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A SYNOPSIS OF THE SAPROMYZIDAE.¹

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In the *Genera Insectorum*, Fascicle 68 (1908), Friedrich Hendel has given an excellent review of the group *Lauxaniinæ*, generally known to American entomologists as the *Sapromyzidæ*. As this work has introduced several changes in nomenclature differing from the list of species as given in Aldrich's Catalogue, and as there has appeared no complete review of the North American species, the following synopsis is offered. It may seem presumptuous to publish this review, based as it is mainly on descriptions, for I have in all but eighty species of the family in my collection for reference, but the value of working tables in assisting future students is obvious enough to excuse its appearance in print.

Naturally, the attempt to visualize a species from a brief description alone does not assure the most satisfactory results, so that the following tables give largely an artificial classification. Such attempts at reconstructing a mind-picture of the species have proved especially unsatisfactory in the big group *Lauxania*, where the assignment of the species to *Minettia* or to *Sapromyza* has sometimes been merely a guess.

I am indebted to my colleague and neighbor, Professor J. M. Aldrich, for the inspiration that prompted this review and for his material assistance in sharing his library and collection during its progress. His collection has extended the distribution of many species, and in the following pages the localities of his species are added with the designation "Aldrich." Those localities marked with the asterisk (*) are represented in my collection.

The North American species of *Sapromyza* have been twice tabulated. In 1892 Mr. C. H. Tyler Townsend published a "Preliminary Grouping of *Sapromyza*" in the *Canadian Entomologist*, pages 301 to 304. The next year appeared "El Género *Sapro-*

¹ Contribution from the Zoölogical Laboratory of the State College of Washington.

myza en América" by Felix Lynch Arribalzaga, in the *Anales de la Sociedad Científica Argentina*, xxxiv., pages 253 to 301.

The subgenus *Sapromyza* is our dominant group. The species may sometimes be difficult to place correctly in a tabulation since their yellow color may change at death. Where confusion was most obvious the species have been several times included in the key. Spottings of the abdominal segments may become vague through a darkening of the general color. Again, there is some variation in the extent of color markings; as, for example, *univittata*, *aveola*, and *vinnula*, probably varieties of a single species, show gradations in the extent of the mesonotal stripe, etc. *Flavipennis* Fabricius, with bare arista, is not the same species as *flavipennis* described by Wiedemann, although Wiedemann's specimens came from Fabricius' collection.

The following description of a new genus of Sciomyzidæ is included in this paper, since it deals with a species hitherto classed as a *Sapromyza*.

PÆCILOMYIA: A NEW GENUS OF SCIOMYZIDÆ. (Figs. 1 and 2.)

In a note in connection with the original description of *Sapromyza decora*, Loew stated that the shape of the head and particularly of the antennæ was very much like that of certain Tetanoceras, in view of which the species should be separated from *Sapromyza* as a distinct genus. Not recalling this note when studying specimens of *decora* I came independently to the same conclusion, and coincidentally received a letter from Mr. C. W. Johnson conveying the same suggestion.

Decora is an unusually distinct species, with its reticulate wings and maculate body. It clearly is not a Sapromyzine because of the following array of characters. These characters are invariably, or at least usually, associated with the Tetanocerine Sciomyzidæ and are not at all, or at most very rarely, found in the Sapromyzidæ.

Front broadly convex, the periorbits separated from the unusually broad, shining, central part by a strong suture; face strongly concave, the oral margin projecting, but the clypeus (Chitinhufeisen) rudimentary; cheeks nearly as deep as the eye-height; postvertical bristles divergent; second antennal joint elongate and bristly; the third joint triangular, pointed, excised above; palpi long and linear; thorax with a fine scabrous coating; prothoracic, mesopleural, and sterno-pleural bristles all wanting; front femora without a series of bristles on posterior flexor edge; middle tibiæ without preapical spur but with apical crown of bristles; wings with complete anal vein.

The species is therefore certainly to be excluded from the Sapromyzidæ, and as there is no genus in the Sciomyzidæ to receive it, I would propose for it the new generic name *Pæcilomyia*.

A further characterization presents the following:

Head in profile a little higher than broad, the upper portion spherical; periorbits less than one-fourth the width of the interfrontalia (Mittelleiste), separated from it by well-marked sutures which are parallel with the eye-margin on the front, but converge at the vertex to meet the sutures of the epicephalon (cerebrale) of the occiput. The interfrontalia is uniformly convex, glabrous, and highly polished, is darker than the silky periorbits, and is marked with a translucent median stripe extending forward from the anterior ocellus. The arms of the frontal suture (Stirnspaltenäste) continue weakly to the lower edge of the eye, but at the usual antennal dark spot they send a suture across to the eye thus dividing the frontal from the facial orbits (Wangendreieck). The lunula is completely covered. The face (Gesichtsleiste) narrow but widening below, at its middle no wider than the sides (Wangen), in profile considerably concave, with oral margin projecting. Clypeus (Schlundgerüst) entirely undeveloped. Palpi linear, porrect, extending beyond oral margin, hairy beneath. Cheeks (Backen) one-half the eye-height, hairy, rounding into the sides of the face (ohne Vibrisseneck). Paracephala (Hinterhauptsorbiten) loosely setose; a closely setulose patch above the neck. Eyes rounded, but obliquely longer than wide. First joint of antennæ small, nearly bare, immersed in its socket; second joint conical, with the upper inner side projecting most, the outer side about one-half the length of the third joint, the inner side subequal to this joint, setose, except the outside, and with three long bristles on the upper edge; third joint pointed, somewhat excised above, uniformly fine-hairy; the dark arista rather loosely and evenly plumose above and below; the whole antenna no longer than eye-breadth, with the arista shorter than the last two joints. The bristles of the head are long and strong and include: a pair of diverging post-verticals, a convergent inner and a divergent outer vertical, 2 reclinate fronto-orbitals and a stout pair of proclinate ocellar bristles. The lesser ocellars are very small. The orbital bristles arise from dark-colored papillæ. The chætotaxy of the thorax is as follows: 1 humeral, 0 posthumeral, 2 notopleural, 1 presutural, 3 dorsocentral, 1 pair prescutellar, 2 pair convergent scutellar, 1 supraalar, and 2 approximate postalar bristles; no prothoracic or pleural bristles, except a couple (Vallarborsten) on the pteropleural ridge just under the calypter. Meso-, ptero-, and sternopleuræ with scattered fine hairs, the last with a bristle in the angle below. Calypteres pale yellow, with pale fringe. Front femora with several bristles in extensor row, hind femora ♂ biserially spinose beneath; front and hind tibiæ with preapical bristle, middle tibiæ with usual ending of bristles. Last two segments of abdomen with long submarginal bristles; hypopygium globose. Wings reticulate with alternating light and dark spots, costal margin unbroken; first vein ending midway between tip of auxiliary vein and the anterior cross vein; veins not sinuate, third and fourth veins subparallel; anal vein complete.

Type: *Sapromyza decora* Loew.

Of the eighteen genera of Sciomyzidæ before me the new genus

bears most resemblance to *Trypetoptera* Hendel, but presents these differences: first vein ending far before the anterior cross vein; meso- and pteropleuræ with very fine hairs which are scarcely bristle-like; second antennal joint obconical and not rounded; calypteres pale; fronto-orbital sutures distinct, in *Trypetoptera* the periorbits are not differentiated; three dorsocentral bristles.

None of the other genera, except *Coremaceŕa* Rondani, have the periorbits so definitely separated from the interfrontalia. The presence of three dorsocentrals and of a convex and broad middle portion of the front are unusual characters in the Sciomyzidæ.

Table of Genera.

