, Pocock, Thorell, Roewer, Nuttall, Warburton and others; but our knowledge of Indian spiders is still woefully incomplete.

In the years 1887-9 the spiders preserved in the Indian Museum formed the subject of a series of short papers contributed by Simon to the *Journal of the Asiatic Society of Bengal*. And a short paper on our Mygalomorphae was published by Hirst in the *Records of the Indian Museum* for 1909.

In 1895 the British Museum published an account of the spiders of Burma by Thorell, who in 1896 and 1898 respectively contributed two lengthy papers on the spiders collected in Burma by Fea, to the *Annals of the Civic Natural History Museum of Genoa*.

In 1899 the Bombay Natural History Society published a paper by Pocock on Indian spiders with which they had supplied him. This was followed in 1900 by a paper in the same *Journal* containing descriptions which "were drawn up for publication in a volume upon the Arachnida of India, forming part of the Fauna of India Series" but which "together with the diagnoses of many

¹ "A Contribution towards the Knowledge of Indian Arachnoidea" (*J.A.S.B.* xxxviii [II], pp. 201-251, pls. xviii-xx); and "Notes on the Indian species of *Thelyphonus*" (*J.A.S.B.* xlii [II], pp. 126-141, pl. xli).

previously established species'' were omitted on account of "exigencies of space." Why any volume of a series of books, whose chief value lies in their completeness, should have been thus curtailed, it is difficult to understand, especially as the volume in question is one of the shortest of the series and attempts to deal with four comparatively small Orders as well as with the immense Order Araneae. It is particularly unfortunate that spiders should have been treated in this way, for there is probably no other group in the whole of the animal kingdom which is so universally distributed in India, and at the same time so striking and varied both in structure and in habit. New and interesting facts about spiders force themselves upon one's attention wherever one goes; but a satisfactory record of them is commonly rendered almost impossible by the difficulty of indicating with sufficient precision the different kinds of spider to which the various facts refer.

The extension in 1912 of the space available for the research collections of the Indian Museum allowed of a much needed expansion of our collection of spiders. Previous to this extension the space allotted to spiders was so crowded by bottles of mixtures from different localities that no attempt at organization could be made. Since then I have devoted such time as I could periodically spare to sorting out the contents of these bottles, and getting both the named and the far larger unnamed collections systematically arranged.

The present paper, and those with which I hope to follow it, are the outcome of this work, which is now approaching its provisional conclusion. These papers will not aim at an extensive revision of the Indian spiders, but will discuss, in the light of the specimens in our collection, the classification adopted by Simon in his "*Histoire Naturelle des Araignées*" (Paris, 1892 and 1897), and record the localities from which the specimens dealt with have been obtained.

The extremely scattered literature relating to species of spiders already described, often all too briefly and usually without figures, together with the means which a large proportion of these species possess in early life of travelling long distances through the air, render it hopeless for anyone who cannot work on spiders during the greater part of his time to determine with certainty whether a species he has been unable to name is new to science or not. There are, however, many indications that a large proportion of such species are actually new. For instance, some common Himalayan spiders were described as new by no less an authority than Simon as recently as 1906. It is highly desirable, I think, that as many as possible of our more distinctive species should be described and named without delay, even at the risk of the creation of a few synonyms. The final revision of each family of spiders will have to be made by a specialist in a position to deal with members of that family from all parts of the world, and the richer the published material at his disposal, provided that the descriptions and

illustrations it contains are adequate and that reasonable care has been taken to avoid repetition, the more complete is his work likely to be. I propose therefore to describe a certain number of species as new, even though I may not be able to trace every possible description that may refer to them.

The very small number of extra-Oriental forms in our collection makes it impossible for me to criticize the relation which these bear to Oriental forms in Simon's system. Where, however, as in the case of the Aviculariinae dealt with in the present paper, the Oriental forms appear to exhibit definite structural zoogeographical relationships to one another, I have not hesitated to suggest the advisability of trying to alter his system in order to bring these into prominence. Such relationships have been found in all of the few groups in which I have looked for them. In the case of one of these groups—the Passalidae—in which such relationships recently led me to separate the Indo-Australian forms from those of the rest of the world, none of which I had seen, I have already obtained proof that the separation was justified; though some of the latter resemble certain Indo-Australian forms so closely that I, like previous authors, should probably have been misled by striking superficial characters, had not my earliest work on the family been confined to Indo-Australian species.

The characters on which the classification of spiders is at present based are to a great extent admittedly unsatisfactory; and it is quite possible that by dealing separately with the faunas of different zoogeographical areas—the extent of the areas that will have to be taken may be found to differ in different groups—local relationships may be brought to light which will lead to the discovery of new characters of deeper significance where we least expect them, especially among the more sedentary families.

References to Simon's "*Histoire Naturelle des Araignées*" and to Pocock's "*Fauna*" volume are so numerous that I have omitted the titles of these works throughout. Where not otherwise stated all references to these authors imply references to these works. Where no references to descriptions of species are given, these will be found in the "*Fauna*"

It has been convenient to put this paper into the form of a catalogue of the specimens in our named collection, a form which will probably be convenient for the rest of the series also. Our collection of spiders has recently been increased to a considerable extent by the generosity of collectors in different parts of India. This has made it more representative of India generally than would otherwise have been the case, and has greatly facilitated my work. Our thanks are due to all who help us in this way, and especially to H. E. the Governor of Bengal who, with the assistance of Mr. Möller, has been making large collections of the Invertebrata of the Darjeeling District; to Dr. Sutherland who has collected spiders extensively round Kalimpong in the same district; to Mr. M. Mackenzie who has sent numerous specimens from Siripur in Bihar; to Mr. G. Henry who has

submitted to me the specimens he has been able to collect in Ceylon during his tours on behalf of the Colombo Museum; to Mr. T. Bainbrigge Fletcher of Pusa; and to Mrs. Drake of Serampore.

Family LIPHISTIIDAE.

Genus **Liphistius**, Schiödte.

This interesting genus is represented in our collection by a single damaged specimen from Moulmein in Lower Burma.

Family AVICULARIIDAE.

Subfamily CTENIZINAE.

Group PACHYLOMEREAE.

Genus **Conothele**, Thorell.

Two female or immature specimens were collected by Theobald in the Nicobars. These differ from *C. birmanica*, Thorell, in having the posterior series of eyes procurved, and in having more teeth on the labium; but they may perhaps belong to some Malaysian species.

Group IDIOPEAE.

I am unable to follow Simon's final revision of this group (Vol. II, pp. 888-890) except as regards the union of *Acanthodon* with *Idiops*, a union the necessity of which is supported by the occurrence in our collection of the male of an Indian species with the eyes of the second group closely crowded and strongly unequal.

Simon separates the American genera of Idiopae from those of the Old World on the grounds that in the former the eyes of the posterior line, seen from above, are lightly procurved whereas in the latter they are lightly recurved, the area occupied by the four median eyes being moreover parallel-sided in the former and broader behind than before in the latter.

In all our specimens, however, and apparently also in those described in the "Fauna," the posterior line of eyes is distinctly procurved and never recurved, the posterior margins of the large laterals never being behind, and the anterior margins of these eyes always being in front of the corresponding margins of the smaller posterior median eyes. And the area occupied by the four median eyes is not always even slightly wider behind than before.

Further, when these characters are disregarded, and an attempt is made to put our three specimens of the group into the Old World genera which would otherwise receive them, only one of the three (*Heligmomerus* sp.) is found to fit. The other two resemble *Gorgyrella* in the structure of the chelicerae, and *Pachyidiops* and *Titanidiops* in the shape of the labium, differing markedly from all of these and from one another in their com-

binations of the other characters used by Simon in his generic definitions.

I have therefore fallen back on Simon's earlier revision of the group (Vol. I, pp. 90-92), which, when *Acanthodon* has been merged in *Idiops*, takes in all these forms conveniently.

Genus *Heligmomerus*, Simon.

Represented by one female, caught in the Royal Botanical Gardens at Sibpur near Calcutta, where it may easily have been introduced among plants from some other place. Its burrow, a short silk-lined tube, closed externally by a trap-door, is also in our collection.

Genus *Idiops*, Perty.

Represented by a female from Bellary in South India, and by a male whose characters seem sufficiently well defined to permit of its description here as a new species.

Idiops biharicus, n. sp. ♂

(Pl. xv, figs. 1 *a-b*).

Locality.—Sahibgunge in Bihar.

Dimensions.—Carapace 6.0×5.2 mm.; sternum 3.0×2.8 mm.; legs in the order 1, 4, 2, 3. In the first legs the femur is fully, and the combined tarsus and metatarsus are scarcely, as long as the carapace. The patella and tibia combined are a little longer than either. The tibia and metatarsus of the second legs are about equal to the patella and tibia of the first in length, but are much slenderer. The tibia of the third leg on each side is nearly three times as long as wide; the femur and patella of these legs are together scarcely as long as the carapace, and are about equal to the femur alone of the fourth legs.

Colour.—Carapace plum-coloured; appendages dark reddish above, paler beneath especially basally; sternum and lower surface of abdomen also pale, almost ochraceous; upper surface of abdomen dull brown.

