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DITTO

**GUIDE**  
**TO THE**  
**INSECTS OF CONNECTICUT**

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**PART VI.**

**The Diptera or True Flies**  
**of Connecticut**

**First Fascicle**

**External Morphology; Key to Families;**  
**Tanyderidae, Ptychopteridae, Trichoceridae, Anisopodidae,**  
**Tipulidae.**

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- Part I. Introduction. By W. E. Britton. Bulletin 16.
- Part II. Euplexoptera and Orthoptera. By B. H. Walden. Bulletin 16.
- Part III. Hymenoptera. By H. L. Viereck, Messrs. MacGillivray, Brues, Wheeler and Rohwer. Bulletin 22.
- Part IV. Hemiptera. By W. E. Britton, Messrs. Abbott, Baker, Barber, Davis, DeLong, Funkhouser, Knight, Maxson, Osborn, Parshley, Stearns, Bueno, Van Duzee, Wilson and Miss Patch. Bulletin 34.
- Part V. Odonata. By Philip Garman. Bulletin 39.
- Part VI. Diptera, First Fascicle. By G. C. Crampton, C. H. Curran, C. P. Alexander. Bulletin 64.
- 
- Check-List of the Insects of Connecticut. By W. E. Britton. Bulletin 31.
- Additions to the Check-List of the Insects of Connecticut. By W. E. Britton. Bulletin 60.
- Check-List of the Spiders of Connecticut. By B. J. Kaston. Bulletin 60.

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Wilton Everett Britton

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## EXPLANATION OF COLLECTORS' INITIALS

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|--|--|
| <p>C. J. A.—C. J. Anderson<br/>           C. P. A.—C. P. Alexander<br/>           M. M. A.—Mabel M. Anderson<br/>           G. B.—George Biecher<br/>           W. H. B.—<br/>           S. W. B.—S. W. Bromley<br/>           W. F. B.—W. F. Bissell<br/>           W. E. B.—W. E. Britton<br/>           P. L. B.—P. L. Buttrick<br/>           B. T. R. L.—Bartlett Tree Research<br/>               Laboratory<br/>           C. S. C.—Connecticut State College<br/>           G. C. C.—G. C. Crampton<br/>           C. F. C.—C. F. Clagg<br/>           C. H. C.—C. H. Curran<br/>           A. B. C.—A. B. Champlain<br/>           H. W. C.—H. W. Chapman<br/>           I. W. D.—I. W. Davis<br/>           G. P. E.—G. P. Engelhardt<br/>           Ely—C. R. Ely<br/>           R. B. F.—R. B. Friend<br/>           G. M. F.—G. M. Finley<br/>           P. G.—P. Garman<br/>           I. N. G.—I. N. Gabrielson<br/>           G. H. G.—G. H. Geissler<br/>           B. Gerry—B. I. Gerry<br/>           C. C. G.—C. C. Gillette<br/>           D. Galbraith<br/>           R. H.—R. Herman<br/>           C. H.—C. Haims<br/>           J. A. H.—J. A. Hyslop</p> | <p>C. W. J.—C. W. Johnson<br/>           J. P. J.—J. P. Johnson<br/>           H. L. J.—H. L. Johnson<br/>           Q. S. L.—Q. S. Lowry<br/>           H. L.—H. Lange<br/>           E. J. S. M.—E. J. S. Moore<br/>           A. W. M.—A. W. Morrill, Jr.<br/>           W. L. M.—W. L. McAtee<br/>           W. M.—W. Marchand<br/>           H. M.—H. Mallett<br/>           J. A. M.—J. A. Manter<br/>           R. C. N.—R. C. Newton<br/>           Norton—E. Norton<br/>           G. H. P.—G. H. Plumb<br/>           Peirce<br/>           Wm. Procter<br/>           L. B. R.—L. B. Ripley<br/>           J. L. R.—J. L. Rogers<br/>           S. N. S.—S. N. Spring<br/>           L. S.—L. Stone<br/>           O. S.—Osten-Sacken<br/>           N. T.—N. Turner<br/>           H. L. V.—H. L. Viereck<br/>           Unger—B. Unger<br/>           B. H. W.—B. H. Walden<br/>           A. J. W.—A. J. Warren<br/>           K. W.—K. Wilcox<br/>           W. M. W.—W. M. Wheeler<br/>           G. S. Walley<br/>           M. P. Z.—M. P. Zappe<br/>           H. W. W.—H. W. Winkley</p> |
|--|--|

Figs.—Johannsen, Maine Agr. Expt. Sta. Bull. 172, fig. 77 (ven.); 1909. Alexander, Cfls. N. Y., 1: 889, fig. B (ven.); 1919. Crampton, Ann. Ent. Soc. Amer., 18, pl. 5, fig. 20 (thorax); 1925. Cole, Proc. Calif. Acad. Sci., (4) 16: 463, fig. 34 (hyp.); 1927.

Head black; palpi yellow at tips. Antennae black. Mesonotum and pleura shiny black, the humeri, lateral margins of notum and scutellum more tinged with reddish. Legs yellow, the outer tarsal segments darkened. Wings hyaline. Abdomen yellow basally, the outer segments darkened. ♂♀. L. 3-4 mm.; w. 3-4 mm.

(July) Me., Mass., N. Y., westw. to Mo. and Col.

Connecticut.—Hartford (C. W. J.).

### Family TIPULIDAE

by CHARLES P. ALEXANDER, PH. D.  
Massachusetts State College

1926. Tipulidae, Tipulinae. Pierre, Genera Insectorum, Fasc. 186: 1-68, 5 pls.

1927. Tipulidae, Cylindrotominae. Alexander, *Ibid.*, Fasc. 187: 1-16, 2 pls.

Date? Tipulidae, Limoniinae. Alexander, *Ibid.* (in preparation).

Antennae with from 5 to 39 segments, in local species with not more than 19, commonly 13 (Tipulinae, most Pediciini); 14 (most Limoniini); 16 (most Hexatomini and Eriopterini); form of antennae various, from moniliform and setaceous to serrate and pectinate (males of *Limonia*, subgenus *Rhipidia*; *Ctenophora*; *Tanyptera*: Figs. 25, A, B; 34, F, G). Maxillary palpi with from one to four segments, commonly the latter. Labial palpi reduced, at most 2-segmented. Frontal prolongation of head in most Tipulinae bearing a small "nasus" or nose at apex of dorsal surface; in cases, the mouth parts are produced into a slender rostrum that exceeds in length one-half the entire body, this either comprised of a long, slender prolongation of the front, with the reduced mouth parts at extreme tip (*Elephantomyia*, Fig. 46, L; *Toxorhina*) or else made up chiefly of greatly elongated labial palpi (*Limonia*, subgenus *Geranomyia*, Fig. 34, C). Eyes glabrous, rarely (Pediciini) short-hairy; eyes usually of moderate size, separated above by the wide anterior vertex, the latter sometimes reduced or lacking, producing a holoptic condition (males of *Limonia* species). No ocelli. Posterior sclerites of head sometimes produced and narrowed behind.

