NEW OR LITTLE-KNOWN SPECIES OF ASIATIC TIPULIDAE (DIPTERA). I

BY

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Over the years extensive collections of crane-flies from all parts of the world have been studied and descriptions and illustrations of many new and insufficiently known species have been prepared. I have assembled a series of reports on such forms and in the present paper am discussing various species taken in southern Asia, from Nepal and parts of northern and eastern India, virtually all having been collected in the Himalayas, particularly in Sikkim, and in the more southern ranges of Manipur in Assam, by Dr. Fernand Schmid. A few further species from Nepal that were received from Dr. Edward I. Coher are included. I express my sincere thanks to Drs. Coher and Schmid for their interest in collecting these flies from this particularly important part of Asia. Attention is called to the description of *Cylindrotoma subapterogyne,* a new species having nearly wingless females, representing the first known case of subapterism in the subfamily Cylindrotominae. The types of the various novelties are preserved in my personal collection of these flies.

The extensive series of Tipulidae from southern Asia collected by Dr. Schmid in recent years has been discussed by me in a long series of papers that have appeared in the Philippine Journal of Science, Transactions and Proceedings of the Royal Entomological Society of London, Annals and Magazine of Natural History, Journal of the New York Entomological Society, Bulletin of the Brooklyn Entomological Society, and Entomological News.

CYLINDROTOMINAE

Cylindrotoma subapterogyne sp.n.

Female subapterous (male sex unknown); general coloration of body black, orbits of head broadly obscure yellow; legs brownish black; wings

[1] Contribution from the Entomological Laboratory, University of Massachusetts.

subequal in length to the halteres, the venation greatly distorted; abdomen brownish black, tergites with a central yellow stripe, less evident on the sternites.

Female.—Length about 10–11 mm.; wing 1.6–1.7 mm.; antenna about 1.9–2 mm.

Rostrum dull black, at apex with long black setae; palpi black. Antennae black throughout; flagellar segments cylindrical, much longer than the verticils. Head dull black, broadly obscure yellow behind the antennal fossae and on the orbits; anterior vertex very broad, the eyes correspondingly small; vertex about three times the diameter of the eye as seen from above or more than four times the diameter of the scape.

Pronotal scutum dull black, scutellum darkened medially, sides obscure yellow. Mesonotum almost entirely dull black, pleurotergite slightly paler. Pleura with propleura, anepisternum and dorsal pteropleurite dull black; sternopleurite, meron and metapleura paler brown; dorsopleural membrane extensively light yellow. The paratype has the postnotum and pleura more yellowed. Halteres with stem light brown, base conspicuously light yellow, knob dark brown. Legs with fore coxae dull black, remaining coxae brown, pollinose; trochanters obscure yellow; femora brownish black, bases obscure yellow; tibiae dark brown, tips narrowly more darkened; tarsi black. Wings greatly atrophied, brachypterous, subequal in length to the halteres, in the paratype slightly broader and with the apex more obtuse; dusky, base and costal border more yellowed; outer half of wing with marginal trichia black, long and conspicuous. Venation very distorted, unrecognizable as belonging to this genus, more deformed in the type.

Abdomen brownish black, tergites with a broad yellow central stripe, extending from base of second segment to the seventh, sternites with a less evident obscure yellow line; basal plate of cerci polished black. Ovipositor with cerci brown, long and slender; hypovalvae projecting slightly beyond, horn-yellow to brownish black, their tips squarely truncate.

Holotype.— ♀, Yedang, Sikkim, 10,600 feet, in *Rhododendron* association, May 25, 1959 (Schmid). *Paratype,* ♀, Lachen, Sikkim, 8930 feet, May 23, 1959 (Schmid).

The possibility exists that this fly is the female sex of *Cylindrotoma seticornis* sp.n., described later, but the general coloration of the two is so different that it seems certain that two distinct species are involved. The reduction of the wings falls between categories 4 and 5 in Bezzi's scale of wing atrophy in the Diptera.[2] Other regional members of the genus include the distinct *Cylindrotoma nigritarsis* Alexander, 1956, of Nepal, and *C. pallidipes* Alexander, 1953, of northeastern Burma.

[2] Bezzi, Mario. 1916. Riduzione e scomparsa delle ali negli insetti Ditteri. Rivista Scienze Naturali, *Natura,* 7: 85–182, 11 figs. with subfigs.

Cylindrotoma seticornis sp.n.

Size large (wing of male about 10 mm.); antennae of male elongate, more than one-half the wing, flagellar segments elongate-cylindrical, with abundant erect black setae distributed over the whole length; head dark brown; thorax yellow, praescutum with three slightly more fulvous stripes; legs with coxae and trochanters yellow, remainder of legs black, femoral bases narrowly obscure yellow; wings brownish yellow, restrictedly patterned with brown, cell *1st* M_2 large; male hypopygium with tergal lobes narrow, aedeagus with the three filaments very unequal, the central one long, the small laterals less than one-third this length.

Male.—Length about 9–9.5 mm.; wing 10–10.5 mm.; antenna about 5.5–6 mm.

Rostrum light brown; palpi black. Antennae of male elongate, exceeding one-half the wing; scape and pedicel testaceous yellow, flagellum black; flagellar segments elongate-cylindrical, with long dense black setae over the entire length, the sparse verticils about one-half longer. Head dark brown, smooth.

Pronotum yellow, weakly darkened medially. Mesonotum yellow, the praescutum with three slightly more fulvous stripes, centers of scutal lobes similarly colored; in one paratype the central praescutal stripe and a small area on each scutal lobe is medium brown. Pleura uniformly yellow. Halteres with stem brown, base narrowly yellow, knob darker brown. Legs with all coxae and trochanters yellow; remainder of legs black, femoral bases narrowly obscure yellow. Wings (fig. 1) brownish yellow, prearcular and costal fields somewhat more saturated; stigma dark brown; a narrow darkened seam over cord; veins brown, those of the basal third more yellowed. Longitudinal veins beyond cord chiefly with long trichia. Venation: Cell *1st* M_2 large; petiole of cell M_1 short, subequal to or shorter than *m*; *m-cu* at or slightly before the fork of *M*.

Abdomen light brown, the fifth and succeeding segments, including the hypopygium, black. Male hypopygium (fig. 5) with the tergite, *t*, large, posterior margin broadly emarginate, the lobes narrow, especially in the holotype; central region of tergite membranous. Dististyle, *d*, an elongate nearly straight rod, the base setiferous, some of the setae very long. Phallosome with the gonapophyses, *g*, appearing as flattened yellow blades, apex and lower margin with microscopic teeth, the more proximal ones recurved; in a paratype these teeth are fewer, with only two present at apex; aedeagus, *a*, consisting of a long curved central filament, with two much smaller and more slender filaments arising at near one-fourth the length, these lateral filaments equal to one another and less than one-third the length of the major central one.

Holotype.— ♂, Yedang, Sikkim, 10,600 feet, in *Rhododendron* association, May 25, 1959 (Schmid). *Paratopotypes,* 3 ♂♂, 9680 feet, June 10, 1959 (Schmid).

Cylindrotoma seticornis is readily told by the almost uniformly yellow thorax, the elongate antennae that are provided with abundant erect setae, and the structure of the aedeagus. As mentioned under the preceding species, the possibility of this fly being the male of *C. subapterogyne* sp.n., is not excluded.

Phalacrocera manipurensis sp.n.

Thoracic dorsum polished brownish yellow, pleura light yellow; antennae short, scape yellow, flagellum black; wings with a long basal petiole, infuscated, *Rs* long, R_{1+2} atrophied; male hypopygium with tergite large, posterior border emarginate, dististyle small.

Male.—Length about 9.5–10 mm.; wing 10–10.2 mm.; antenna about 1.5–1.6 mm.

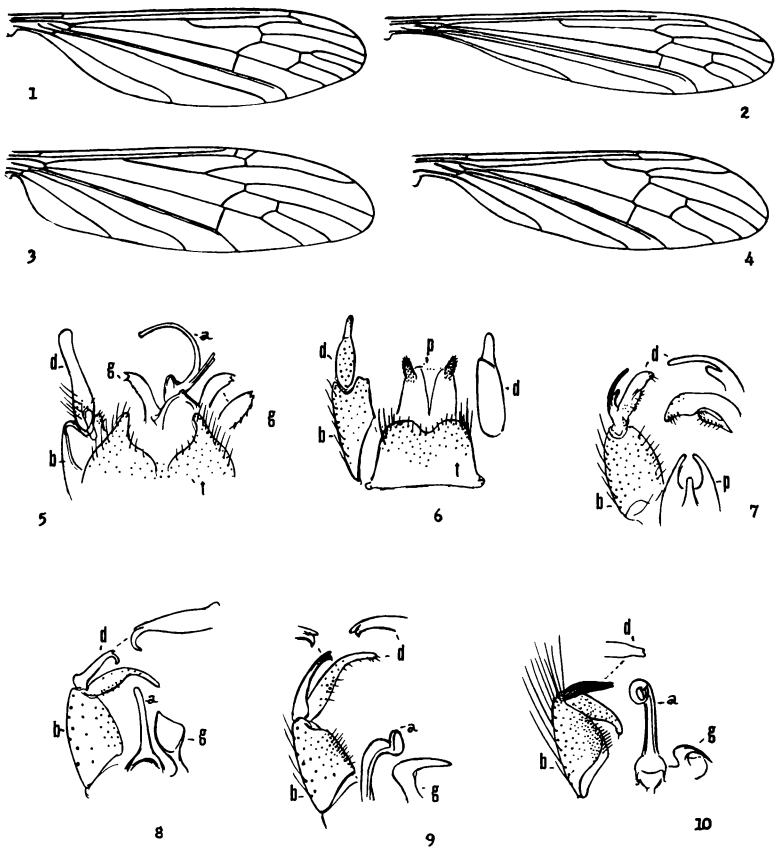
Rostrum pale yellow, palpi black. Antennae short; scape yellow, pedical brownish yellow, flagellum black; flagellar segments suboval, the outer ones elongate, with long verticils that exceed the segments in length. Head above polished brown, more yellowed in front and beneath; vestiture virtually lacking.

