

THE INDIAN CADDIS FLIES (*TRICHOPTERA*).

BY

MARTIN E. MOSELY, F.R.E.S., F.Z.S.

(*With twelve plates*).

PART V.

(*Continued from page 478 of Volume xxxviii, 1936*).

SERICOSTOMATIDAE McLACHLAN.

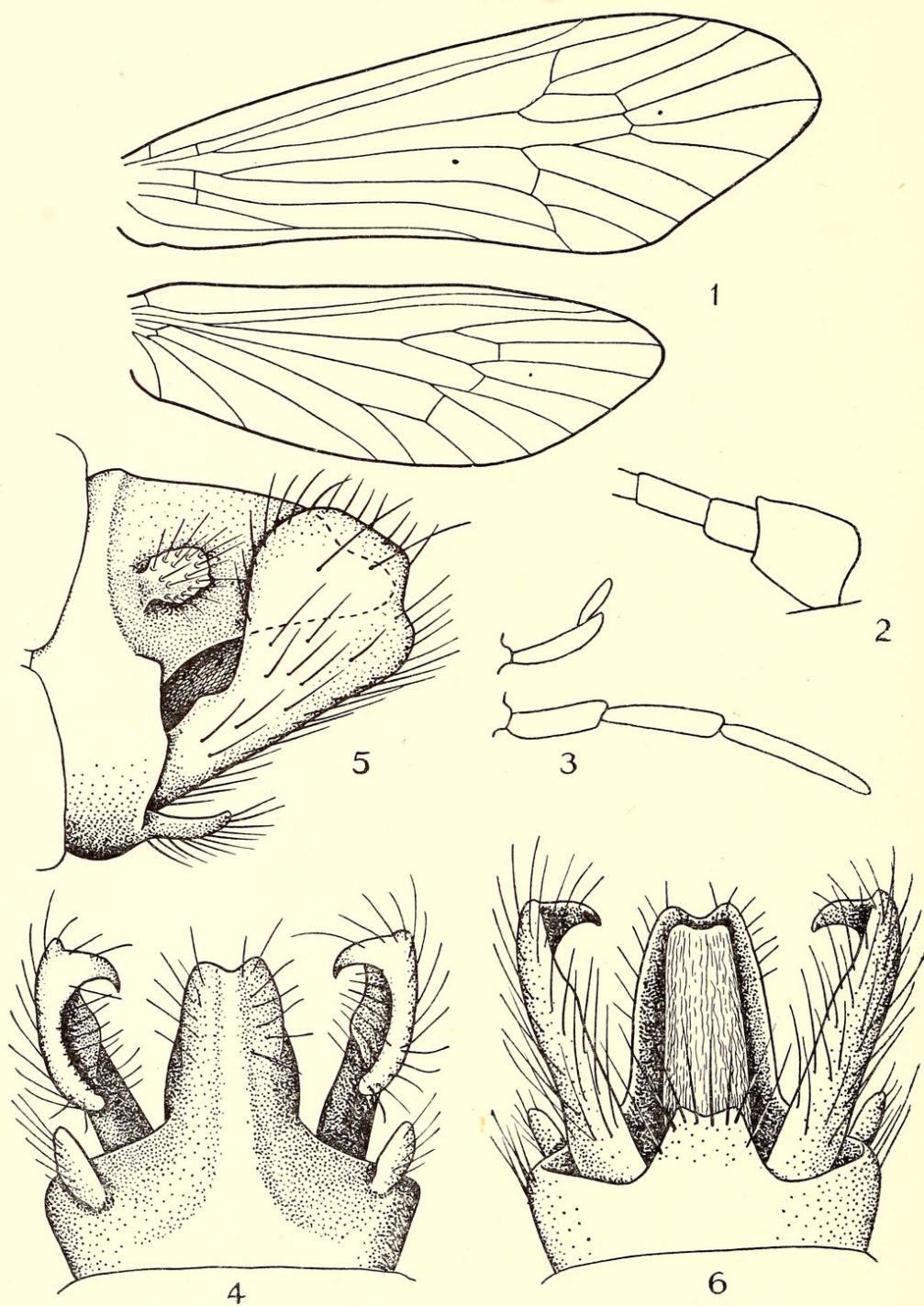
Sericostomatidae.—McLach., Rev. & Syn. Trich., pp. 221-223, 1876.

CHARACTERS OF THE FAMILY.

Antennae as long as the wings or slightly shorter; moderately stout, basal joint often much longer than the head; generally thickly clothed with hair; sometimes furnished with processes or spines; ocelli generally absent; present in the genus *Eothremma*. Maxillary palpi of the ♂ always different in form to those of the ♀, frequently membranous and clothed with specialised hairs or scales; they may be pressed against the face, or merely carried upturned; they are frequently, in this sex, associated with scent-diffusing apparatus; the number of joints varies from one to four but in the ♀, there are always the usual five; labial palpi alike in both sexes, the basal joint small, the second considerably larger, about the same length as the third; wings usually densely pubescent, often with scales or specialized hairs mingled with hairs of the ordinary form; frequently with scale-lined grooves and sometimes with folds as well, or folds without additional grooves; posterior wings generally without folds but frequently with grooves; neurulation varying greatly according to genus, or even in the same genus, or between the sexes of the same species; neurulation generally more regular in the ♀ than in the ♂.

KEY TO THE SUB-FAMILIES.

- | | |
|--|------------------|
| 1. Ocelli present. | THREMMINAE |
| —Ocelli absent. | 2 |
| 2. Fork no. 4 in the posterior wing generally present. | HELICOPSYCHINAE |
| —Fork no. 4 in the posterior wing always absent. | 3 |
| 3. Spurs 2, 2, 4. | SERICOSTOMATINAE |
| —Spurs other than 2, 2, 4. | 4 |



Notidobia nigra sp. n., ♂.—Fig. 1, wings. Fig. 2, basal joints of the antenna.
Fig. 3, palpi. Fig. 4, genitalia, dorsal. Fig. 5, lateral. Fig. 6, ventral.

4. Spurs 2, 2, 2 or 2, 3, 3.
—Spurs other than the above.

BRACHYCENTRINAE

5

5. Fork nos. 1, 2, 3, 5 present in the posterior wing.

GOËRINAE

- Fork nos. 1, 2, 3, 5 never all present in the posterior wing.

LEPIDOSTOMATINAE

Genera not placed in sub-families.

Ashmera spurs 2, 4, 3. Discoidal cell in the posterior wing closed.

Noleca spurs 2, 2, 2, (maxillary palpi single-jointed).

Gastrocentrides spurs 1, 4, 4; forks nos. 1, 2, 3, 5 not all present in the posterior wing.

It has not been found practicable to give keys to the species in the Sericostomatid genera. The student must therefore have direct recourse to the descriptions and figures.

SERICOSTOMATINAE Ulmer.

Sericostomatinae Ulm., Abh. Natur. Ver. Hamb., 18, p. 78, 1903.

Head differently formed in the sexes; basal joint of the antenna shorter than the head; maxillary palpi pressed closely against the face, two- or three-jointed; wings elongate, densely pubescent, neuration alike in both sexes; apical forks nos. 1, 2, 3, and 5 present in the anterior wing, nos. 1, 2, and 5 in the posterior; discoidal cell closed in both wings, the anterior open or closed in the posterior wings. Spurs, 2, 2, 4.

Only one genus, *Notidobia*, has so far been found to occur in India.

Notidobia Stephens.

Notidobia Steph., Ill. Ent., p. 185, 1836.

Spurs 2, 2, 4.

Antennae stout with a stout, nearly rhomboidal basal joint; maxillary palpi pressed against the face, two-jointed in the single, known, Indian species; discoidal cell of the anterior wing oblong, the first apical sector connected with the radius by a nervule at or near the base; posterior wing, discoidal cell not connected to the radius by a transverse nervule. Other characters as detailed in the specific description.

Genotype: *Notidobia ciliaris* L.

Notidobia nigra sp. n. Pl. I, Figs. 1-6.

Insect black. In the ♂, basal joint of the antenna stout, somewhat rhomboidal; maxillary palpi two-jointed, basal joint slightly curved and longer than the second; labial palpi with the first and second joints approximately equal in length, third rather longer; wings black, neuration conforming generally with that of the genotype, *ciliaris*, but differing in detail.

Genitalia ♂.—Apical margin of the ninth tergite strongly produced at its centre to form a dorsal plate, apex excised; at the base of the plate, on each side, is a small, rounded process as seen from the side; penis large, covered by the pent sides of the dorsal plate; inferior appendages with greatly dilated apices slightly notched at the lower apical margin, a stout claw arising at the upper angle of the notch, directed inwards; centre of the margin of the ninth sternite produced in a small ventral plate with an excised apical margin.

Length of the anterior wing ♂ 9 mm.

N.-E. Burma: Kambaiti, 6,800 ft., 9-iv-1934; 7,000 ft., 10-iv-1934, R. Malaise.

Type ♂ in the collection of the Stockholm Museum. Paratype ♂ in the British Museum collection.

GOËRINAE Ulmer.

Goërinae Ulm., Abh. Natur. Ver. Hamb., 18, p. 81, 1903.

Ocelli absent; basal joint of the antennae about twice the length of the head, very hairy; maxillary palpi of the ♂ closely applied to the face, hairy, often with thickened or clavate hairs; joints varying in number, labial palpi long and stout; wings short and broad, densely pubescent, often with grooves or folds, especially in the posterior region in the ♂, that partly obliterate the neuration which, otherwise, is the same in both sexes; in the anterior wings, discoidal cell present, open in the posterior; apical forks nos. 1, 2, 3, and 5 in both wings; generally a ventral process to the sixth or seventh ventral segments, sometimes both.