Pronotum usually well developed. Thoracic dorsum comprised chiefly of the mesonotum, with well-developed praescutum (lying before the so-called V-shaped or transverse suture, Fig. 22, D), scutum, scutellum, and postnotum, the latter with a median (mediotergite) and lateral (pleurotergites) subdivisions. Praescutum often with paired double dots (*tuberculate pits*) near cephalic end, or with a polished impressed humeral area (*pseudosutural foveae*) on either

side; ground-areas (*interspaces*) between the usual praescutal stripes usually with abundant setae. Pleural sutures distinct; pleural sclerites glabrous or variously provided with setae. Halteres long to very long. Legs breaking readily at junction of trochanter and femur; tibiae with or without spurs at distal end; five tarsal segments; claws smooth or variously toothed near base (*Tipula*; *Limonia*, Fig. 34, D, E): legs almost invariably long and slender, shortest and stoutest in nearly apterous species, as *Chionea*. Wings (Fig. 23) with from one to three branches of  $R_s$ ; two to four branches of  $M$ ;  $Cu_2$  present (in local species), lying close behind  $Cu_1$ , longest in most Tipulinae where it virtually attains the margin; two Anal veins (in all local species); in most members of the family an enclosed discal ( $1st M_2$ ) cell; radial crossvein,  $r$ , lacking, as in all Diptera, but its position taken and simulated by the transversely placed  $R_2$ ; wings almost invariably with strong setae (*macrotrichia*) on certain of the veins; more rarely with these in the cells (best developed in *Ula*, *Utomorpha* and *Ormosia*).

Abdomen always long and slender, sometimes (*Longurio*, *Tipula longiventris*, female) excessively so; apex of abdomen in males enlarged into a club-shaped hypopygium (Fig. 22, B, C); females usually with an elongate, acutely pointed ovipositor, comprised of slender, gently upcurved dorsal valves (*cerci*) and shorter, more nearly straight sternal valves (*hypovalvae*). Male hypopygium comprised of basistyles (parameres, coxites, pleurites, gonostipes or side-pieces), bearing at their tips the more or less complicated dististyles (styles, claspers, apical appendages); a complex armature surrounding the aedeagus, the most evident structures being the gonapophyses (parameres, genital palpi), the whole structure sometimes fused into a complex mass, the phallosome. Dorsal surface of basistyle at proximal end (as in *Epiphragma*, Fig. 22, C) with a sclerotized rod, the interbase, lost in all more specialized types. Anal tube dorsal in position. Lateral angles of ninth tergite often produced into slender lobes or spines (as in Tipulinae, *Dolichoheza*; Pediciini, *Dicranota*; Limoniini, *Dicranoptycha*).

**Morphological References.** In addition to the features above listed, certain other details of body structure and wing venation are shown in Figs. 22 and 23. The detailed account of dipterous morphology given by Doctor Crampton earlier in this volume will prove of the very greatest value in determining doubtful structures. Numerous papers are now available discussing the various morphological features throughout the Order. For convenience of reference, I have listed a number of the more important papers that pertain to the Tipulidae.

#### HEAD AND MOUTH PARTS.

Crampton, G. C.

1917 A phylogenetic study of the larval and adult head in Neuroptera, Mecoptera, Diptera and Trichoptera.

Ann. Ent. Soc. Amer., 10: 337-344, figs. 1-14.

1921 The sclerites of the head, and the mouth-parts of certain immature and adult insects.

*Ibid.*, 14: 65-110, pls. 2-8.

FIGURE 22. Tipulidae; structures.

- A. *Tipula (Yamatotipula) jacobus* Alex.; lateral aspect of head and thorax, showing principal structures.
- B. The same; apex of abdomen of male, showing hypopygium, lateral aspect.
- C. *Epiphragma (Epiphragma) fascipennis* (Say); male hypopygium, dorsal aspect.
- D. *Pseudolimnophila inornata* (O.S.); mesonotum, dorsal aspect.

## Symbols:

<i>a</i>	antenna	<i>pas</i>	parascutellum
<i>abs</i>	abdominal sternites	<i>pat</i>	pretergite (paratergite)
<i>abt</i>	abdominal tergites	<i>pf</i>	pseudosutural fovea (humeral pit)
<i>acd</i>	acdeagus	<i>pn</i>	pronotum
<i>aes</i>	anepisternum (mesepisternum)	<i>psc</i>	praescutum
<i>al</i>	wing	<i>pt</i>	postnotal pleurotergite
<i>b</i>	basistyle (coxite, pleurite, gonostipes, side-piece)	<i>ptp</i>	pteropleurite (mesepimeron)
<i>cx</i>	coxa	<i>s</i>	squama
<i>d</i>	dististyle (style, clasper, apical appendage)	<i>sc</i>	scutum
<i>em</i>	epimeron	<i>sl</i>	scutellum
<i>es</i>	episternum	<i>sp</i>	spiracle
<i>f</i>	frontal prolongation of head (rostrum)	<i>spl</i>	sternopleurite (mesepisternal katepisternum)
<i>h</i>	haltere	<i>tp</i>	tuberculate pit (double dots)
<i>in</i>	interbase	<i>tr</i>	trochanter
<i>mt</i>	postnotal mediotergite	<i>v</i>	vertex
<i>n</i>	nasus		
<i>p</i>	maxillary palpus		