Thoracic dorsum almost uniformly brownish yellow, polished, glabrous, the praescutal stripes vaguely differentiated. Pleura light yellow. Halteres elongate, black. Legs with coxae and trochanters pale yellow; femora obscure yellow basally, tips brownish black; tibiae and tarsi black; claws small, simple. Wings (fig. 2) with a long basal petiole, strongly infuscated, stigma very small, scarcely differentiated; veins brown. Macrotrichia on outer radial veins, distal section of M_{1+2} and M_3. Venation: *Rs* long, R_{1+2} atrophied; cell *1st* M_2 elongate, subequal to distal section of M_{1+2}; *m-cu* its own length or less beyond the fork of *M;* cell *2nd A* relatively narrow.

Abdomen elongate, tergites in type brown, in the paratype more brownish yellow medially, the lateral borders dark brown; outer segments, including hypopygium, black; sternites obscure yellow. Male hypopygium (fig. 6) with the tergite, *t,* large, posterior border with a U-shaped emargination, lobes broadly obtuse; numerous setae on lobes and on central area of disk. Dististyle, *d,* small, subglabrous, outer fifth more narrowed, tip obtuse.

Holotype.— ♂, Sirhoi Kashong, Manipur, Assam, 6000 feet, June 8, 1960 (Schmid). *Paratype,* ♂ Hkayam Boum, Manipur, 8500 feet, June 22, 1960 (Schmid).

This is the first Indian species of the genus to be described. It differs from other Asiatic species, as *Phalacrocera angustaxillaris* Alexander, of northeastern Burma, in venation, including the less developed wing petiole, and with R_{2+3} much shorter, about one-third *Rs* and much shorter than R_3.



Text-figs. 1–10. Fig. 1, *Cylindrotoma seticornis* sp.n., venation; Fig. 2, *Phalacrocera manipurensis* sp.n., venation; Fig. 3, *Protohelius khasicus* sp.n., venation; Fig. 4, *Helius* (*Helius*) *tanyrhinus* sp.n., venation; Fig. 5, *Cylindrotoma seticornis* sp.n., male hypopygium; Fig. 6, *Phalacrocera manipurensis* sp.n., male hypopygium; Fig. 7, *Protohelius khasicus* sp.n., male hypopygium; Fig. 8, *Helius* (*Helius*) *unicolor* (Brunetti), male hypopygium; Fig. 9, *Helius* (*Helius*) *perflavens* sp.n., male hypopygium; Fig. 10, *Helius* (*Helius*) *tanyrhinus* sp.n., male hypopygium.

Symbols: *a*, aedeagus; *b*, basistyle; *d*, dististyle; *g*, gonapophysis; *p*, phallosome.

LIMONIINAE

LIMONIINI

Protohelius khasicus sp.n.

General coloration of thorax dark fulvous, unpatterned; femora and tibiae yellow, the tips narrowly dark brown; wings subhyaline, stigma short-oval, pale brown.

Male.—Length about 6.5–6.7 mm.; wing 7–7.5 mm.; antenna about 1.7–1.8 mm.

Rostrum fulvous, palpi black, elongate. Antennae relatively long; scape and pedicel orange, flagellum light brown, outer segments passing into black; flagellar segments cylindrical, subequal to or slightly exceeding the longest verticils; terminal segment about two-thirds the penultimate. Head obscure fulvous; anterior vertex narrow, less than one-half the diameter of the scape.

Cervical region infuscated; pronotum fulvous. Mesothorax almost uniformly dark fulvous, without darker pattern as in *nilgiricus*. Halteres with stem dusky, narrowly yellowed at base, knob dark brown. Legs with coxae and trochanters fulvous; femora and tibiae yellow, tips rather narrowly dark brown, tarsi black; claw with a long basal spine. Wings (fig. 3) subhyaline, a trifle more yellowed at base; stigma short-oval, pale brown. Longitudinal veins beyond general level of cord with macrotrichia, lacking on *Sc* and basal veins, sparse and scattered on *R*. Venation: *Sc* about opposite one-third to two-thirds R_{2+3}; *m-cu* close to fork of *M*.

Abdomen yellowish brown to light brown, hypopygium light brown to orange-yellow. Male hypopygium (fig. 7) with the lateral arm of outer dististyle, *d*, very small; outer blade of inner style cultriform.

Holotype.— ♂, Shilliang Myntang, United Khasi and Jaintia Hills, Assam, 3500 feet, April 21, 1960 (Schmid). *Paratopotypes*, 4 ♂ ♂; *paratype*, 1 ♂, Thangrain, United Khasi and Jaintia Hills, 3000 feet, April 22, 1960 (Schmid).

The only other regional species is *Protohelius nilgiricus* Alexander, of South India, readily told by the conspicuous blackened pattern of the mesonotum. The long basal spine of the claw is found in both species. The relationship of *Protohelius* Alexander to the Baltic Amber *Electrolabis* Alexander appears evident.

Helius (Helius) unicolor (Brunetti)

Rhamphidia unicolor Brunetti, Fauna British India, Diptera Nematocera, p. 419, 1912.

Brunetti's type was from Darjeeling, taken August 8, 1909, by Paiva. A metatype male was received in an exchange of speci-

mens with Brunetti and notes on the hypopygial structure are supplied. The specimen was from Kalimpong, Darjeeling District, 600–4500 feet, April 24–May 10, 1915, taken by F. H. Gravely.

Male hypopygium (fig. 8) with the basistyle, *b*, simple, setae relatively sparse, including especially the smaller ones of the mesal face. Outer dististyle, *d*, pale throughout, with a small knob or swelling on outer margin at base, apical fourth narrowed and curved, the small outer spine at base of the narrowed portion; inner style longer, narrowed on nearly the outer half. Gonapophysis, *g*, distinctive, appearing as a pale scoop, the stem short and stout. Aedeagus, *a*, almost straight, apex simple, rounded.

The chief differences from *Helius* (*Helius*) *perflavens* sp.n. lie in the structure of the outer dististyle, gonapophysis and aedeagus.

Helius (Helius) perflavens sp.n.

General coloration of entire body pale yellow; antennal flagellum brown, basal segments very short and crowded, the outer ones unusually long; male hypopygium with outer dististyle blackened, shallowly bidentate at tip; gonapophysis terminating in a long point; aedeagus moderately long, curved, apex bilobed.

Male.—Length, including rostrum, about 7.5–8 mm.; wing 6.2–7 mm.; rostrum about 0.7–0.8 mm.

Female.—Length, including rostrum, about 8 mm.; wing 7.5 mm.; rostrum about 0.7 mm.

Rostrum pale yellow throughout, shorter than the antennae; palpi brownish yellow. Antennae with scape and pedicel yellow, flagellum brown; proximal five or six flagellar segments very short and crowded, becoming longer at midlength of organ, the outer four or five progressively lengthened, the terminal segment very long and slender, exceeding the preceding two combined. Head yellow; anterior vertex relatively narrow, subequal to the diameter of the scape.

Cervical region and thorax very pale yellow, the median region of praescutum somewhat more saturated yellow. Halteres pale yellow. Legs with coxae and trochanters very pale; remainder of legs more obscure yellow, appearing still darker because of the short and very abundant vestiture; tarsi not darker than remainder. Wings uniformly very pale yellow, the veins deeper yellow, inconspicuous against the ground. Veins of nearly the outer half of wing with abundant trichia; costal fringe short. Venation: Anterior branch of Rs arcuated at origin, thence extended parallel to R_1, posterior branch deflected strongly caudad, ending just behind the wing tip, cell R_3 at margin very extensive; basal section of R_{4+5} more than one-half *r-m;* cell *1st* M_2 rectangular, slightly more than one-half longer than broad; *m-cu* at or close to fork of M.

Abdomen brownish yellow, the tergites not or scarcely darker than the sternites, eighth sternite more or less darkened, hypopygium yellow. Male hypopygium (fig. 9) with the basistyle, *b*, lacking a lobe on mesal face but with a concentration of stiff setae. Dististyles, *d*, terminal; outer style about two-thirds as long as the inner and more slender, gently curved, narrowly blackened at the shallowly bidentate tip; axial spine stouter, decurved, outer spine jutting beyond, tip obtuse. Gonapophysis, *g*, with apical point elongate. Aedeagus, *a*, moderately long, apex bilobed.

Holotype.— ♂, Simbhanjang Pass, Kathmandu Road, Nepal, mile 63.5, June 24, 1957 (Coher). *Allotopotype*, ♀. *Paratopotypes*, 4 ♂ ♂.

The most similar regional species is *Helius* (*Helius*) *unicolor* (Brunetti) which has been discussed earlier in this report.

Helius (Helius) sigillatus sp.n.

General coloration of mesonotal praescutum obscure yellow, with three medium brown stripes; posterior sclerites of notum darker, scutellum dark brown with a central yellow spot; femora with a broad dark brown subterminal ring, the actual tip very narrowly yellow; wings whitish, with a conspicuous brown pattern that includes large areas at origin of *Rs*, along the cord and elsewhere, wing tip broadly paler brown.

Female.—Length, including rostrum, about 8 mm.; wing 8.5 mm.; rostrum about 0.6 mm.

Rostrum relatively short, dull black, palpi black. Antennae black throughout; flagellar segments cylindrical to subcylindrical, gradually decreasing in length outwardly, subequal in length to their verticils. Head dark gray, posterior vertex and occiput darker.