1. Tibiæ with evident preapical bristle; two fronto-orbital bristles; postvertical bristles convergent; ovipositor not specialized, with two small lamellæ (Subfamily Lauxaniinæ) 2
 Tibiæ without preapical bristle; front with only the upper orbital bristle; postvertical bristles divergent; ovipositor flattened, with chitinous tube-like ending (Subfamily Lonchæinæ) 13
2. Face swollen, in profile convex 3
 Face flat, without convexity in the middle, in profile a straight line 7
3. Third antennal joint greatly lengthened, pointed or slender and linear 4
 Third antennal joint shortened and oval, first joint shorter than second 6
4. Two sternopleural bristles; both fronto-orbital bristles reclinate; face not strongly gibbous. (Fig. 10.) **Lauxania** Latreille.
 One sternopleural; anterior pair of fronto-orbitals convergent; face markedly gibbous 5
5. Head higher than long, occiput and front concave; the line connecting the fronto-orbitals converging in front, lower orbital bristle strongly inclined; facial groove nearly touching lower angle of eye, extending back under the eye so that the face is strongly developed underneath as well as in front; ocelli not elevated. (Fig. 6.) **Physogenia** Macquart.
 Head more globular, the front convex; fronto-orbital bristles in parallel rows; facial groove parallel with margin of eye, continuing obliquely downward leaving the cheeks free, the face in front of and not beneath this line; ocellar triangle somewhat raised. (Fig. 7.) **Pachycerina** Macquart.
6. Face with a transverse groove above the mouth, or with lateral vestiges of a groove, the oral margin projecting more or less in front of this groove; arista sometimes pubescent. (Fig. 12.) **Caliope** Haliday.
 Face swollen, with or without a transverse groove above the mouth, but the oral margin retracted beneath or behind this groove; arista plumose. (Fig. 11.) **Xangelina** Walker.
7. In profile the angle formed by the front and face acute, less than 90 degrees; front less inclined than the face, so that the mouth opening is strongly retracted 8

- Angle of front and face obtuse, the front more inclined than the face, the mouth opening therefore not retracted. 9
8. Posterior cross-vein in middle of wing; third vein sinuous. (Fig. 4.)
 **Procrita** Hendel.
 Posterior cross-vein beyond the middle of wing; third vein straight; eyes horizontally oval. (Fig. 8.) **Trigonometopus** Macquart.
9. Both fronto-orbital bristles reclinate. 10
 Anterior pair of fronto-orbitals extending inwards and forwards; 1 sternopleural; third joint of antennæ elongate. (Fig. 9.) **Camptoprosopella** Hendel.
10. Front forming no evident angle with the face; head higher than long; fourth vein bowed forward at tip of wing, narrowing the first posterior cell. (Fig. 5.)
 **Griphoneura** Schiner.
 Front and face forming an evident though rounded and obtuse angle; head as long as high. 11
11. Orbital bristles arising from tubercles; wings rather slender basally. (Fig. 3.)
 **Chætocœlia** Giglio-Tos.
 Orbits without tubercles; wings not narrowed on basal half. 12
12. Thorax opaque or sub-opaque, ground color usually dark, ocellar bristles usually large and spaced far apart near the front ocellus, behind the ocellars typically one or two pairs of outwardly diverging small bristles; arista usually plumose and at the same time the scutellar bristles usually cruciate; front often relatively broad; wings rarely pictured; hind tibiæ often marked with a basal ring. (Fig. 14.) **Minettia** Robineau-Desvoidy.
 Thorax shining or but slightly pollinose, its ground color usually yellow; ocellar bristles usually small and placed close together behind the front ocellus, the other bristles rarely present; arista often pubescent and scutellar bristles generally parallel or diverging; convergent scutellar bristles typically not occurring with a plumose arista; front usually narrower; wings often pictured; hind tibiæ rarely annulate. (Fig. 13.) **Sapromyza** Fallen.
13. Metallic black species; front rather narrow; two dorsocentral bristles. (Fig. 15.)
 **Lonchæa** Fallen.
 Yellow, largely yellowish, or cinereous species, not metallic; front broad; four dorsocentrals. (Figs. 16–21.) **Palloptera** Fallen.

Lauxania Latreille, sensu lato.

Including *Lauxania* s. str., *Caliope* Haliday, *Xangelina* Walker, *Minettia* Robineau-Desvoidy, and *Sapromyza* Fallen.

1. Dorsum of thorax black or blackish in ground color, overlaid or not with pollinose coating; wings never pictured (except sometimes extreme base of cross-veins infuscated) 2
 Mesonotum yellow, testaceous, reddish, or brown, not black in ground color, except rarely a median dark vitta; wings often pictured. 45
2. Third antennal joint linear, elongate, cylindrical, the first joint as long as or longer than the second; center of face protuberant; facial orbits white pruinose (*Lauxania* sensu stricto) 3

- Third antennal joint ovate or oblong-ovate, not more than four times as long as broad, the first joint shorter than the second; center of face gibbose (*Caliope* and *Xangelina*) or not (*Sapromyza* and *Minettia*).....10
3. Wings short and broad, brown; second vein arched forward; scutellum long and flat; four rows of acrostichals, the middle rows very indefinite; arista plumose. (N. J.; Fla., Aldrich; Ga.*).....***Lauxania latipennis*** Coquillett.
Wings not abnormally broad and short, the submarginal cell not broadened at the expense of the marginal; scutellum shorter.....4
4. Knob of halteres black; calypteres and fringe dark; base of wings darker than remainder; arista short-plumose; front legs black, the posterior tibiae and tarsi brown.....5
Halteres yellow or white; calypteres rarely dark; wings not blackened at base; arista white.....7
5. Scutellum convex; body and head polished; periorbits broad, cœruleous, the median vitta of front shining black. Eur.*, N. Scot., Mass.*, N. Y.*, (N. J., Pa., Mich., Wisc. Aldrich), Ga., N. Mex., Queb.*, Ont.*, B. C.*, Alaska*. (Fig. 10.).....***Lauxania cylindricornis*** Fabricius.
Scutellum flat, white pollinose; mesonotum white pollinose except a narrow median stripe and the sides broadly; pleuræ with two white pollinose spots..6
6. Face completely white pollinose; front opaque with the sides white pollinose, a lateral vitta cinereous and the median vitta black; arista dark except base. Fla., N. J.....***Lauxania opaca*** Loew.
Face with a middle line and lateral vittæ more or less white-pollinose, otherwise shining; front shining black except the narrow orbits, but viewed from above showing a black median vitta and lateral black spots circumscribed with white pollen; arista pale. (*facialis* Coquillett) Fla., Ga.*, La.*; Tenn. Aldrich.....***Lauxania trivittata*** Loew.
7. Arista densely pubescent with appressed white hairs; front shining black....8
Arista loosely plumose; center of front opaque black; legs largely whitish....9
8. Mesonotum and scutellum whitish pruinose; front tibiae and tarsi black; front femora and posterior legs brownish; lunule red; 3 dorsocentrals, 4 acrostichal rows. Ariz.; Mono Lake, Cal. Aldrich.
.....***Lauxania nigrimanus*** Coquillett.
Head, thorax and abdomen shining, with slight coppery tinge; legs brownish but the posterior femora largely black; 4 dorsocentrals, 2 acrostichal rows. Cal.*.....***Lauxania albiseta*** Coquillett.
9. Scutellum velvety black except at base; legs whitish, the coxæ and femora black; wings yellowish. N. J., Pa., Ga.; Kans., Tenn. Aldrich.
.....***Lauxania femoralis*** Loew.
Scutellum shining, lightly white pollinose; front legs ♂ black from end of femora to tip of metatarsi, remainder of front tarsi white; costal part of wings yellowish, apex and posterior part infuscated. Pa.
.....***Lauxania manuleata*** Loew.
10. Face more or less protuberant in center, in part at least polished, although sometimes with oral, orbital or subantennal pruinose markings; halteres yellow..11
Face flat or concave, wholly silvery, white, yellow or gray pruinose, or otherwise marked with pollen, not polished; halteres sometimes black.....24

11. Antennal arista bare or microscopically pubescent; wings nearly hyaline 12
 Antennal arista moderately or long plumose, or with dense pubescence; front
 not yellow, except sometimes a spot on lunule; wings yellowish 16
12. Front not vittate; insect entirely black, except halteres and wings. Cal.*
 *Caliope nigerrima* sp. nov.
 Front vittate with reddish 13
13. Head largely yellow or red 14
 Head black, the front anteriorly and the face in part yellowish 15
14. Very robust, cheeks broad; head reddish except for an occipital fascia, three
 frontal vittæ, the middle one triangular, and six facial spots; scutellum and
 base of abdomen reddish; legs reddish, femora in part black; thorax polli-
 nose; third antennal joint elongate; 3 dorsocentrals, 2 sternopleurals; scutel-
 lars strongly diverging. Tex.; Miss. Aldrich. . . . *Minettia eucephala* Loew.
 Head yellow, the ocellar region and short lateral vittæ black; third antennal
 joint ovate; legs blackish, the knees and end of tibiæ tipped with yellow;
 thorax shining. D. C. *Caliope flaviceps* Loew.
15. Third antennal joint less than twice as long as wide; legs yellow except base of
 femora; 4 dorsocentrals. Tex.*, Ariz. *Caliope variceps* Coquillett.
 Third antennal joint over three times as long as wide; legs black, the knees and
 posterior tibiæ and tarsi yellow; 3 dorsocentrals. Ariz., N. M.
 *Caliope longicornis* Coquillett.
16. Scutellum flat and velvety black; legs whitish, the femora black 17
 Scutellum convex and not velvety 18
17. Scutellum entirely velutinous; center of front shining, laterally with a bisected
 dead-black spot. Tex.*; Kans. Aldrich. . . . *Caliope signatifrons* Coquillett.
 Scutellum subshining at base; front opaque black above the antennæ, laterally
 shining; arista very long-plumose. Mass., Pa.*, N. J. (Fig. 12.)
 *Caliope gracilipes* Loew.
18. Front tibiæ largely blackish 19
 Front legs including coxæ yellow; arista short-plumose, white, the base yellow-
 ish; face strongly gibbous. Cal.* *Lauxania albiseta* Coquillett.
19. Thorax and scutellum white pruinose; front tibiæ and tarsi black, contrasting
 with remainder of legs; arista densely white-pilose. Ariz., Cal.
 *Lauxania nigrimanus* Coquillett.
 Thorax and scutellum shining, not or scarcely pruinose; arista dark 20
20. Thorax with slight metallic tinge; pleuræ sometimes more or less brownish
 (compare species of alternate also) 21
 Thorax polished black, but scarcely metallic 22
21. Thorax cæruleous, becoming reddish in back and on sides; pleuræ brownish;
 femora and tibiæ brownish, base of tarsi whitish. Mex., S. Am.
 *Caliope? flavipennis* Fabricius, Wiedemann,
 Thorax chalybeous, pleuræ sometimes brownish in part; legs black, the tibiæ
 and tarsi yellow; 2 dorsocentrals, acrostichals numerous; third antennal
 joint oblate-ovate; face moderately convex. S. Am., Mex., W. Ind., Ala.,
 La.*, N. J.; Orizaba, Aldrich. *Caliope muscaria* Loew.
22. Face in profile incised at middle, bulbous only beneath antennæ; arista pilose. 23
 Face large, bare, smooth, evenly convex from side to side and from antennæ