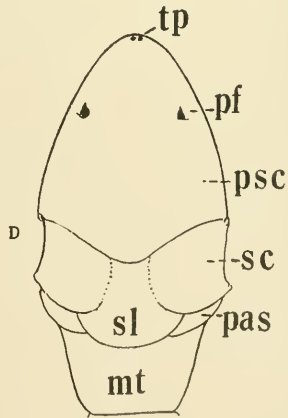
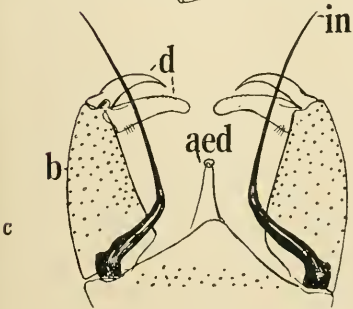
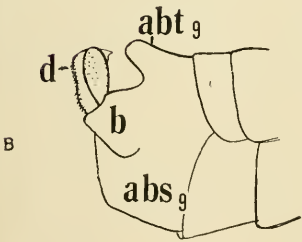
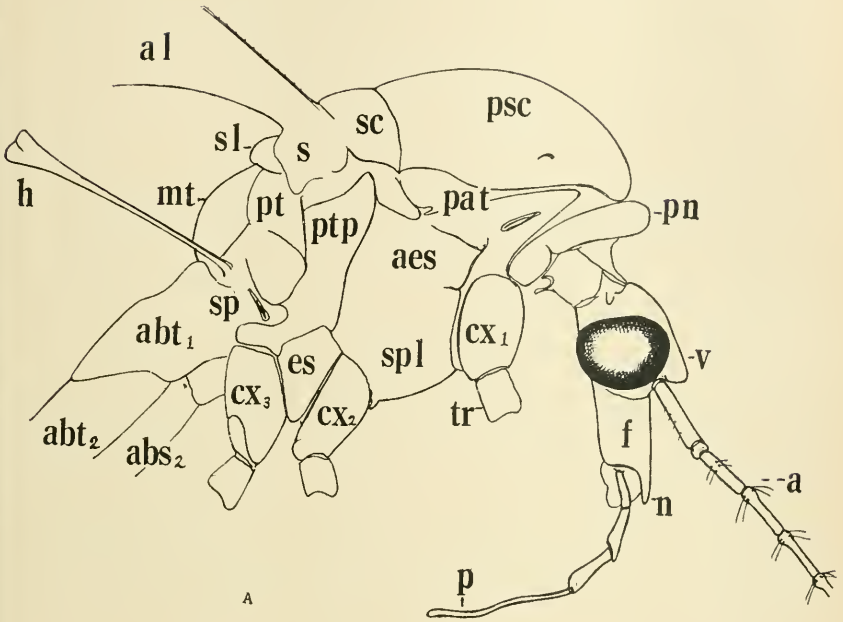




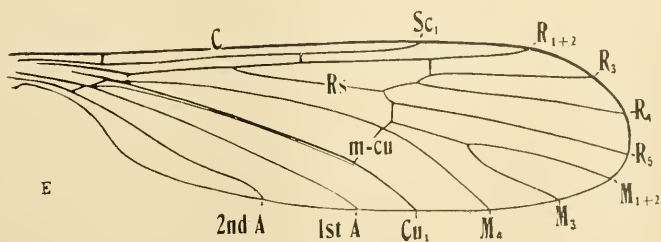
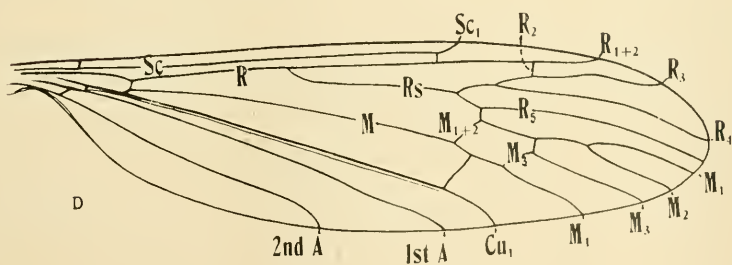
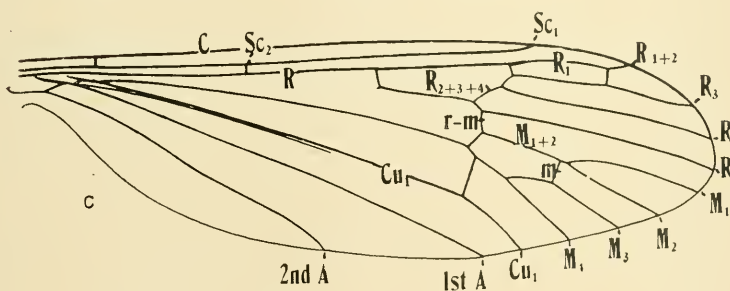
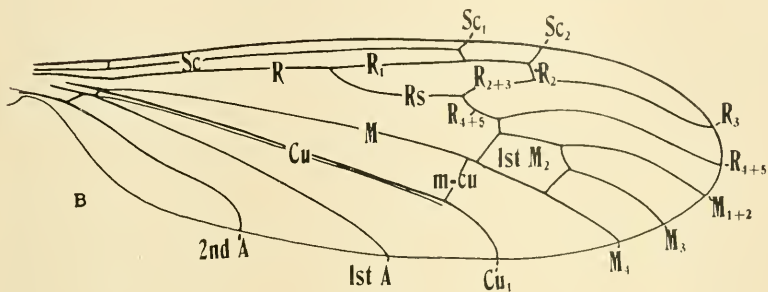
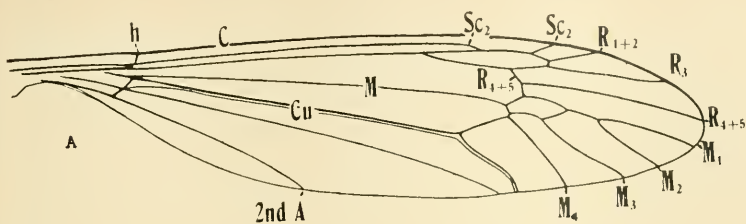
FIGURE 23. Venation of chief tribes and subfamilies of Tipulidae.

A.	<i>Tipula</i> ( <i>Yamatotipula</i> ) <i>tricolor</i> Fabr.	(TIPULINAE)
B.	<i>Limonia</i> ( <i>Limonia</i> ) <i>triocellata</i> (O.S.)	(LIMONIINI)
C.	<i>Dicranota</i> ( <i>Eudicranota</i> ) <i>pallida</i> Alex.	(PEDICIINI)
D.	<i>Pseudolimnophila</i> <i>inornata</i> (O.S.)	(HEXATOMINI)
E.	<i>Ormosia</i> <i>monticola</i> (O.S.)	(ERIOPTERINI)

(Interpreted according to the Comstock-Needham System, as modified for the Radial field by Alexander and for the Cubital field by Tillyard.)

## Symbols:

<i>A</i>	Anal veins	<i>m</i>	medial crossvein
<i>C</i>	Costa	<i>m-cu</i>	medial-cubital crossvein
<i>Cu</i>	Cubitus	<i>R</i>	Radius
<i>h</i>	humeral crossvein	<i>Rs</i>	Radial sector
<i>M</i>	Media	<i>Sc</i>	Subcosta





- 1923 A phylogenetic comparison of the maxillae throughout the orders of insects.  
Journ. N. Y. Ent. Soc., 31: 77-107, pls. 12-17.
- 1925 A phylogenetic study of the labium of holometabolous insects, with particular reference to the Diptera.  
Proc. Ent. Soc. Washington, 27: 68-91, pls. 6-8.
- Peterson, Alvah  
1916 The head-capsule and mouth-parts of Diptera.  
Illinois Biol. Mon., 3: 7-111, 25 pls.