Cervical region brown; pronotal scutum variegated brown and obscure yellow, scutellum and pretergites yellow. Mesonotal praescutum with the restricted ground obscure yellow, with three medium brown stripes, the central one divided on about the posterior fourth, not reaching the suture behind; lateral stripes widely separated, the ground interspaces very broad, humeral and lateral regions light yellow; scutum with lobes dark brown, central region restrictedly paler; scutellum dark brown with a very narrow and inconspicuous central yellow spot; mediotergite dark brown, pleurotergite brownish yellow. Mesepisternum weakly infuscated, the posterior pleurites more yellowed, especially the meron and metapleura. Halteres with stem dirty white, knob infuscated. Legs with fore coxae weakly darkened, middle and hind coxae and all trochanters yellow; femora brownish yellow basally, darkening toward tips, with a broad dark brown subterminal ring, the actual tip very narrowly yellow; tibiae and tarsi dark brown. Wings with the ground whitish, the prearcular and costal fields more yellowed; a conspicuous brown pattern, including the stigma, a large area at origin of *Rs*, cord, outer end of cell *1st* M_2 and a small arcular area; slight'y

paler brown markings include the broad wing tip, from cell R_2 into cell M_4, with further darkenings in ends of cells *Cu* and *1st A;* veins brown, paler in the yellowed portions. Veins of more than outer half of wing with numerous macrotrichia. Venation: *Rs* in direct alignment with R_{4+5}, *r-m* conspicuous, just before the fork; cell *1st* M_2 subrectangular, with *m-cu* at near two-fifths the length; *m* oblique, a little longer than the basal section of M_3.

Abdominal tergites dark reddish brown, sternites yellow, sixth and seventh segments more blackened, to form a narrow ring. Ovipositor with the genital segment fulvous yellow; cerci slender, especially on the upcurved outer ends.

Holotype.— ♀, Simbhanjang Pass, Mahabharat Range, 8190 feet, June 24, 1957 (Coher).

Although it is closely related to *Helius* (*Helius*) *euryphallus* Alexander, I regard the two flies as being distinct. The chief colorational differences include the leg and wing patterns, the present fly being more conspicuously marked in all regards.

Helius (Helius) tanyrhinus sp.n.

General coloration of entire body brownish black; rostrum very long and slender, approximately one-half as long as remainder of body; halteres yellow; legs black, femoral bases obscure yellow; wings brownish yellow, cord and outer ends of cell *1st* M_2 conspicuously seamed with brown, some other veins less evidently darkened; cell *1st* M_2 large; male hypopygium with apex of outer dististyle shallowly emarginate.

Male.—Length, excluding rostrum, about 7.5 mm.; wing 9 mm.; rostrum alone about 4 mm.

Rostrum black, exceedingly long and slender, about one-third longer than the combined head and thorax; maxillary palpi black, labial palpi about one-third as long, pale. Antennae black; basal flagellar segments crowded, subglobular, outer segments passing through oval to elongate, with long verticils. Head black; anterior vertex slightly wider than the diameter of the scape.

Thorax almost uniformly brownish black, subnitidous, median area of suture and the restricted humeri obscure yellow, scutellum and postnotum vaguely more pruinose; setae of praescutum and scutum very sparse but long and erect. Halteres yellow. Legs with coxae dark brown; trochanters obscure yellow; remainder of legs brownish black, femoral bases obscure yellow, narrowest on fore legs; claws long, simple. Wings (fig. 4) brownish yellow, prearcular and costal fields clear light yellow; stigma and conspicuous seams over cord and outer ends of cell *1st* M_2 brown; narrow and less evident darkenings over both sections of Cu_1, outer half of *M* and *2nd A*, and on the outer medial veins. Longitudinal veins beyond cord with abundant macrotrichia, before cord including *Rs* and outer end of Cu_1, lacking on *M* and the Anals. Venation: Sc_2 ending shortly before fork of *Rs,*

branches of the latter gently divergent, R_{4+5} deflected strongly toward wing tip, cell R_3 very extensive at margin, nearly two and one-half times R_2; cell *1st* M_2 large, subrectangular, nearly as long as vein M_4; *m-cu* shortly beyond fork of *M*.

Basal abdominal tergites brown, sternites brownish yellow, outer segments, including hypopygium, brownish black. Male hypopygium (fig. 10) with the basistyle, *b*, lacking lobes; setae of outer face of style very long, the longest about two-thirds the style; setae of mesal face shorter but abundant. Outer dististyle, *d*, a nearly straight black rod, gradually narrowed to the very shallowly notched apex; inner style nearly twice as long and stouter. Gonapophysis, *g*, extended apically into a long gently curved spine. Aedeagus, *a*, terminating in a short simply curved pale filament.

Holotype.— ♂, Karponang, Sikkim, 9900 feet, August 23, 1959 (Schmid).

The only other described *Helius* having the rostrum proportionately as long and slender as in the present fly is *Helius* (*Helius*) *dolichorhynchus* Edwards, of Mount Kinabalu, North Borneo, entirely distinct in coloration of the body, halteres and wings, and in the structure of the male hypopygium.

ERIOPTERINI

Genus **DASYMALLOMYIA** Brunetti

Dasymallomyia Brunetti, Rec. Indian Mus. 6: 304, 1911.
Dasymallomyia Brunetti, Fauna British India, Diptera Nematocera, pp. 494–495, 1912.

A single member of the genus had been known from India to which are added four further species. A key to the known Asiatic representatives is provided. *Dasymallomyia* is eminently characteristic of the Himalayan mountain system and its various extensions, including Formosa in the extreme east. No species is known from South India or Ceylon. Most species occur at moderate altitudes but *Dasymallomyia persignata* has been taken at 9000 feet in western China.

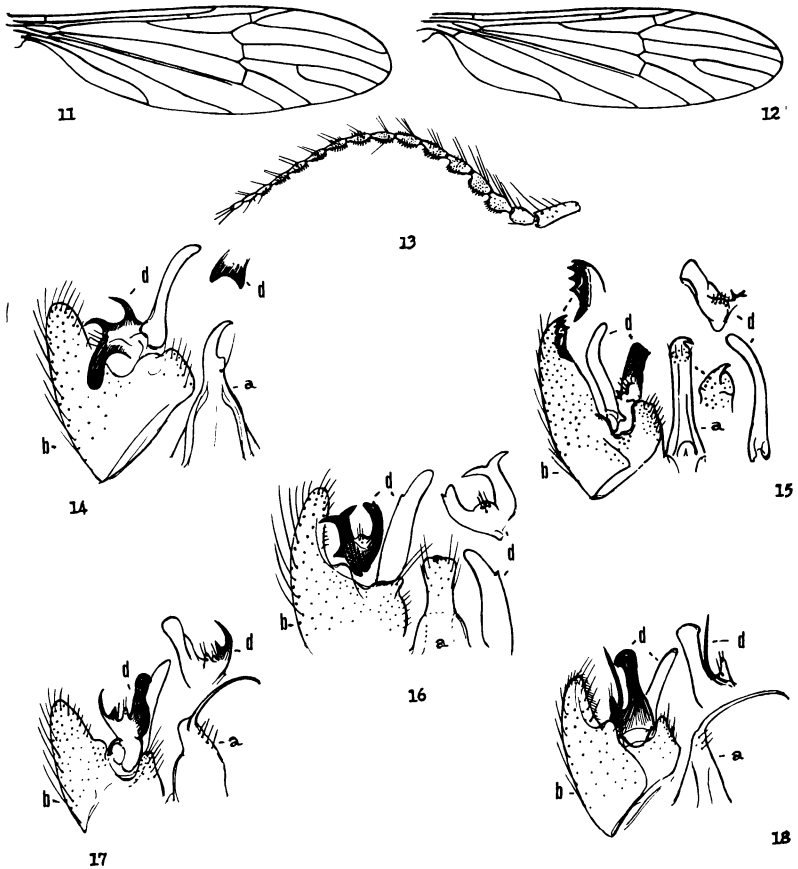
The affinities of the genus appear to lie with *Gnophomyia* Osten Sacken, *Teucholabis* Osten Sacken, *Gymnastes* Brunetti, and especially with *Neognophomyia* Alexander, of Tropical America, where it is represented by numerous species. Although *Dasymallomyia* is similar in general appearance to this last, especially in venation, the fundamental structure of the male hypopygium is quite different and two distinct generic groups are involved.

All species are of small to medium size, yellow or fulvous in color, the mesonotal praescutum and scutum being patterned with polished black, the other darkened areas on the thorax more pruinose. The legs are provided with long outspreading setae that give to the group a characteristic appearance and has suggested the generic name. All species have a narrow darkened subterminal ring on the femora. The antenna, venation and general structure of the male hypopygium has been discussed under *Dasymallomyia signata*, the genotype.

Key to the Species of Dasymallomyia

1. Wings with cell *1st* M_2 closed 2
   Wings with cell M_2 open by atrophy of basal section of vein M_3 (figs. 11, 12) 3
2. Wing veins brownish yellow to pale brown, inconspicuous; narrow brown seams over cord of wing and outer end of cell *1st* M_2; outer half of vein R_4 decurved. (Eastern China: Chekiang) *clausa* Alexander
   Wing veins, excepting *C* and *Sc*, black, very conspicuous against the ground; wings unpatterned; vein R_4 virtually straight. (Afghanistan) *klapperichi* Alexander
3. Wings pale yellow, patterned with pale brown, including a broken cross-band at level of origin of *Rs*, additional to a seam at cord. (Western China: Szechwan) ..... *persignata* Alexander
   Wings unpatterned, except for a narrow darkened seam at cord when this is present 4
4. Male hypopygium with the aedeagus terminating in an elongate filament that is subequal in length to the enlarged base of the organ (figs. 17, 18) 5
   Male hypopygium with terminal part of aedeagus short to very short, much less than the base (figs. 14–16) 6
5. Outer dististyle of hypopygium bearing a stout spine with a broad triangular tooth at its base; aedeagus slightly expanded at base of terminal filament (fig. 17). (Assam: Manipur) ..... *mecophallus* sp.n.
   Outer dististyle with a simple elongate slender spine; filament of aedeagus merging gradually with the enlarged base (fig. 18). (Sikkim) *tanyphallus* sp.n.
6. Mesal face of apex of basistyle a blackened flange that bears several spinous points (fig. 15). (Sikkim) ..... *compacta* sp.n.
   Apex of basistyle unarmed or modified, with yellow setae only 7
7. Outer dististyle with lateral arm a powerful blackened rod that forks into two divaricate spines; aedeagus stout, apex virtually truncate, with a microscopic terminal point (fig. 16). (Assam: Manipur) *ditenostyla* sp.n.