to near the oral margin, just above the oral margin a narrow horizontal groove; arista plumose; deep shining black throughout, the third antennal joint and four posterior tarsi reddish. W. Ind., S. Am. (Fig. 11.)

- *Xangelina nigra* Williston.
23. Face glistening beneath the antennæ; third antennal joint four times as long as wide, dark; legs black, except knees and posterior tibiæ and tarsi. Eur., N. Scot., Wash.* *Caliope elisæ* Meigen.
- Face pollinose immediately beneath antennæ; third antennal joint three times as long as wide, often reddish; legs entirely yellowish. Cal., Vanc., Wash.*, Id.* (*livingstoni* Coquillett) *Caliope quadrisetosa* Thomson.
24. Some of the abdominal segments marked with spots; thorax opaque gray pruinose 25
- Abdomen not regularly spotted 31
25. Arista long-plumose 26
- Arista short-pubescent; mesonotum with four fuscous vittæ, scutellum with two fuscous dots; front bivittate; abdominal segments with four series of brown spots; legs yellow 30
26. Abdominal segments yellow, marked with pairs of blackish spots; thorax not vittate; scutellum cinereous black 27
- Abdomen largely black 28
27. Lower part of pleuræ yellow; 2 dorsocentrals and 1 sternopleural. Kans. *Minettia crevecœuri* Coquillett.
- Pleuræ concolorous with notum; 4 dorsocentrals and 2 sternopleurals. Md. *Minettia glauca* Coquillett.
28. Abdomen largely blackish, base and tip yellow, dull with thick cinereous coating; thorax uniformly cinereous, but humeri and scutellum yellow; 4 acrostichal rows; legs yellow; last sections of fourth vein subequal. Wash.* *Minettia univittata* var.
- Abdomen polished; thorax vittate with brown; scutellum largely or wholly black 29
29. Abdomen black, base and tip yellow, each segment with lateral gray pruinose spots; legs whitish; thorax with four vittæ; face whitish; hind cross vein broadly brown; cross veins approximate. Nicaragua. *Minettia albipes* Coquillett.
- Abdomen black with hind margins of segments brownish and pollinose, fifth segment with four gray pruinose spots; legs black except tibiæ and most of tarsi; thorax with three vittæ; cheeks with black spot. Nicaragua. (*varia* Coquillett.) *Minettia variata* Hendel.
30. Abdominal segments marked with four brown spots; femora not with patches of setulæ; antennæ often black at base; cheeks with large blackish spot; Pa., N. J., N. H., Can.; Tenn., Mich., Wisc. Aldrich. *Minettia quadrilineata* Loew,
- Abdominal segments marked with many small brown setigerous spots; front femora with a row of minute setulæ on distal part of flexor surface; antennæ yellow. Me.*; Tenn., Wisc. Aldrich; Wash.*. *Minettia annulata* sp. nov.
31. Face silvery pollinose on a brown ground; thorax and abdomen shining bluish

- black, the pleuræ brownish; femora blackish, tibiæ brownish, tarsi whitish.
5.3 mm. S. Am., W. Ind. **Minettia argyrostoma** Wiedemann.
Otherwise; if the face is silvery the thorax is pollinose. 32
32. Arista pubescent or bare. 33
Arista plumose. 36
33. Body very slender; black, thorax gray pruinose, legs brown, the posterior
tibiæ and tarsi yellow; antennæ yellow, arista bare; wings four times the
length of the abdomen. N. H., Alaska.
..... **Minettia brachystoma** Coquillett.
Third antennal joint partly blackish, arista pubescent. 34
34. Mesonotum trivittate; front with median brown vitta. 35
Mesonotum and scutellum uniformly dusted; front shining black except a yellow
anterior fascia, face silvery-dusted; legs blackish. Wash.*
..... **Minettia nigrans** sp. nov.
35. Face silvery white; center of scutellum brownish; abdomen black; femora
blackish, tibiæ brownish, their base yellow, tarsi more or less yellowish.
St. Vincent. **Minettia exul** Williston.
Face with small brown spot each side of center; scutellum gray-pruinose;
3 dorsocentrals of which one is presutural, 2 acrostichals, 2 sternopleurals;
venter yellow, dorsum of abdomen fuscous; base and middle ring of tibiæ
yellow. 2.5 mm. Ga.; Tenn. Aldrich. **Minettia vittigera** Coquillett.
36. Wings blackish at base; halteres black; thorax opaque black; abdomen black. 37
Root of wing not blackened; halteres yellow; thorax grayish pollinose or sub-
shining. 38
37. Front less broad, face shorter and less convex, abdomen shining. Can., Pa.,
N. J., N. H. **Minettia obscura** Loew.
3 dorsocentrals, 6 rows acrostichals; abdomen subshining, grayish pollinose.
Eur., Mass., N. J.*, Me.*, Pa.*, Que.*, Ont., Ill.*; Wisc., Mich. Aldrich.
..... **Minettia longipennis** Fabricius.
38. Mesonotum very lightly gray pollinose, shining; 3 dorsocentrals, 4 acrostichals;
head shining black. Eur., N. Am. (*frontalis* Loew).
..... **Sapromyza hyalinata** Meigen.
Mesonotum and head opaque. 39
39. Mesonotum opaque gray pollinose, with lateral margins brownish; strikingly
marked with brown setigerous spots; 2 dorsocentrals, 1 sternopleural; scutel-
lum gray pruinose; abdomen polished black, somewhat brassy. Fla., Cuba,
Aldrich. **Minettia cineracea** Coquillett.
Mesonotum not marked with brown spots. 40
40. Mesonotum vittate; abdomen largely or wholly black. 41
Mesonotum densely cinereous pruinose, not vittate. 42
41. Mesonotum blackish, almost opaque, with two narrow gray vittæ, scutellum
black, abdomen reddish terminally; head yellow; legs light yellow. W. Ind.
..... **Sapromyza puella** Williston.
Mesonotum opaque black, with four white-pollinose vittæ; scutellum black
with white-pollinose margin; abdomen thinly gray-pollinose, shining at apex;
head black. W. Ind. **Minettia albovittata** Loew.