## THORACIC SCLERITES, WING-BASES AND LEGS.

- Crampton, G. C.  
1923 Preliminary note on the terminology applied to the parts of an insect's leg.  
Can. Ent., 55: 126-132, pl. 3.
- 1925a A phylogenetic study of the thoracic sclerites of the non-Tipuloid Nematocerous Diptera.  
Ann. Ent. Soc. Amer., 18: 49-74, pls. 1-5.
- 1925b Evidences of relationship indicated by the thoracic sclerites of certain Eriopterine Tipuloid Diptera.  
Insec. Inscit. Menst., 13: 197-213, pls. 2-3.
- 1926a A phylogenetic study of the thoracic sclerites of the Psychodoid Diptera, with remarks on the inter-relationships of the Nematocera.  
Ent. News, 37: 33-39, 65-70, pls. 3-4.
- 1926b A comparison of the neck and prothoracic sclerites throughout the orders of insects from the standpoint of phylogeny.  
Trans. Amer. Ent. Soc., 52: 199-248, pls. 10-17.
- Snodgrass, R. E.  
1909 The thorax of insects and the articulation of the wings.  
Proc. U. S. Nat. Mus., 36: 511-595, pls. 40-69.
- Young, B. P.  
1921 Attachment of the abdomen to the thorax in Diptera.  
Cornell Univ. Agr. Expt. Sta., Mem. 44: 255-306, 76 figs.

## VENATION.

- Alexander, C. P.  
1927 The interpretation of the radial field of the wing in the Nematocerous Diptera, with special reference to the Tipulidae.  
Proc. Linn. Soc. New South Wales, 52: 42-72, 92 figs.
- 1929 A comparison of the systems of nomenclature that have been applied to the radial field of the wing in the Diptera.  
IV. Internat. Congress Ent., 2: 700-707, 3 pls.
- 1934 (In C. H. Curran, The families and genera of North American Diptera, pp. 38-39, figs.)
- Comstock, J. H.  
1918 The Wings of Insects, pp. 1-430, 427 figs., 10 pls.
- MacGillivray, A. D.  
1923 The anal veins in the wings of Diptera.  
Ent. News, 34: 106-111.
- Needham, J. G.  
1908 Venation of the wings of Tipulidae.  
23rd Rept. N. Y. St. Ent. for 1907: 217-238, pls. 11-32, figs. 11-16.
- Tillyard, R. J.  
1919 The Panorpid Complex. Part 3.—The wing-venation.  
Proc. Linn. Soc. New South Wales, 44: 533-718, pls. 31-35, figs. 35-112.

## GENITALIA.

Cole, F. R.

- 1927 A study of the terminal abdominal structures of male Diptera (Two-winged Flies).  
Proc. California Acad. Sci., (4) 16: 397-499, figs. 1-287.

Crampton, G. C.

- 1923 The genitalia of male Diptera and Mecoptera compared with those of related insects, from the standpoint of phylogeny.  
Trans. Amer. Ent. Soc., 48: 207-225, pls. 8-10.  
1941 The terminal abdominal structures of male Diptera.  
Psyche 48: 79-94, 2 pls.

Snodgrass, R. E.

- 1903 The terminal abdominal segments of female Tipulidae.  
Journ. N. Y. Ent. Soc., 11: 177-183, pls. 10-11.  
1904 The hypopygium of the Tipulidae.  
Trans. Amer. Ent. Soc., 30: 179-236, pls. 8-18.

The Tipulidae, commonly called "Crane-flies", comprises one of the largest families of Diptera, with some 8,500 described species, of which nearly 500 occur in northeastern North America. The adult flies frequent a variety of habitats, though usually not far from moisture, required in one form or another by the larvae of all species. The habitats of the immature stages have been briefly discussed under the various genera. Students who are interested in the early stages of these flies are referred to the following papers:

Alexander, C. P.

- 1920 The crane-flies of New York. Part II. Biology and Phylogeny.  
Cornell Univ. Agr. Expt. Sta., Mem. 38: 691-1133, pls. 11-97 (Bibliography of immature stages to 1920).  
1931 The crane-flies (Tipulidae, Diptera). Deutsche Limnologische Sunda-Expedition.  
Archiv für Hydrobiol., Suppl. Bd. 9, Tropische Binnengewässer, Bd. 2, pt. 36: 135-191, 2 pls. (Bibliography of immature stages 1920-1930. Summary of larval habitats of Tipulidae).

Rogers, J. S.

- 1926 Notes on the biology and immature stages of *Gonomyia (Leiponcura) pleuralis* (Will.). Tipulidae, Diptera.  
Florida Ent., 10: 33-38, 5 figs.  
1927a Notes on the life history, distribution and ecology of *Diotrepha mirabilis* Osten Sacken.  
Ann. Ent. Soc. Amer., 20: 23-36, 9 figs.  
1927b Notes on the biology of *Atarba picticornis* Osten Sacken. Tipulidae-Diptera.  
Florida Ent., 10: 49-55, 7 figs.  
1927c Notes on the biology and immature stages of *Geranomyia* (Tipulidae, Dipt.) 1. *Geranomyia rostrata*.  
*Ibid.*, 11: 17-26, 7 figs.  
1930 The summer crane-fly fauna of the Cumberland plateau in Tennessee.  
Occas. Papers Mus. Zool. Univ. Michigan, 215: 1-50, 5 pls.  
1932 On the biology of *Limonia (Dicranomyia) floridana* (Osten Sacken).  
Florida Ent., 15: 65-70, 8 figs.  
1933a The ecological distribution of the crane-flies of northern Florida.  
Ecol. Mon. 3, no. 1: 1-74, figs. 1-25.  
1933b Contributions toward a knowledge of the natural history and immature stages of the crane-flies. 1. The genus *Polymera* Wiedemann.  
Occas. Papers Mus. Zool. Univ. Michigan, 268: 1-13, 2 pls.