In the ♀, the ninth dorsal segment is rather small and from it proceeds the tubular piece which is deeply divided, forming two narrow, hairy valves; ninth ventral segment nearly obsolete, eighth forming a polished plate, seventh regularly rounded; a tooth to the sixth. Spurs 2, 4, 4 or 1, 4, 4.

Goëra Leach.

Goëra Leach, Edinb. Enc., p. 136, 1815;

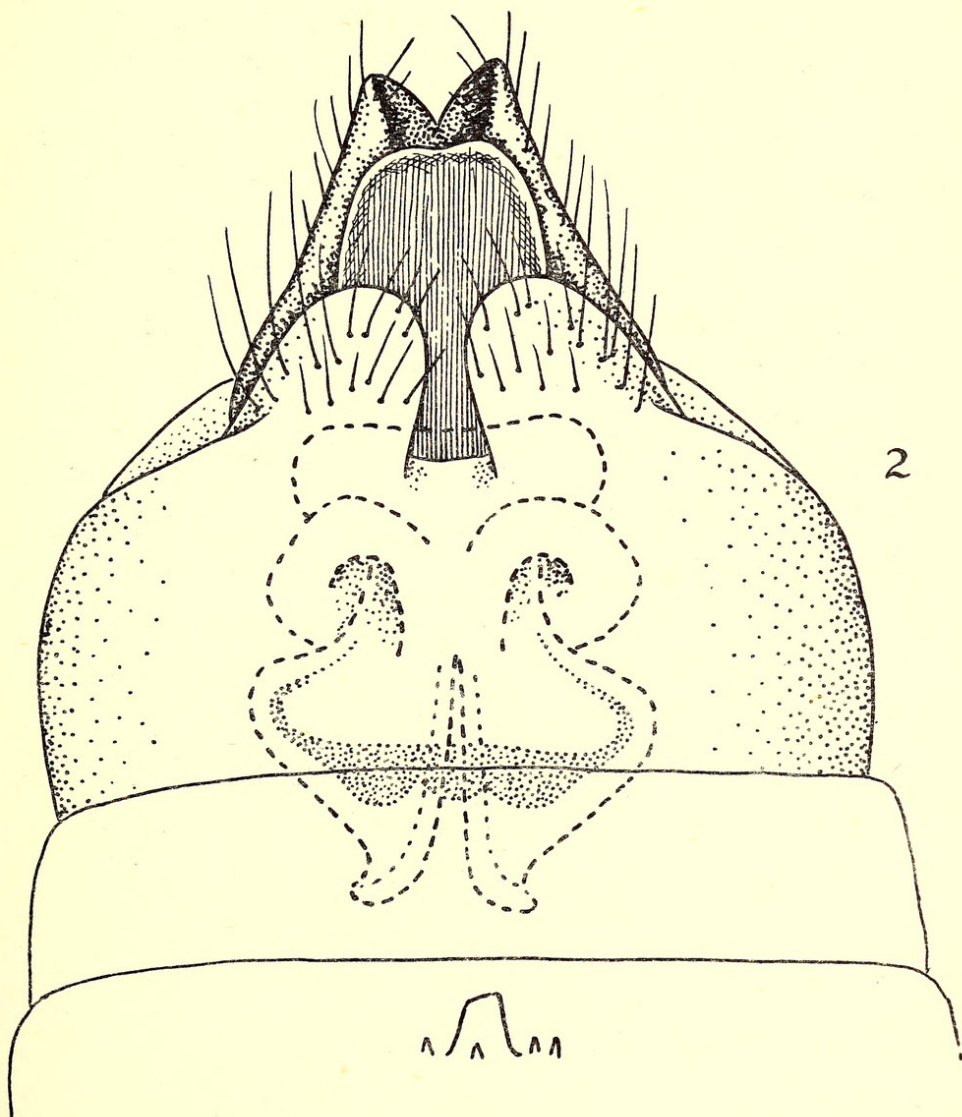
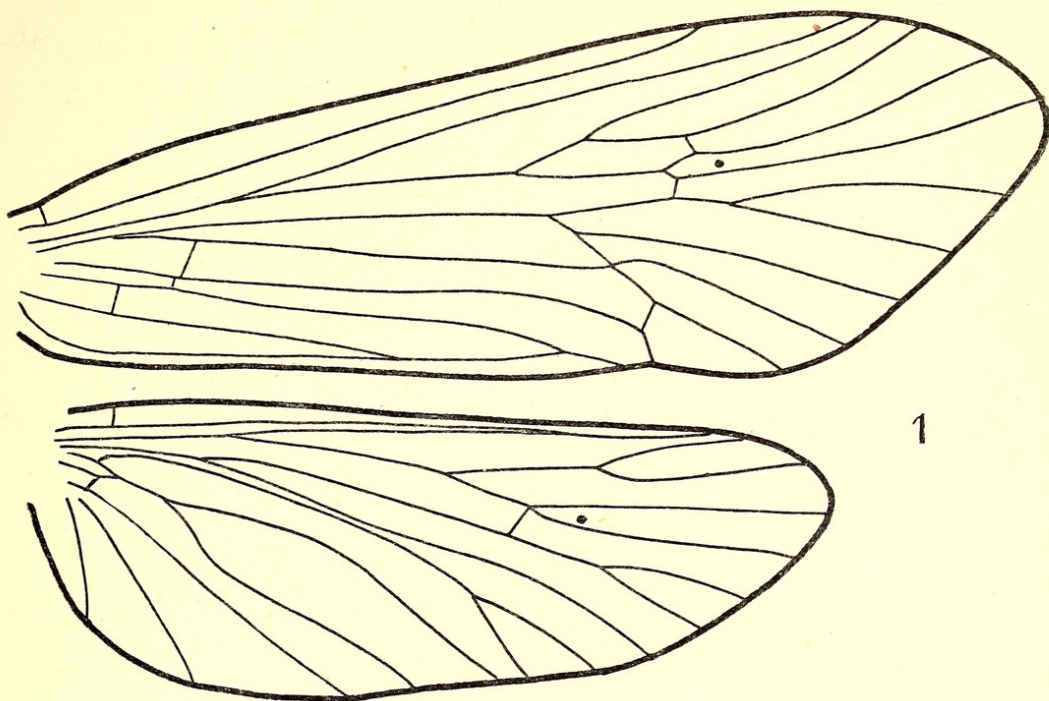
„ McLachlan, Rev. and Syn. Trich., p. 240, 1876;

„ Ulmer, Gen. Insect., fasc. 60a, p. 87, 1907.

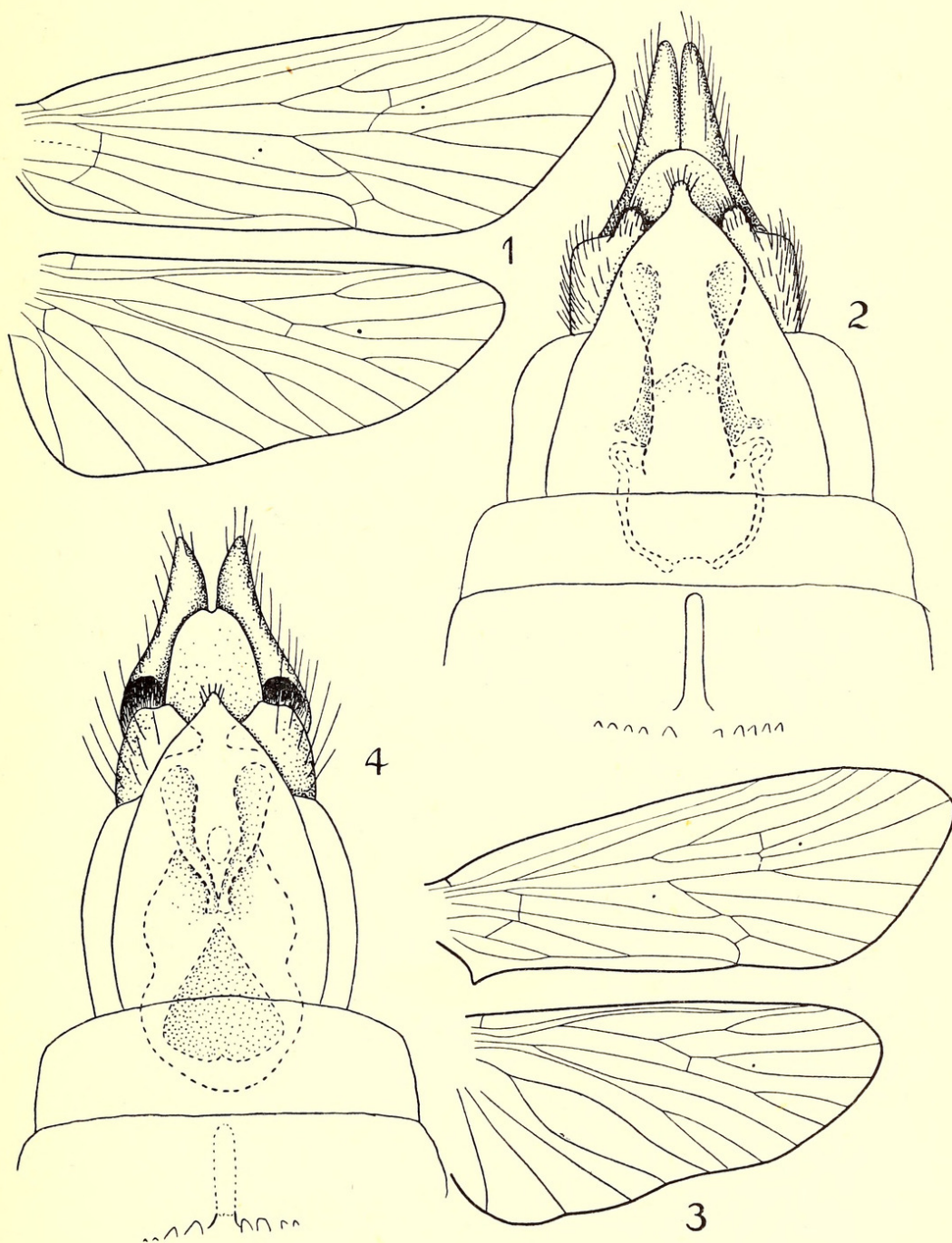
Spurs 2, 4, 4 or 1, 4, 4.