42. Scutellum bordered with velvet black: palpi black; legs mostly yellow; 3 dorsocentrals, 4 acrostichals. Eur.*, Alaska, Que.*, B. C.*, Vanc.*, Mass.*, N. H., Vt.*, N. Y., N. J., Pa.*, Ill.*, Mont.*, Wyo.*, Id.*, Wash.*, (Mich., Wisc., Or., Tenn., Kans. Aldrich) (Fig. 14)... **Minettia lupulina** Fabricius.
Scutellum entirely gray-pollinose; palpi yellow..... 43
43. Abdomen black, cinereous pruinose, base of segments 3, 4, 5, black-fasciate; head yellow, upper part of occiput and vertex black; legs mostly black. Nev.; Pine Lake, So. Cal. Aldrich; Wash.*..... **Minettia cæsia** Coquillett.
At most a brownish fascia on those segments; head mostly black in ground color..... 44
44. Legs yellow, front of femora, a basal ring and apex of tibiæ sometimes darker; face yellowish with central U-shaped brown spot and facial grooves black. D. C..... **Minettia magna** Coquillett.
Legs black; face uniformly overlaid with gray pollen. Mass.*
..... **Minettia cana** sp. nov.
45. Species whose wings are marked or spotted in some way or other..... 46
Species with wings not at all ornate, except sometimes at very base, or with uniform infuscation..... 63
46. One or both cross-veins alone with brown clouding; usually 4 dorsocentrals... 47
Costal margin before submarginal cell as well as one or both cross-veins brown; generally 3 dorsocentrals. 51
2, 3 and 4 veins tipped with a brown dot, cross-veins clouded and third vein with one or two additional spots..... 61
With numerous confluent black dots and an apical spot surrounded by eleven dots; opaque gray spotted with brown on head, thorax and abdomen; legs yellowish, femora with two rings, tibiæ with one; halteres black. D. C., Tex.
..... **Minettia stictica** Loew.
47. Arista long-plumose; thorax with four brown vittæ; face with black central spot; front with ocellar mark; base of antennæ black; abdominal segments trimaculate; hind tibiæ ringed. Nicaragua, Tex.
..... **Sapromyza picticornis** Coquillett.
Arista short-plumose or pubescent; thorax yellowish; face and front uniformly yellow; antennæ yellow; abdomen not spotted; tibiæ not ringed..... 48
48. Thorax opaque, dusted; 3 dorsocentrals, 6 uniform acrostichals; arista nearly bare; front longer than broad; hairs of lower facial ridge large; mesopleuræ setulose. Ill.*; Kans. Aldrich..... **Minettia ordinaria** sp. nov.
Thorax subshining; 4 dorsocentrals, 4 acrostichals, the middle rows setiform; mesopleuræ bare..... 49
49. Arista short-pubescent; front broader than long; brown of cross-veins suffused. 50
Arista plumose; front longer than broad; clouds of cross-veins blackish; macrochætæ strong. Ill.*; Or. Aldrich..... **Minettia nubila** sp. nov.
50. Last ventral segment ♂ dilated or with two strong black teeth, lamellæ rounded and black-pilose; abdominal segments margined with long setæ; ocellar bristles closer together than width of front ocellus. Neb.; Mass.*, Vt.*, Ill.*, Ind.*, (Mich., Wisc., S. Dak., Kans. Aldrich)
..... **Sapromyza bispina** Loew.

- Abdomen not furnished with spines; entire insect yellow; ocellar bristles separated more than the width of the front ocellus; ♂ lamellæ long and linear Mex., N. J., B. C.*; Cal. Aldrich. *Sapromyza innuba* Giglio-Tos.
51. Mesonotum vittate; face maculate. 52
 Mesonotum not vittate; face not spotted. 54
52. Mesonotum opaque yellow and with four vittæ; posterior tibiæ with basal ring; fifth vein not brown. 53
 Mesonotum brown and bivittate, pleuræ bivittate; tibiæ more or less brown but not ringed; fifth vein brown; face with two oral spots; abdomen testaceous; the last two segments with median vitta. S. Am., Mex. *Sapromyza geminata* Fabricius.
53. Face with a median oral spot; pleuræ bivittate; abdomen with three rows of brown spots; arista short plumose. W. Ind. *Minettia octovittata* Williston.
 Face with black antennal spots and with a pair of dusky oral spots; pleuræ obsoletely maculate; abdomen reddish; arista short-pubescent; oral hairs more prominent than usual, the foremost almost bristle-like. Mass., D. C., N. J., Va., Fla., La.* *Sapromyza umbrosa* Loew.
54. Scutellum with two black spots on margin; arista bare; abdomen with darkened incisures and median vitta. Mex., S. Am. *Sapromyza bipunctata* Say.
 Scutellum unicolorous; arista pubescent to plumose; abdomen yellow to brown but not marked. 55
55. Brown of costal margin arising over posterior cross-vein and confluent with cloud on this cross-vein; ♂ lamellæ large, black-hairy; second joint of hind tarsi black, in ♂ broad; arista short-pubescent. Que., Ont., Me., N. H., N. J., Pacific Coast; Mass.*, Pa.*, Ill.*, Tex.* (Mich., Wis., Tenn., S. Dak. Aldrich) *Sapromyza compedita* Loew.
 Brown of costal margin arising near base of wing and usually separate from cloud on posterior cross vein; second joint of hind tarsi rarely differentiated from the others. 56
56. Brown of costal margin including the anterior cross-vein. 57
 Brown of costal margin separate from anterior cross-vein. 59
57. Brown of costal margin in addition to apical cloud extending backward as three broad blunt projections, the first including the anterior cross-vein, the other two not passing the third vein; arista plumose; abdomen brown. Brazil, Mex. *Sapromyza contigua* Fabricius.
 Brown of costal margin with two rather slender projections in front of cross-veins in addition to the apical cloud; arista short-plumose; abdomen reddish 58
58. Costa broadly brown; second joint of hind tarsi not differentiated. N. Y. *Sapromyza sheldoni* Coquillett.
 Brown of costa quite narrow at end of second vein; second joint of hind tarsi black, in ♂ somewhat widened. Mass.* *Sapromyza houghii* Coquillett.
59. Brown of costa stopping at fourth vein. S. Am., Mex. *Sapromyza latelimbata* Macquart.
 Brown of costa extending beyond fourth vein at apex of wing. 60

60. Arista with scarcely perceptible pubescence. Ariz.
 *Sapromyza hubbardi* Coquillett.
 Arista short-plumose. Mex. *Sapromyza stata* Giglio-Tos.
61. Third vein with a single spot near middle of last section; 4 dorsocentrals; arista short-plumose. Que., N. H., Mass.*, N. J., Pa.*, La.*, Ill.*; S. Dak. Aldrich. *Sapromyza philadelphia* Macquart.
 Third vein with two spots near middle of last section. 62
62. Hind femora ♂ with black setulæ beneath; three dorsocentrals; arista long-plumose. Eur., N. H., N. Y. *Sapromyza notata* Fallen.
 Hind femora bare; four dorsocentrals; arista short-plumose. Pa., N. J., Cal.*, Wash.*. *Sapromyza fraterna* Loew.
63. Abdominal segments marked with regular series of spots, or vittate. 64
 Abdomen not seriatly maculate. 77
64. Face with brown or black spot in middle above oral margin; usually scutellum bimaculate also. 65
 Face yellowish, not spotted; usually the scutellum not maculate. 68
65. Basal joints of antennæ black; pleuræ bimaculate; thorax with a narrow median vitta; 2 dorsocentrals, no acrostichals, one sternopleural; middle tibiæ without preapical bristle; segments 3, 4, 5 of abdomen bimaculate, a dorsal vitta on last three segments. Fla. *Sapromyza slossonæ* Coquillett.
 Antennæ entirely yellowish; pleuræ not maculate. 66
66. Thorax quadrivittate; hind tibiæ with basal ring; pleuræ bivittate; the flat disc of the scutellum with two indefinite broad brown marks; arista short-plumose; upper side of abdominal segments trimaculate; palpi black; 3 dorsocentrals, 6 acrostichals. Tex., W. Ind., Brazil, N. J.; Mass.*, La.*; Kans. Aldrich. *Minettia macula* Loew.
 Thorax not clearly vittate; tibiæ not ringed; pleuræ not vittate; scutellum bimaculate. 67
67. Segments 2, 3, and 4 each with two spots, ♂ with median vitta on terminal segments also. W. Ind. *Sapromyza octopunctata* Wiedemann.
 Abdomen with series of median and lateral spots; arista short-pubescent. W. Ind. *Sapromyza ingrata* Williston.
68. Mesonotum vittate. 69
 Mesonotum not vittate; scutellum not maculate. 72
69. Mesonotum with broad median vitta; palpi yellow; arista plumose; tibiæ not ringed; hind femora tipped with two small dark spots; abdominal spots not clearly defined, sometimes forming a basal fascia on the segments. Cal.*
 *Minettia univittata* Coquillett.
 Mesonotum with lateral vittæ; palpi blackish; arista short-pubescent. 70
70. Hind tibiæ with proximal ring; scutellum typically bimaculate; mesonotum quadrivittate; 4 dorsocentrals, 2 acrostichals, 2 sternopleurals; antennæ red;
 71
 Tibiæ not ringed; scutellum not maculate; notum shining, with three broad vittæ, the median geminate; third antennal joint black; abdominal segments more or less trimaculate. St. Vinc. *Sapromyza venusta* Williston.