**Geographical Limits.** The area adopted in the present report is almost that considered in Gray's "New Manual of Botany", seventh edition, 1908, that is, northeastern North America, north to the 50th degree of north Latitude, west to the 96th Meridian. The southern limits include the south boundary lines of Kansas, Missouri, Kentucky and Virginia. It is believed that this northeastern area includes about all of the species that are regional to Connecticut and to the adjoining states of Massachusetts, Rhode Island and New York. A very few extra-limital species have been included while undescribed species still continue to be discovered within the area. The present list for Connecticut includes 229 species. To this figure may be added 120 species that have been taken in either Massachusetts or New York, or both, virtually all of which may well be taken in Connecticut as a result of further collecting. The remaining species treated herein occur elsewhere in New England and southern Canada, or in New Jersey and Pennsylvania, southward and westward. Following each species is given a brief summary of range by states and provinces, with particular reference to the occurrence of species in the New England States and New York, the western and southern limits being indicated by the marginal states attained. These states and provinces are abbreviated in accordance with standard symbols. Following certain of the species, the life-zone or zones to which it is restricted is given in parentheses. In Connecticut, three life-zones are found, the Canadian, the Transition (Alleghenian) and the Upper Austral (Carolinian).

**Regional Lists.** Our knowledge of crane-fly distribution has been built up through intensive collecting and study over a period of many years. The following papers are of the greatest importance in studying the area under present consideration.

Ontario.

Alexander, C. P.

- 1926 Records of crane-flies from Ontario.  
Can. Ent., 58: 236-240. (77)
- 1928 The same, Part II.  
*Ibid.*, 60: 54-60. (159)

Quebec.

Alexander, C. P.

- 1929 A list of the crane-flies of Quebec, I.  
*Ibid.*, 61: 231-236, 247-251. (139)
- 1931 The same, Part II.  
*Ibid.*, 63: 135-147. (208)

Winn, A. F., and Beaulieu, G. (as revised by Petch, C. E. and Maltais, J. B.)

- 1932 A preliminary list of the insects of the province of Quebec. Part  
2, Diptera.  
Quebec Soc. Prot. Plants, 24: 5-100. (246)

New England.

Johnson, C. W.

- 1925 Diptera of New England.  
Occas. Papers Boston Soc. Nat. Hist., 7, no. 15: 1-326. (264)

Alexander, C. P.

- 1925 First supplementary list of Tipulidae.  
*Ibid.*, 5: 169-174. (277)
- 1927 Second supplementary list.  
*Ibid.*, 5: 223-231. (290)
- 1930 Third supplementary list.  
*Ibid.*, 5: 267-278. (318)
- 1936 Fourth supplementary list.  
*Ibid.*, 8: 273-292. (346)

Proctor, William

- 1938 Biological survey of the Mount Desert Region. Part VI. The insect fauna with references to methods of capture, food plants, the flora and other biological features, pp. 496, 12 figs., 1 map. (198)

New York.

Alexander, C. P.

- 1919 The crane-flies of New York, Part I.  
 Cornell Univ. Agr. Expt. Sta., Mem. 25: 765-993. (267)
- 1922 First supplementary list.  
 Bull. Brooklyn Ent. Soc., 17: 58-62. (277)
- 1924 Second supplementary list.  
*Ibid.*, 19: 57-64. (282)
- 1929 Third supplementary list.  
*Ibid.*, 24: 22-29. (306)
- 1929 Fourth supplementary list.  
*Ibid.*, 24: 295-302. (318)

Michigan.

Rogers, J. Speed

- 1942 The crane-flies (Tipulidae) of the George Reserve, Mich.  
 Mus. Zool., Univ. Mich., Misc. Publ. 53: 1-128, 8 pls., 1 map. (206)

Wisconsin.

Dickinson, W. E.

- 1932 The crane-flies of Wisconsin. (130)  
 Bull. Public Mus. Milwaukee, 8: 139-266, Frontis., pls. 22-24,  
 figs. 29-197 (abbreviated in this paper, Cfs. Wisc.).

The figures in parentheses following each of the above references represent the consecutive totals in number of species of Tipulidae from the area in question.

For much information, still unpublished, regarding the range of various species elsewhere in the region under consideration, I wish to express my deepest thanks to Professor J. Speed Rogers (for records from Michigan, Iowa, Indiana, Tennessee, North Carolina, Georgia and Florida) and to Dr. Henry Townes, Jr. (North Carolina, South Carolina).

**Seasonal Limits.** Crane-flies are wonderfully restricted in their season of flight-appearance. The seasonal range given in parentheses at the end of each species is that for Connecticut, or for that state or province nearest Connecticut where the species is known to occur. This restriction of dates is of particular importance in the case of wide-ranging species, which might be found on the wing in May in Connecticut, in April in the latitude of Washington, and even as early as February or March in the southern part of the range of the species in question. Most Tipulidae are on the wing only for a



month or so, but some have a more extended flight period. In some species this is due to their having two generations per season, the first appearing in Spring or early Summer, the second in late Summer or Autumn.

**Figures.** The figures herein supplied have been chosen from a wealth of material. The wing venation of each genus and subgenus is illustrated, together with that of certain other species that deviate in important regards from the genotype. Where such species have macrotrichia in the wing-cells, these are indicated by circular dots to represent the position of the setigerous punctures. No attempt has been made to show the wing pattern, eminently characteristic of many species with variegated wings. For the local species, most of these have been shown in an earlier report by the writer (*The Crane-flies of New York, Part I, Cornell Univ. Agr. Expt. Sta. Mem. 25:765-993, text-figs. 121-132, pls. 30-55; 1919, abbreviated in this report as "Cfls. N. Y., 1"*), which should be used in conjunction with the present paper. For further convenience of reference, all other readily available figures have been cited, in conjunction with the various species. The figures cited, with those supplied as original at this time, should aid materially in the identification of these flies.

Special emphasis is here placed on the structure of the male hypopygium, which furnishes almost the sole available specific characters in many groups. Such figures are somewhat diagrammatic outlines to show details and position of parts. Mounts for preserving the genitalic structures are easily made in the following manner: The apex of the abdomen is removed and placed in cold KOH, 10 percent solution, overnight. After thorough washing, dehydration and clearing in xylol, permanent slide mounts may be made in dammar or balsam.

### Connecticut Collections and Acknowledgments

The records of Tipulidae for the State List have been derived from a variety of sources. One of the largest single series is that of the Connecticut Agricultural Experiment Station, amassed during a long period of years by the various members of the staff, under the leadership of Doctor Britton, and indicated in this report by the collector's initials. A second major series is that of the University of Connecticut (Connecticut State College), collected by Professors de Coursey and Manter, together with their various students in entomology. Most of these latter records are indicated by the initials, C. S. C. (Connecticut State College).

The numerous records secured by the late Mr. Charles W. Johnson and collaborators (*Occas. Papers Boston Soc. Nat. Hist., 7:1-326; 1925*) have been included. A small collection from near Avon was taken by Dr. C. H. Curran. The majority of the specimens discussed herewith have been taken by Dr. G. C. Crampton, Mrs. Alexander, and myself during the course of many trips into the State during the years 1928 to 1933. One notable excursion made by us (June 8-9,

1929) added no fewer than 68 species of Tipulidae to the list as then known. Special attention has been devoted to Litchfield County, including a systematic month by month survey of the rich fauna of Kent Falls and vicinity.