Maxillary palpi, generally three-jointed, the two basal joints very short, terminal joint sometimes capable of being inflated in a membranous sac bearing specialized hairs or androconia; wings generally short and broad, covered with dense pubescence, but there are no intermingled scales; neither folds nor grooves in the male wings; in the anterior wings in both sexes, the area below the *cellula thyridii* is generally dilated at the end, forming a small, irregular, circular space free from pubescence; external post-costal cellule in the anterior wing, very long and narrow; a transverse nervure connecting the lower branch of the sector to the upper branch of the medius in the posterior wing; spurs 1, 4, 4 or 2, 4, 4.

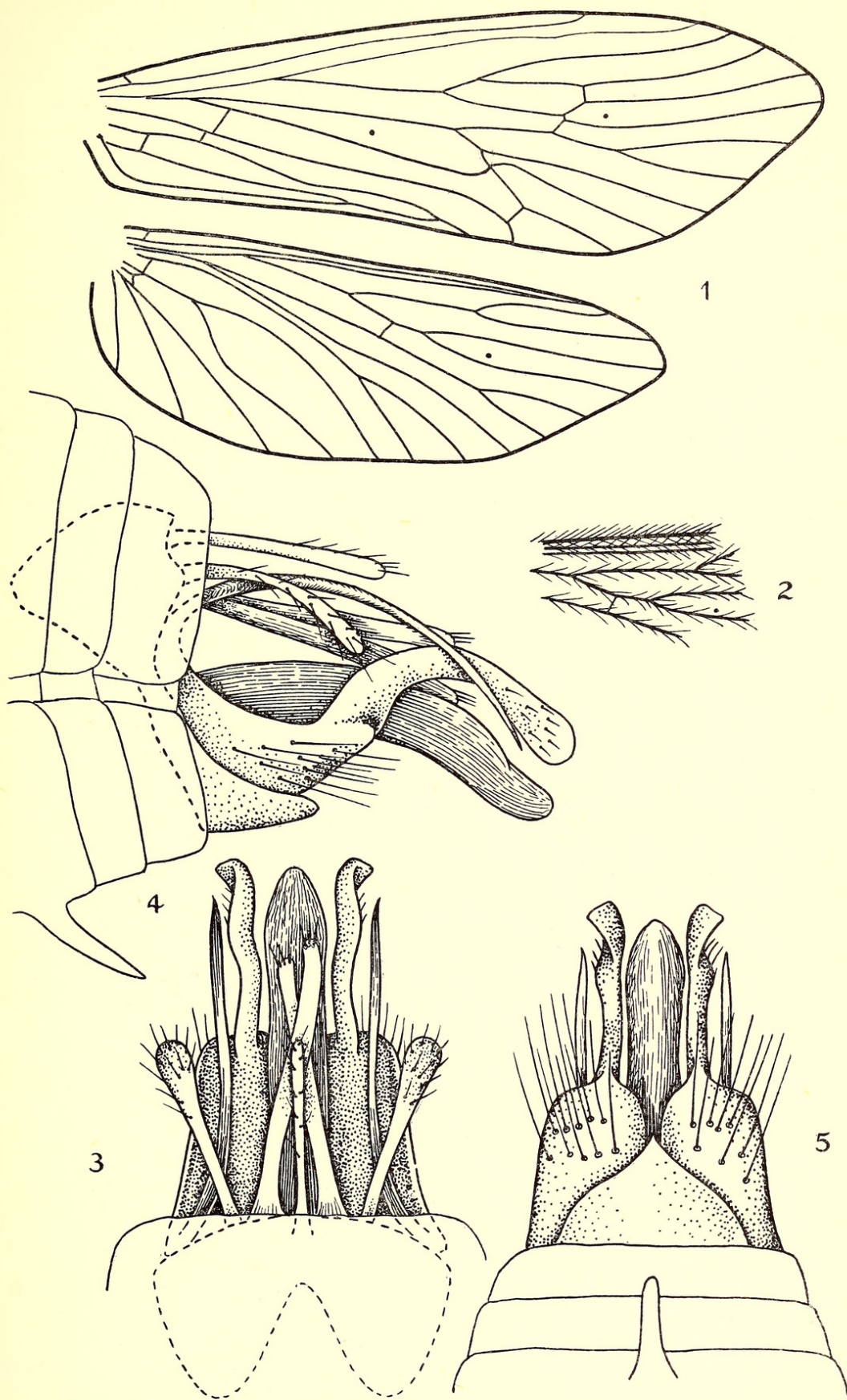
Genotype: *Goëra pilosa* F.



Goëra atra sp. n , ♀.—Fig. 1, wings. Fig. 2, apex of the abdomen, ventral.



Goëra kursea sp. n., ♀.—Fig. 1, wings. Fig. 2, apex of the abdomen, ventral.
Goëra kalimpa sp. n., ♀.—Fig. 3, wings. Fig. 4, apex of the abdomen, ventral.



Goëra minor sp. n., ♂.—Fig. 1, wings. Fig. 2, portion of the posterior wing. Fig. 3, genitalia, dorsal. Fig. 4, lateral. Fig. 5, ventral.

Goëra atra sp. n. Pl. 2. Figs. 1-2.

Insect blackish. Neuration conforming to the usual pattern in the genus. The abdomen terminates in a pair of processes which are rather shorter and blunter than is usual with species of *Goëra*; structures connected with the vagina very strongly chitinized; a short (? broken), wide process to the sixth sternite, flanked on each side by one or two small teeth or tubercles. Spurs, 2, 4, 4.

Length of the anterior wing ♀ 9 mm.

N.-E. Burma: Kambaiti, 11-v-1934, R. Malaise.

Type ♀ in the collection of the Stockholm Museum. A ♀ paratype in the British Museum collection.

The unusual colour for a *Goëra* should render this species easily recognizable.

Goëra kursea sp. n. Pl. 3. Figs. 1-2.

Having regard to the similarity in neuration in both sexes in this genus, there should be no difficulty in correctly associating the males on this character, and I have therefore described this species from a female type.

Both neuration and the structures connected with the vagina serve to identify the species in the female sex.

The insect is brownish and in the anterior wing, fork no. 1 extends about halfway across the upper margin of the discoidal cell and is rather broad. The structures of the vagina are shown in the accompanying figure. Spurs 2, 4, 4.

Length of the anterior wing ♀ 10 mm.

Sikkim: Kurseong, 7 to 20-vi-1922, Fletcher collection.

Type ♀ in the collection of the British Museum.

Goëra kalimpa sp. n. Pl. 3. Figs. 3-4.

Insect brown; in the anterior wing, fork no. 1 is long and narrow, extending more than halfway along the upper margin of the discoidal cell; structures of the vagina differing from those of *kursea* as shown in the figure. Spurs 2, 4, 4.

Length of the anterior wing ♀ 9 mm.

Sikkim: Kalimpong, Lindgren collection.

Type ♀ in the collection of the British Museum.

Goëra minor sp. n. Pl. 4. Figs. 1-5.

Insect small and yellowish. The type was collected in fluid and is considerably denuded as to the anterior wings; in the posterior, the nervures are set with stout hairs directed outwards, an unusual vestiture. Spurs 2, 4, 4.

Genitalia ♂.—Ninth tergite cut away above; in the cavity is a pair of slender superior appendages with dilated apices as seen from above, from the side, slightly arched; between them is a central process a little shorter than the appendages; beneath this is a pair of long, rod-like processes, crossing at the truncate apices which are armed with a few bristles; penis long and stout, curving slightly downward; inferior appendages branched; there is

a long, spine-like upper branch, curving upwards and distally, adjacent at its base to the margin of the ninth segment as seen from the side also and, a lower branch, much stouter and elbowed so that its apical half is curved and directed distally; from beneath, the base of the appendage is stout and the apex of the lower branch is turned slightly outward; apical margin of the ninth sternite strongly produced to form a triangle with a slender, produced apex; a strong ventral process to the sixth sternite.

Length of the anterior wing ♂ 5 mm.

Burma: Washaung, 20k. east of Myitkyina, 16-vii-1934, R. Malaise.

Type ♂ in the collection of the Stockholm Museum.

Goëra mandana sp. n. Pl. 5. Figs. 1-6.

Insect light ochraceous; maxillary palpi ♂, two-jointed, basal joint small, terminal joint capable of being extended so as to form a membranous sac which is covered on the inner surface with dark androconia towards the basal half, and with pale androconia in the apical half; there is a small, membranous branch at the base, carrying a tuft of black hair; labial palpi, basal joint very short, second and third much longer, approximately equal; wings, neuration of the typical *Goëra* pattern; fork no. 3 of the anterior wing long. Spurs, 2, 4, 4.