Spines of outer arm of dististyle widely separated; aedeagus more slender, apex produced into a cleaver-like blade or hook that is approximately one-fourth as long as base (fig. 14). (Western Himalayas, eastward to Formosa) ..... *signata* Brunetti



Text-figs. 11–18. Fig. 11, *Dasymallomyia signata* Brunetti, venation; Fig. 12, *Dasymallomyia ditenostyla* sp.n., venation; Fig. 13, *Dasymallomyia signata* Brunetti, antenna of male; Fig. 14, *Dasymallomyia signata* Brunetti, male hypopygium; Fig. 15, *Dasymallomyia compacta* sp.n., male hypopygium; Fig. 16, *Dasymallomyia ditenostyla* sp.n., male hypopygium; Fig. 17, *Dasymallomyia mecophallus* sp.n., male hypopygium; Fig. 18, *Dasymallomyia tanyphallus* sp.n., male hypopygium.

Symbols: *a*, aedeagus; *b*, basistyle; *d*, dististyle.

Dasymallomyia clausa Alexander

Dasymallomyia clausa Alexander, Lingnan Science Jour. 19: 115–116, fig. 7 (ven.), 1940.

Types.— ♀ ♀, Tien-mu-shan, Chekiang, China, May 16–June 16, 1937 (E. Suenson).

Dasymallomyia klapperichi Alexander

Dasymallomyia klapperichi Alexander, Ann. Mag. Nat. Hist. (12) 7: 903–904, 1954.

Types.— ♀ ♀, Kutian, Nuristan, Afghanistan, 1500 meters, May 22, 1953 (Johann Klapperich).

Dasymallomyia persignata Alexander

Dasymallomyia persignata Alexander, Philippine Jour. Sci. 49: 396–398, pl. 1, fig. 17 (ven.), pl. 3, fig. 45 (♂ hypo.), 1932.

Types.— ♂, ♀, Mount Omei, Szechwan, China, 7000–9000 feet, July 20–27, 1931 (G. M. Franck).

Dasymallomyia signata Brunetti

Dasymallomyia signata Brunetti, Rec. Indian Mus. 6: 304, 1911.
Dasymallomyia signata Brunetti, Fauna British India, Diptera Nematocera, pp. 494–496, pl. 10, fig. 4 (ven.), 1912.
Dasymallomyia signata Edwards, Ann. Mag. Nat. Hist. (8) 18: 249, 1916.

The type, a ♀, was taken at Kurseong, in the eastern Himalayas, September 7, 1909, by D. F. Lynch. Edwards (1916) recorded it from Formosa, based on a ♀ taken at Horisha, May 10, 1913, by M. Maki.

An examination of numerous specimens from all parts of the known range confirms the belief that a single species is involved. The type has not been examined but specimens from near the type locality agree sufficiently well with the description. Brunetti describes the median praescutal stripe as reaching the mesonotal suture behind but no specimen examined shows this and it seems doubtful that this character actually is true. The coloration of the male abdomen ranges from almost clear yellow, with narrow darkened lateral borders on both the tergites and sternites, to specimens with the dark color increased, in cases with only the posterior margins of the segments yellowed.

Antennae (fig. 13) with the more proximal flagellar segments strongly produced beneath, the outer ones passing into elongate-oval, all but the last two or three with glabrous apical necks, all segments with long conspicuous verticils, lacking on lower face of the more proximal segments which are provided with a dense short erect yellow pubescence. Venation (fig. 11) with *Sc* long, Sc_1 ending a short distance before fork of *Rs*, Sc_2 removed from its tip; R_2 at or shortly before the radial fork; cell M_2 open by atrophy of basal section of M_3; *m-cu* nearly its own length beyond fork of *M*. Longitudinal veins beyond the general level of arculus with conspicuous macrotrichia. Male hypopygium (fig. 14) with the tergite, *t*, a small semicircular plate. Basistyle, *b*, provided with long yellow setae, narrowed outwardly, apex obtuse, without armature. Outer dististyle, *d*, with the major arm slightly expanded distally, apex slightly notched, in certain specimens with the end of style apparently obtusely rounded; margin of style with two strong spines; inner dististyle a simple pale yellow blade, apex obtuse. Apex of aedeagus, *a*, a stout point, scarcely one-fourth as long as remainder of organ.

Additional records.—*India*—Kumaon (western Himalaya)—Tarag Tal, Almora, 3900 feet, October 5, 1958 (Schmid); Chhana, Almora, 3500 feet, September 22, 1958; Loharket, Almora, September 19, 1958 (Schmid). West Bengal (eastern Himalaya)—Git Dabling, 4900 feet, September 13, 1959 (Schmid). Sikkim—Kambur, 3280 feet, August 16, 1959; Nampung, 3280 feet, May 8, 1959; Singhik, 3700 feet, August 7, 1959; Teng, 4600 feet, August 1, 1959 (Schmid). *Western China*—Szechwan—Kwanhsien, 3000 feet, July 27, 1930 (G. M. Franck); Mount Omei, 4500 feet, August 2, 1929 (Franck). *Formosa*—Funkiko, April 25, 1917 (Shiraki); Taito, February 25, 1919 (Shiraki); Arisan, 7300 feet, July 7, 1929 (S. Issiki).

Dasymallomyia compacta sp.n.

Male.—Length about 6.5 mm.; wing 6–6.1 mm.; antenna about 1.9 mm.

General coloration much as in *signata* Brunetti. Lateral praescutal stripes more polished than the slightly narrower median vitta that does not reach the suture; mediotergite blackened, the cephalic third more pruinose. Pleura yellow, conspicuously patterned with grayish brown, including the anepisternum, ventral half of sternopleurite and anterior border of meron. Halteres uniformly light yellow. Darkened femoral ring narrow and ill-defined, pale brown. Abdominal tergites dark brown, incisures of outer segments narrowly yellowed; hypopygium brownish yellow. Male hypopygium (fig. 15) with the tergite semicircular in outline, darkened, with a few long delicate setae. Basistyle, *b*, narrowed into a slender outer lobe, the mesal margin blackened and sclerotized, conspicuously toothed, ar-

ranged in two groups, the cephalic spine largest. Outer dististyle, *d*, blackened, unusually small and compact, appearing as an elongate rectangular mass, the posterior lobes and spines very reduced, the latter including two tiny points; inner style slightly arcuated, pale. Aedeagus, *a*, straight, the short darkened tip with a small erect to recurved apical point.

Holotype.— ♂, Dikchu, Sikkim, 2300 feet, May 9, 1959 (Schmid). *Paratopotype,* ♂, pinned with type.

Dasymallomyia ditenostyla sp.n.

Size large (wing of female 8 mm.); general coloration of thorax yellow, praescutum with three polished black stripes, the central one more pruinose, not reaching the suture behind; pleura light yellow, variegated by light brown; wings light yellow, veins comprising the cord slightly more darkened; abdomen yellow, segments variegated by narrow brown longitudinal lines; male hypopygium with the outer dististyle conspicuously bifid, outer arm forking at apex into two divaricate spines; aedeagus short, stout, apex virtually truncate.

Male.—Length about 6.5 mm.; wing 6.6 mm.; antenna about 2 mm.

Female.—Length about 8 mm.; wing 8 mm.

Rostrum light brown; palpi dark brown. Antennae with scape and pedicel light yellow; basal flagellar segments blackened, the incisures yellowed, outer segments more uniformly dark brown; segments much shorter than the verticils. Head brownish gray.

Prothorax light yellow, with a darkened spot at center of scutellum. Mesonotal praescutum with three polished black stripes, the median one slightly more pruinose on central part, not reaching the suture, lateral stripes more oval, polished black, remainder yellow; pseudosutural foveae black; scutum yellow, each lobe with two polished black areas, larger and confluent in female; scutellum light yellow, darkened at base; mediotergite light brown, anterolateral portions yellow. Pleura light yellow, variegated by light brown on dorsal anepisternum and pteropleurite and again on ventral sternopleurite. Halteres yellow, knobs clear light yellow. Legs with coxae and trochanters fulvous yellow; femora yellow, with a narrow dark brown subterminal ring placed at near three times its length from tip; tibiae yellow, apices weakly darkened; tarsi brownish yellow, outer segments dark brown; legs conspicuously hairy; claws long and slender. Wings (fig. 12) light yellow, prearcular and costal regions clearer yellow, including the veins; remaining veins brown, those of cord more blackened, not so scarcely involving the membrane. Venation: R_2 at or slightly before the radial fork; cell *2nd* M_2 varying from equal to its petiole to about one-half longer; *m-cu* about one-half its length beyond fork of *M*.

Abdomen yellow, segments variegated by narrow brown longitudinal lines; hypopygium deep yellow. The allotype female has the abdomen blackened, the extreme posterior borders of segments and the lateral membrane yellowed. Male hypopygium (fig. 16) with apex of basistyle, *b*, narrowly obtuse. Dististyles, *d*, subterminal, the blackened outer style large,

conspicuously bifid into two slender arms, the outer one forking at tip into two divaricate spines, inner arm curved, its apex vaguely and unequally notched, at base slightly tumid, with a few strong setae; inner style a flattened yellow blade. Aedeagus, *a,* with base stout, the apical half subequal in length, virtually truncate at tip, with a very small darkened apical tubercle.

Holotype.— ♂, Chingsao, Manipur, Assam, 5400 feet, June 14, 1960 (Schmid). *Allotopotype,* ♀, pinned with type.

Readily told from other known species by the distinctive male hypopygium, especially the outer dististyle and the short aedeagus with apex truncate.

Dasymallomyia mecophallus sp.n.

Male.—Length about 5.6 mm.; wing 5.8 mm.; antenna about 1.6 mm.