Especial thanks are extended to Dr. Britton and to Dr. Friend for their kindly advice and cooperation during the progress of this study.

**Abbreviations:** Besides the standard State abbreviations, a few others are given throughout the text in order to save space. These are as follows:

abdom.—abdominal	southw.—southward
e.—east, eastern	southwestw.—southwestward
eastw.—eastward	ven.—venation
hyp.—male hypopygium	w.—west, western
l.—body length	westw.—westward
n.—north, northern	w.—wing length
northw.—northward	♂—male sex
northwestw.—northwestward	♀—female sex
s.—south, southern	

#### Key to Subfamilies

1. Terminal segment of maxillary palpus elongate, whiplash-like; nasus usually distinct; antennae usually with 13 segments; wings (Fig. 24) with  $Sc_1$  usually atrophied; vein  $Cu_1$  constricted at  $m-cu$ , the latter usually at or close to the fork of  $M_{3+4}$ ; body-size large.....**Tipulinae**
2. Terminal segment of maxillary palpus short; no distinct nasus; antennae usually with either 14 or 16 segments;  $Sc_1$  present, the tip atrophied in some *Cylindrotominae* (Fig. 33); vein  $Cu_1$  straight, not constricted at  $m-cu$ , the latter placed far before the fork of  $M_{3+4}$ , usually at or close to fork of  $M$ ; body-size usually small or medium..... **2**
2. Wings with tip of  $R_{1+2}$  atrophied, giving the appearance of a long fusion back from the margin of veins  $R_1$  and the anterior branch of its sector; free tip of  $Sc_2$  preserved (Fig. 33, E-I).....**Cylindrotominae**
- Wings sometimes with tip of  $R_{1+2}$  atrophied (*Limoniini*, Fig. 34, A, B) but not giving the appearance of a long fusion back from the margin of veins  $R_1$  and the anterior branch of the sector; free tip of  $Sc_2$  preserved in many species of *Limoniini* (Fig. 34, A, B), lacking in all other tribes in this fauna (Figs. 38, 40, 43, 44, 47, 50).....**Limoniinae 297**

The only subapterous crane-flies within our faunal limits are members of the genus *Chionea* (*Eriopterini*) and the female sex of some species of *Pedicia* (*Pediciini*), both belonging to the subfamily *Limoniinae*.

#### Subfamily TIPULINAE

In the local fauna, the Tipulinae include almost all of the larger species of Tipulidae. Most of the included forms have an average size greater than that of the other major subfamily, the Limoniinae. Exceptions in the latter group occur in rare instances, as certain species of *Limonia*, *Limnophila*, *Eriocera*, and *Pedicia*.

Key to Subtribes, Genera and Subgenera

1. Legs unusually long and filiform; wings with vein  $R_{1+2}$  atrophied and with  $Sc_2$  ending in  $Sc$  close to origin of  $Rs$  (*Dolichopeza*, Figs. 24, A, B); or  $R_{1+2}$  preserved,  $Sc$  very long and  $Sc_1$  reaching  $C$  as a distinct element some distance beyond fork of  $Rs$ ;  $r-m$  shortened or obliterated by fusion of adjoining veins (*Brachypremna*, Fig. 24, C)..... (DOLICHOPEZARIA) 2
- Legs of normal stoutness for the family; wings (Fig. 24, D-H) with vein  $R_{1+2}$  preserved; when latter is atrophied (a few species of *Tipula*), with  $r-m$  distinct,  $Sc$  of moderate length,  $Sc_1$  atrophied before fork of  $Rs$  and with  $Sc_2$  ending at or near midlength of  $Rs$  (exception, some *Longurio*, which never have white on legs, as is the case in *Brachypremna*)..... 3

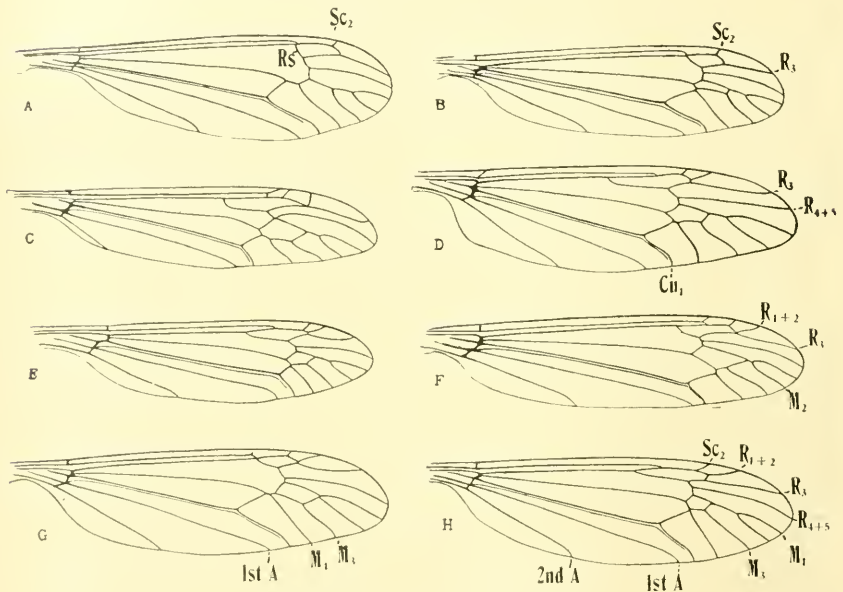


FIGURE 24. Tipulinae; venation.

- |  |   |
|--|---|
| A. <i>Dolichopeza (Dolichopeza) americana</i> Ndm. | E. <i>Prionocera fuscipennis</i> (Lw.)        |
| B. <i>D. (Oropeza) similis</i> (Johns.)            | F. <i>Longurio testaceus</i> Lw.              |
| C. <i>Brachypremna dispellens</i> (Wk.)            | G. <i>Nephrotoma ferruginca</i> (Fabr.)       |
| D. <i>Ctenophora angustipennis</i> Lw.             | H. <i>Tipula (Lunatipula) bicornis</i> Forbes |

Symbols: A, Anal; Cu, Cubitus; M, Media; R, Radius; Sc, Subcosta.