Genitalia ♂.—Dorsal margin of the ninth tergite widely and deeply excised; in the cavity thus formed are three processes, the two outer, short, one directed asymmetrically outwards, possibly broken in the type; the central process rather longer, with a truncate apex; beneath these is a pair of strongly chitinized, asymmetric processes, the one in the form of a very fine spine, the other stouter, with a flattened, blade-like apex; penis with a membranous apical part, curled and terminating in a strongly chitinized point; it is armed on its upper surface with a pair of short and very strongly chitinized, acute spurs; there is also a small, concave plate on the upper surface before the apex; penis-sheaths stout, bent downward from about midway; inferior appendages apparently with two joints fused together, three-branched; basal (?) joint very broad; the lower branches more strongly chitinized than the other two; from beneath, straight and divergent; behind this are the upper branches which are semi-transparent and plate-like, the inner wider than the outer, separated from each other by a rounded excision; from the side, the upper branches are the longest; ninth segment from beneath, produced in a broad triangle; a large, comb-like structure to the sixth ventral segment.

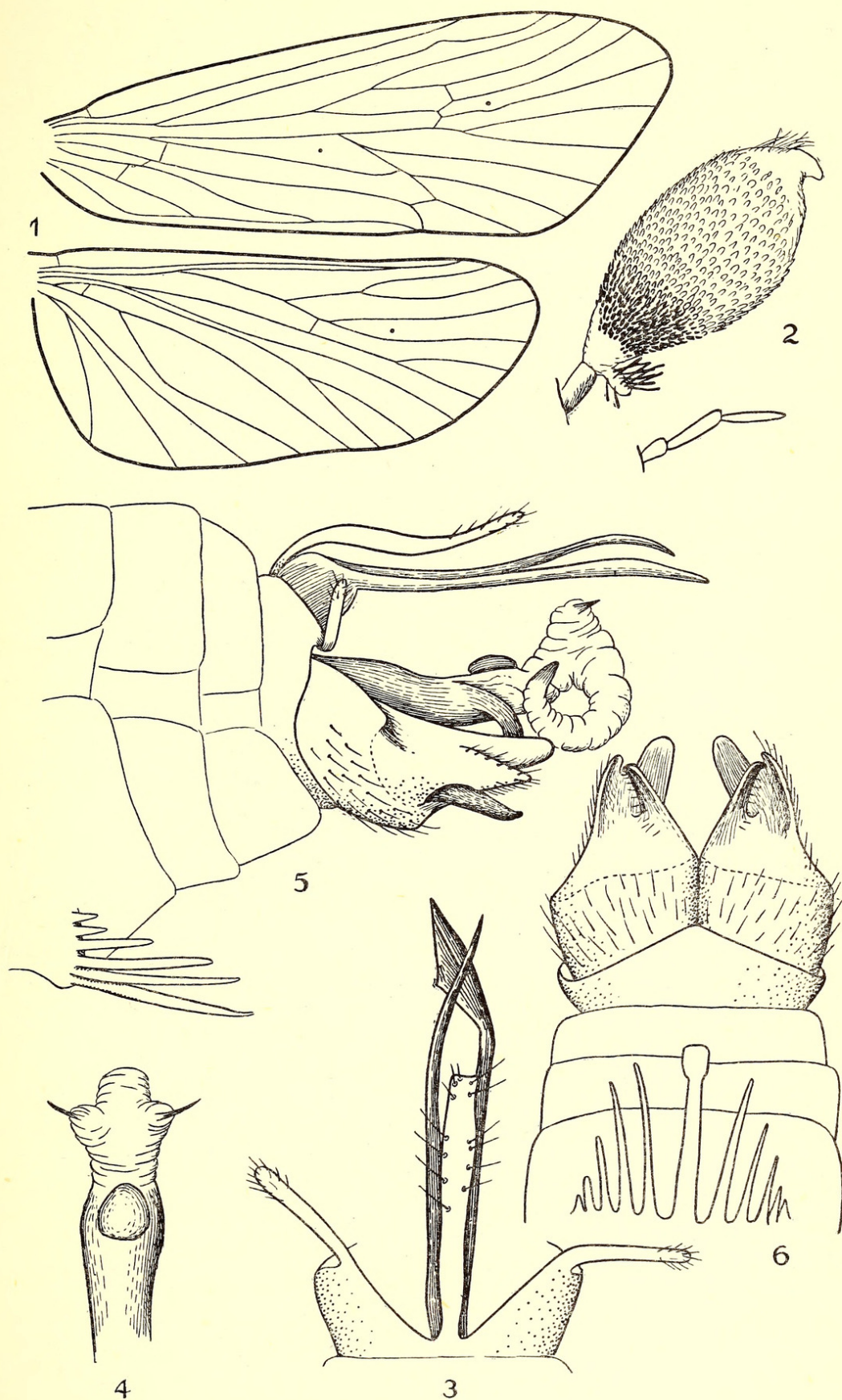
Length of anterior wing ♀ 8 mm.

Andamans: Mt. Harriet, 1,200 ft., 6-iv- 7-v-1927, Ferrar coll.

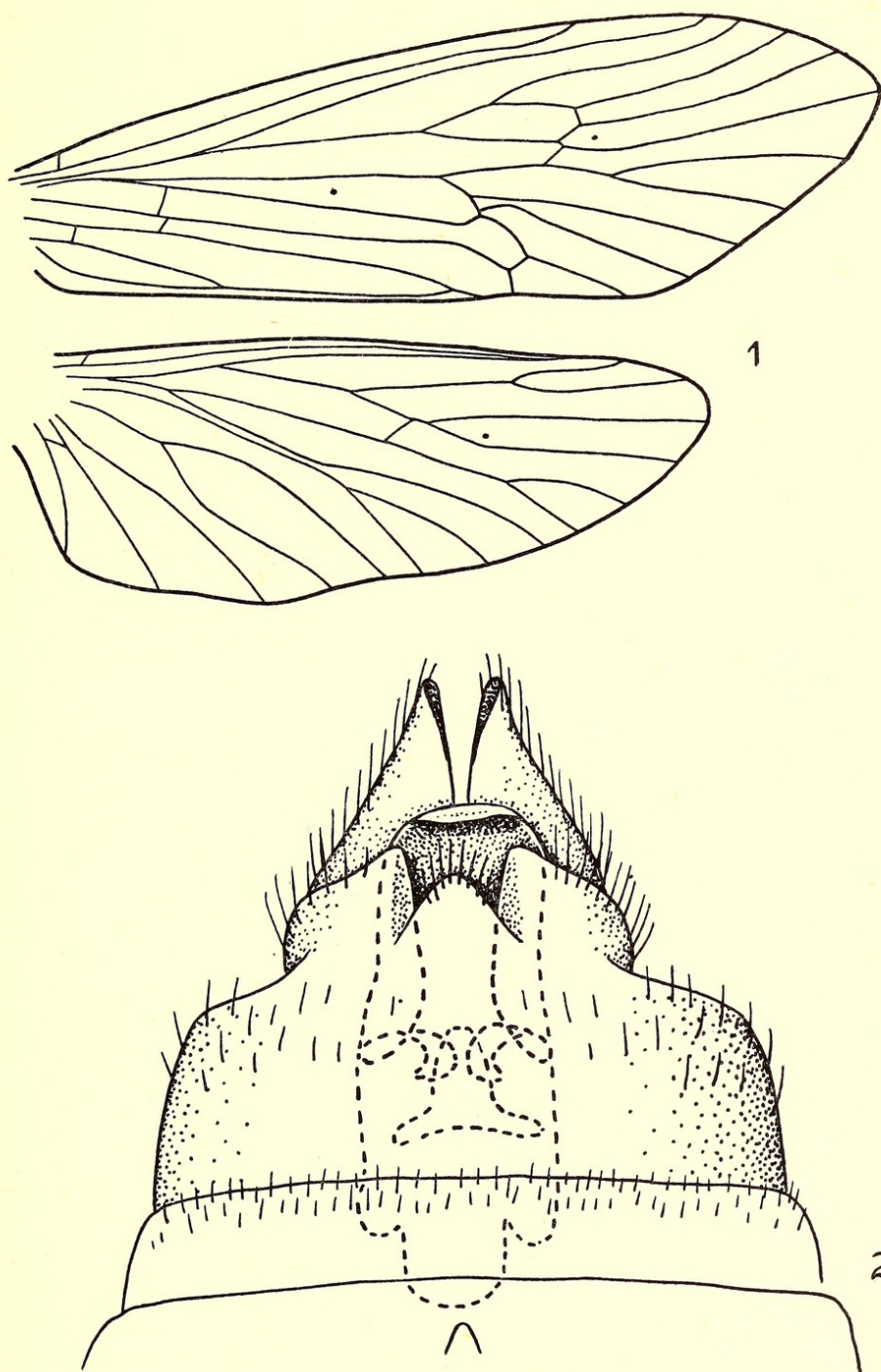
Type ♂ in the collection of the British Museum.

Goëra mishmia sp. n. Pl. 6. Figs. 1-2.