Structure.—The *carapace* is ovate, slightly narrower behind than in front, with the posterior margin short and faintly concave in the middle line. The anterior lateral eyes are situated close together on a prominent tubercle close to the anterior margin. The remaining eyes are situated in a compact group: of these the anterior medians are almost in contact, and are the largest; the posterior medians are separated by a distance about equal to a diameter of one of the anterior medians, and are the smallest; both are almost in contact with the posterior laterals, whose long diameter is about equal to that of an anterior median, and whose other diameter is about equal to that of a posterior median. The fovea is large and very deeply impressed in the form of a procurved semicircle.

In front of it the cephalic part of the carapace is strongly elevated, and bears a pair of broad longitudinal bands of sparse coarse tubercles, which become faint on either side of the posterior group of eyes and disappear before they reach the anterior margin of the carapace, this being quite smooth. The rest of the margin is granular except in the median concavity behind, and broadening bands of coarse tubercles radiate towards it from the fovea.

The *labium* is about as broad behind as it is long, and is slightly narrower in front. It is unarmed.

The *sternum* appears to have been spiny.

The *chelicerae* are provided each with a rastellum set on an apophysis overhanging the base of the fang. The *chelicerae* are armed each with 5 outer and 7 or 8 inner teeth.

There is no *stridulating organ*.

The tibia of the *palp* is excavate beneath in its distal third, the outer side of the hollow being armed with stout spines, of which those at the two ends are long and those in the middle short. The distal end of the tarsus bears a bluntly conical process on the outer side.

The bulb of the palpal organ (fig. 1b) is helicoid. The style consists of two parts, a basal lamina which is triangular in shape and somewhat narrower at the base than it is long, and a very slender, slightly curved, distal duct of about the same length.

The *legs* are spiny. The extremity of the tibia of the first legs (fig. 1a) is armed on the inner side with two stout conical apophyses, of which the proximal has a simple apex turned slightly downwards when viewed laterally, while the distal is strongly indented on the lower side below the somewhat upwardly directed apex. The metatarsus is somewhat bent outwards and swollen on the inner side below the middle; it lacks the submedian conical spur found in *I constructor* (Pocock), but bears numerous stout spines on the lower side, as does the tibia also.

The tibiae of the third legs are faintly excavate above, though not definitely so as in *Heligmomerus*.

This species seems to be most closely related to *I constructor* (Pocock), from the male of which it differs chiefly in the large size of the anterior median eyes—assuming that Pocock's description of the eyes of the female applies also to the male, except as regards their proximity where he notes a difference between the sexes. The unarmed labium appears to be another distinguishing character. In any case the present species differs from *I constructor* in the absence of the metatarsal spur of the first leg of the male.

Group CYRTAUCHENIEAE.

Genus *Atmetochilus*, Simon.

Represented by the type of *A. fossor*, Simon (*genotype*), and by an immature male from Upper Tenasserim.

Group AMBLYOCARENEAE.

Genus *Damarchus*, Thorell.

Represented by the type specimen (male) of *Damarchus assamensis*, Hirst, and by three females associated with it which "do not differ in structure from the female of *D. oatesii* (1909, p. 384)." Also by a small specimen from Gmatia in the Birbhum District of Bengal.

Group ARBANITEAE.

Genus *Scalidognathus*, Karsch.

Represented by specimens of *S. radialis* (Cambr.), from Kandy, Galagedara and Newara in Ceylon.

Genus *Nemesiellus*, Pocock.

Represented by specimens from Barkuda Island, Chilka Lake (north-eastern end of Madras Presidency), and from S. India. The lateral spacing of the eyes is distinctly less in both than it is in our specimens of the preceding genus, which makes the anterior line appear more procurved, and makes the anterior and posterior lateral eyes on each side appear relatively further apart.

Subfamily BARYCHELINEAE.

Group DIPLOTHELEAE.

Genus *Diplothele*, Cambr.

Represented by one specimen of *D. walshi*, Cambr from Waltair on the eastern side of the Madras Presidency.

Neither Simon nor Pocock appear to have been aware that Walsh described this species under the name *Adelonychia nigrostriata*, n. gen. and sp. (*J.A.S.B.*, LIX, [II], pp. 269-270) at about the same time that Cambridge described it from specimens which Walsh had sent him. Walsh's description was received on Oct. 27, read on Nov. 5, and published on Dec. 10, 1890. Cambridge's description was received on Oct. 23 and read on Nov. 18 of the same year; the date of publication is not recorded and cannot have been much if at all before Dec. 10. Cambridge's name has, however, been universally adopted, and it seems in any case undesirable to change it.

Group BARYCHELEAE.

Genus *Sasonichus*, Pocock.

The description of this genus, and of the single species on which it is based, are very imperfect. So far as I can tell the new species which I am referring to the genus differs from the original species in one only of the characters to which generic value has

been attached. To avoid establishing a new monospecific genus this character, the presence or absence of apical apophyses on the tibia of the first leg of the male, may be given specific value.

Sasonichus arthrapophysis, n. sp. ♂

(Pl. xv, figs. 2 a-b).

Locality.—Barkul in south-east Orissa.

Dimensions.—Carapace 7.5×6.0 mm.; sternum 2.7×2.5 mm.; legs in the order 4, 1, 2, 3.

The patella and tibia of the first legs are together equal to the length of the carapace; the tarsus and metatarsus are together slightly shorter, and the femur is shorter still, the femur and half the patella being about equal to the length of the carapace, as are also the femur of the second legs with the whole of the patella, the tibia and metatarsus together of the third legs, and the patella and tibia together and the metatarsus alone of the fourth legs.

Colour.—Dark brownish above, paler below, the ends of the tibiae of the legs silvery above—least so on the hind legs.

Structure.—The *carapace* is ovate, slightly broader behind than in front. The ocular area is very compact and is situated on a clearly defined tubercle approximately circular in outline. The anterior lateral eyes are oval, and are situated obliquely in front of the rest about a short diameter away from the anterior medians and fully a long diameter from one another. The anterior medians are round, their diameter fully as great as the long diameter of the anterior laterals; they are separated by a distance about equal to a diameter of the small posterior medians. The posterior medians and anterior laterals form a square; and the centres of the former are directly behind the outer margins of the anterior medians. The posterior laterals are quite as long as the anterior laterals, but much narrower. A line of low tubercles extends medially from the ocular tubercle to the fovea, which is linear as a whole, but distinctly recurved just at its extremities. Lines of tubercles radiate from the fovea. The whole carapace has probably been covered with long golden brown hair and scattered black spines, but most of these have disappeared. The spines are very long and thick posteriorly, where they project outwards and curve forwards.

The *labium* is very imperfectly separated from the sternum. It is armed behind the anterior margin with a line of four more or less distinct erect teeth, among long spiniform hairs.

The *sternum* is covered with erect spiniform hairs, and is bordered laterally and behind by a single row of long black slender spines. The *coxae*, *trochanters* and *femora* are similarly armed; but long white silky hair surrounds the mouth, both on the labium and on the coxae of the palps. On the latter it hides a group of denticles like those which form a line on the labium, but much more numerous.

The *chelicerae* are armed with about ten inner but no outer teeth, and are provided with a rastellum whose spines are somewhat long and slender.

There is no *stridulating organ*.

The tarsus of the *palp* is lobed on the inner side below. The style of the palpal organ (fig. 2*b*) is more or less lamelliform and parallel-sided throughout the greater part of its length, and is twisted on its own axis through about 90°; distally it is sharply pointed.

The *legs* are spiny, with a series of very stout spines on the tibia and metatarsus. The tibia of the first legs is armed on the inner side near the end with two stout apophyses, of which the distal is ventral to the other (fig. 2*a*). They curve towards one another as a whole, but the extreme apices are slightly turned in the opposite direction. The distal part of each, which is greater in the proximal than in the distal, appears to be jointed on to the basal part. From this it seems probable that the former is moveable in life. I do not remember to have heard of any other Arachnids with jointed apophyses; but the jointed setae of Nereidiform Polychaet worms and the jointed tooth found on the mandibles of most Passalid beetles, afford instances of similar jointing of chitinous structures in other groups.

This species differs from *S. sulivani* chiefly in the presence of apophyses on the tibiae of the first legs.

Group SASONEAE.

Genus *Sason*.

Represented by specimens of *S. cinctipes*, Pocock, from Peradeniya in Ceylon, and by one undetermined specimen from the Nicobars. *S. cinctipes* lives on moss-covered rocks or walls where it constructs a curious flat, more or less 8-shaped nest. The upper part of this nest consists of two rounded flaps hinged together along their contiguous borders, these borders forming the cross-piece of the eight. The double trap-door is attached to the basal part of the nest on either side of the cross-piece.

Subfamily AVICULARIINAE.

Five of the groups of this sub-family recognized in Simon's "Supplement" occur in the Indian Empire, and of these four are only known from the Oriental and Australian Regions. The fifth is the most primitive of them all, and has a much wider distribution; it may be looked upon as the ancestor of the other four.

This group, the Ischnocoleae, is almost confined in the Oriental Region to the Indian Peninsula and Ceylon. The genera which occur there are found nowhere else, except perhaps in the Eastern Himalayas and Burma. In Simon's arrangement they are scattered among genera from other parts of the world; but when taken by themselves they are found to fall into line, not only with

one another, but also with the Thrigmopoeae, each genus of the two groups (except perhaps *Annandaliella*, see below, p. 271) representing one stage in an evolutionary series culminating in the genus *Thrigmopoeus*.