71. Abdominal segments with series of four fuscous spots; femora not with patch of setulæ. Pa., N. J., N. H., Montreal; Mich., Tenn., Wisc. Aldrich.
 *Minettia quadrilineata* Loew.
 Abdominal segments with many small fuscous setigerous spots; front femora with a row of setulæ on distal part of flexor surface. Me.*, Wash.*; Wisc., Tenn. Aldrich. *Minettia annulata* sp. nov.
72. Abdominal segments fasciate, their marginal setæ strong. 73
 Abdominal segments spotted. 74
73. Abdomen brown with hind margins of the segments and a median vitta darker; palpi brown. Mex. *Minettia vinnula* Giglio-Tos.
 A basal or middle fascia on abdominal segments, basal segments more or less vittate; palpi red. Cal.*, Or.*, Wash.* *Minettia flaveola* Coquillett.
74. Last two or three segments of abdomen with round black spot on each side; 1 dorsocentral, 6 acrostichals; palpi yellow. N. H., Alaska, Idaho*; Yukon Terr. Aldrich. *Sapromyza rotundicornis* Loew.
 Abdomen with a median row of spots. 75
75. Abdominal segments with median spots only. 76
 Last four segments of abdomen with both lateral and median spots; palpi yellow; mesonotum pruinose, scutellum shining. Nicaragua.
 *Sapromyza triseriata* Coquillett.
76. Mesonotum little shining; arista pubescent; wings gray hyaline, penultimate section of fourth vein but little more than one-half the ultimate; front narrow; palpi black at tip. W. Ind. *Sapromyza sororia* Williston.
 Mesonotum polished; arista plumose; wings yellowish, penultimate section of fourth vein about one-third the ultimate; face strongly convex; front broad. Fla. *Caliope lutea* Coquillett.
77. Mesonotum entirely yellow or reddish, not vittate with darker stripes. 78
 Mesonotum vittate or blackish above. 90
78. Scutellum with two black spots at the bristles; insect otherwise entirely luteous. S. Am., W. Ind. *Sapromyza grata* Wiedemann
 Scutellum not maculate. 79
79. Scutellum black, with base brownish; pleuræ with brown mark before wing; abdomen black; arista long-plumose. Mex. *Sapromyza sonax* Giglio-Tos.
 Scutellum and abdomen yellow. 80
80. Face centrally marked with a velvet-black spot; front with a black ocellar spot; arista pubescent; notum thinly gray-pruinose, 3 dorsocentrals, 4 acrostichals; length 2.5 mm. N. H. *Sapromyza puncticeps* Coquillett.
 Face not maculate. 81
81. Last ventral segment ♂ with lateral acute projections directed backward; arista short-pubescent. 82
 Abdomen not with such projections. 83
82. The ventral spines very large, broad and conspicuous; ♂ lamellæ rounded, black-pilose. (*connexa* Say is probably the ♀) Mass. to Kans.
 *Sapromyza bispina* Loew.
 The ventral spines slender; ♂ lamellæ minute, short black-pilose. Neb., Mex.
 *Sapromyza tenuispina* Loew.

83. Shining luteous species with black palpi and a black ocellar spot; mesonotum with two lighter vittæ. Ga., Fla., N. J., N. Y.
 *Sapromyza resinosa* Wiedemann.
 Otherwise. 84
84. Palpi brown; abdomen brown, the segments more or less fasciate on hind border and with long bristle-like hairs; front yellow. Mex.
 *Minettia vinnula* Giglio-Tos.
 Palpi and abdomen yellow. 85
85. Arista plumose; antennæ yellow. 86
 Arista nearly bare; tip of antennæ blackened; ocellar bristles long; front broader than long; thorax at least subshining; scutellar bristles diverging. 89
86. Thorax dull with yellow pruinosity; ocellar bristles and thoracic setulæ strong; 2 and 3 segments of abdomen with long bristles near hind margin, especially on sides; 3, rarely 4, dorsocentrals, 6 acrostichals. 87
 Thorax shining; ocellar bristles rudimentary; front yellow. 88
87. Arista rather long-plumose; wings nearly hyaline; front with faint yellow fascia bordered with brown. Cal.*, Or.*, Wash.*
 *Minettia flaveola* Coquillett.
 Arista short-plumose; wings strongly infumated; front not fasciate. Cal. Aldrich. *Minettia fumipennis* sp. nov.
88. Front as broad as long; arista long-plumose on upper side. Fla., Ga., W. Ind.*; Tenn. Aldrich. *Sapromyza sordida* Wiedemann, Williston.
 Front one-third broader than long; arista very long-plumose. Ga., La.*
 *Sapromyza amida* Walker.
89. Front with central black spot; 4 dorsocentrals; third antennal joint twice as long as deep, the upper side excised. Wyo.* *Sapromyza cyclops* sp. nov.
 Front yellow; 3 dorsocentrals; third antennal joint short-ovate. Id.*, Wash.* (Fig. 13) *Sapromyza monticola* sp. nov.
90. Mesonotum with narrow vittæ; front quadrate. 91
 Mesonotum with broad vittæ, or dark above. 92
91. Arista plumose; thorax brownish, with two narrow grayish stripes; antennæ black; scutellum and base of abdomen black. W. Ind.
 *Sapromyza puella* Williston.
 Arista pubescent; thorax reddish, with four slender brown stripes; antennæ red, tipped with brown. W. Ind. *Sapromyza lineata* Williston.
92. Third antennal joint black; arista short-pubescent; palpi mostly black; thorax shining yellow with three broad brownish stripes, the middle one obsoletely geminate. W. Ind. *Sapromyza venusta* Williston.
 Antennæ yellow, the arista long-plumose; palpi yellow; thorax opaque, univittate or the disc dark. 93
93. Mesonotum with a median broad dark stripe, at least the humeri yellow; hind femora tipped with minute shining black dot on each side; 3 or 4 dorsocentrals, 4 acrostichals; front yellow. Cal.*
 *Minettia univittata* Coquillett.
 Disc of mesonotum dark; front brown on upper half. 94

94. Face with a U-shaped brown mark flanked by an oblique stripe; pleuræ not vittate; femora striped with gray in front, tibiæ with a basal ring. D.C.
 *Minettia magna* Coquillett.
 Face yellow; pleuræ vittate above; legs yellow. Kans.
 *Minettia crevecœuri* Coquillett.

Caliope nigerrima sp. nov.

♂. Length 3 mm. Entirely black, the halteres, calypteres and wings alone yellowish. Front shining, with slight coppery hue, slightly broader than long, the ocellar bristles approximate: face in profile convex only near the antennæ, broadly angulate at the middle; center and sides of the face white-pruinose; lower occiput white-pruinose. Third antennal joint elongate-oval, twice as long as wide, the black arista microscopically pubescent. Palpi linear, black-hairy. Mesonotum shining greenish black, thinly coated with olivaceous pollen; four dorsocentrals, acrostichals very sparse, apical scutellars divergent, two sternopleurals. Abdomen shining, slightly metallic. Wings hyaline, with yellowish tinge, veins yellow, last two sections of the fourth vein nearly one to two.

A single specimen taken by Professor Aldrich at Pacific Grove, California, May 6, 1906.

The profile of the face indicates that this species is related to *quadrissetosa* and *elisæ*, but the uniformly black color and the sub-bare arista are different.

Caliope elisæ Meigen.

Meigen's original description calls for a species with white arista and red antennæ. Zetterstedt states that the arista is white and the tip of the antenna is brown. Schiner says that the infuscation of the antenna is variable and that the arista is light brown; while Rondani and Becker give the arista as brown.

This species was included in the North American fauna on Walker's authority. I have a series of specimens from Mount Constitution, on Orcas Island, Washington, that agree with the descriptions of *elisæ*, and may or may not be the same as the European species. In the absence of typical specimens of *elisæ* it would be premature either to describe them as new or to vouch their identity. They have the face but little bulbous beneath the antennæ and below the swelling it is excised in profile. This character is quite different from the evenly convex face of *cylindricornis*, with which species *elisæ* is repeatedly compared. The third antennal joint is dusky, four times as long as deep, its upper and lower edges parallel, so that before the tip it is not smaller

than in the middle. The face is pollinose only along the orbits and not at all in the middle beneath the antennæ. The front legs are the darkest, their knees only are broadly yellowish.

Minettia nigrans sp. nov.

♀. Length 4 mm. Shining black, with pale wings. Occiput shining black; front one-fourth broader than long, shining black with bluish tinge, especially on the broad paraorbits, the front edge above the antennæ yellow, ocellar bristles moderate, rather distant; face not convex, uniformly white-pruinose; cheeks white-pruinose except the narrow shining oral margin; proboscis and palpi black. Thorax highly shining black, but the disc of the mesonotum dusted with gray, scutellum concolorous; three postsutural dorsocentrals, four rows of acrostichals, two sternopleurals; mesopleuræ with weak setulæ; scutellar bristles long, convergent. Abdomen shining black, the marginal setæ about two-thirds the length of the segments. Front legs entirely black, middle femora black except the knees, their tibiæ and tarsi blackish, hind femora black, the tibiæ and tarsi blackish, hind tibiæ without preapical bristle. Halteres white. Wings large, clear hyaline, veins pale, the last two sections of fourth vein proportioned two to five.

One specimen from Monroe, Washington; May 20, 1908.

Minettia cana sp. nov.

Like *lupulina* but the scutellum not bordered with black, palpi yellow, face uniformly gray-pruinose, and front lacking the conspicuous yellow fascia: like *glauca* but the abdominal segments not spotted and the front differently marked.