General coloration much as in *signata* Brunetti. Median praescutal stripe polished black, only slightly less than the brilliantly blackened lateral areas, not reaching the suture; mediotergite, anepisternum and ventral sternopleurite conspicuously patterned with brown, sparsely pruinose. Legs with darkened femoral ring narrow, clearly defined, less than one-third the yellow apex; blackened tips of tibiae subequal in extent to the femoral rings. Abdominal tergites dark brown, posterior borders and incisures more yellowed; sternites yellow, lateral borders weakly infuscated; hypopygium with basistyle light brown. Male hypopygium (fig. 17) with apical lobe of basistyle, *b,* relatively narrow, tip obtuse, unarmed; vestiture of basistyle long, yellow. Outer dististyle, *d,* blackened, apex of the elongate beak obtuse, outer basal region produced into a stout black spine with a broader triangular tooth at its base; on outer margin between the lobes with a small elongate tubercle that bears three or four strong setae, with two separate bristles, one longer; inner dististyle an elongate pale blade. Aedeagus, *a,* distinctive; basal part dilated, outer half extended into an elongate slender decurved filament, the tip gently bent, the whole suggesting the head and beak of a curlew (*Numenius*); lower margin near base of the extended part with four long pale setae.

Holotype.— ♂, Pushing, Manipur, Assam, 6000 feet, July 18, 1960 (Schmid).

The only other member of the genus having the apex of the aedeagus greatly produced is *Dasymallomyia tanyphallus* sp.n., which differs in all details of structure of the outer dististyle and aedeagus, as described.

Dasymallomyia tanyphallus sp.n.

Male.—Length about 6 mm.; wing 6 mm.

General coloration much as in *signata* Brunetti. Median praescutal stripe

brownish black, more obscure behind, not reaching the suture; scutal blackenings polished laterally, mesal half paler and more pruinose. Pleura conspicuously patterned with black on anepisternum and ventral sternopleurite. Darkened femoral ring about one-third as extensive as the yellow tip; tips of tibiae narrowly brownish black. Abdomen chiefly dark brown, segments with posterior borders and the incisures vaguely more yellowed. Male hypopygium (fig. 18) with apical lobe of basistyle, *b*, narrow, as in *mecophallus;* setae yellow, with abundant dense yellow setulae at apex and on inner face of lobe. Outer dististyle, *d*, blackened, the elongate beak slightly dilated at outer end, apex broadly obtuse; an appressed elongate black spine and a strong fingerlike lobe tipped with two or three setae; inner style relatively broad. Aedeagus, *a*, much as in *mecophallus*, especially in the elongate terminal point which is subequal in length to the base, without a conspicuous expansion at base of the rostrum.

Holotype.— ♂, Nanga, Sikkim, 5000 feet, August 3, 1959 (Schmid).

Dasymallomyia tanyphallus differs from *D. mecophallus* sp.n., especially in the hypopygial characters, including particularly the outer dististyle and aedeagus, as described and figured.

Genus **RHABDOMASTIX** Skuse

Rhabdomastix Skuse, Proc. Linn. Soc. New South Wales (2) 4: 828–829, pl. 22, fig. 15 (ven.), 1890 (preprint date September 25, 1889).
Rhabdomastix Alexander, Rev. de Entomologia 18: 318–322, 1947.
Sacandaga Alexander, Ent. News, 22: 351–352, 1911.

The genus was proposed for a single species, *Rhabdomastix osten-sackeni* Skuse, from southeastern Australia. It now is known from all major biotic regions, as well as from New Zealand. In the typical subgenus, centering in South and Central America, there are about 15 New World species, one in the southwestern United States in Arizona. In the Old World the typical subgenus reaches its maximum number of species in southern Asia, including India, where four species occur and are discussed herewith. The second subgenus, *Sacandaga,* proposed for a single species, *Rhabdomastix* (*Sacandaga*) *flava* (Alexander) from eastern North America, now is known from many species occurring throughout the Holarctic and Oriental regions, with rather numerous species in New Zealand and fewer in South Africa. In most species of this latter subgenus the antennae are short and inconspicuous but in a few the organ is longer, but always much less

developed than in the males of the typical subgenus. In the latter the antennae are greatly lengthened in the males, in this respect being approached only by a few other crane-fly genera, including *Megistocera* Wiedemann and *Hexatoma* Latreille. No Indian species of *Rhabdomastix* were known to Brunetti.

Key to the Indian Species of Rhabdomastix

1. Antennae of male greatly lengthened, approximately three times the wing. (Subgenus *Rhabdomastix*) 2
   Antennae short in both sexes, much less than the wing, usually scarcely longer than the head. (Subgenus *Sacandaga*) 5
2. Vein R_2 of wing preserved. (Ceylon) ..... *schmidiana* Alexander
   Vein R_2 lacking (figs. 20–22) 3
3. Wings patterned with brown, additional to the stigmal darkening, most evident in the outer radial field. (South India) .. *nilgirica* Alexander
   Wings unpatterned except for the oval brown stigma 4
4. Wings subhyaline; legs brownish yellow. (Western Himalayas: Kumaon) ..... *himalayensis* Alexander
   Wings (fig. 19) strongly tinged with brown; legs dark brown. (Assam: Manipur) ..... *manipurensis* sp.n.
5. Cell M_2 of wings open by atrophy of *m* (fig. 20); *Rs* short, less than twice *m-cu*. (Assam: Manipur) .....*arnaudi* sp.n.
   Cell *1st* M_2 closed (figs. 21, 22); *Rs* long, four or more times *m-cu* ... 6
6. Body, halteres and legs black; antennae of male moderately long, exceeding one-third the wing-length; wing (fig. 21). (Assam: Manipur) ..... *nigropumila* sp.n.
   Body either yellowed or gray, not black; antennae short 7
7. Basal three flagellar segments of antennae more or less completely fused. (Western Himalayas: Kumaon) ..... *almorae* Alexander
   Antennae with all fourteen flagellar segments distinct 8
8. Wings with vein R_4 long and nearly straight, exceeding vein R_{2+3+4}; cell R_4 at margin less extensive than cell R_3; wing (fig. 22) 9
   Wings with vein R_4 shorter than R_{2+3+4}, gently curved; cell R_4 at margin more extensive than cell R_3 10
9. Mesonotal praescutum yellow, with three nearly confluent brown stripes; legs brownish yellow; wings brownish yellow, *Sc* long, Sc_1 ending beyond two-thirds *Rs*, Sc_2 present; distance on costa between veins R_{1+2} and R_3 less than the length of the latter; cell *1st* M_2 long, about twice its width; male hypopygium with interbase blackened, apical blade narrow. (Pakistan) ..... *shardiana* Alexander
   Mesonotal praescutum gray, with vague brown stripes; legs brownish black; wings more darkened (fig. 22); *Sc* shorter, Sc_1 ending about opposite midlength of *Rs*, Sc_2 apparently lacking; distance on costa between veins R_{1+2} and R_3 greater than the length of the latter; cell *1st* M_2 short, its length less than twice the width; male hypopygium (fig. 25) with interbase blackened, the apical blade narrow. (Sikkim) *strictivena* sp.n.

10. Wings narrow; Cell R_4 at margin less than twice cell R_3; male hypopygium with outer dististyle relatively short and stout, the length about five times the diameter. (Kashmir) ..... *emodicola* Alexander
Wings broader; cell R_4 at margin about twice cell R_3; male hypopygium with outer dististyle slender, the length about seven times the diameter. (Western Himalayas: Kumaon) ..... *teriensis* Alexander

Rhabdomastix (Rhabdomastix) himalayensis Alexander

Rhabdomastix (*Rhabdomastix*) *himalayensis* Alexander, Jour. N. Y. Ent. Soc. 68: 142–143, 1960.

Type.—Pauri Garwhal, Kumaon, India.

Rhabdomastix (Rhabdomastix) nilgirica Alexander

Rhabdomastix (*Rhabdomastix*) *nilgirica* Alexander, Ann. Mag. Nat. Hist. (12) 1: 660–662, 1948.

Type.—Nilgiri Hills, South India.

Rhabdomastix (Rhabdomastix) schmidiana Alexander

Rhabdomastix (*Rhabdomastix*) *schmidiana* Alexander, Ann. Mag. Nat. Hist. (13) 1: 228–229, 1958.

Types.—Various stations in Ceylon.

Rhabdomastix (Sacandaga) almorae Alexander

Rhabdomastix (*Sacandaga*) *almorae* Alexander, Jour. N. Y. Ent. Soc. 68: 143–144, 1960.

Type.—Almora, Kumaon, India.

Rhabdomastix (Sacandaga) emodicola Alexander

Rhabdomastix (*Sacandaga*) *emodicola* Alexander, Ann. Mag. Nat. Hist. (12) 10: 291–292, 1957.

Type.—Kashmir.

Rhabdomastix (Sacandaga) shardiana Alexander

Rhabdomastix (*Sacandaga*) *shardiana* Alexander, Ann. Mag. Nat. Hist. (12) 10: 292–293, 1957.

Type.—Pakistan.

Rhabdomastix (Sacandaga) teriensis Alexander

Rhabdomastix (*Sacandaga*) *teriensis* Alexander, Ent. News 73: 122–123, 1962.

Type.—Teri, Kumaon, India.

Rhabdomastix (Rhabdomastix) trochanterata Edwards

Rhabdomastix (*Rhabdomastix*) *trochanterata* Edwards, Jour. Fed. Malay States Mus. 14: 116, 1928.

Type.—Pahang.

Extra-limital, the first member of the typical subgenus to be recorded from Asia.

Rhabdomastix (Rhabdomastix) manipurensis sp.n.

Size relatively large (wing of male 8.5 mm.); general coloration of thorax dark brown; antennae of male very long, about three times the wing; legs dark brown; wings strongly tinged with brown, stigma darker; a few macrotrichia near outer end of vein R_5.

Male.—Length about 8 mm.; wing 8.5 mm.; antenna about 28 mm.