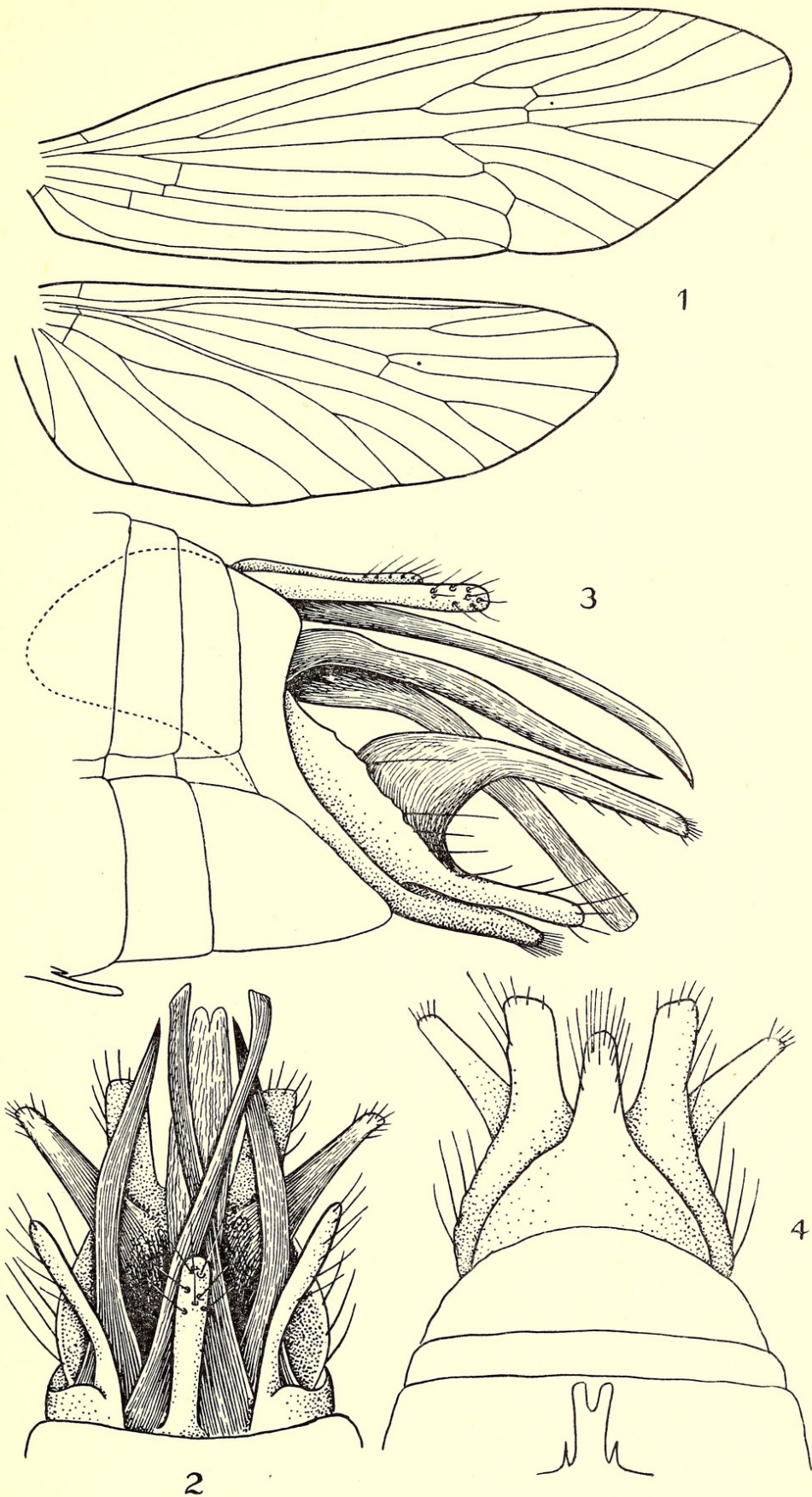
Insect yellowish-brown, unusually small; wings clothed with dense, yellowish pubescence; neuration conforming to the usual



Goëra mandana sp. n., ♂.—Fig. 1, wings. Fig. 2, palpi. Fig. 3, dorsal processes. Fig. 4, penis, from above. Fig. 5, genitalia, lateral. Fig. 6, ventral.



Goëva mishmia sp. n., ♀.—Fig. 1, wings. Fig 2, apex of abdomen, ventral.



Goëra rumabia sp. n., ♂.—Fig. 1, wings. Fig. 2, genitalia, dorsal. Fig. 3, lateral. Fig. 4, ventral.

Goëra pattern; in the anterior wing, the eighth apical sector is bent upwards nearly to meet the seventh towards its base; structure of the vagina as shown in the figure. Spurs 2, 4, 4.

Length of the anterior wing ♀ 6 mm.

Assam: Mishmi Hills, Lohit River, vi-1935, M. Steele.

Type ♀ in the collection of the British Museum.

***Goëra nigricornis* Navás.**

Goëra nigricornis Nav., Rev. Ac. Cienc. Fis. Nat. Zaragoza, 15, p. 39, 1932.

Navás describes this species as follows:—

‘Caput fulvum, fulvo pilosum; oculis nigris; antennis nigris, primo articulo fulvo, fulvo piloso, elongato, longiore spatio interoculari.

‘Thorax inferne fuscus, superne fulvo-ferrugineus, mesonoto ad latera fuscescente; pilis fulvis.

‘Abdomen fulvo-flavum, primo segmento subfusco, appendicibus fulvo-flavis.

‘Pedes fusco-nigri, tarsis ferrugineo-fulvis; calcaribus fusco-nigris; tibiis posterioribus ferrugineis.

‘Ala anterior apice parabolico, pubescentia densa et reticulatione ferrugineis; cellula discali brevior suo pedunculo; furca apicale 1 longa, ad medium cellulae discalis penetrante; membrana fulvo leviter tincta in speculo suborbiculari in apice areae cubitalis laevi, hyalino.

‘Ala posterior membrana levissime fulvo tincta; furca apicali 2 breviter, 3 longius pedunculata; reticulatione forti, conspicua, fusca, itemque pilis fimbriisque fuscis.

‘Long. corp. ♀ 9 mm.

‘Long. al. ant. 10.6 mm.

‘Long. al. post. 8.2 mm.

‘Patria. Khandala (Bombay), 20-X-1929.’

Type ♀ in the Navás collection.

***Goëra rumaba* sp. n. Pl. 7. Figs. 1-4.**

General appearance light fulvous; antennae fairly stout, basal joint not so long as the greatest breadth of the head without the oculi; maxillary palpi three-jointed, partly membranous, first joint small, strongly chitinized and pigmented, second about three times the length of the first, membranous, but with a strongly chitinized and pigmented nodule at the base, third, membranous, slightly longer than the second; labial palpi, basal joint short, second and third equal, rather longer than the first; wings rather broad, clothed mainly with ordinary hairs but there are some clavate hairs in the post-costal region, no scales; no scales or clavate hairs on the posterior wing; spurs 2, 4, 4.

Genitalia ♂.—The apical margin of the ninth tergite bears at its centre three membranous processes, the central, rather the shorter; beneath them is a pair of long, strongly chitinized spines crossing each other about the middle, apices truncate; there are two, long, rod-like intermediate appendages with acute apices;

beneath these is a long, straight penis with an excised apex; inferior appendages bifurcate; the upper forks from above, widely divergent on each side of the penis, with wide bases, tapering to truncate apices; the direction of the forks appears to vary in individuals; lower forks long, rectangular, with truncate apices; from the side, the upper and lower forks are separated by an excision represented by three sides of a square; the ninth sternite strongly produced, the centre of its margin still further produced in a narrow, fringed process with a rounded apex; the sixth sternite bearing a bifurcate process with a spine on each side of its base; this process is variable in shape in individuals.

Length of the anterior wing ♂ 9 mm.

N.-E. Burma: Kambaiti, 6,800 ft., 9-iv-1934, R. Malaise.

Type ♂ in the collection of the Stockholm Museum. Paratypes in the collection of the British Museum.

Goëra tridens sp. n. Pl. 8. Figs. 1-4.

Insect deep, yellowish brown, wings covered with dense pubescence of the same shade. Spurs 2, 4, 4.

Genitalia ♂.—Ninth tergite cut away to leave a wide cavity in which is a pair of slender superior appendages and between them, a central process, similar in shape but slightly longer; immediately beneath this process is a pair of very long, stout spines, crossing at their apices; beneath these is the penis, furnished with a trough-shaped lower penis-cover with excised apex; inferior appendages branched at the apices; from the side, basal part bulbous, covered with very stout hairs; lower branch, from above, slender, terminating at its apex in a hook; from beneath, it tapers to an acute apex, the upper branch being shorter, oval and with a rounded apex; process to the sixth sternite formed of three prongs, the central the longest.

Length of the anterior wing ♂ 8 mm.

India: Kharsis. (McLachlan collection.)

Type and paratypes ♂ in the collection of the British Museum.