Simon's final revision of the Ischnocoleae brings all the Oriental species of the group into three genera, *Phlogiodes*, *Heterophrictus* and *Plesiophrictus*, and to these Hirst has since added the genus *Annandaliella*. Of these the first appears to have been known to Simon only from Pocock's imperfect description of two forms which probably, as pointed out below (p. 269), are opposite sexes of a single species. Of the second he appears to have seen a female (the only sex known) of the single species as yet referred to it. Of the third the male was evidently known to him from Pocock's description only. It is, therefore, scarcely to be wondered at, that his definitions of these genera are somewhat unsatisfactory, and that several of the species described below differ from the genera in which I have placed them in one or more of the characters used in his keys; but as they differ at least equally widely from all extra Oriental genera and appear to be closely related to one another, I have thought it best to place them in these Oriental ones.

An account of the genera of Indian Ischnocoleae and of Thrigmopoeae will be found below (pp. 269-280). It is designed to bring out the evolutionary sequence which the genera appear to illustrate. This sequence seems to me to indicate that the two groups should ultimately be united; and that if any characters can be found to separate both of them from the extra-Oriental Ischnocoleae, a new group should be instituted for them. But as I have no extra-Oriental forms for comparison I am not able to attempt this at present.

None of the genera of Indian Ischnocoleae and Thrigmopoeae have attained so high a degree of specialization as have the genera *Poecilotheria* and *Chilobrachys*, which also live in the Indian Peninsula and Ceylon. The former lives in trees and in the thatch of houses, so can scarcely be regarded as entering into competition with ground-dwellers like the Indian Ischnocoleae¹. I have elsewhere (1915, pp. 417-418) given reasons, largely zoogeographical, for supposing that it originated from a primitive stock—presumably of the Ischnocoleae or Thrigmopoeae—in the Indian Peninsula or Ceylon. It will be sufficient here to point out that it differs from the Selenocosmieae not only in important details of the stridulating organ, but also in the structure of the labium—for which reasons, among others, I prefer to follow Simon who established a special group, Poecilotherieae, for its reception, rather than Pocock who united it with the Selenocosmieae.

¹ Nothing appears to be known of the habits of the Thrigmopoeae, which probably resemble those of the Ischnocoleae. The specimen I obtained in Cochin was not recognized when captured. If I caught it myself it must have been on the ground, like all the other Mygalomorphae I found. But it may have been brought to me by someone else.

The only remaining genus of Aviculariinae found in the Indian Peninsula or Ceylon is *Chilobrachys*, the most highly specialized genus of the group Selenocosmieae. The whole history of the evolution of this ground-dwelling genus can be read in the forms inhabiting the countries north and east of the Ganges to-day; and there seems no reason to doubt that its evolution took place there. The primitive forms left there are extremely rare, having no doubt suffered in the struggle for existence with their more highly specialized relatives. The most highly specialized genus of these has spread into the Indian Peninsula and Ceylon, a fact which probably accounts for the concentration southwards and westwards of the Indian Ischnocoleae and the Thrigmopoeae.

The evolution of the Selenocosmieae has already been dealt with from a primarily zoogeographical point of view (Gravely, 1915), with the results indicated in the above summary. The morphological point of view must now be more fully considered.

Reference has been made above to the existence in parts of the Oriental Region north and east of the Ganges of a few primitive species of Aviculariinae. These appear to be extremely rare, and those hitherto described are known to me from descriptions only. There is, however, in the Indian Museum collection, a single immature specimen from the Darjeeling District which must be associated with them. The species already described are two in number; both were collected by Fea in Burma, and referred by Thorell to the genus *Ischnocolus* (1896, pp 170-175). More recently Simon (Vol. II, p. 925) has shown that this genus *Ischnocolus* must be restricted to species from the Mediterranean and Ethiopian regions; but he makes no mention of the position to be assigned to the Burmese forms. In describing the labium of one of these, "*Ischnocolus*" *brevipes*, Thorell says, "apice fascia transversa sat lata granulorum densissimorum praeditum." With regard to the labium of the other, "*Ischnocolus*" *ornatus*, which he described from two immature specimens, he says, "quod apice minus dense granulatum est—an ita etiam in adultis?" Now the presence of a densely granular transverse band on the apex of the labium is characteristic of the Selenocosmieae. In all other Oriental groups of Aviculariinae the anterior part of the labium is more sparsely armed. The distinction, although quantitative, is very marked; and except perhaps in very young and imperfectly hardened specimens such as no one could think of naming, a glance at the labium is sufficient to show whether a specimen belongs to the Selenocosmieae or not.

The only Burmese species in which the labium is sparsely armed, other than those referred by Thorell to the genus *Ischnocolus*, are those comprising the group Ornithoctoneae, which are separated from all other Oriental species by the densely hairy outer surfaces of their chelicerae. That the occurrence of a sparsely armed labium in a Burmese species without externally hairy chelicerae struck Thorell as very remarkable, seems to be indicated by his suggestion that its presence was due to the imma-

turity of his specimens, a suggestion which is not supported by the immature specimens of Selenocosmieae in our collection. The dense armature of the labium of the Selenocosmieae has been recorded as a group character by Simon (Vol. II, p. 953), though he does not appear to have attached much importance to it. In view of the fact, however, that it supplies a clearly defined character which, unlike the stridulating organ, appears unchanged in all genera of the group, and thus enables us to recognize as a primitive ally of the group "*Ischnocolus*" *brevipes* in which no stridulating organ occurs at all, its importance as a group character should, in my opinion, be ranked even higher than that of the stridulating organ itself. "*Ischnocolus*" *brevipes* may therefore be transferred to the Selenocosmieae, the evolution of the higher forms of which is discussed below (pp. 282-287).

"*Ischnocolus*" *ornatus* must now be considered. It differs from the Selenocosmieae not only in the structure of the labium, but also in the greater number of spines on its legs. In the former character it resembles all, and in the latter the more primitive, of the Indian Ischnocoleae. For the present then it will be best to associate it with this group and especially with the primitive genus *Plesiophrictus*. But its genus cannot be definitely determined in the absence of mature specimens of either sex. This applies also to the immature specimen referred to above, which was collected in the Darjeeling District, and is preserved in our collection. These two forms are presumably remnants of a primitive Himalayo-Malaysian fauna from which both the Selenocosmieae and Ornithoctoneae have originated; and their rarity is probably accounted for by their inability to compete successfully with these more highly specialized groups.

The Ornithoctoneae are the only Oriental Aviculariinae that have not been dealt with above. They form so compact and isolated a group that little or no direct morphological evidence of their affinities with other groups is to be found (see Gravely, 1915, p. 417).

The five Oriental groups of Aviculariinae as described above may now be defined.

1. { Anterior part of labium armed with den-
ticles somewhat sparsely distributed 2.
1. { Anterior part of labium covered with
closely crowded granules .. *Selenocosmieae*, p. 282.
2. { Outer surface of chelicerae bare 3.
2. { Outer surface of chelicerae densely hairy *Ornithoctoneae*, p. 280.
3. { No bacilli present on anterior surface of
coxae of palps, this surface bearing at
most small spines 4.
3. { A cluster of more or less claviform bacilli,
accompanied by one or more stout den-
ticles, present on anterior surface of
coxae of palps *Poecilotherieae*, p. 280.

4. { No stridulating organ present between
 cheliceræ and coxæ of palps *Ischnocoleae*, p. 269.
 A stridulating organ present in this posi-
 tion *Thrigmopoeæe*, p. 278.

If any character can be found by means of which the Indian *Ischnocoleae* can be separated from the *Ischnocoleae* of other parts of the world it will be advantageous, as pointed out above (p. 266), to bring about this separation, at the same time uniting the former with the *Thrigmopoeæe*

Group ISCHNOCOLEAE.

Among Indian genera of this group there appears to be a marked sexual dimorphism. All known males are distinguished by the more or less extensive and conspicuous development of white hair on the feet, especially the anterior ones

In the two species of which males are known to me, the anterior tarsal scopulae, which, except in the genus *Phlogiodes*, are always more or less clearly divided in females,¹ are either undivided in the male or less clearly divided in the male than in the female; also the anterior median eyes tend to be enlarged in the male and the anterior laterals in the female.² As yet all species of this group appear to have been described from one sex only; but there can be little doubt, I think, that *Phlogiodes robustus*, Poc. (♀) = *P. validus*, Poc. (♂), since both are found at Matheran. In the former, according to Pocock (1899, pp. 748-9), the tarsal scopulae are broadly divided on legs 2-4, in the latter they are undivided except on the fourth leg where the division is narrow.

I have found it impossible to separate the genus *Heterophrictus* from *Plesiophrictus*. Pocock's distinction, based on slight differences in the shape of the fovea, is very unsatisfactory.

Simon separates them primarily on characters presented by the vestiture of the anterior surfaces of the coxæ of the first legs. But these vary even in mature examples of one sex of a single species, and they are clearly correlated with size, the *Plesiophrictus* characters being found in the young of large forms whose adults have well-marked *Heterophrictus* characters, as well as in adults of species of small size similar to that of the species grouped together by Pocock in the former genus.