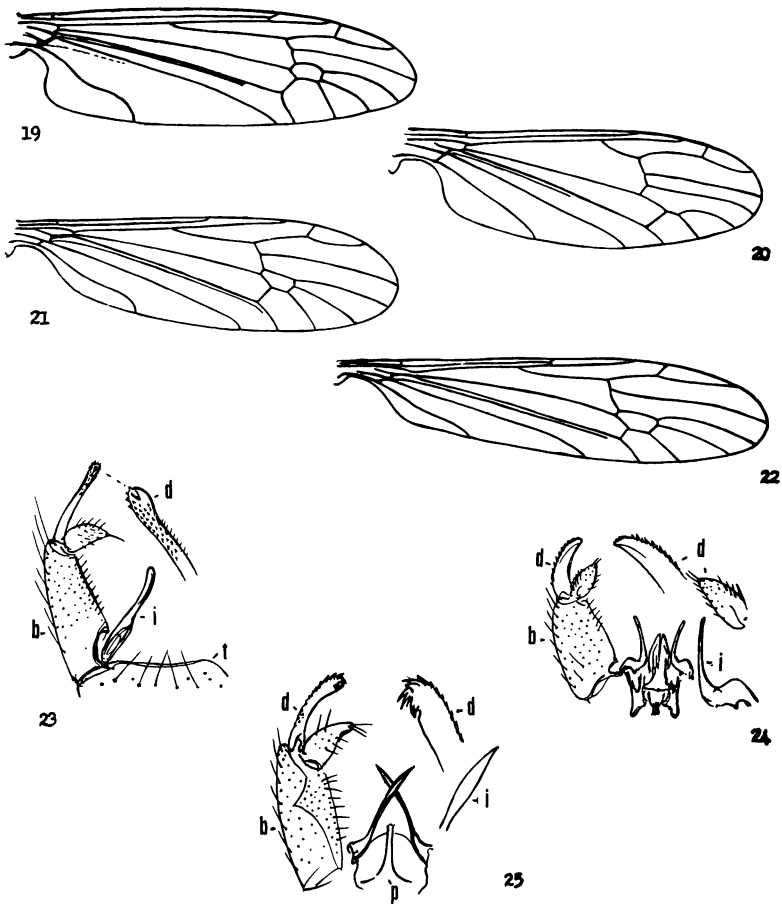
Face light brown, protuberant, mouthparts and palpi very small, black. Antennae of male very long, about three times the wing; scape tumid, dark chestnut brown, pedicel black, flagellum dark brown; flagellar segments very long, first and second subequal, succeeding segments progressively lengthened, terminal segment shorter, subequal to the first; flagellar segments unusually glabrous, verticils of proximal segments erect, those of outer segments smaller. Head transverse, anterior vertex very broad, exceeding the transverse diameter of the eye as seen from above; genae with long black setae.

Pronotum brownish gray, sides of scutellum restrictedly pale yellow. Mesonotum almost uniformly dark brown, very sparsely pruinose; pseudosutural foveae black. Pleura dark brown anteriorly, the posterior sclerites brighter brown. Halteres pale brown, knob dark brown. Legs with coxae and trochanters light brown; remainder of legs dark brown. Wings (fig. 19) strongly tinged with brown, the oval stigma darker brown; veins brown. Veins virtually glabrous, with about six trichia on outer fourth of vein R_5, lacking on *Sc* and *R;* costal fringe relatively short but dense. Venation: Sc_1 ending before fork of *Rs*, Sc_2 near its tip; vein R_3 erect, distance on costa between veins R_{1+2} and R_3 about three-fourths the latter; second section of vein M_{1+2} strongly arched; Cu_1 strongly shirred at *m-cu*, as common in the Tipulinae but not in the Limoniinae; cell *2nd A* very broad.

Abdomen brown, outer segments and hypopygium darker brown.

Holotype.— ♂, Langkhe, Manipur, Assam, 5000 feet, July 20, 1960 (Schmid).

Rhabdomastix (*Rhabdomastix*) *manipurensis* is most similar to *R.* (*R.*) *himalayensis* Alexander, of the western Himalayas, differing especially in the coloration of the legs and wings, as indicated in the key.



Text-figs 19–25. Fig. 19, *Rhabdomastix* (*Rhabdomastix*) *manipurensis* sp.n., venation; Fig. 20, *Rhabdomastix* (*Sacandaga*) *arnaudi* sp.n., venation; Fig. 21, *Rhabdomastix* (*Sacandaga*) *nigropumila* sp.n., venation; Fig. 22, *Rhabdomastix* (*Sacandaga*) *strictivena* sp.n., venation; Fig. 23, *Rhabdomastix* (*Sacandaga*) *arnaudi* sp.n., male hypopygium; Fig. 24, *Rhabdomastix* (*Sacandaga*) *nigropumila* sp.n., male hypopygium; Fig. 25, *Rhabdomastix* (*Sacandaga*) *strictivena* sp.n., male hypopygium.

Symbols: *b*, basistyle; *d*, dististyle; *i*, interbase; *p*, phallosome; *t*, tergite.

Rhabdomastix (Sacandaga) arnaudi sp.n.

General coloration dull black, variegated with yellow; head above yellow; antennae moderately long, segments with conspicuous long erect setae; halteres and legs brown, tarsi paling to obscure yellow; wings weakly infuscated, base narrowly yellowed, cell M_2 open by atrophy of *m;* male hypopygium with outer dististyle slender, very slightly expanded at outer end,

surface of outer two-thirds with appressed spicules; interbase only moderately dilated.

Male.—Length about 4.8–5 mm.; wing 5–5.2 mm.; antenna about 2–2.1 mm.

Rostrum obscure yellow; palpi black. Antennae unusually long for a member of the subgenus, exceeding one-third the body or wing; scape yellow, pedicel brownish yellow, flagellum black; flagellar segments elongate, more narrowed at either end; verticils single on dorsal surface, only a little longer than the numerous erect pale setae distributed over the entire segment; terminal segment small. Head light yellow, posterior vertex weakly infuscated; anterior vertex broad, nearly four times the diameter of the scape.

Pronotum light yellow. Mesonotal praescutum and scutum blackened, sparsely pruinose to appear subopaque; humeral region, suture and narrow midregion of scutum yellowed; scutellum and postnotum similarly blackened, parascutella yellow; thorax virtually glabrous, praescutal interspaces with very small sparse yellow setae. Pleura dull black, dorsopleural region, wing root and base of halteres yellow; ventral pteropleurite, meron and metapleura in cases paler brown. Halteres infuscated, base of stem yellowed. Legs with coxae weakly darkened; trochanters yellow; femora and tibiae brown, tarsi paling to obscure yellow, terminal segment darkened. Wings (fig. 20) weakly infuscated, base narrowly yellowed; veins brown, yellowed in the brightened parts. Macrotrichia on veins R_4 and outer ends of R_5, M_{1+2}, M_3 and M_4; *Sc, M, Cu* and Anals glabrous, *R* nearly so. Venation: Sc_1 ending opposite fork of *Rs,* the latter unusually short, about two to two and one-half times the basal section of R_5; vein R_3 erect; cell M_2 open by atrophy of *m; m-cu* at from one-half to two-thirds M_{3+4}; vein *2nd A* nearly straight beyond base.

Abdomen dull black; hypopygium with tergite black, basistyle obscure yellow. Male hypopygium (fig. 23) with the outer dististyle, *d,* slender, very slightly expanded at outer end, surface of outer two-thirds with inconspicuous appressed spicules, more conspicuous near apex, with a major appressed spine; inner style relatively stout. Interbase, *i,* moderately dilated and longitudinally folded on outer half.

Holotype.— ♂, Thanlon, Manipur, Assam, 2500 feet, September 2, 1960 (Schmid). *Paratopotype,* ♂; *paratype,* ♂, Khaorang, Manipur, 3750 feet, August 28, 1960 (Schmid).

I take pleasure in naming this species for Dr. Paul H. Arnaud, distinguished student of the higher Diptera, to whom I am indebted for many favors in the past. The only other species of the genus having cell M_2 of the wings open is *Rhabdomastix* (*Sacandaga*) *feuerborni* Alexander, of central Java, quite distinct in the venation and in the coloration of the body and appendages.

Both species have *Rs* unusually short as compared with the normal condition in the subgenus.

Rhabdomastix (Sacandaga) nigropumila sp.n.

Size small (wing less than 4 mm.); general coloration of the entire body and appendages black, anterior mesonotum more polished; antennae of male relatively long, nearly one-half the wing; wings strongly blackened, cell *1st* M_2 narrow; male hypopygium with the outer dististyle stout, distal three-fourths of outer margin with strong teeth, the outer ones much smaller; interbase a slender rod, narrowed to the subacute apex.

Male.—Length about 4–4.3 mm.; wing 3.5–4.2 mm.; antenna about 1.4–1.6 mm.

Female.—Length about 4.5 mm.; wing 3.8 mm.

Rostrum and palpi black, reduced in size. Antennae black throughout, unusually long for a member of this subgenus; in male, flagellar segments long-oval, exceeding the verticils, terminal segment very small, short-oval; in female, flagellar segments of antennae a little shorter, the verticils more conspicuous. Head dull black; anterior vertex broad.

Thorax black, praescutum and scutum polished, the remainder somewhat more opaque. Halteres black. Legs black, femoral bases slightly paler. Wings (fig. 21) strongly blackened; a whitened streak in cell *R* adjoining vein *M;* veins pale brown. Veins chiefly glabrous; a series of about 18 trichia over the whole length of distal section of vein R_5 and about eight on distal section of M_{1+2}. Venation: *Sc* relatively short, Sc_1 ending just beyond one-third the length of *Rs*, Sc_2 not clearly evident; *Rs* relatively long, exceeding R_{2+3+4}; vein R_3 oblique to suberect; distance on costa between R_{1+2} and R_3 from about one and one-half to nearly twice the latter; cell *1st* M_2 narrow; *m-cu* at from one-half to two-thirds M_{3+4}; cell *2nd A* narrow.