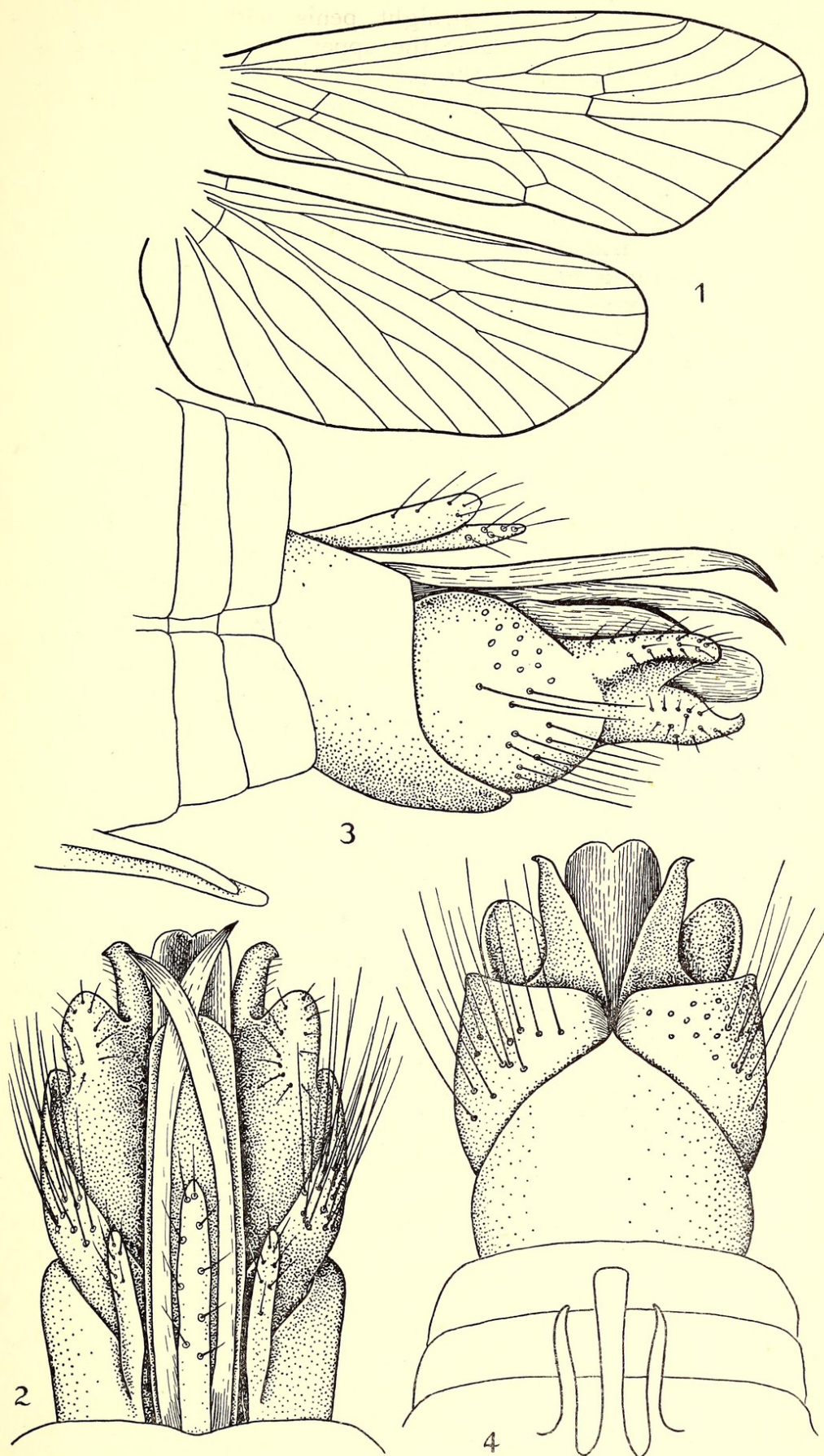
Goëra vulpina Hagen. Pl. 9. Figs. 1-7.

Mormonia vulpina Hagen *partim*, Verh. zool.-bot. ges. Wien, ix, p. 208, 1859.

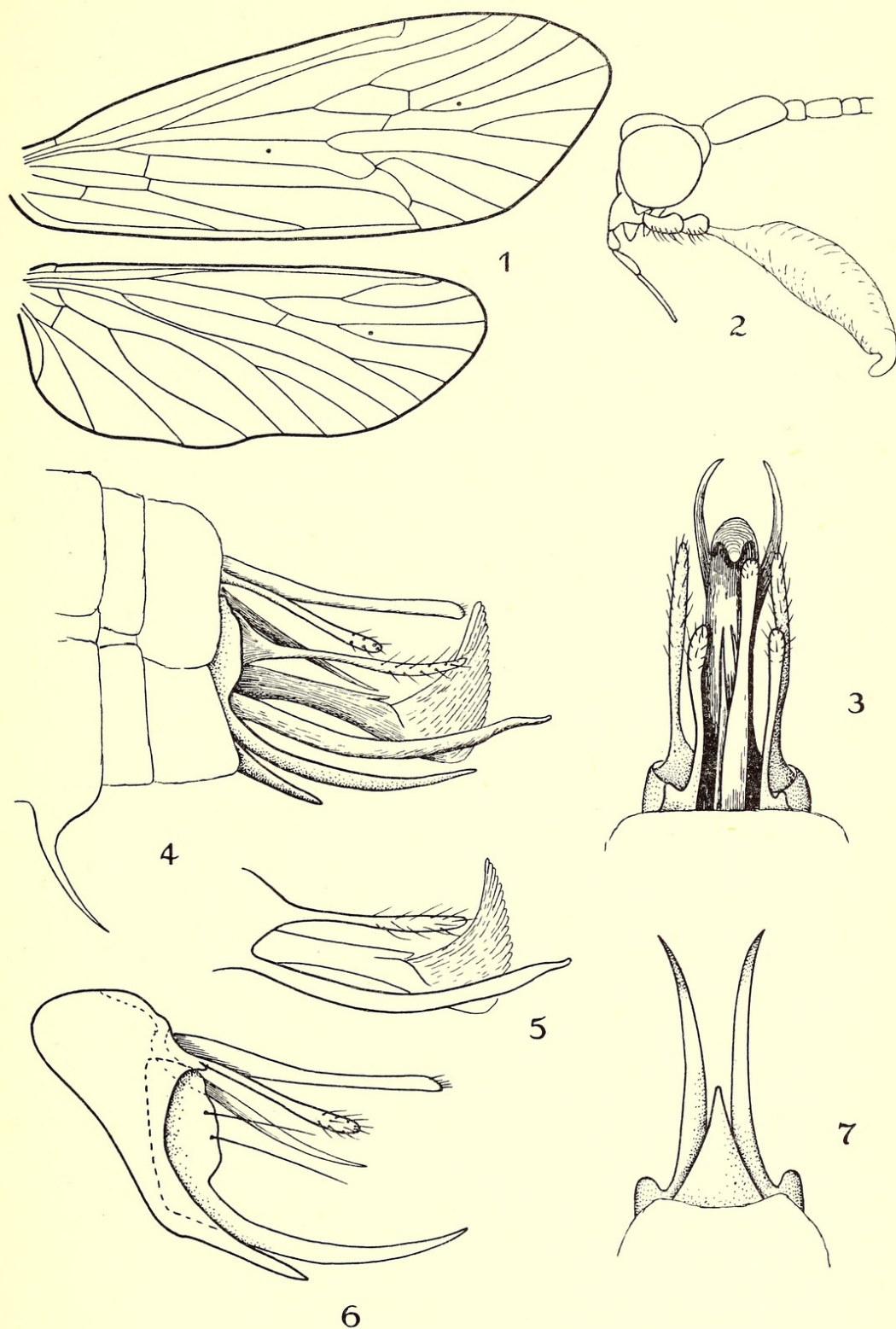
Goërodes vulpina Ulmer *nec* Hagen, Coll. Selys, fasc. vi (i), p. 40, fig. 64, 1907.

Goërodes vulpina Ulmer *nec* Hagen, Gen. Insect. fasc. 60a, p. 106, 1907. Deut. ent. Zeit., 1915, p. 75, 1915.

Description of the ♂. Insect light ochraceous generally; basal joint of the antenna about as long as the width of the head without the oculi; second joint short, about half the length of the third which is twice as long as each of the remaining joints towards the base, but these tend to become longer towards the apex; the third joint bears an impressed line halfway round its circumference on the inner side so that it is probably formed by the welding together of two joints; maxillary palpi three-jointed, a fringe of dark hairs on the under side; when cleared in KOH, it may be seen that the two basal



Goëra tridens sp. n., ♂.—Fig. 1, wings. Fig. 2, genitalia, dorsal. Fig. 3, lateral.
Fig. 4, ventral.



Goëra vulpina Hagen, ♂.—Fig. 1, wings. Fig. 2, head and palpi. Fig. 3, dorsal processes. Fig. 4, genitalia, lateral. Fig. 5, penis and intermediate (?) appendages. Fig. 6, dorsal processes, upper penis-cover, inferior appendages and ninth sternite. Fig. 7, ventral plate and inferior appendages, from beneath.

joints are small and more strongly chitinized than the third which forms a membranous sac, large, upturned in front of the face, the extreme apex constricted and bent; the joint is clothed with a few scattered and broadened hairs; labial palpi with a small basal joint, second more than twice the length of the first and shorter than the third; legs, anterior pair rather darker than the rest of the insect; spurs 1, 4, 4; anterior leg with a single short, stout spur and a heavily fringed tibia; wings thickly clothed with yellowish pubescence; anterior, discoidal cell short and broad, fork no. 2 with a minute foot-stalk; in the posterior wing, fork no. 2 with a long foot-stalk

Genitalia ♂.—Ninth dorsal segment retracted within the eighth; the centre of its margin is produced in three long, strongly chitinized rods of which the central is the longest; the apices of the outer (possibly superior appendages), slightly dilated; beneath them is a pair of long, transparent spines, perhaps an upper penis-cover; penis straight with a membranous apex shaped like a foot with the toes turned up as seen from the side; there is a small dorsal spur at the base of the membranous apex; then there is a pair of bifurcate processes, possibly intermediate appendages, the upper forks long and fringed, appearing above the penis, the lower still longer and slightly upcurved with sinuous apices but no fringes; inferior appendages in the form of a pair of strongly chitinised spines, about the same length as the penis, curving upward; centre of the margin of the ninth ventral segment produced in a ventral plate forming a stout spike; a strong and long down-curving process to the sixth ventral segment.

Length of anterior wing ♂ 7 mm.

Ceylon: Rambodde, (Nietner).

The Hagen series of cotypes of his species *Mormonia vulpina* is mixed, containing at least one insect either a *Goëra*, or very closely allied to species in this genus, and others belonging to a genus in the *Lepidostomatinae*.

Hagen, whilst he refers to scales on the wings of the males of all the other *Mormonia* species he describes, writes of *vulpina* in the following terms, '*alis anticis luteis, luteo hirtis* (masc); there is no mention of scales.

I describe *vulpina* from a ♂ example, bearing a label in Hagen's own handwriting, in the type series to which he referred and which was received in exchange from the Harvard Museum of Comparative Zoology, Cambridge, Mass., U.S.A., where the Hagen collection is lodged. This description conforms with that of Hagen.

Ulmer, in the Cat. Selys. Coll., figures the wings of one of the two ♀ cotypes in the Brussels Museum but does not actually designate this ♀ as the type of the species; his figure shows clearly that the Brussels insect belongs to the sub-family of the *Lepidostomatinae* in which nearly all the known ♂ species in Ceylon bear scales on the wings; moreover, the female wing of a *Goëra* species or of a species with a neuration such as I have figured, would not resemble Ulmer's figure.