The genus *Annandaliella* ought also, perhaps, to be merged in *Plesiophrictus*; but as the spines on the inner surfaces of the cheliceræ, by which it is characterized, are sharply distinctive I retain the genus provisionally. These spines are considered by Hirst to

¹ They are said to be undivided in *Annandaliella travancorica*, but fresh specimens show a median line of fine hairs such as accompany the spines by which the scopulae of the other feet are divided.

² In females of *Plesiophrictus sericeus*, *collinus* and *fabrei*, according to Pocock, the anterior laterals are not larger than the medians. Males do not appear to be known in any of these species.

be stridulatory structures; but so far as I know there is no direct evidence on this point. It is difficult to find any other explanation for them; in view, however, of the fact brought out by material recently added to our collection, that they do not occur in specimens less than half grown, or in mature males, their physiological homology with the stridulating organs of other Oriental Aviculariinae is open to question. But for the importance that has been attached to these spines the only species yet referred to the genus would find its natural place somewhere near the middle of the series of species composing the genus *Plesiophrictus*.

This series shows a gradual change from small forms with small marginal posterior sigilla and more distinctively *Plesiophricticid* anterior coxae, to larger forms with larger posterior sigilla more widely separated from the margin of the sternum and more distinctively *Heterophricticid* coxae, characters all of which are intensified in the genus *Phlogiodes*, which affords a transition to the *Thrigmopoeae*.

If the genus *Phlogiodes* were only distinguished by the size and position of its sigilla, and by the shape of its fovea—the characters used by Pocock in his key—its distinctness from *Plesiophrictus* could hardly be maintained. Probably the most important character separating the two genera is the absence in *Phlogiodes* of the tibial apophysis of the first leg of the male—a character which separates it alike from *Plesiophrictus* and *Annandaliella*.¹ But this character does not help in the case of species (unfortunately the majority) known from females only. It appears, however, that *Phlogiodes* approaches the *Thrigmopoeae* in the characters of its feet, as in so many other features. The feet of the *Thrigmopoeae* are very different from those of *Plesiophrictus*; and it is likely, I think, that the character will prove to be a valid one for the separation of *Phlogiodes* from *Plesiophrictus*, in spite of a certain amount of variation which it exhibits in the latter and perhaps in both genera.

The genera of the Indian Ischnocoleae may now be redefined thus:—

- | | | |
|----|---|---|
| I. | { | A row of stout spines present on the inner surfaces of the chelicerae of mature females; feet of first legs slender, the division of their tarsal scopulae more or less obsolete especially in male; male with tibial apophysis of first leg . <i>Annandaliella</i> , p. 271. |
| | | No spines on the inner surfaces of the chelicerae |
| | | 2. |

¹ The possession of this apophysis, and of somewhat numerous spines on the legs generally, suggests a possible relationship between the more primitive Indian Ischnocoleae and the Indian Barychelinae. In the Indian Barychelinae, however, the spines thickly cover all joints of the legs, and no definite arrangement of them can be recognized. In the Indian Ischnocoleae such an arrangement is recognizable among the few spines that may be present on the anterior legs, and is repeated on the posterior legs in all species in which their spines have been reduced to a small enough number (see below, p. 274).

2. { Male with tibial apophysis of first leg ;
 feet of first legs slender, their tarsal
 scopulae (? always) clearly divided. *Plesiophrictus*, p. 273.
 { Male without tibial apophysis of first leg ;
 feet of first legs stout, their tarsal
 scopulae (? always) undivided *Phlogiodes*, p. 278.

Genus *Annandaliella*, Hirst.

It will be convenient to deal first with this genus, which appears to form a lateral offshoot from the main trend of evolution, leading up towards the *Thrigmopoeae*. It appears to have originated from some species near the middle of the evolutionary series of the genus *Plesiophrictus*, and to differ therefrom only in the presence of the characteristic spines on the inner surfaces of the chelicerae of the female, and perhaps in the absence of spines from among the fine hairs by which the anterior tarsal scopulae are divided in the female, hairs which are not sufficiently numerous in the male even to form a definite line. The absence of the characteristic spines from the mandibles of the male (and young) is very remarkable, if, as has hitherto been supposed, they constitute a stridulating organ comparable to that found between the chelicerae and palps of the more highly specialized Oriental genera of *Aviculariinae*.

The genus is represented in our collection by a number of specimens of *A. travancorica*, Hirst (1909). It is also represented by a specimen from Chalakudi in the cultivated low country of Cochin which may perhaps belong to the same species; by a specimen said to come from Hung in Persian Baluchistan—a locality which I have reason to think was at some time attributed to at least one bottle of mixed spiders from Southern India or Burma; by a mutilated specimen from Ootacamund; and by a young one from Coimbatore.

Annandaliella travancorica, Hirst.

(Pl. xv, figs. 4a-b).

This species is represented in our collection by the type from Travancore; by a female from Kulattupuzha in the same State, at the base of the western slopes of the Western Ghats; and by numerous specimens, including three males, from under stones and logs of wood, in the rich evergreen jungle at the base of the same range near Trichur (Cochin) and near the rubber estate between the tenth and fourteenth miles of the Cochin State Forest Tramway. It is very sluggish, at least by day, crouching down when discovered, and remaining quiet with its legs drawn up against the body when seized.

This species has hitherto been known from the type only. Now that more extensive material is available it may be redescribed as follows:—

♂ *Dimensions*.—Carapace 7.2 × 6.0 mm.—9.2 × 8.3 mm. Sternum 3.4 × 3.0 mm.—4.4 × 3.9 mm. The fourth leg longer

than the first Tarsus and metatarsus together of first and third legs, and metatarsus alone of fourth legs, about equal to carapace in length; tarsus and metatarsus of second legs slightly shorter, of fourth legs longer by about half the length of the metatarsus, this joint being slightly longer than the femora of the first and fourth legs which are about equal to one another and to the femur together with half the patella of the second and third legs. The proportions all somewhat variable.

Colour.—Dark olivaceous brown, the tarsi and metatarsi of the two front pairs of legs, and the tarsi and distal halves of the metatarsi of the two hind pairs, white. The tarsi of the palps whitish.

Structure.—The *carapace* resembles in shape that of *Plesio-phrictus satarensis* described below, but the fovea is lightly procurved, and the anterior median eyes vary from slightly smaller than, to distinctly larger than, the anterior laterals, the diameter of the former being in the latter case about equal to the long diameter of the latter.

The posterior sigilla of the *sternum* vary in position from being almost close to the margin to being separated from it by somewhat more than the diameter of one of them.

The *labium* and its teeth are normal.

The inner surfaces of the *chelicerae* lack the row of spines characteristic of females of this genus.

The *palps* are slender, their tarsi bilobed, with the outer lobe itself obscurely divided into two parts, one anterior to the palpal organ and the other on its outer side. The palpal organ is shown on pl. xv, fig. 4*b*; the spiral curvature of its gracefully bowed, slender, tapering style is very slight.

The first *legs* are unarmed except for the usual apical spine on the metatarsus and apophysis (fig. 4*a*) and spine (the latter sometimes absent) on the tibia. The metatarsus of the second legs is armed with three apical spines and one (rarely absent) about in the middle of the ventral side. The tibia of the same leg has two apical spines and often one mid-ventral one. The tibiae and metatarsi of the third and fourth legs are each armed with a number of spines in the distal two-thirds of their length.

Of the tarsal scopulae only the fourth is divided. The metatarsal scopulae are all apical only; those of the third and fourth legs are sometimes obsolete.

♀ *Dimensions*.—Carapace up to 11.0 × 8.4 mm. Sternum up to 4.5 × 3.8 mm. Legs in the order 4, 1, 2, 3, but relatively much shorter than in the male. Carapace of about the same length as sum of tibia and patella or metatarsus of first leg, to sum of femur and patella of second leg, to patella and tibia with half metatarsus of third, to tibia with patella or half metatarsus of fourth; metatarsus of fourth about equal to tarsus and metatarsus combined of first and second legs, slightly shorter than those of third legs. As in the male these proportions are not altogether constant: the fourth metatarsus is, for instance, sometimes relatively longer as compared with the other joints.

Colour.—Brown, much paler than in the male and not olivaceous.

Structure.—The *carapace* differs from that of the male in having the fovea transversely linear, and the anterior median eyes smaller than the anterior laterals. *Sternum* and *labium* as in male; posterior sigilla often obscure.

The tibia of the *palp* is armed with two apical spines as in *Plesiophrictus satarensis*. The tibia of the first *leg* has one or two apical spines and no apophysis; otherwise the armature of the legs resembles that of the male, except that the metatarsus of the second leg usually has one instead of three spines. The metatarsal scopulae are denser and more extensive than in the male, those of the first legs extending practically to the base of the joint. The first tarsal scopula is often somewhat indistinctly divided by a row of long hairs, rather than by a definite band of spines; the second is divided by a line of spines, the third and fourth also by bands of spines.

Genus *Plesiophrictus*, Poc.

Incl. *Heterophrictus*, Poc.

This genus appears to have given rise to both the other genera of Indian Ischnocoleae, and through one of them to the Thrigmopoeae also. It is much larger than any of the four derived genera; and the following description, based mainly on the species by which it is represented in our collection, may serve as a standard by comparison with which these genera can be more briefly described. In *Plesiophrictus satarensis*, of which alone the male is known to me, the characters mentioned are found in both sexes unless otherwise stated.