2. Wings with  $R_{1+2}$  atrophied;  $Rs$  short, transverse, simulating a cross vein, about equal in length to one-half  $m-cu$  (Fig. 24, A, B)..... **Dolichopeza**
- Wings with  $R_{1+2}$  pale, perpendicular to  $R_{2+3}$ ;  $Rs$  strongly arcuated at origin (Fig. 24, C)..... **Brachypremna**
3. Antennal flagellum of male branched (Fig. 25, A, B), of female branched or serrate; flagellar verticils present but short; legs relatively short and stout. .... (CTENOPHORARIA) 4
- Antennal flagellum simple (serrate in *Prionocera*; Fig. 25, C), which is readily told by lack of antennal verticils); legs usually more slender..... (TIPULARIA) 5

4. Antennae ( $\delta$ ) with three pectinations on each of flagellar segments 2 to 9, each segment with a single branch on apical half, in addition to the usual basal pair (Fig. 25, A); ovipositor greatly elongated, sabre-like ..... **Tanyptera**
- Antennae ( $\delta$ ) with two pairs of pectinations on each of flagellar segments 2 to 9, one pair being subbasal, the other subapical (Fig. 25, B); ovipositor short and of normal tipuline structure ..... **Ctenophora**
5. Flagellar segments without verticils, the lower face of individual segments slightly produced near outer end, giving the organ a serrate appearance; terminal flagellar segment abruptly more slender (Fig. 25, C)..... **Prionocera**
- Flagellar segments verticillate, simple or nearly so..... 6
6. Abdomen of both sexes greatly elongated, somewhat resembling that of a dragonfly; verticils of outer flagellar segments very long and conspicuous; cerci of ovipositor with smooth margins..... **Longurio**
- Abdomen not so elongated (except in  $\text{♀}$  of *Tipula longiventris* which has cerci serrate on outer margins); antennal verticils of moderate length only. .... 7
7. Wings (Fig. 24, G) with *Rs* short and oblique in position, shorter than *m-cu*; cell *M*<sub>1</sub> sessile or very short-petiolate; vein *M*<sub>4</sub> arising opposite or basad of origin of *M*<sub>1+2</sub>; body-coloration highly polished, often black and yellow. .... **Nephrotoma**
- Wings (Fig. 24, H) with *Rs* elongate, exceeding *m-cu*; cell *M*<sub>1</sub> petiolate; vein *M*<sub>4</sub> arising distad of origin of *M*<sub>1+2</sub>; body-coloration almost always opaque, pruinose or pollinose (polished only in *nobilis* and a few allies).

**Tipula 226**

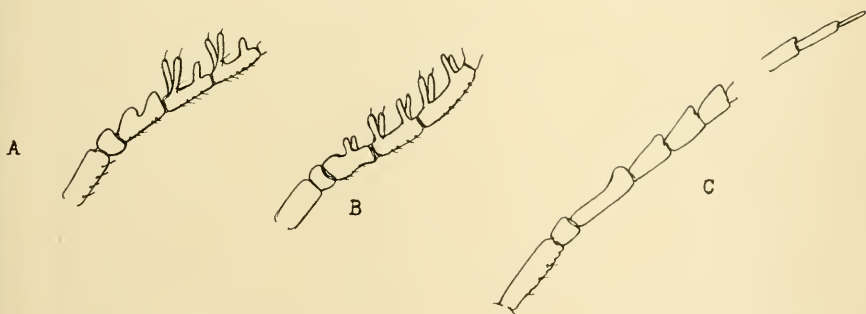


FIGURE 25. Tipulinae; details of antennae.

- A. *Tanyptera frontalis* (O.S.);  $\delta$ , basal five segments.  
 B. *Ctenophora apicata* O.S.;  $\delta$ , basal five segments.  
 C. *Prionocera dimidiata* (Lw.);  $\delta$ , in part, intermediate flagellar segments omitted.

### Dolichopeza Curtis

1825. *Dolichopeza* Curtis; Brit. Ent., p. 62.

An extensive genus of flies, with representatives in all major regions. The reasons for uniting *Dolichopeza* and *Oropeza* into a single genus have been given in another report (Alexander, Philippine Journ. Sci., 46:269-270; 1931).

The venation of the radial field is quite like that of the genus *Limonia*, except that no species of *Dolichopeza* is known where the



free tip of  $Sc_2$  is carried distad of the level of  $R_2$ , as is common in the Limoniini. Most of the species in our region are very similar in general appearance and are most readily separated by characters of the male hypopygium.

The adults are among the best-known of local flies, being found in small dancing groups in darkened shady places, as in shaded spots in woods, beneath culverts and bridges, in outhouses, in crannies and caverns of shaded cliffs, beneath overhanging boulders, in the shade of uprooted shallow tree roots, and numerous other similar situations. When not engaged in a characteristic vertical dance, they hang from the roof of their haunts by the fore legs, the posterior pair hanging pendant. The larvae live in moss cushions, often in dry situations.

#### Key to Subgenera

1. Wings with cell  $1st\ M_2$  open by atrophy of basal section of vein  $M_3$  (Fig. 24, A). . . . . **Dolichopeza: Dolichopeza**  
Wings with cell  $1st\ M_2$  closed (Fig. 24, B). . . . . **Dolichopeza: Oropeza**

#### Subgenus **Dolichopeza** Curtis

**Dolichopeza** (*Dolichopeza*) *americana* Ndm. (Fig. 24, A).

1908. *Dolichopeza americana* Needham; 23rd Rept. N. Y. St. Ent. for 1907: 211.

Figs.—Needham, *Ibid.*, pl. 16, fig. 5 (ven.). Alexander, *Cfls.* N. Y., 1, pl. 43, fig. 187 (wing); 1919.

Praescutum with three brown stripes, the lateral pair and areas on scutal lobes darker. Pleura yellow, variegated with brown area. Legs brown, the tips of basitarsi and all succeeding tarsal segments snowy white. ♂. L. 8-9 mm.; w. 10-10.5 mm. ♀. L. 8.5-9 mm.; w. 9.5-10 mm.

(June, July) Labr., Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., N. J., Pa., Ohio, Ind., Mich., southw. to Tenn., S. C. and Ga.

Connecticut.—E. Hartland, June 8, 1929 (C. P. A.); Hartford, June 12, 1931 (C. P. A.); Hartland, June 9, 1929 (C. P. A.); Kent Falls, June 12 - 13, 1931 (C. P. A.); Norfolk, June 9, 1929 (G. C. C.); Riverton, June 12, 1931 (C. P. A.); Tunxis State Park, June 12, 1931 (C. P. A.); Union, June 14, 1933 (C. P. A.); W. Granby, June 8, 1929 (G. C. C.).

#### Subgenus **Oropeza** Needham

1908. *Oropeza* Needham; 23rd Rept. N. Y. St. Ent. for 1907: 211.