Abdomen black. Ovipositor with cerci very long and slender, straight, the outer two-thirds whitened. Male hypopygium (fig. 24) with the dististyles, *d*, terminal, outer style broad, its outer margin with a more or less double row of coarse teeth extended back to the basal fourth of style, the teeth small and inconspicuous near apex; inner style long-oval, with numerous setae, including two stouter bristles at base and apex. Interbase, *i*, a slender rod, narrowed very gradually to the subacute tip.

Holotype.— ♂, Singkap, Manipur, Assam, 3800 feet, August 17, 1960 (Schmid). *Allotopotype,* ♀, pinned with type. *Paratype,* ♂, Uttare, Sikkim, 6950 feet, April 5, 1959 (Schmid).

Rhabdomastix (*Sacandaga*) *nigropumila* is quite distinct from all other regional species in the black color of the body and appendages, in the comparatively long antennae of the male, and in the structure of the male hypopygium. In its size and general

appearance it more suggests *R.* (*S.*) *atrata* Alexander, of Japan, from which it differs evidently in the structure of the antennae and male hypopygium.

Rhabdomastix (Sacandaga) strictivena sp.n.

General coloration of head and thorax gray, the praescutum with intermediate brown stripes; antennae short, black throughout; halteres whitened; femora and tibiae brownish yellow; wings faintly brownish gray, stigma scarcely darker than the ground; vein R_4 long and nearly straight, subequal to or longer than R_{2+3+4}; male hypopygium with outer third of interbase dilated into a narrow paddle, the tip acute.

Male.—Length about 3.8–4 mm.; wing 4.4–4.6 mm.; antenna about 1–1.1 mm.

Female.—Length about 5 mm.; wing 4 mm.

Rostrum dark brown; palpi black. Antennae black, scape more pruinose; flagellar segments subcylindrical, shorter than the longest verticils. Head gray, center of posterior vertex slightly darker.

Thorax gray, clearer gray on posterior sclerites; praescutum with vague indications of intermediate stripes; tuberculate pits and pseudosutural foveae black. Pleura light gray, dorsopleural region darkened. Halteres whitened, base of stem a trifle darker. Legs with fore coxae gray, remaining coxae brownish yellow, sparsely pruinose; trochanters brownish yellow; femora and tibiae brownish yellow to light brown; outer tarsal segments brownish black. Wings (fig. 22) faintly brownish gray, extreme base vaguely more yellowed; stigma oval, very pale brown, scarcely darker than the ground; veins light brown. Macrotrichia on outer section of vein R_5 and on outer ends of R_4 and all outer medial veins. Venation: Sc_1 ending shortly beyond midlength of Rs, Sc_2 preserved in holotype, at extreme tip of Sc_1; distance on costa between veins R_{1+2} and R_5 long, in holotype about twice the length of the latter, in the allotype subequal to the vein; vein R_4 long and straight, subequal to or longer than R_{2+3+4} or nearly as long as Rs; *r-m* long and very oblique; *m* variable in length, in the holotype shorter than basal section of M_3; *m-cu* at near midlength of M_{3+4}.

Abdomen, including hypopygium, dark brown. Male hypopygium (fig. 25) with apical spine of outer dististyle, *d*, very small; inner style strongly narrowed on outer fourth. Interbase, *i*, dilated on outer third into a narrow paddle, the tip acute.

Holotype.— ♂, Kechoiperi, Sikkim, 5900 feet, April 9, 1959 (Schmid). *Allotype,* ♀, Sandeng, Sikkim, 3600 feet, March 30, 1959 (Schmid).

Rhabdomastix (*Sacandaga*) *strictivena* is distinguished from other regional small, gray species, such as *R.* (*S.*) *almorae* Alexander and *R.* (*S.*) *emodicola* by the venation, particularly the long, nearly straight vein R_4.

Cheilotrichia (Cheilotrichia) schmidiana sp.n.

General coloration white, fore femora dark brown, tibiae white, apices dark brown; remaining femora white with a narrow brown subterminal ring, tibiae white, tips darkened, mid-tibia narrowly darkened at base; wings whitened, with abundant pale brown spots, including a marginal series; abdomen fulvous yellow, the lateral margins of both tergites and sternites with darkened spots; male hypopygium with inner dististyle a slender rod, the tip acute.

Male.—Length about 3 mm.; wing 3.7 mm.

Female.—Length about 3.5 mm.; wing 3.8 mm.

Rostrum pale, palpi infuscated. Antennae with scape and pedicel brownish black, basal flagellar segments white, outer segments darkening to pale brown; flagellar segments elongate. Head white.

Pronotum and pretergites white. Mesonotum whitened, praescutal stripes barely indicated as darker lines; postnotum darkened. Pleura yellowish white, with a brown longitudinal stripe from and including the fore coxae, passing above the halteres, interrupted posteriorly by the pale pleurotergite. Halteres white. Legs with fore coxae and trochanters darkened, middle and hind pairs whitened; fore femora dark brown, tibia white, the outer two-fifths to one-third dark brown, proximal three tarsal segments white, remainder dark brown; middle femora white, with a narrow brown subterminal ring, the subequal tip yellowed, tibia narrowly darkened at base and apex, the central half, including the vestiture, snowy white; tarsi white, terminal segment and apex of fourth darkened; posterior femora white, the tip narrowly dark brown, tibia similar, the apical fifth or sixth dark brown. Wings (fig. 26) whitened, with an extensive but inconspicuous very pale brown spotted pattern, including clouds at arculus, origin of *Rs,* fork of *Sc,* R_2, fork of R_{3+4}, cord, *m,* fork of M_{3+4}, and circular marginal spots at ends of longitudinal veins, lacking on R_5, those nearer the wing tip smaller; very small brownish black spots at *h* and posterior arculus; veins hyaline, a little darker in the clouded parts. Trichia of veins conspicuous, those in the darkened areas longer, including the very long marginal fringe. Venation: Sc_1 ending shortly before fork of *Rs,* Sc_2 near tip; *Rs* angulated and more or less spurred at origin; cell *1st* M_2 elongate, basal section of M_3 longitudinal, about three times the transverse *m; m-cu* erect, before fork of *M;* vein *2nd A* straight.

Abdomen fulvous yellow, posterior border of segments narrowly whitened; pale brown areas on lateral margins of both tergites and sternites, the former larger. Male hypopygium (fig. 30) with outer dististyle, *d,* unequally forked, the outer arm longer, gently curved, apex of inner arm dilated into an oval blade; inner style a long slender rod, tip acute. Phallosome, *p,* with arms of aedeagus elongate, divergent.

Holotype.— ♂, Langdang, Manipur, Assam, 5300 feet, June 5, 1960 (Schmid). *Allotopotype,* ♀.

I am pleased to dedicate this attractive fly to the collector, who

has added so materially to our knowledge of the Indian Tipulidae. The only close relative is *Cheilotrichia* (*Cheilotrichia*) *monosticta* (Alexander), likewise from Assam. This is most readily told by the virtually unpatterned wings. It should be noted that *monosticta* has the crossvein *m* present, as in *schmidiana,* and is best placed in typical *Cheilotrichia* rather than in the subgenus *Empeda* Osten Sacken, where it originally was referred.

Cheilotrichia (Empeda) dimelania sp.n.

Head and thorax plumbeous gray; antennae and legs black, halteres pale yellow; wings fulvous, stigma elongate, pale brown, veins yellow; *Sc* long, veins R_3 and R_4 elongate, parallel at origin; male hypopygium with outer dististyle unequally bifid, blackened; phallosome with two blackened rods, their tips acute.

Male.—Length about 4 mm.; wing 4.3 mm.

Rostrum and palpi black. Antennae black. Head dark gray.

Pronotum brownish gray, pretergites brownish yellow. Mesonotum brownish gray; pseudosutural foveae reddish brown, inconspicuous; lateral praescutal borders narrowly infuscated. Pleura black, pruinose to appear dark plumbeous gray; dorsopleural membrane brown. Halteres pale yellow. Legs with coxae and trochanters brown; remainder of legs brownish black to black; elongate scales only poorly differentiated from the longest setae. Wings (fig. 27) fulvous; stigma elongate, pale brown; veins yellow, trichia darker. Venation: *Sc* long, Sc_1 ending about opposite three-fourths the long *Rs;* R_2 about two-thirds R_{2+3+4}; veins R_3 and R_4 elongate, parallel to one another at origin, R_4 deflected strongly toward wing tip, at margin cell R_3 subequal in extent to cell R_2.

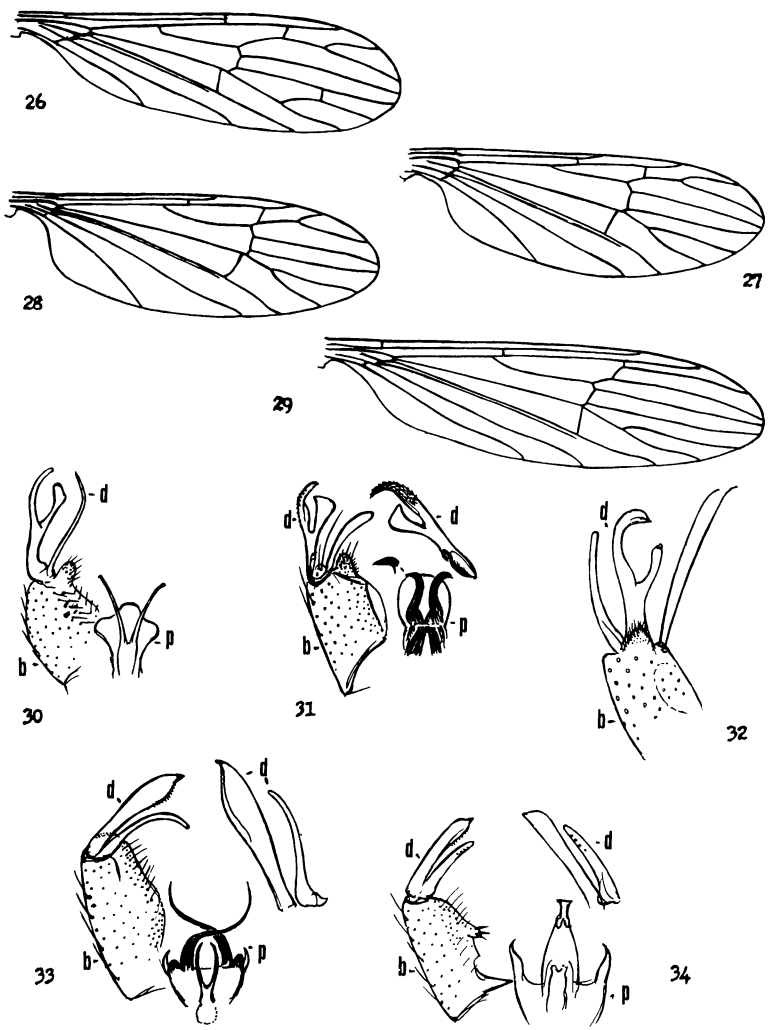
Abdomen dark brown, hypopygium brownish black. Male hypopygium (fig. 31) with the outer dististyle, *d,* blackened, unequally bifid; outer arm gently curved, the outer face microscopically scabrous, the shorter inner arm dilated; inner style a dusky paddle. Phallosome, *p,* a relatively narrow plate; gonapophyses distinctive, appearing as two blackened rods, the curved tips acute.