The ocular area is rectangular, nearly or quite three times as broad as long. The eyes of the anterior line, which is lightly procurved, are about equally spaced, somewhat variable in relative size but together larger than the eyes of the posterior line together. The median eyes of the posterior line, which is very lightly recurved, are smaller than the posterior laterals, with which they are practically contiguous being widely separated from one another. The anterior medians are circular, the rest are more or less oval.

The position of the posterior sigilla of the *sternum* varies. In small species they are (? always) marginal; in larger ones they tend to be separated from the margin by a distance not (? ever) exceeding their own width.

The *labium* is about as long as broad, with slightly concave anterior margin, immediately behind which it is armed with a transverse band of somewhat sparsely scattered denticles, rather coarse in the female but sometimes very fine in the male. Similar denticles occupy a roughly equilaterally triangular patch on the lower surface of the coxa of the palp, a patch of which one side is formed by the anterior half of the basal margin.

The *chelicerae* are armed with a row of denticles on the inner side only.

The trochanters of the *palps* are not scopulate; their vestiture resembles that of the trochanters of the legs. The tarsal scopulae of the palps (♀) resemble those of the first legs. The penultimate joints are not scopulate.

The first legs are almost always shorter than the fourth¹, the second than the first, and the third than the second. The tarsal scopulae of the first legs are (? always) divided (? sometimes imperfectly especially in the male). The tarsal scopulae of the fourth legs are always divided in both sexes, and in the female at least the division is sometimes so broad that the scopula appears only as a pair of narrow lateral bands. The spiny armature of the legs does not reach its full development in all forms; and it is noteworthy that this is especially the case in relatively large forms whose posterior sigilla are situated away from the margin of the sternum. Such forms resemble *Phlogiodes* and the *Thrigmopoeae* in these respects.

The spines develop only after the specimen has attained a moderate size; they appear in a definite order, and those which are normally developed last are the first to be lost in the larger and more highly specialized species. The complete armature may now be described. The spines are confined to the lower surface and sides of the tibiae and metatarsi. On the third and fourth legs they are relatively numerous in well-grown specimens of all species. On the first and second legs, however, they are less numerous and occupy very definite positions. The metatarsi of these legs may bear the following spines—one midapical, a pair of lateral apicals, and one median, of which the midapical always appears first, the order of appearance of the others being less constant; but I do not know of any species in which any of these except the first is developed on the front leg. The complete armature of the tibiae consists of the following spines—inner apical, outer apical, and median, developed in that order. The tibia of the palp is similarly armed, except that so far as I know the median spine is never developed.

The species of *Plesiophrictus* in our collection are as follows:—

***Plesiophrictus satarensis*, n. sp.**

(Pl. xv, figs. 3a-b).

Localities.—Medha, 2200 ft., in the Yenna valley (♂♂); Umbri, 3500 ft., Taloshi, 2000 ft., Helvak, 2000 ft., and Kembsa, 2650 ft., in the Koyna valley (♀♀ and immature). All these localities are in the Satara district of the Bombay Presidency. The upper parts of the valleys of the Yenna and Koyna, rivers which flow into the Krishna, are only separated by one ridge of

P. tenuipes, Poc., from Ceylon, is an exception.

hills, and I have no hesitation in regarding the males found in the one as belonging to the same species as the females found in the other. I have selected the largest male as type.

♂. *Dimensions*.—Carapace 5.0×3.4 mm.— 7.2×4.9 mm. Sternum 3.0×2.4 mm.— 2.1×1.6 mm. Fourth leg longer than first. Carapace about equal in length to patella and tibia of first and fourth legs, to tibia and metatarsus with patella or tarsus of second and third.¹ Legs relatively a little longer in small than in large specimens.

Colour.—Brown, sternum and coxae slightly brighter than the rest because less obscured by hair. The anterior metatarsi whitish.

Structure.—The *carapace* is ovate, broader behind than in front; it is smoothly rounded, free from tubercles, but clothed with hair. The anterior median eyes are as large as the anterior laterals. The fovea is transversely linear.

The posterior sigilla of the *sternum* are marginal.

The *labium* is armed with teeth so small as to be distinct only under a much higher magnification than is usually necessary.

The patella of the *palp* is swollen distally and the tibia proximally. The tarsus is bilobed. The palpal organ is shown in pl. xv, fig. 3*b*; its style is slender, tapering and spirally curved.

The first two pairs of *legs* are unarmed except for the usual apical spine on the metatarsi,² the apophysis and its accompanying stout spine on the tibia of the first leg (see pl. xv, fig. 3*a*) and one or two apical spines (not always found) on the tibia of the second leg. The metatarsus of the first leg is lobed on the outer side at the base (fig. 3*a*). The tibia and metatarsus of the third and fourth legs are armed ventrally with 2-3 transverse series of 2-4 spines each. The first tarsal scopula is undivided, the second very narrowly, the third and fourth more (but not very) widely divided.

The metatarsal scopula of the first legs is a little less dense than the tarsal, it is broad distally and narrow proximally, but extends over rather more than the distal half of the joint. On the second legs it is similar, but less obscured by long hair; on the third and fourth it is much smaller and confined to the sides of the distal part of the joint.

The male of this species appears to differ from *P. millardi*, Pocock (the only male hitherto described in the genus) in the denser metatarsal scopula of the first legs, and in the presence of a small apical metatarsal scopula on the fourth legs.

♀ *Dimensions*.—Carapace up to 6.0×4.5 mm., sternum up to 2.7×2.5 mm. The fourth leg longer than the first as in the male; the pieces which are about equal in length to the carapace in the male seem to be a little shorter in the female.

¹ These joints are a trifle longer in the second than in the third leg—slightly so in the type specimen, decidedly so in the other two, which are much smaller.

² Occasionally another near it in the second legs.

Colour.—Distinctly yellower than the male; no white hairs on any of the legs.

Structure.—The *carapace* resembles that of the male, but the anterior lateral eyes are somewhat larger than the anterior medians.

The *sternum* is somewhat broader in proportion to its length than in the male.

The teeth on the *labium* are stouter than in the male, normal.

The tibia of the *palp* is armed with two apical spines.

The first legs are armed only with the usual apical spine of the metatarsus, and sometimes with a small apical spine on the inner side of the tibia; the metatarsus is not lobed at the base. The tibia is similarly armed in the second legs, but the metatarsus of this pair has three apical spines. The metatarsi of the third and fourth legs are armed as in the male, but the tibiae of these legs appear to be unarmed in their basal halves. All the tarsal scopulae are divided, those of the anterior legs normally, those of the posterior legs very widely. The metatarsal scopulae resemble those of the male, but are perhaps a trifle less pronounced.

The female of this species differs from *P. tenuipes*, the only species previously described in which the anterior median eyes are smaller than the anterior laterals, in having the anterior legs distinctly shorter than the posterior.

***Plesiophrictus raja*, n. sp.**

This handsome species resembles *Annandaliella travancorica* in habits. Its name is given in recognition of the facilities for collecting kindly afforded me by H. H. the Raja (now the ex-Raja) of Cochin, and of the interest which he took in my work.

Localities.—Kavalai, 1300-3000 ft. on the Cochin State Forest Tramway, and near the rubber estate on the lowest slopes of the Ghats between the tenth and fourteenth miles of that tramway. Only one specimen, however, was obtained from the latter place. I have selected the largest of the Kavalai specimens as type.

♂ Unknown.

♀ *Dimensions*.—Carapace up to 9.0×6.5 mm. Sternum up to 3.2×3.2 . The fourth legs longer than the first. Carapace equal in length to femur and patella and to tibia metatarsus and tarsus of first legs, to patella tibia and metatarsus of second legs, to femur patella and tibia of third, and to femur and patella and to metatarsus and tarsus of fourth.

Colour.—Carapace and abdomen covered with hair, occasionally (in one faded-looking specimen from Kavalai) dull greenish brown throughout, usually deep blue above, giving the whole upper surface of the body a rich dark, steel-blue lustre. Legs and lower surface of body olivaceous, sternum and coxae more reddish; anterior tarsi and apical half of anterior metatarsi pale.

Structure.—The *carapace* is ovate, broader behind than in front. The fovea is lightly procurved. The anterior lateral eyes are at least as large as the anterior medians.

The *sternum* is no longer than it is broad. The posterior sigilla are fully a diameter distant from the margin.

The *labium* is normal.

On the tibia of the *palps* only the inner apical spine is developed.

The first *legs* are unarmed except for the usual apical spine on the metatarsus. The second legs have three apical and one median spines on the metatarsus; their other joints are unarmed. The third and fourth legs bear spines on the distal two-thirds of the length of each. All the tarsal scopulae are completely divided, but the spines between the two halves are stouter and more widely spaced on the two posterior pairs of legs than on the two anterior pairs. All protarsal scopulae are more or less obsolete.

This species differs from all that have hitherto been described in its deep steel-blue colour.

***Plesiophrictus bhor*i, n. sp.**

This species resembles *Annandaliella travancorica* and *Plesiophrictus raja* in its general habits. The jungle in which it lives is, however, largely of the deciduous type, instead of the ever-green type that predominates at the base of the hills and at Kavalai. A large proportion of the specimens were found under pieces of wood in open jungle consisting largely of bamboo, a type of jungle of which neither insects nor arachnids seem usually to be fond. The species is named after Mr. J. Bhore, the Dewan of Cochin, whose constant help enabled me to make interesting collections in places that I could not otherwise have reached during my short visit to the State.