♀. Length 4 mm. Head and thorax black, thickly covered with blue-gray pollen. Middle of front with a broad brown fascia and orbits with a triangular brown spot at the level of the antennæ. Above the base of the antennæ the front shows but little trace of yellow ground-color, but is blue-gray pruinose like the face, vertex and occiput. Ocellar bristles distant, behind them are six cruciate setulæ. Antennæ reddish brown, the third joint ovate, with short-plumose brown arista. Palpi reddish yellow; proboscis black. Three dorsocentrals, four rows of acrostichals, the acrostichals and the other setulæ strong, metapleuræ setulose, two sternopleurals: mesonotum not vittate, scutellum uniformly cinereous above. Abdomen entirely yellowish, the segments not margined with long setæ. Legs blackish, the front legs black, front femora cinereous, knees narrowly yellowish, posterior tibiæ with base and a broad medial ring somewhat paler, hind tibiæ without preapical bristle. Halteres yellow. Wings uniformly with yellow tinge, as in *lupulina*; the last two sections of the fourth vein equal.

One specimen received with a lot of *lupulina* from Dr. Garry deN. Hough, who took it at New Bedford, Massachusetts, on Memorial Day, about twelve years ago.

Minettia annulata sp. nov.

♂ and ♀. Length 3 mm. Very close to *quadrilineata* Lw., in size, structure, chætotaxy, color, and variations in color, but distinguishable by its different sexual structures, the setulæ of the front femora, and the maculation of the abdomen.

Ground color mostly blackish, although sometimes quite testaceous, overlaid on head and thorax with dense cinereous pollen. Front large, a little broader than long, with two well-defined darker vittæ extending from the antennæ to the level of the posterior ocelli, elsewhere cinereous; ocellar bristles of moderate length and well separated from each other; face cinereous-white, the ground color beneath the antennæ sometimes more or less blackish, along the orbits whitish; below the eyes the cheeks are marked with a large darker spot. Antennæ yellowish, the third joint ovate; arista short-pubescent. Palpi black. Mesonotum blackish to testaceous, with alternating stripes, five cinereous and four fuscous, with four strong dorsocentral bristles, of which one is presutural, with but two definite rows of minute acrostichals, one intraalar; mesopleuræ with scattered short hairs; two sternopleural bristles: scutellum rather flat, cinereous except for the continuation on its disc of the median fuscous vittæ of the notum. Abdomen subshining, brownish to yellow, with numerous small brownish mottlings, most distinct at the bases of the submarginal rows of bristles, the mottlings toward the base of the segments sometimes confluent to form vague resemblances to the maculations of *quadrilineata*; hind margins of segments paler; marginal bristles nearly as long as the segments; hypopygium narrowly and deeply cleft, the two sides of the emargination sharply projecting ventrally as a pair of finger-like processes, ventrally at the base of the hypopygium there is another pair of black acuminate recurved processes. Femora brown to yellow but the underside of each with a well-defined dark spot near the distal third, the spot of the front pair provided in both sexes with a row of about ten microscopic close-set black teeth along the inner edge: tibiæ with basal dark ring opposite the femoral mark; tarsi dull yellowish. Halteres whitish. Wings uniformly subhyaline, the last two sections of the fourth vein proportioned three to five.

Nine specimens are before me from East Eddington, Maine (Hough), Price County, Wisconsin (C. F. Baker), Knoxville, Tennessee (Aldrich collection), and Mount Constitution, Washington, July 3, 1908.

Loew's species *quadrilineata*, well represented in Professor Aldrich's collection from Pennsylvania, Michigan, Tennessee, and Wisconsin, differs as follows: The stouter hypopygium is broadly emarginate, the finger-like prolongations of the sides of the excision dark in color and the basal pair of black acuminate processes straight and approximate. Unless the hypopygium is open these structures are not to be seen. The femora usually lack the distal black spot and always are devoid of the row of

denticles. Moreover, the maculation of the abdominal segments is not in the form of small setigerous spots.

Minettia nubila sp. nov.

♀. Length 4 mm. Body with antennæ, mouth-parts, legs and halteres entirely flavous, wings hyaline with yellowish tinge, the cross-veins broadly blackish. Third antennal joint oval, one-half longer than deep, the black arista moderately long-plumose, the hairs of the lower side nearly as long as the upper. Front slightly longer than broad, not shining; ocellar bristles long, located on a line with the posterior ocelli but in back of the front ocellus; hairs of lower facial ridge minute; postverticals strong. Thorax lightly dusted, subshining, not vittate, thoracic bristles relatively strong, four dorsocentrals, the foremost much in front of suture, four rows of acrostichals, the middle rows setiform, two sternopleurals, scutellar bristles convergent. All the abdominal segments but the first with submarginal rows of bristle-like hairs. Brown cloud of anterior cross-vein extending along the third and fourth veins to form an H-shaped spot, brown of posterior cross-vein similarly extending on the fourth vein, but not on the fifth, so that its outline is narrowly triangular.

One specimen, collected near Chicago, Illinois, August 10, 1901. Another typical specimen in Professor Aldrich's collection is labeled Lawrence, Kansas.

VAR. A female specimen from Hood River, Oregon, in Professor Aldrich's collection differs in having the bristles reduced in size. The genitalia are small, with the lamellæ of the ovipositor blackish and densely dark-pilose. The front is relatively a little broader and the clouds of the cross-veins are less distinct.

Minettia ordinaria sp. nov.

♂. Length 4 mm. Dull testaceous including the appendages; wings hyaline, the cross-veins with faint clouds. Third antennal joint broadly oval, the black arista with very short pubescence. Front slightly longer than broad, opaque with reddish pollen, except that the orbital bristles arise from spots of yellowish-gray pollen. Ocellar bristles moderate in length, spaced apart a little more than the width of the front ocellus, the lesser ocellar bristles distinct; occipital setulæ and those of lower facial ridge conspicuous, the foremost like an oral vibrissa. Thorax opaque, not vittate; setulæ of thorax well developed, forming six acrostichal rows; mesopleuræ with numerous setulæ in addition to the usual macrochæta; three dorsocentrals, all postsutural. Marginal setæ of third and fourth abdominal segments as long as the segments: hypopygium, small, the lamellæ retracted. Tibial spurs of moderate length. Penultimate section of fourth vein two-thirds the length of the ultimate section.

One specimen, collected in 1897 at Chicago, Illinois, and another in Professor Aldrich's collection taken at Lawrence, Kansas.

Minettia fumipennis sp. nov.

♂. Length 5 mm. A stout and large species easily recognized by its strongly infumated wings. Very close to *flaveola* Coquillett, differing only in the dark wings, more protuberant center of the face and shorter plumosity of the arista. In *flaveola* the hairs of the upper side of the arista are as long as the depth of the third antennal joint and also conspicuously longer than the hairs below. In *fumipennis* the hairs of both sides of the arista are of the same length and are less than one-half the depth of the third antennal joint, i. e. short-plumose. The infuscation of the wings is strongest in front: along the hind border the wings are subhyaline. Chætotaxy and structure as in *flaveola*. Color testaceous.

One specimen in Professor Aldrich's collection, taken near Stanford University, California, 21 October, 1905.

Sapromyza cyclops sp. nov.

♀. Length 4 mm. Testaceous yellow throughout, except a shining black spot in center of front, and outer one-half of third antennal joint black. Front one-third broader than long, shining; ocellar bristles strong and closely approximate behind the front ocellus; cheeks two-thirds the eye-height; face flat, the central part sericeous. Third antennal joint nearly twice as long as the width in front of the arista, its upper edge concave so that the upper apical corner is rounded-rectangular; arista microscopically pubescent. Thorax lightly yellow-tomentose, four postsutural dorsocentrals, the rows diverging posteriorly so as to meet a moderately-sized intraalar bristle; six rows of scattered acrostichals; two sternopleurals. The abdomen of the dried specimen is somewhat brownish, lightly pollinose, the last segment shining. Femora with the usual bristles of moderate size. Wings hyaline, with yellowish tinge, veins yellow, the posterior cross-vein darker; anterior cross-vein a little beyond the middle of the discal cell, opposite the end of the first vein; penultimate section of the fourth vein four-fifths as long as the ultimate, last section of fifth vein one-half the length of the posterior cross vein.

The distinguishing characteristics of this species are the yellow color, black-spotted front, black-tipped antennæ with excised antennal joint and nearly bare arista, and clear wings.

One specimen collected by Dr. W. M. Wheeler at Dinwiddie Creek, Wyoming, September 5, 1895.

Sapromyza monticola sp. nov. (fig. 13)

♂ ♀. Length 3.5 mm. Entirely testaceous, except the tip of the antennæ.

Front about one-fourth broader than long, fine-hairy in front, shining, a line connecting the front-orbital bristles would meet the base of the antenna; ocellar bristles spaced apart the width of the front ocellus just behind which they are located, the lesser ocellar bristles minute; face receding, but the clypeus prominent,

in color pale yellow, neither shining nor sericeous, the central part of the face is twice as broad as the sides: cheeks scarcely one-half the eye-height, the lower edge with minute hairs: palpi and proboscis yellow, rarely the tip of the palpi blackened: Third antennal joint oval, one-half longer than broad, the outer third to half blackened, the arista microscopically pubescent.