I am therefore of opinion that the Brussels females belong to a different species, and I here designate the male cotype, mounted in

balsam and figured here, the type of *vulpina*. This type has been returned to Mr. Banks, at the Harvard Museum.

BRACHYCENTRINAE Ulmer.

Brachycentrinae Ulm., Abh. Natur. Ver. Hamb., 18, p. 85, 1903

Basal joint of the antenna shorter than the width of the head with the oculi. Maxillary palpi cylindrical, hairy, curved upward, not applied against the face, three-jointed, basal joint shorter than the others; labial palpi longer than the maxillary palpi, stout, basal joint short, second and third approximately equal; wings varying in form, usually rather broad, posterior generally much shorter than the anterior; no grooves or folds in either pair; pubescence usually dense but never mixed with scales; neurulation generally differing in the sexes; in the anterior wing, the discoidal cell is ordinarily short and broad; apical forks nos. 1, 2, 3 and 5 usually present in the ♂ and often fork no. 4 in addition in the ♀; in the posterior wing, discoidal cell is usually open; ordinarily, forks nos. 1 and 5 in the ♂, with frequently additional forks in the ♀; a transverse nervure connects the radial sector to the medius; spurs varying; often a lobe or tooth to the 7th ventral segment.

KEY TO THE BRACHYCENTRINAE.

1. Spurs 2, 3, 3.
- Spurs 2, 2, 2.

BRACHYCENTRUS
MICRASEMA

Brachycentrus Curt.

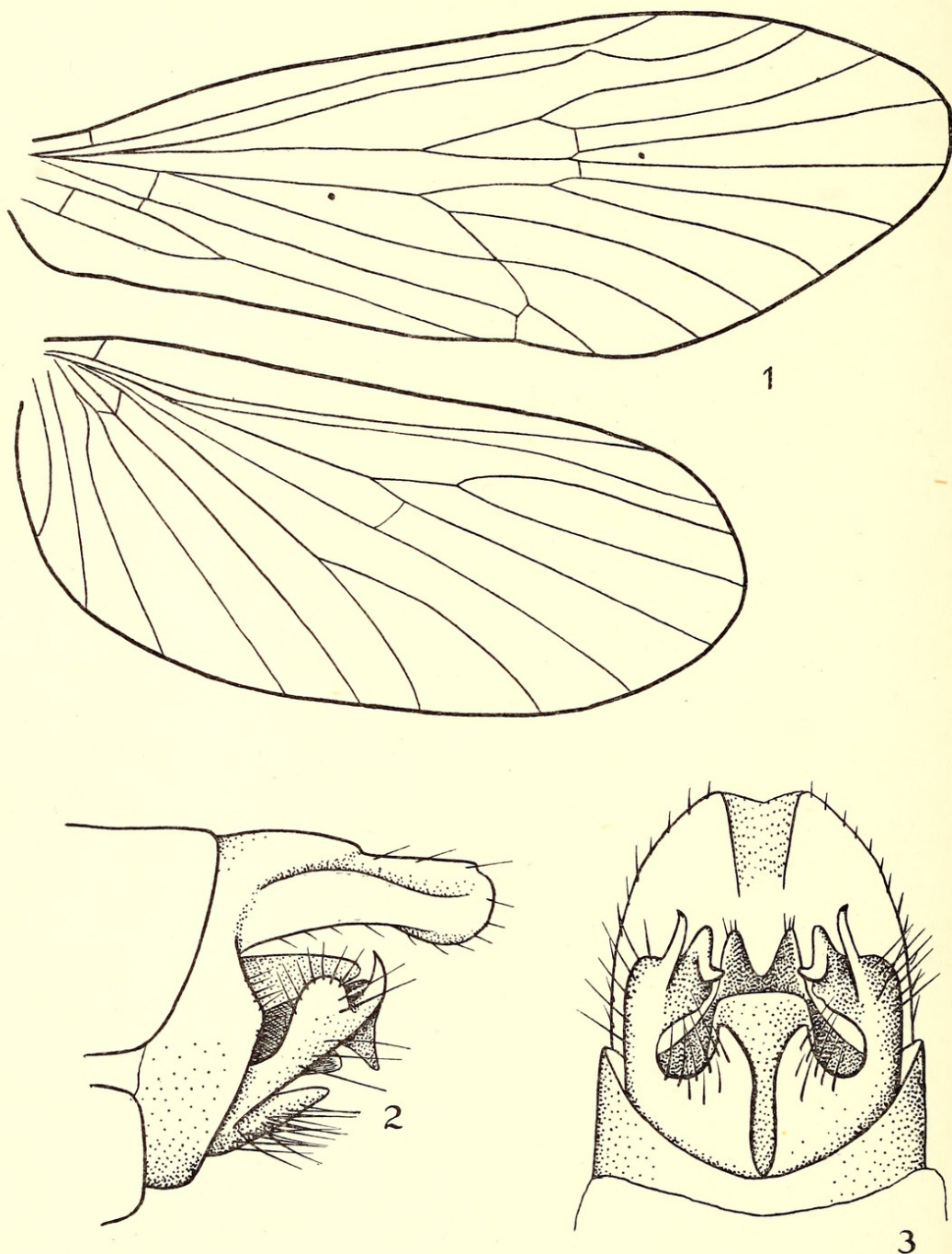
Brachycentrus Curtis, Phil. Mag., 1834, p. 215.

Spurs 2, 3, 3.

Antennae slender, about the length of the wings, basal joint stout, maxillary palpi of the male upturned, three-jointed, middle joint longer than the first or last; maxillary palpi of the female long and slender, terminal joints thin, third joint the longest, second, fourth and fifth nearly equal in length, basal joint short; anterior wings moderately broad and elongate, without folds or scales in the male; apical margin somewhat oblique, much more oblique and produced in the female than in the male; in the anterior wing male, forks nos. 1, 2, 3 and 5 are present, all extending to the anastomosis; in the anterior wing female, forks nos. 1, 2, 3, 4 and 5 are present; no. 4 does not reach the anastomosis; discoidal cell short and broad in both sexes, more particularly in the female; posterior wings much shorter than the anterior, broad and very obtuse (slightly less so in the female); discoidal cell open; only forks nos. 1 and 5 present in the male, but nos. 1, 2, 3 and 5 in the female; lower branch of the sector connected with the medius by a nervule.

Genitalia male.—A large dorsal hood covers the various genital appendages. The species are best separated by the form of the inferior appendages.

Genotype: *Brachycentrus subnubilus* Curt.



Brachycentrus kozlovi Mart., ♂.—Fig. 1, wings. Fig. 2, genitalia, lateral Fig. 3, from behind.

The species belonging to this genus are wont to appear in great swarms, early in the season. The females are frequently seen carrying an ovoid mass of bluish-green eggs at the oviducts; if the insect be examined when in this condition, it will be noticed that the terminal segments are inturned to make a kind of cup in which the eggs are carried.

Brachycentrus kozlovi Martynov. Pl 10. Figs. 1-3.

Brachycentrus kozlovi Mart., Ann. Mus. Zool. Ac. Sci.

Peters., xiv, pp. 291-4, figs. 6-9, 1909.

Head and thorax fuscous with light, honey-coloured hairs; oculi black; antennae fuscous with pale annulations; palpi and legs testaceous; spurs 2, 3, 3; wings greyish with light honey-coloured pubescence.

Genitalia ♂.—Ninth dorsal segment produced in a large hood with a slightly excised apical margin; this hood obscures all the genital parts from above; upper penis-cover deeply excised; penis with a swollen and slightly cleft apex; lower penis-cover in the form of a rectangular plate; inferior appendages rather complicated; in each, there is a lower, strongly chitinized, triangular basal fork separated from the remainder of the appendage by a deep rounded excision as seen from beneath; the apical portion of the appendage consists of two leaves, the outer from behind, with a strongly produced, inner, apical angle, from the side, very acute and curving upwards, the outer apical angle shorter and rounded; the inner leaf with the lower apical angle produced downward and the upper angle rounded.

Length of anterior wing ♂ 9, mm., ♀ 10-11 mm.

Kashmir: L. Vishensar, 12,000 ft., F. J. Mitchell; W. Tibet: Basgo, 20-ix-1932; Chushol, 14,228 ft., 10-viii-1932, G. E. Hutchinson.

The female insect is seen frequently with a ball of olive-green eggs carried at the oviducts. The insect bears a close resemblance to the European species, *Brachycentrus subnubilus* Curt., well-known to anglers under the popular name, the Grannom.

Micrasema McLachlan.

Spurs 2, 2, 2, those of the anterior tibiae very short. Antennae slender, about as long as the wings, those of the ♀ slightly shorter than those of the ♂, basal joint stout. Maxillary palpi ♂ greatly curved and extending to or near the apex of the basal antennal joint, not applied against the face. Anterior wings broad, oval, unicolorous, generally black, neuration obscured by dense pubescence; fork no. 3 of the anterior sometimes with a footstalk, generally sessile; discoidal cell present and short in the anterior wing, absent in the posterior; in the former wing, forks Nos. 1, 2, 3 and 5 present in the ♂, Nos. 1, 2, 3, 4 and 5 in the ♀; in the posterior wing, forks nos. 1 and 5 in both sexes; lower branch of the medius sometimes present, sometimes obsolete or partly obsolete.

Genotype: *Micrasema tristellum* McLach., here designated.

Micrasema baitina sp. n. Pl. 11. Figs. 1-4.

Insect black; fork no. 3 in the anterior wing sessile. Lower branch of the medius in the posterior wing entirely obsolete.