Locality.—Parambikulam in the Western Ghats, Cochin State, at altitudes varying from 1700-3200 ft.

♂ Unknown.

♀ *Dimensions*.—Carapace up to 12.0 × 10.0 mm. Sternum up to 5.3 × 5.3. The fourth leg longer than the first. Carapace slightly shorter than femur and patella or tibia metatarsus and tarsus of first leg, about equal to (perhaps slightly longer than) patella and tibia of same leg, to femur and patella and to tibia metatarsus and tarsus of second legs, to trochanter femur and patella of third legs, and to tarsus and metatarsus of fourth, scarcely as long as femur and patella of fourth.

Colour.—Almost uniformly brown.

Structure.—The *carapace*, *sternum* and *labium* resemble those of the preceding species. The sternum is, however, somewhat more densely hairy. The tibia of the *palps* is armed with two apical spines only in the largest specimen seen (the type), in other large specimens only the inner one is present, the palps being as usual unarmed in the very young.

The first legs are armed as in the preceding species, except that in full grown specimens there is (? always) a small apical spine on the inner side of the tibia. The same applies to the second legs except that this inner apical spine of the tibia appears at an earlier stage, and is followed by a mid-ventral spine and an outer apical one. The third and fourth legs are armed as in that species. The tarsal scopulae resemble those of the preceding species. The metatarsal scopulae are dense on the first pair of legs, slightly thinner on the others; they occupy the distal half of the metatarsi of the first two pairs of legs, but are more restricted on the last two.

This species seems to be very closely allied to *P. milleti*. It agrees with Pocock's short description of that species in all structural characters, but differs in the colour of its pile which is distinctly brown, not red, being almost olivaceous on the abdomen; it also differs in the absence of white hairs from the extremities of the legs. The localities from which the two species come are very widely separated; and a fuller description of *H. milleti* will probably reveal structural differences between the two.

Genus **Phlogiodes**, Pocock.

This genus is not represented in our collection, unless it be by two immature specimens from the Bombay Presidency. I can add nothing to what I have already said about it above (pp. 269-270).

Group THRIGMOPOEEAE.

Pocock's key to the two genera recognized in this group seems quite satisfactory.

Genus **Haploclastus**, Simon.

The stridulating organ of the new species of this genus described below is of a very simple, almost rudimentary type. It has been figured elsewhere (Gravely, 1915, pl. xxxi, fig 1). The bacilli on the chelicerae are situated on the lower margin, into the general hairiness of which they merge, and the minute scattered bristles on the anterior surface of the coxa of the palp are scarcely if at all different from the more numerous bristles which cover this surface in the first legs. In other characters, the genus closely resembles the preceding¹ which has no stridulating organ, and the following in which the stridulating organ is of a somewhat more advanced type. It may therefore be regarded as transitional between the two.

Haploclastus kayi, n. sp.

Locality.—Parambikulam, 1700-3200 ft., Cochin State, where the wide knowledge of the country and its jungles possessed by

¹ This refers to the female. No male Thrigmopoeae yet appear to be known.

Mr. P. B. Kay enabled me to find without delay the most promising collecting grounds of the neighbourhood. Only one specimen of the present species was obtained.

♂ Unknown.

♀ *Dimensions*.—Carapace 13.0 × 9.8 mm. Sternum 6.1 × 5.5 mm. First legs fully as long as fourth which are slenderer than any of the others; second shorter than first and fourth, longer than third. Carapace not quite as long as patella and tibia of first legs, much longer than femur and than tarsus and metatarsus of same, and than femur or patella and tibia or tarsus and metatarsus of second legs; fully as long as femur and patella of third legs, scarcely as long as tibia metatarsus and tarsus of same; about equal to femur and half patella, to patella and tibia, and to tarsus and metatarsus of fourth legs.

Colour.—Reddish brown, except the upper sides of the patella and tibia of the second legs which are paler, almost golden; and of the patella, tibia, and base of metatarsus of the first legs which are paler still and greyish.

Structure.—The shape of the *carapace* resembles that of the preceding species. The anterior median eyes are larger than the anterior laterals, the diameter of the former being about equal to the long diameter of the latter. The fovea is lightly procurved and very deeply impressed. The *labium* is normal; the *sternum* is very hairy, with large sigilla which are rounded in front and pointed behind. The *chelicerae* resemble those of *Plesiophrictus* apart from the presence of stridulatory spines upon them. There is the usual mid-apical spine on the metatarsi of the first pair of legs, but it is much hidden by the dense scopula. I have not been able to detect any spine on the second metatarsus, but here too the scopula is very dense. The metatarsi of the two hind legs each have three apical spines. The tibiae of the palps and of all the legs are unarmed. The tarsal and metatarsal scopulae are divided in the fourth leg only. The metatarsal scopulae of the first two legs are very dense, and extend to the base of the segment. Those of the third legs, though dense, only cover the distal half of the segment. Those of the fourth legs are weaker and apical.

This species differs from *H. nilgirinus* in that the fourth leg is longer than the second, and from *H. cervinus* in that the patella and tibia of the first are together longer than those of the fourth. From both it appears to differ in colour, but this difference may be less real than it seems as its most striking feature—the light grey of the upper surface of the patellae and tibiae of the anterior legs—is not apparent as long as the specimen remains superficially wet.

Genus *Thrigmopoeus*, Pocock.

A single immature specimen from South Arcot is the only representative of this genus which we possess. Its stridulating organ differs from that of *Haploclastus kayi* in the more definite arrangement and slightly greater size of the spines on the palps,

and also in the greater distinctness of the group of bacilli on the chelicerae from the hairs which clothe the lower sides of these appendages. The organ has been figured elsewhere (Gravely, 1915, pl. xxxi, fig. 2).

Group POECILOTHERIEAE.

This group, which contains only one genus, appears to have originated in the Indian Peninsula or Ceylon, from some form presumably allied to the foregoing genera of Aviculariinae, as a result of adaptation to a new mode of life (see Gravely, 1915, pp. 417-418).

Genus *Poecilotheria*, Simon.

Poecilotheria miranda, Pocock.

One female specimen from "Kharagpur Hills"¹, and another from near Chaibassa in the Singbhum District of Chota Nagpur.

Poecilotheria regalis, Pocock.

One male from Bangalore, and one female from the Annamalai Hills. The latter record extends the known range of this species to the hills south of the Palghat Gap, an extensive low-lying plain which cuts right across the hills of South India. The specimen is one determined by Mr. Hirst of the British Museum, who presumably had the type available for comparison. The discovery of a male in the Annamalais is greatly to be desired, as it is possible that its palpal organ may prove to differ from that of the male found on the opposite side of the Gap.

Poecilotheria striata, Pocock.

One female from South India, and one somewhat smaller specimen from Pamben on Rameswaram Island.

Group ORNITHOCTONEAE.

Only one species of each of three genera of this group are recorded from the Indian Empire. Of these *Melopoeus minax* is much the commonest, and is represented in our collection by females from "Burma", "Upper Tenasserim", Myawadi on the Burmo-Siamese frontier (Thoungyin valley, Amherst District of Tenasserim), the hills between the Thoungyin and Me-Ping in Siam, and from Pitsanuloke in Siam. It spends the day in silk-lined burrows devoid of a trap-door, but comes out in the evening. The only specimen I saw outside seemed very sluggish.

The road between Thingannyinaung and the base of the Dawna Hills, on the extreme west of the Thoungyin Valley,

¹ Kharagpur is situated in the Midnapur District of Bengal, in the western part of the flat country bordering on the Gangetic Delta. The hills referred to are probably those of Singbhum, a district of Chota Nagpur immediately to the west of Midnapur.

was lined with these burrows; but having little time to spare when I noticed them, and no proper digging implements, I only got one spider from them. This was a male which I had no hesitation in associating with the similar-looking female common in the district, *i.e.* with *Melopoeus minax*. Its characters were, however, those of a *Cyriopagus* rather than of a *Melopoeus*. This led me to consider whether *Cyriopagus* might not be simply the male of *Melopoeus*. The type of the former genus is recorded as a female; but it is in our collection, and there can, I think, be no doubt at all about its immaturity. It may therefore be a male. *Omothymus schioedtei*, Thorell, which Simon refers to the genus *Cyriopagus*, is described from a male only. The male of *Selenocosmia albostrigata*, the species for which Pocock established the genus *Melopoeus*, is described by Simon (1886, p. 162) as "feminae subsimilis sed cephalothorace humiliore." The low cephalothorax is one of the two chief characters in which *Cyriopagus* differs from *Melopoeus*; and nothing is said as to the distance of the eyes from the margin of the carapace in either sex of the species in question. I conclude, therefore, that *Cyriopagus* and *Melopoeus* represent opposite sexes of one genus.

Of these two names the former has priority. This is unfortunate, inasmuch as the genus *Ornithoctonus*, which is known from the female sex only, differs from *Cyriopagus* in the same characters as does "*Melopoeus*", and may also very possibly have a male with *Cyriopagus* characters. The characters by which Pocock separates *Cyriopagus* (= *Melopoeus*) from *Ornithoctonus* are unsatisfactory even for females; and the two genera will very likely have to be united.