Mesonotum shining, very thinly yellow-pollinose, three postsutural dorso-centrals, four definite rows of acrostichals; one intraalar, apical scutellars convergent, usually but one pronounced sternopleural, mesopleuræ not setulose. Abdomen shining, no long marginal bristles, hypopygium small, compressed. Front tarsi sometimes a little dusky. Wings with decided yellowish tinge, the last section of the fourth vein nearly two times the penultimate section, the last section of the fifth vein nearly as long as the posterior cross vein.

Seventeen males and twelve females. One specimen from Bellingham, Washington, two from Tacoma, all the others from Moscow Mt., Idaho; June to August. One female is a variant in having the anterior cross vein located further towards the end of the wing, so that the penultimate section of the fourth vein is about one-third the ultimate.

Genus *Camptoprosopella* Hendel.

1. Mesonotum and pleuræ each with a median dark vitta; wings strongly infumated. Mex., N. Mex., Col.* (*melanoptera* Hendel)..... *dolorosa* Williston.
Thorax not or but faintly vittate; wings nearly hyaline..... 2
2. Arista densely plumose, third antennal joint somewhat tapering, three times as long as broad. N. J., Fla., Ga.*, N. Mex., Peru; S. Dak. Aldrich. (*xanthoptera* Hendel) (fig. 9)..... *verticalis* Loew.
Arista more loosely plumose, the third antennal joint oblong-ovate, less than three times as long as broad. Me., Ont.*, Mass., N. Y., N. J.*, Pa.*, Ind.*, Ill.*, Wisc., La.*, Ala.*, Tex.*, N. Mex., Col.*, Wyo.*, Cal.*, Mex., Nicaragua,* W. Ind.*, S. Am.; (N. H., Mich., S. Dak., Ia., Kans., Vera Cruz, Oaxaca, Puebla, Cuba, Aldrich) (*cincta* Loew; *plumata* Wulp; *ocellaris* Townsend; *claripennis* Coquillett)..... *vulgaris* Fitch.

Mr. Aldrich has informed me that Mr. Coquillett corrected the name *clavipennis* to *claripennis* in the separata he distributed, and Mr. C. W. Johnson, who has recently examined his type specimen of this species in the National Museum, writes that it is *verticalis*, under which name he submitted the specimen. The error in describing the species as new under the name *claripennis* was occasioned by Mr. Coquillett's misidentification of the dark colored *dolorosa* as *verticalis*. So writes Mr. Johnson.

Genus *Chætocœlia* Giglio-Tos.

1. Wings brown except most of second posterior cell and the anal angle which are hyaline, brown of center of wing without clear spots; face not or but feebly maculate; thorax brown punctate. Mex. *palans* Giglio-Tos.
Brown of center of wings with clear spots; face with two evident black spots. . . . 2
2. The larger part of the second posterior cell and of the anal angle brown, disc of wings with three clear spots, two on fourth vein and one on posterior cross-vein. Mex., S. Am. (fig. 3) *distinctissima* Schiner.
The larger part of the second posterior cell and of the anal angle hyaline. 3
3. The brown area of the wings between the second and fifth veins with many irregular clear spots; abdominal segments not margined with setigerous black spots. Mex. *caloptera* Hendel
Wings with two small round clear spots near tip of third vein and another above posterior cross-vein, near which spots the brown is more intensive, discal cell largely hyaline. W. Ind. *angustipennis* Williston.

Genus *Griphoneura* Schiner.

Blackish, shining, thorax not vittate; antennæ yellowish, arista plumose; face white-pruinose; legs black, the tibiæ and tarsi brownish; wings yellowish with the apical third brown, more intensive in front. 5 mm. Mex., S. Am. (fig. 5.)

..... *imbuta* Wiedemann.

Genus *Procrita* Hendel.

Shining yellow, abdomen black; costal half of wing brown, sharply extending in several places into the hyaline portion. Mex. (fig. 4) *pectinata* Hendel.

Entirely shining yellow, the small ocellar triangle and the tip of the antennæ alone black; brown of wings including the costal portion, ends of the veins, and the hind cross-vein. Costa Rica. *sigma* Hendel.

Genus *Trigonometopus* Macquart.

1. Wings hyaline, cross-veins bordered with brown, third vein with two brown spots; yellow, mesonotum quadrivittate and scutellum brown. Col. *punctipennis* Coquillett.
No round wing-spots. 2
2. Costal margin narrowly brown, cross veins slightly clouded; reddish, mesonotum darker laterally. W. Ind. (fig. 8) *rotundicornis* Williston.
Wings with vitta including third and fourth veins and a cloud at end of second vein; yellow, thorax quadrivittate with brown, scutellum brown except a median line. Ga. *vittatus* Loew.

Genus *Physogenia* Macquart.

1. With sub-alar round velvet-black spot. 2
Without such mark on pleuræ; testaceous, thorax obscurely brown-vittate. Cal. *planiscuta* Thomson.

2. Face translucent yellow; thorax weakly bivittate. S. Am., Mex.* (*urina* Giglio-Tos).....*ferruginea* Schiner.
 Face trimaculate; thorax quadrivittate. W. Ind.*, S. Am.; Vera Cruz, Aldrich
 (*obscuripennis* Bigot, *variegata* Loew, *nasalis* Thomson) (fig. 6)
*vittata* Macquart.

This genus is easily recognized by the greatly swollen and translucent face. The species are reddish yellow in color. The brief description of *Lauxania planiscuta* by Thomson brings to mind the other species of *Physogenia*: the testaceous color, the convex protuberant glabrous face, the position of the anterior cross vein much beyond the end of the first vein and the vittate thorax are rather distinctive characters. Possibly it is a synonym of *ferruginea*. *Lauxania nasalis* Thomson is certainly the same as *vittata* Fabricius. The erect dark stripe of the pleura, surmounted by a velvety black spot, the black dots above the antennæ, and the greatly swollen face indicate the synonymy.

Genus *Pachycerina* Macquart.

The North American species previously assigned to *Pachycerina* are to be found in *Camptoprosopella*. The present species differs from the type of *Pachycerina*, the European *seticornis* Fallen, in the following structural characters which hardly have generic value: The occiput is flattened instead of convex, the face is gently convex instead of bulbous, the anterior fronto-orbital bristles are more strongly inclinate, the third antennal joint is elongate-linear and the short arista is loosely plumose, instead of the antennæ tapering and arista with appressed pubescence. There are three dorsocentral bristles, six distinct rows of acrostichals, one humeral, one presutural, two notopleural, one supraalar, two postalar, one pair prescutellar, four scutellar, the apical pair parallel, one mesopleural, one sternopleural and one prothoracic, all but the last two directed backwards, the sternopleural and prothoracic bristles directed upwards. *Seticornis* has four dorsocentrals and two rows of acrostichals, but the other bristles are arranged as in the following species.

From *Camptoprosopella* the present species differs in the convex face and narrower facial orbits. In *Camptoprosopella* the sides of the face are broad and join the oral margin so that the central portion of the face takes no part in the formation of the cheeks.

Pachycerina ornata sp. nov. (fig. 7)

♀. Length 4 mm. Largely testaceous, the lower part of the head paler yellow, ocellar prominence and a large round spot in center of face shining black. Base of antennæ reddish, becoming black beyond the arista; arista reaching but two-thirds the length of the third joint, loosely plumose, long- above and short-plumose below. Oral margin retracted; proboscis yellow, palpi black. Thorax with the following markings: humeri, scutellum and posterior half of mesopleuræ whitish yellow; two transverse bands blackish, one in front of scutellum including the pteropleuræ, and another including the front half of the mesopleuræ continuing across the notopleural suture to the mesonotal suture and then broadly interrupted across the disc of the mesonotum. Abdominal segments, except the first, with broad sub-basal black fasciæ, interrupted along the median line. Legs yellow, front tarsi dusky, all the tibiæ with preapical bristle. Calypteres and fringe yellow, but a dusky spot on the margin. Halteres yellow. Wings hyaline, with a very faint yellowish tinge: anterior cross-vein beyond the end of the first vein, the last two sections of the fourth vein subequal; last section of fifth vein shorter than posterior cross vein and one-sixth the length of the preceding section.

Two specimens from Professor Aldrich's collection, received from Mr. Crawford, who collected them at Dona Marcia, Chiapas, Mexico.

Genus *Lonchæa* Fallen.