Genitalia ♂.—Dorsal plate forming a large triangle with a slightly excised apex; beneath it may be seen the fringed and rounded apices of the intermediate (?) appendages; penis broad and spatulate, tapering to a slender apex from the side; inferior appendages stout and two-branched, the short, sausage-shaped second branch arising from a deep, nearly right-angular excision on the inner surface towards the apex which is slightly excised.

Length of the anterior wing ♂ 4.5 mm.

N.-E. Burma: Kambaiti, 2,000 m., 4-iv-1934; 7,000 ft., 30-iv-1934; 2,000 m., 12-v-1934.

Type ♂ in the collection of the Stockholm Museum. Paratypes ♂ and ♀ in the Stockholm and the British Museum collections.

Micrasema punjaubi sp. n. Pl. 12. Figs. 1-2.

The single example known of this species has been mounted in balsam and I am unable to describe its general appearance. In the anterior wing, fork no. 1 extends nearly to the middle of the upper margin of the discoidal cell; posterior wing, the lower branch of the medius is partly obsolete.

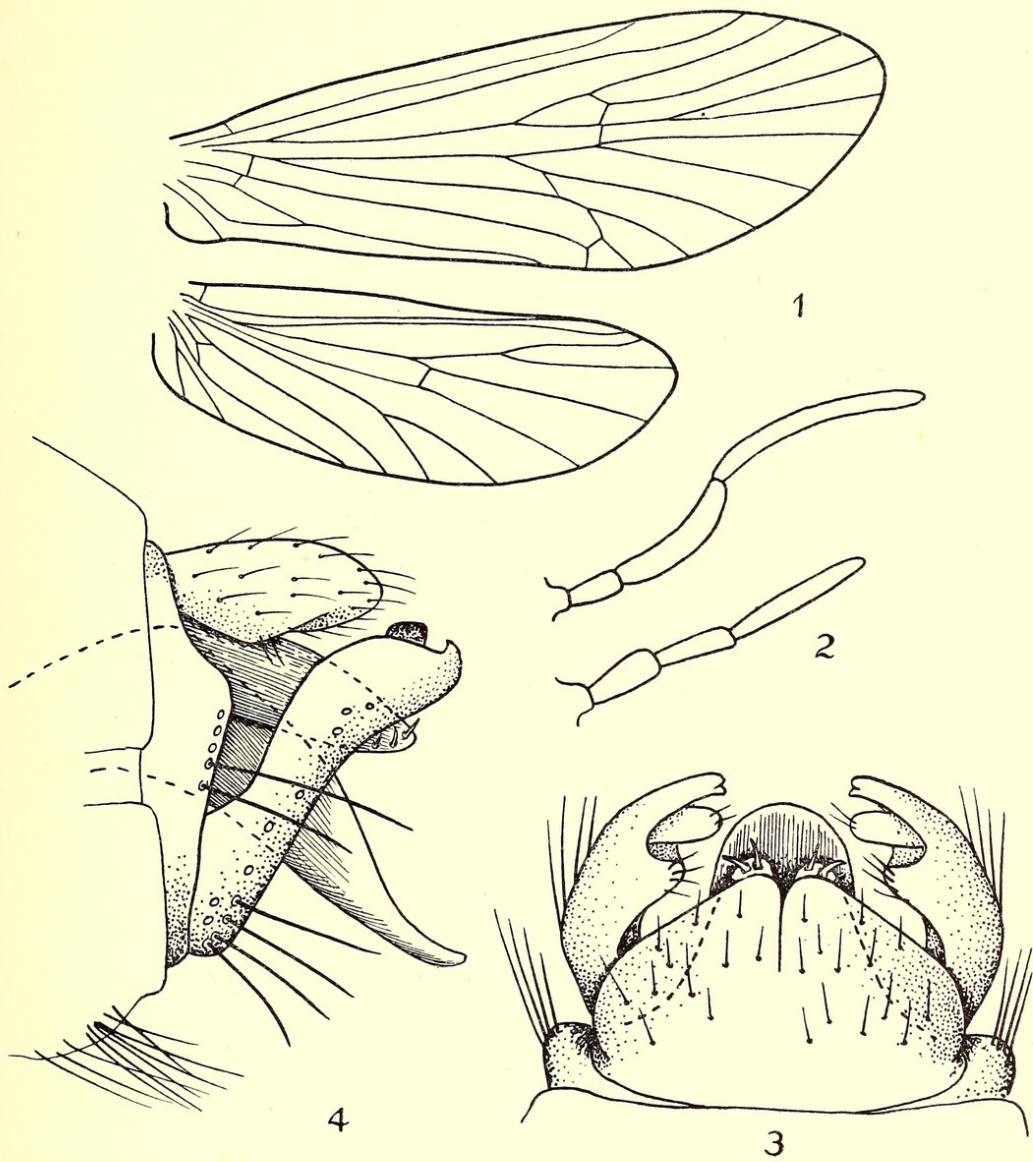
Genitalia ♂.—From above, the dorsal plate is formed of a pair of triangular plates fused together on the ventral side and tectiform on the upper; intermediate appendages broad, with a row of short, stout spines along the apical margin; penis short and straight; inferior appendages two-jointed, basal joint large, terminal joint very short.

Length of the anterior wing ♂ 5 mm.

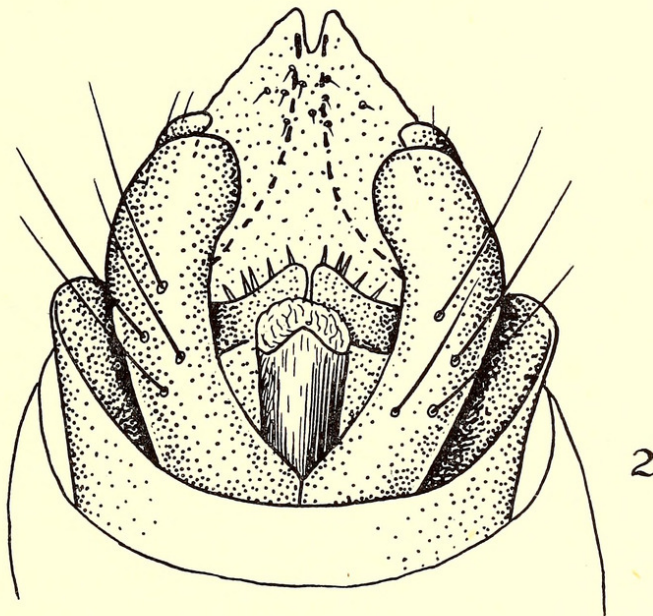
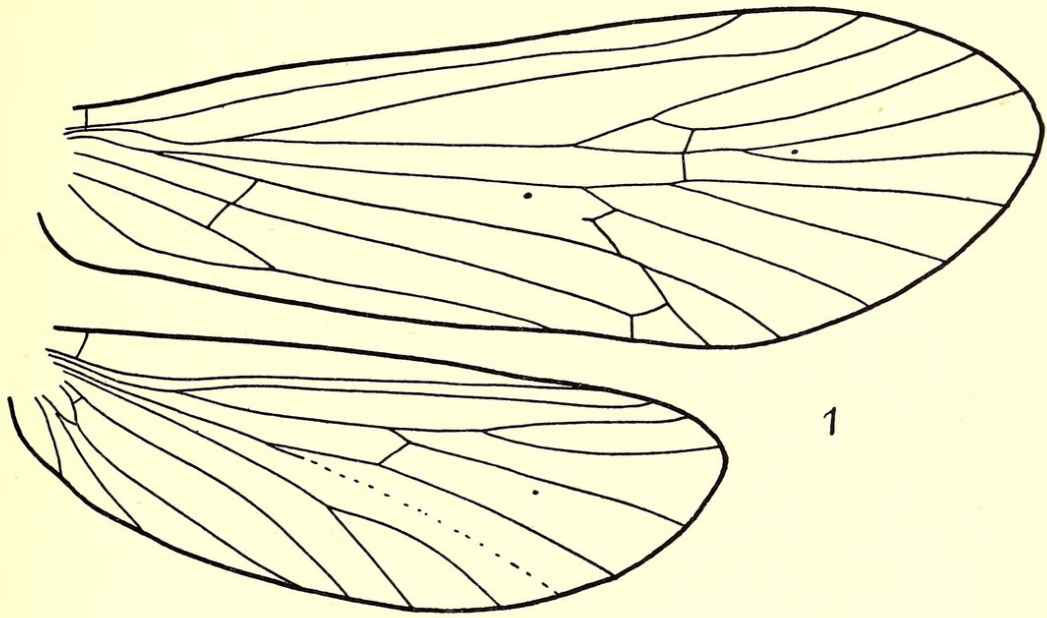
India: Punjab, R. Uhl, Chotah Bagahal, vi-1914, G. C. L. Howell.

Type ♂ in the author's collection, now in the British Museum.

(To be continued).



Micrasema baitina sp. n., ♂.—Fig. 1, wings. Fig. 2, palpi. Fig. 3, genitalia, dorsal. Fig. 4, lateral.



Micrasema punjaubi sp. n., ♂.—Fig. 1, wings. Fig. 2, genitalia, ventral.



Mosely, Martin E. 1938. "The Indian caddis flies (Trichoptera). Part V." *The journal of the Bombay Natural History Society* 40, 486–496.

View This Item Online: <https://www.biodiversitylibrary.org/item/183295>

Permalink: <https://www.biodiversitylibrary.org/partpdf/154007>

Holding Institution

Smithsonian Libraries and Archives

Sponsored by

Biodiversity Heritage Library

Copyright & Reuse

Copyright Status: In Copyright. Digitized with the permission of the rights holder

License: <http://creativecommons.org/licenses/by-nc/3.0/>

Rights: <https://www.biodiversitylibrary.org/permissions/>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.