The material before me is not, however, sufficient to justify this course at present, so the probable relation of the genotype of the former, *Cyriopagus paganus*, to other members of these genera must be considered. The characters by which their females are separated are found in practice to be so unsatisfactory even in that sex, that it would be hopeless to try to apply them to the other. Pocock's figure of the stridulating organ of *Ornithoctonus* suggests, however, another means of separating that genus from *Cyriopagus*. For the stridulatory processes of the palp are shown as long spiniform structures, whereas in *Cyriopagus minax* they are short and denticuliform. And it may be mentioned that a specimen in our collection which seems to approach the genus *Ornithoctonus* rather than "*Melopoeus*" in the characters of its legs and fovea has spiniform, not denticuliform, stridulatory processes on the palp. Unfortunately the locality of the specimen is not known.

The stridulatory processes on the palp are denticuliform in the genotype of *Cyriopagus*; so it is *Melopoeus* rather than *Ornithoctonus* that must now be sunk as a synonym. Whether *Ornithoctonus* is to be sunk as well requires further investigation.

Apart from the immature type of *Cyriopagus paganus*, *C. minax* is the only named species of this group in our collection.

The male specimen is at present on loan in America so I cannot give the description of it which ought to appear here.

Group SELENOCOSMIEAE.

This group, as defined above (p. 268), contains all the Indo-Australian Aviculariinae in which the anterior part of the labium is covered with densely packed granules, no matter whether a stridulating organ is present between the chelicerae and palps or not.

The only known species which lacks the stridulating organ is "*Ischnocolus*" *brevipes*, Thorell, but in "*Ischnocolus*" *subarmatus*, Thorell, this organ is quite rudimentary. The latter species was removed by Simon (Vol. II, p. 925) to the genus *Phlogiellus*, Poc., a genus which has since been shown by Hirst (1909, p. 384) to be indistinguishable from *Selenocosmia* and *Chilobrachys*. For the species *subarmatus*, however, he instituted a new subgenus *Neochilobrachys*, on account of the rudimentary nature of the stridulating organ (*loc. cit.*, p. 389).

Neochilobrachys subarmatus differs from species belonging to the genus *Chilobrachys* in having a much smaller number of stridulating rods on the coxa of the palp, and *Chilobrachys* differs from *Selenocosmia* in the same way. It was presumably for this reason that Hirst decided to regard *Neochilobrachys* as a subgenus of the former rather than of the latter. The change from the *Selenocosmia* to the *Chilobrachys* type of stridulating organ—of which many stages can be illustrated from species found at the present day—has, however, been accompanied by a marked increase in the specialization of the stridulating rods. The whole organ is clearly of a more advanced type in *Chilobrachys* than in *Selenocosmia*, and the reduction in the number of the rods cannot be regarded as in any way indicating a tendency towards degeneration—the only process which could bring them to the rudimentary condition of the "rods" found in *Neochilobrachys subarmatus*. The "rods" of *N. subarmatus* are, indeed, mere spines, comparable to those composing the dorsal and lateral parts of the groups of "rods" found in *Selenocosmia*, in which genus only the middle and ventral elements of these groups are really bacilliform.

In my opinion, therefore, *Neochilobrachys subarmatus* should be regarded as a primitive form transitional between "*Ischnocolus*" *brevipes* with no stridulating organ, and the genus *Selenocosmia* which possesses a stridulating organ of some complexity. In this case *Neochilobrachys* cannot remain as a subgenus of *Chilobrachys*; and as it differs from *Selenocosmia* more widely than does that genus from certain species of *Chilobrachys*, it may be regarded as a distinct genus. For the present it will be best, I think, to define this genus somewhat loosely, so that "*Ischnocolus*" *brevipes* may be included in it. Otherwise yet another monospecific genus would be required.

The three genera *Neochilobrachys*, *Selenocosmia* and *Chilobrachys* represent three stages in the evolution of the type of stridulating organ found in the group. The *Selenocosmia* stage is found in the localized genera *Lyrognathus* (3 species), *Coremiocnemis* (2 species), *Selenostholus* (1 species) and *Selenotypus* (1 species) as well as in the large and widely distributed genus *Selenocosmia*. Of these the last two are Australian, and I am not in a position to say anything about them. Of the desirability of keeping the first two distinct from *Selenocosmia* I am very doubtful. The Indian species of *Selenocosmia* appear to be transitional between this genus and *Coremiocnemis*, a genus which should certainly, I think, be abandoned. And the value of the single character by which the genus *Lyrognathus* is distinguished is probably small. I have, however, provisionally retained *Lyrognathus* as a sub-genus. Similarly, I am inclined to doubt the advisability of keeping distinct from the larger and more widely distributed genus *Chilobrachys* the mono-specific genus *Orphnoecus* from the Philippines.

The genera of Selenocosmieae found in the Indian Empire may be distinguished as follows:—

- | | | | |
|----|---|---|----------------------------------|
| 1. | { | Stridulating organ between chelicerae and palps rudimentary or absent | <i>Neochilobrachys</i> . |
| | { | Stridulating organ well developed | 2. |
| | { | Stridulating organ consisting of a dorsal crescent of fine spines, merging into and partially surrounding a ventral group of more or less claviform, but always somewhat slender, bacilli | <i>Selenocosmia</i> , p. 284. |
| 2. | { | A few of the bacilli in the ventral row very large and strongly claviform; the number of rows, both of bacilli and of spines, often greatly reduced; the ventral row of bacilli usually extending beyond the spines in one or other direction | .. <i>Chilobrachys</i> , p. 285. |

Genus *Neochilobrachys*, Hirst.

So far as I know, only two species have yet been described which can be placed in this genus. They are *N. brevipes* (Thorell, 1896, pp. 170-173) and *N. subarmatus* (Thorell, 1891, p. 13). In the former there is no stridulating organ between the chelicerae and palps. In the latter, which is represented in our collection by a number of specimens from the Nicobars, there is a row of 2-6 (see Hirst, 1909, p. 388) stout spinules on the palp, and a group of somewhat similar but scattered and smaller spinules on the sides of the chelicerae close to the hair on the proximal part of the lower margin. This stridulating organ has been figured elsewhere (Gravely, 1915, pl. xxxi, fig. 3). The part on the chelicerae has also been figured by Hirst (1909, pl. xxiv, fig. 2).

Genus *Selenocosmia*, Ausserer.

The palpal parts of the stridulating organs of this genus have already been described (p. 283). The parts situated on the sides of the chelicerae normally consist of a number of long and slender spines mixed with, and not always sharply differentiated from, scattered hairs which are continuous with the thicker covering of the lower margins. In *S. himalayana*, however, these spines are shorter, and not mixed with hair, resembling those found in *Chilobrachys assamensis* and *fumosus*, rather than those found in other members of its own genus. In this species, too, the group of claviform bacilli on the palp is elongated at the expense of the downwardly curved ends of the group of simpler bristles, the two groups being almost equal in extent. It approaches *Chilobrachys* in these characters of the palpal part of the stridulating organ, to a greater extent than does any other species of *Selenocosmia* known to me. I have elsewhere figured a typical stridulating organ of the genus *Selenocosmia* (1915, pl. xxxi, fig. 4).

Two Indian subgenera may be recognized, though their value is uncertain. They may be distinguished thus:—

Fourth legs much thicker than first,
their metatarsal scopulae entire and
extending to the base of the segment *Lyrognathus*.

Fourth legs not thicker than first, their
metatarsal scopulae weaker and
apical *Selenocosmia*.

Lyrognathus is represented in our collection by two specimens. One, from the Khasi Hills, has been determined by Hirst as *L. crotalis*; the other, from the Garo Hills, has been determined by myself as *L. pugnax*. I am very doubtful whether they are really distinct.

Selenocosmia is represented by one specimen from the Andamans doubtfully referred by Hirst to *S. javanus*; by two immature specimens from the same group of islands; by several specimens with slenderer legs from Sibsagar in Assam; and by several specimens (mostly males) of *S. himalayana*. The last named species was described by Pocock from a specimen from Dehra Dun, said to be a female, the length of whose carapace was 15 mm. Hirst (1907, pp. 523-4, text-fig. 2) has since described a male from Kasauli, 6,600 ft., with a carapace length of 20 mm., and a female from Dalhousie, 6000 ft., with a carapace length of 18 mm.; he therefore concludes that the type was immature. This was not necessarily the case, however, for we have adult males whose carapace lengths range from 8.5-12.0 mm. Two of these are from Dehra Dun, two from Almora, 5500 ft., and two from Naini Tal. We also have one female from Dehra Dun. The species is evidently very variable in size. In one of the males from Dehra Dun the characteristic projection on the outer side of the palpal organ, though present on that of the left side, is absent on that of the right.

Genus *Chilobrachys*, Karsch.

Simon's definition of this genus applies only to those species in which the stridulating organs approach or attain their highest degree of specialization. To the simpler forms it is inapplicable. This is especially so in the case of *C. assamensis* and *C. fumosus*, species which resemble *Selenocosmia himalayana* in the structure of the parts of the stridulating organs situated on the chelicerae, and approach it more closely than do any other species of *Chilobrachys* known to me, in the structure of the parts of these organs situated on the palps. The stridulating organ of *C. assamensis* has already been figured (Gravely, 1915, pl. xxxi, fig. 5).