1. Arista plumose; third antennal joint short, testaceous; legs piceous, tarsi testaceous. Mex. *discrepans* Walker.
Arista bare or short-pubescent. 2
2. Front with a median reddish vitta; venter yellowish, with a broad black stripe; legs brown. W. Ind., Ga. *glaberrima* Wiedemann.
Front and venter not red or yellow. 3
3. Antennæ not reaching the oral margin. 4
Antennæ reaching or surpassing the oral margin. 9
4. Legs entirely black or blackish. 5
Metatarsi yellow. 6
5. Metallic black, scutellum more green, abdomen deep metallic green. 1.5 mm.
W. Ind. *orchidearum* Townsend (*Agromy*)
Shining black, scarcely at all metallic, abdomen thinly covered with brownish dust; calypteres with brown cilia. 3 mm. Eur., Alaska, Wash.*
. *deutschii* Zetterstedt.
6. Cheeks bristly; front femora strongly setose beneath; two basal joints of tarsi yellow; calypteres yellow; head, thorax and abdomen deep metallic green; front of ♀ two times as long as wide, its sides parallel. St. Vinc.; Cuba, Aldrich. *brevicornis* Williston.
Cheeks hairy, at most with one or two bristles in front; legs not with stout bristles. 7

7. Calypteres fringed with dusky hairs; lunule bare; base of tarsi alone yellow; arista bare. 8
 Calypteres yellow, with yellow fringe; lunule hairy; tarsi largely or wholly yellow; arista microscopically pubescent; third antennal joint large, longer than broad; front of ♀ slightly narrowed anteriorly; epistome projecting. Eur., La.*; Id., Aldrich. *laticornis* Meigen.
8. Third antennal joint orbicular, not longer than broad; front broadly quadrate, not at all narrowed anteriorly, the lunula broadly arched; face retreating, the epistome retracted, the face very wide, its sides white-pruinose; tarsi noticeably flattened. Eur.; Id. Aldrich. *parvicornis* Zetterstedt.
 Third antennal joint longer than broad; front of ♀ narrowed anteriorly, the lunula highly arched; epistome projecting; side of face less pruinose and face not unusually wide. Eur.; Id. Aldrich, Mont.* *viridana* Meigen.
9. Legs entirely black or blackish. 10
 At least base of tarsi yellowish. 13
10. Head, thorax and abdomen metallic blue-green; antennæ greatly surpassing the oral margin. S. Am., Mex. *chalybea* Wiedemann.
 Head and thorax jet black, or at least but little metallic; antennæ reaching the oral margin. 11
11. Vertex opaque, with three shining spots. 12
 Vertex black; abdomen metallic black; legs and antennæ fuscous. Brazil, Cuba, N. H. (*nigra* Wied., 1830, nec. Meig. 1826). *wiedemanni* Townsend.
12. Anterior cross-vein beyond the apex of the auxiliary vein; calypteres pale yellow. Eur.*; Wash., Wisc. Aldrich. *vaginalis* Fallen.
 Anterior cross-vein before the apex of the auxiliary vein; calypteres fuscous. Eur., Alaska. *hyalipennis* Zetterstedt.
13. Calypteres with white cilia. 14
 Calypteres with blackish cilia. 15
14. Head, thorax and abdomen deep shining black; wings tinged with light brownish yellow; metatarsi yellow. W. Ind. *longicornis* Williston.
 Thorax and abdomen more or less metallic blue-violet or bluish green; face entirely white-pruinose, nearly flat in profile; wings hyaline; tarsi yellow except the tip brown. Mass., N. H., N. Y., N. J., Pa., Ga., La.*, Ind., Ill.*, S. Dak.*, Ariz., Wash.*, Mex. [*polita* Say (1830); *cærulea* Walker (1849) *rufitarsis* Macquart (1851)] (fig. 15). *polita* Say (1830)
15. Thorax pilose; front shining black. Eur., Ga., Id.* *tarsata* Fallen.
 Hairs of thorax relatively short; front matte-black. Eur., Alaska. *albitarsis* Zetterstedt.

Genus *Palloptera* Fallen.

1. Cross-veins not bordered with brown; thorax gray-pollinose; auxiliary and first vein and apex of wing brownish. Alaska, Wash.* (fig. 21) *terminalis* Loew.
 Cross-veins bordered with brown; thorax and abdomen yellowish. 2
2. First vein wholly included in the brown color, costa wholly or almost entirely brown. 3

- First and auxiliary veins brown only at costa, the base and middle of costa not brown, wing also tipped with brown. Eur.*, N. H. (fig. 17)
*arcuata* Fallen.
3. Front half of wing and posterior cross vein broadly brown.....4
 Wings mostly hyaline, the submarginal cell clear except at tip. Alaska, Wash.*
 Id.*, Col.; Cal., Nev. Aldrich. (fig. 19).....*jucunda* Loew.
4. Head, thorax and abdomen largely cinereous-pruinose; brown pattern of wings sharply defined; abdominal segments setose; four rows of acrostichals. Mich. (figs. 16, 20).....*setosa* sp. nov.
 Head, thorax and abdomen shining yellow; brown of wings diffusing into hyaline portion.....5
5. Abdomen setulose, but with strong marginal bristles arising from black spots; acrostichals dense. N. J.*, Pa., Que., N. H.; Va., Ia. Aldrich.
*superba* Loew.
 Abdomen with hind edges of the segments narrowly and the sides broadly margined with black. Me.....*similis* Johnson.

Palloptera setosa sp. nov.

♂ ♀. Length 3.5 mm. Pale cinereous in color covered especially on occiput and mesonotum with whitish gray pruinosity; anterior portion of front, face, cheeks, scutellum, pleuræ, abdomen, halteres, calypteres and legs becoming yellowish; base of antennæ and mouth-parts testaceous; outer portion of third antennal joint infuscated. Arista dusky, pubescent. Four dorsocentrals, one of them presutural, four rows of sparse delicate acrostichals. Abdominal setæ arising from minute black dots, rather robust, the marginal ones a little stronger; fifth abdominal segment elongate. Anterior half of wing, apex and broad cloud about posterior cross vein infumated, a small clear costal spot just before the end of the auxiliary vein, the brown surrounding the cross-veins more saturate, remainder of wings clear hyaline; posterior cross-vein at right angles to the fifth vein; last section of fourth vein arched.

Two males and one female collected by Professor Aldrich at Battle Creek, Michigan. The female has a slender hyaline stripe extending down the middle of much of the submarginal cell.

EXPLANATION OF PLATE 3.

1. *Poecilomyia* (new genus of Sciomyzidæ) *decora* Loew.
2. *Poecilomyia decora* Loew. Front and face.
3. *Chætocoelia distinctissima* Schiner. From Hendel.
4. *Procrita pectinata* Hendel. Wing, from Hendel.
5. *Griphoneura imbuta* Wiedemann. From Hendel.
6. *Physogenia vittata* Macquart. Profile of head.
7. *Pachycerina ornata*, new species. Profile of head.
8. *Trigonometopus rotundicornis* Williston. Profile, from Williston.
9. *Camptoprosopella verticalis* Loew. Profile of head.

10. *Lauxania cylindricornis* Fabricius. Profile of head.
11. *Xangelina nigra* Williston. Profile of head, from Williston.
12. *Caliope gracilipes* Loew. Profile of head.
13. *Sapromyza monticola*, new species. Profile of head.
14. *Minettia lupulina* Fabricius. Front and face.
15. *Lonchæa polita* Say. Profile of head.
16. *Palloptera setosa*, new species. Profile of head.
17. *Palloptera arcuata* Meigen. Wing.
18. *Palloptera superba* Loew. Wing.
19. *Palloptera jucunda* Loew. Wing.
20. *Palloptera setosa*, new species. Wing.
21. *Palloptera terminalis* Loew. Wing.

BOOK NOTICE.

Injurious Insects. How to recognize and control them. By Walter C. O'Kane. Pp. 1-414; figs., 606. The Macmillan Company, New York.

This little book is without a parallel in so far as a concise and scientific treatment of economic entomology is concerned. It is built on a plan of three parts. Into the first part O'Kane gathers material which deals with the structure, habits and classification of insects. Some of the subjects in this part are very lightly touched, but enough of insect adaptations and habits are given to arouse an interest in people engaged primarily in the control of noxious forms. The second part deals with various methods of control such as crop rotation and mechanical means involving banding, screening and trapping. Many insecticides for biting and sucking insects are given as well as repellants and fumigants. This is followed by three illustrated chapters on spray machinery and its uses. Part three is entitled "Injurious Insects" and constitutes the bulk of the book. This section deals with insect pests of garden and field crops and with those infesting orchards and small fruits, followed by a chapter on household pests and one on those of domestic animals. Each economic species is treated separately, and with the aid of the excellent photographs which accompany each description, one is able to recognize the insect in question. The life history and habits which are naturally bound up with the injury inflicted to plant or animal are discussed in a clear and concise manner. If a method of control is known, it invariably follows.

O'Kane's conciseness in exposition and consistency in treatment are two of the book's most prominent features. The sentence construction in places is not as good as it might be, but this occasional weakness is not such as to cause any great difficulty. The photographs are another feature worthy of mention for they are well chosen and usually illustrate the insect, its stages and its destructive work, all of which should aid materially in identification.

The book is of such a nature that few would care to read it through from cover to cover, but it will undoubtedly prove to be an invaluable handy reference work to both entomologist and layman.

R. W. GLASER.
Bussey Institution.



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