Holotype.— ♂, Yedang, Sikkim, 10,600 feet, in *Rhododendron* association, June 9, 1959 (Schmid).

Cheilotrichia (*Empeda*) *dimelania* is readily told from other regional species with vein *Sc* elongate by the fulvous wings and the structure of the male hypopygium, particularly the two blackened phallosomic rods.

Cheilotrichia (Empeda) vasanta sp.n.

Size medium (wing of male 4 mm.); general coloration of thorax clear blue gray, praescutum and scutal lobes with inconspicuous brown markings;



Text-figs. 26–34. Fig. 26, *Cheilotrichia* (*Cheilotrichia*) *schmidiana* sp.n., venation; Fig. 27, *Cheilotrichia* (*Empeda*) *dimelania* sp.n., venation; Fig. 28, *Cheilotrichia* (*Empeda*) *vasanta* sp.n., venation; Fig. 29, *Erioptera* (*Psiloconopa*) *preclara* sp.n., venation; Fig. 30, *Cheilotrichia* (*Cheilotrichia*) *schmidiana* sp.n., male hypopygium; Fig. 31, *Cheilotrichia* (*Empeda*) *dimelania* sp.n., male hypopygium; Fig. 32, *Cheilotrichia* (*Empeda*) *vasanta* sp.n., male hypopygium; Fig. 33, *Erioptera* (*Psiloconopa*) *preclara* sp.n., male hypopygium; Fig. 34, *Erioptera* (*Psiloconopa*) *preclaroides* sp.n., male hypopygium.

Symbols: *b*, basistyle; *d*, dististyle; *p*, phallosome.

antennae black; halteres yellow; legs brownish yellow but appearing darker because of the vestiture; wings brownish gray, prearcular and costal fields more yellowed, stigma and a narrow seam at cord more darkened; *Sc* long, vein R_2 oblique; male hypopygium with dististyles pale; outer style unequally bifid, inner style a long simple pale blade.

Male.—Length about 4.5 mm.; wing 4 mm.

Rostrum and palpi black, mouthparts paler. Antennae black, outer flagellar segments elongate-cylindrical. Head gray.

Pronotum gray, pretergites light yellow. Mesonotum clear blue gray, praescutum with an inconspicuous brown central stripe, centers of scutal lobes vaguely infuscated. Pleura similarly blue gray, dorsopleural membrane variegated gray and yellow. Halteres yellow, the knobs clearer light yellow. Legs with coxae and trochanters yellow, fore coxae slightly more grayish; femora and tibiae brownish yellow but appearing darker because of the vestiture; tarsi dark brown; scales of legs very long and narrow, trilineate. Wings (fig. 28) brownish gray, prearcular and costal fields more yellowed; stigma and a narrow seam along cord darker brown, the latter best indicated by the darkened veins which elsewhere are yellow. Venation: *Sc* long, Sc_1 ending about opposite three-fifths *Rs;* R_2 oblique, about one-half longer than R_{2+3+1}; vein R_3 oblique, distance on costa between veins R_{1+2} and R_3 nearly as long as the latter; cell M_3 deep.

Abdomen dark brown, hypopygium more yellowed, relatively small, with delicate setulae. Male hypopygium (fig. 32) with terminal setae of basistyle, *b,* very long, exceeding the dististyles, their outer ends curved. Outer dististyle, *d,* pale, basal half broad, forking into two unequal arms, the longer one broad at base, apex weakly dilated, the shorter arm about two-thirds as long; inner style long, appearing as a very slender simple pale blade, narrowed very gradually to the obtuse tip.

Holotype.—♂, Rapham, Sikkim, 5250 feet, April 2, 1959 (Schmid).

Cheilotrichia (*Empeda*) *vasanta* is readily told from the hitherto described regional species of the subgenus by the coloration of the body and wings, the long *Sc,* and the hypopygial structure.

Erioptera (Psiloconopa) preclara sp.n.

Size medium (wing to 6 mm.); general coloration of thorax yellowish brown, praescutum bordered laterally by dark brown; pleura yellow, with a broad dark brown longitudinal stripe; halteres yellow; legs yellowed, outer tarsal segments brownish black; wings yellowed, apex and posterior margin more darkened; a conspicuous dark brown pattern, including areas at origin of *Rs,* Sc_2 and a broad crossband, including the stigma and cord, ending behind at *Cu;* male hypopygium without a tubercle on mesal face of basistyle; gonapophysis a slender blade.

Male.—Length about 4–5 mm.; wing 4.5–6 mm.; antenna about 0.6–0.8 mm.

Female.—Length about 5 mm.; wing 6 mm.

Rostrum and palpi black. Antennae with scape and pedicel brownish black, flagellum paler brown; basal flagellar segments short, outer ones more elongate, with long verticils that much exceed the segments. Head yellowed above, in cases darker.

Pronotum and pretergites light yellow. Mesonotal praescutum light yellowish brown, bordered laterally by darker brown; posterior sclerites of notum slightly darker brown, anterolateral parts of mediotergite and dorsal pleurotergite more yellowed. Pleura yellow, with a broad conspicuous dark brown longitudinal stripe extending from cervical region to base of abdomen. Halteres light yellow, especially the knobs. Legs with fore and hind coxae slightly darker, middle pair clearer yellow; trochanters obscure yellow; remainder of legs yellowed, outer tarsal segments brownish black; vestiture of legs including long slender setoid scales additional to the more sparse longer setae. Wings (fig. 29) with center of disk yellowed, the margins, including the wing tip, more brownish yellow; a conspicuous dark brown pattern that includes a spot at origin of *Rs* and a broad band virtually crossing the wing at cord, including the long-extended stigmal region, reaching the posterior border as a much paler seam along vein *Cu;* smaller isolated brown spots at Sc_2 and outer medial fork; veins brownish yellow to yellow, darker in the heavily patterned areas; trichia of veins long, chiefly yellowed, some darker, especially in the heavily patterned areas. Venation: *Sc* long, Sc_1 ending beyond level of R_2; R_{2+3+4} in direct longitudinal alignment with *Rs,* R_{2+3} oblique to suberect at origin, R_2 short; cell M_2 open by atrophy of *m; m-cu* close to fork of *M;* vein *2nd A* long but only gently sinuous, ending far before *m-cu.*

Abdomen dark brown, hypopygium more castaneous. Male hypopygium (fig. 33) with basistyle, *b,* lacking a lobule on mesal face. Both dististyles, *d,* virtually terminal, outer style blackened, outwardly expanded, plaited longitudinally, terminating in a small blackened point; outer two-thirds and lower margin with very abundant delicate dark setulae; inner style about two-thirds as long, appearing as a narrow blade. Phallosome, *p,* including the deeply forked aedeagus and much longer gonapophyses that appear as slender blades, decussate at midline, very gradually narrowed into acute points; lateral angles of base of phallosome produced into long gently curved pale horns.

Holotype.— ♂, Zomphuk, Sikkim, 6500 feet, October 1, 1959 (Schmid). *Allotopotype,* ♀, pinned with type. *Paratopotypes,* 2 ♂ ♀, with the types. *Paratypes,* 1 ♂, Ramtang, Sikkim, 5780 feet, October 13, 1959 (Schmid); 1 ♀, Yoksam, Sikkim, 5600 feet, September 30, 1959 (Schmid).

Erioptera (*Psiloconopa*) *preclara* may be confused only with *E.* (*P.*) *preclaroides* sp.n., which, while very similar in its general appearance, including the striking wing pattern, differs signifi-

cantly in the structure of the male hypopygium, particularly the basistyle, dististyle and phallosome.

Erioptera (Psiloconopa) preclaroides sp.n.

Male.—Length about 4.5 mm.; wing 5 mm.

Mesonotal praescutum more uniformly yellowed, lateral borders not darkened; scutellum and mediotergite dark brown, the latter with a small yellow area at anterolateral angle. Pleura almost uniformly dark brown, more brownish black dorsally. Macrotrichia of wing veins blackened. Male hypopygium (fig. 34) much as in *preclara* but with the details distinct. Basistyle, *b,* with a conspicuous setiferous lobe on mesal face at near midlength directed strongly cephalad. Dististyles, *d,* terminal; outer style more slender, inner style broader and proportionately shorter. Median area of phallosome, *p,* produced caudad into a large organ that narrows outwardly, apex truncated, produced into small lateral points, this central structure nearly as long as the outer dististyle; neither the long arms of the aedeagus nor the decussate gonapophyses found in *preclara* are evident and presumably have been broken in the unique type slide; lateral horns of phallosome longer and more pointed, surface with microscopic setulae.

Holotype.— ♂, Labha, West Bengal, India, 5000 feet, September 11, 1959 (Schmid).

This species is very similar to *Erioptera* (*Psiloconopa*) *preclara* sp.n., differing especially in the details of structure of the male hypopygium.