C. assamensis and *C. fumosus* are closely allied to one another. *C. fumosus* appears invariably to attain a much greater size than *C. assamensis*; but in view of the great range in size shown by *S. himalayana* (see previous page) and by *C. hardwickii* (see following page) this, the only difference known to me in females, cannot be regarded as an altogether satisfactory character.

The palpal organs of males of the two species are remarkably alike in their general features, but the style is longer and more abruptly spatulate at the end in *C. fumosus* than in *C. assamensis*. The latter species is represented in our collection by cotypes of both sexes from Sibsagar in Assam. The former is represented by two males from Kurseong, on one of which (that collected by Dr. Annandale) Hirst's description of this sex (1909, pp. 386-7—the only one yet published) was based. Females and young, which must provisionally be referred to this species, are represented in our collection by specimens from Chitlong in Nepal; Singla, 1500 ft., Darjeeling, Sureil and Kalimpong in the Darjeeling District; the Assam-Bhutan Frontier of Mangaldai District; and Burroi at the base of the Daffa Hills. It remains to be seen, however, whether the males from all these localities belong to a single species. If not, as the type is a female labelled "North India", the name *C. fumosus* should be kept for the Kurseong (Darjeeling District) form. The arrangement of the spines on the chelicerae in parallel rows is more or less clearly marked in certain specimens of this and other species; it cannot be regarded as a good specific character.

In *Chilobrachys assamensis* and *fumosus* the largest bacilli on the palps are situated in the distal half of the ventral row, and the stridulating processes of the chelicerae are slender and spini-form as in *Selenocosmia*. In all other species which I have seen the largest bacilli are proximal, and the projections against which they work are short and denticuliform. In a species from the Malay Peninsula, however, the former are practically median, though the dorsal spines are concentrated a little on the distal side of them. It is possible that *Chilobrachys assamensis* and *fumosus* have originated independently of the rest of the genus, in which case the former might be made the type of a new genus containing the latter and perhaps also *Selenocosmia himalayana*. But the

evidence is not yet conclusive; and in any case these species furnish an interesting indication of the manner in which the more typical forms of the genus *Chilobrachys* must have arisen. I have already figured elsewhere the stridulating organ of the type specimen of *C. stridulans* (1915, pl. xxxi, fig. 6).

Of the three remaining Indian species of *Chilobrachys*, which I am able to identify in our collection, *C. fimbriatus* appears to be the most primitive, *i.e.* the least removed from *Selenocosmia*, in the structure of its stridulating organs; for the rows of small bacilli are more numerous than is usual in either of the others. In *Chilobrachys hardwickii* the extent of these small bacilli appears to be somewhat variable, but it is usually less than is the case in our single specimen of *C. fimbriatus*; the shape of the whole group of bacilli in *C. hardwickii* is, moreover, longer and narrower, and so more like that of *C. stridulans*, in which the rows of small bacilli left exposed by the dorsal fringe of hair are still fewer. Another variable feature of *C. hardwickii*, and one in no way correlated with the variations found in the stridulating organ, is its size. The mature males in our collection have carapaces varying in length from barely 10 to over 16 mm. in length. The smallest males are associated with specimens of similar dimensions which are presumably mature females. Pocock's suggestion that females of this species may always be distinguished from those of *C. nitellinus* by their larger size can no longer, therefore, be maintained.

C. fimbriatus is represented in our collection by a single male from Hoshali in the Shimoga District of Mysore. *C. hardwickii* is represented by specimens from Dharhara (Monghyr District) and Sahibgunge in Bihar; from Chakardharpur (Singbhum District) in Chota Nagpur; and from Gmatia (Birbhum District) and Murshidabad in Bengal. *C. stridulans* is represented by specimens from Punkabari at the foot of the Darjeeling Hills, and from Goalpara, Shamsbernager (Sylhet), Silcuri (Cachar), Aideo¹ and Sibsagar in Assam.

Subfamily *DIPLURINAE*.

Group *MACROTHELEAE*.

Genus *Macrothele*, Ausserer.

Macrothele vidua, Simon.

(Pl. xv, fig. 5).

I have little hesitation in referring to this species specimens sent me by Dr. Sutherland from Kalimpong. The species was described by Simon (1906, p. 306) from the "bas plateaux de l'Himalaya"; and the only way in which our specimens appear to differ from it is in the armature of the anterior tarsi, which is present on the outer as well as on the inner side.

¹ I do not know in which district Aideo is situated.

The Kalimpong series includes one male, and we have a male of the same species from Kurseong. This sex differs from the female in having the anterior median eyes more distinctly larger than the anterior laterals, and the posterior medians much smaller than the posterior laterals. The lower surface is inclined to be somewhat reddish throughout—more so in our Kurseong specimen than in the other. The legs and spinnerettes are much slenderer in the male than in the female; and the abdomen is shorter in proportion to the length of the spinnerettes. The palpal organ is lightly constricted below the stout conical base of the remarkably long slender and almost straight style (see pl. xv, fig. 5).

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EXPLANATION OF PLATE XV.

FIG. 1.—*Idiops biharicus*, type (♂).

- a. Junction of tibia and metatarsus of first leg of right side, from above and in front.
- b. Outer side of right palpal organ.

„ 2.—*Sasonichus arthropophysis*, type (♂).

- a. Junction of tibia and metatarsus of first right leg from the inner side.
- b. Outer side of right palpal organ.

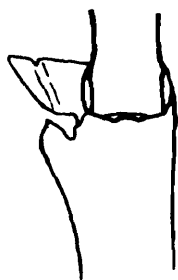
„ 3.—*Plesiophrictus satarensis*, type (♂).

- a. Junction of tibia and metatarsus of first right leg from below.
- b. Outer side of right palpal organ.

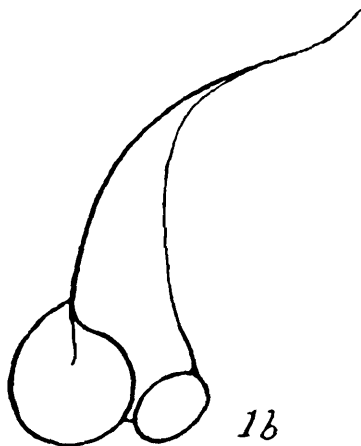
„ 4.—*Annandaliella travancorica* (♂).

- a. Tibial apophysis of first right leg from below.
- b. Outer side of right palpal organ.

„ 5.—*Macrothele vidua* (♂). Outer side of right palpal organ.



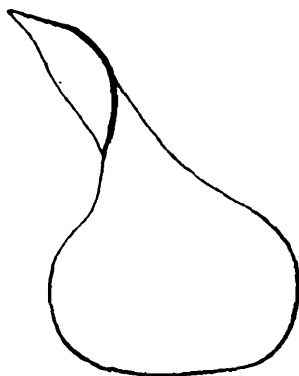
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1b



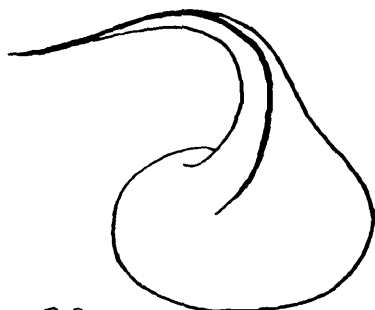
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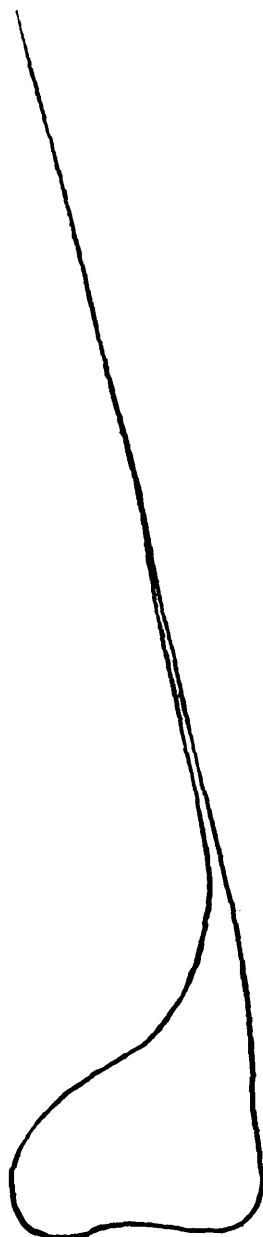
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3a.



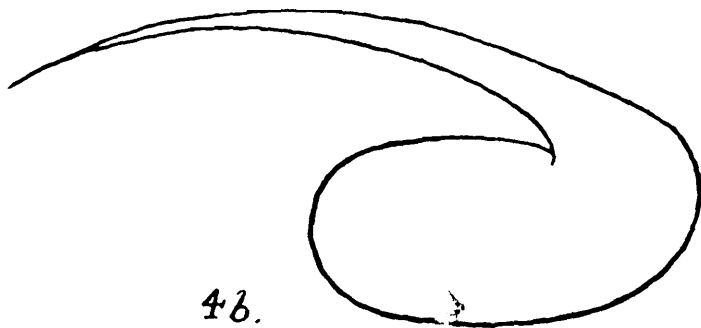
3b.



5.



4a.



4b.