#### Key to Species (based on male characters)

1. Tarsi snowy white . . . . . 2  
Tarsi dark brown, brown or yellowish . . . . . 3
2. Male hypopygium with the outer dististyle shorter than the inner dististyle; gonapophysis appearing as a flattened blade provided with delicate setulae, the apex an acute glabrous point. (Fig. 26, A). . . . . **carolus**  
Male hypopygium with the outer dististyle longer than the inner; gonapophyses appearing as divergent lobes that are set with abundant blackened spines and setae. (Fig. 26, H). . . . . **subalbipes**

3. Halteres pale yellow, without conspicuously darkened knobs (slightly suffused at bases of knobs in *sayi* and *walleyi*); male hypopygium with gonapophyses more or less expanded outwardly into pale blades, usually with pale spinous points..... 4  
Knobs of halteres dark brown; male hypopygium with gonapophyses either appearing as divergent cushions set with black spinous points, or else as flattened blades that narrow at apex into a single acute spine..... 6
4. Aedeagus at apex split into two acute black points; each gonapophysis at apex extended laterad into a long point. (Fig. 26, G).....*similis*  
Aedeagus simple; gonapophysis not prolonged into a slender apical point... 5
5. Gonapophyses not spinose, appearing as flattened blades that are slightly expanded at outer ends, the surface with abundant setulae. (Fig. 26, F) *sayi*  
Gonapophyses expanded at tips, the apex set with irregular denticles. (Fig. 26, K).....*walleyi*
6. Gonapophyses appearing as flattened plates, without spines..... 7  
Gonapophyses appearing as divergent cushions, set with strong black spines and spinous setae. .... 8
7. Thoracic pleura yellow, unmarked; stigma pale brown; no dark seam along vein *Cu*; hypopygium with lateral arms of tergite not expanded; gonapophyses not blackened at tips. (Fig. 26, B).....*dorsalis*  
Thoracic pleura variegated with dark brown; stigma dark brown; a dark seam along vein *Cu*; hypopygium with lateral arms of tergite angularly expanded; gonapophyses gradually narrowed into long black spines. (Fig. 26, J) .....*venosa*
8. Median region of 9th tergite of male hypopygium more or less produced. 9  
Median region of 9th tergite of male hypopygium weakly emarginate. (Fig. 26, C).....*johnsonella*
9. Surface of thoracic notum usually subnitidous; male hypopygium with base of outer dististyle abruptly dilated. (Fig. 26, E).....*polita*  
Surface of thoracic notum opaque male hypopygium with the outer dististyle not expanded at base ..... 10
10. Median region of tergite of male hypopygium produced into a small, dark plate that is tridentate at apex; inner dististyle very broad, bidentate and spinous at tip. (Fig. 26, I).....*tridenticulata*  
Median region of tergite produced into a small point on either side of median line; inner dististyle narrow, at apex narrowed to an obtuse blackened point. (Fig. 26, D).....*obscura*

*Arrangement of species, based on male hypopygial characters:*

- Gonapophyses (Fig. 26, C, D, E, H, I) densely set with blackened spinous setae. *johnsonella*, *obscura*, *polita*, *subalbipes*, *tridenticulata*.
- Gonapophyses (Fig. 26, A, B, F, G, J, K) appearing as flattened plates, with setae, but no blackened spines or spinous setae, the apex smooth or else terminating in one or more glabrous pale spines. *carolus*, *dorsalis*, *sayi*, *similis*, *venosa*, *walleyi*.

**Dolichopeza** (*Oropeza*) *carolus* nom. nov. (Fig. 26, A).

1909. *Oropeza albipes* Johnson; Proc. Boston Soc. Nat. Hist., 34:121 (preoccupied).

Fig.—Johnson, *Ibid.*, pl. 15, fig. 12 (hyp.).

Praescutum brown, with three darker stripes; pleura yellow, variegated with dark brown. Knobs of halteres darkened. Male hypopygium (Fig. 26, A). ♂. L. 10 mm.; w. 12 mm. ♀. L. 12-13 mm.; w. 11-12 mm.

(June-Aug.) Que., N. B., Me., N. H., Vt., Mass., N. Y., N. J., Pa., westw. to Ind. and Mich., southw. to Va., N. C., S. C. and Tenn.

Connecticut.—Cornwall Bridge, Aug. 19, 1931 (C.P.A.); Granby, July 9, 1929 (R. B. F.); Kent Falls, July 23-24, 1931 (C. P. A.); Norfolk, July 24, 1931 (C. P. A.); N. Woodstock, June 30, 1928 (C. F. C.); Riverton, July 23, 1931 (C. P. A.); Salisbury, Sept. 12, 1928 (C. P. A.); Tunxis State Park, July 23, 1931 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.).

This preoccupied species is re-named in honor of the late Mr. Charles W. Johnson, whose friendly interest was largely responsible for leading me into a study of the Tipulidae.

**D. (*Oropeza*) *dorsalis* (Johns.) (Fig. 26, B).**

1909. *Oropeza dorsalis* Johnson; *Ibid.*, 34:119-120.

Fig.—Johnson, *Ibid.*, pl. 15, fig. 6 (hyp.).

General coloration yellow, the mesonotum brown, including scutellum and center of mediotergite; praescutal stripes confluent, with a delicate darker median line. Tarsi brown or brownish black. Male hypopygium (Fig. 26, B): gonapophyses much as in *carolus*, densely setiferous, the acute apex glabrous. ♂. L. 9-10 mm.; w. 9-10 mm. ♀. L. 10.5-11 mm.; w. 9-10 mm.

(June) Ont., Que., Me., N. Y., westw. to Mich. and Alta., southw. to Md. and N. C. (Hudsonian, Canadian).

Connecticut.—East River, July 14, 1912 (Ely) 1 ♂.

**D. (*Oropeza*) *dorsalis rogersi* (Alex.)**

1922. *Oropeza rogersi* Alexander; Occas. Papers Mus. Zool. University Michigan, 127:6-7.

Almost identical with the typical form but smaller; hypopygium identical. ♂. L. 7.5-8.3 mm.; w. 8.5-9 mm. ♀. L. 10 mm.; w. 9 mm.

(May, June) Va., southw. to Ind. and nw. Fla. (Transition, Austral).

**D. (*Oropeza*) *johnsonella* (Alex.) (Fig. 26, C).**

1930. *Oropeza johnsonella* Alexander; Bull. Brooklyn Ent. Soc., 25:279-280.

Mesonotum reddish brown, the praescutal stripes darker but relatively indistinct. Halteres dusky. Tarsi paler than remainder of legs, yellowish brown. Male hypopygium (Fig. 26, C): lateral arms of tergite long, slender. ♂. L. 8-9 mm.; w. 9.8-11 mm.

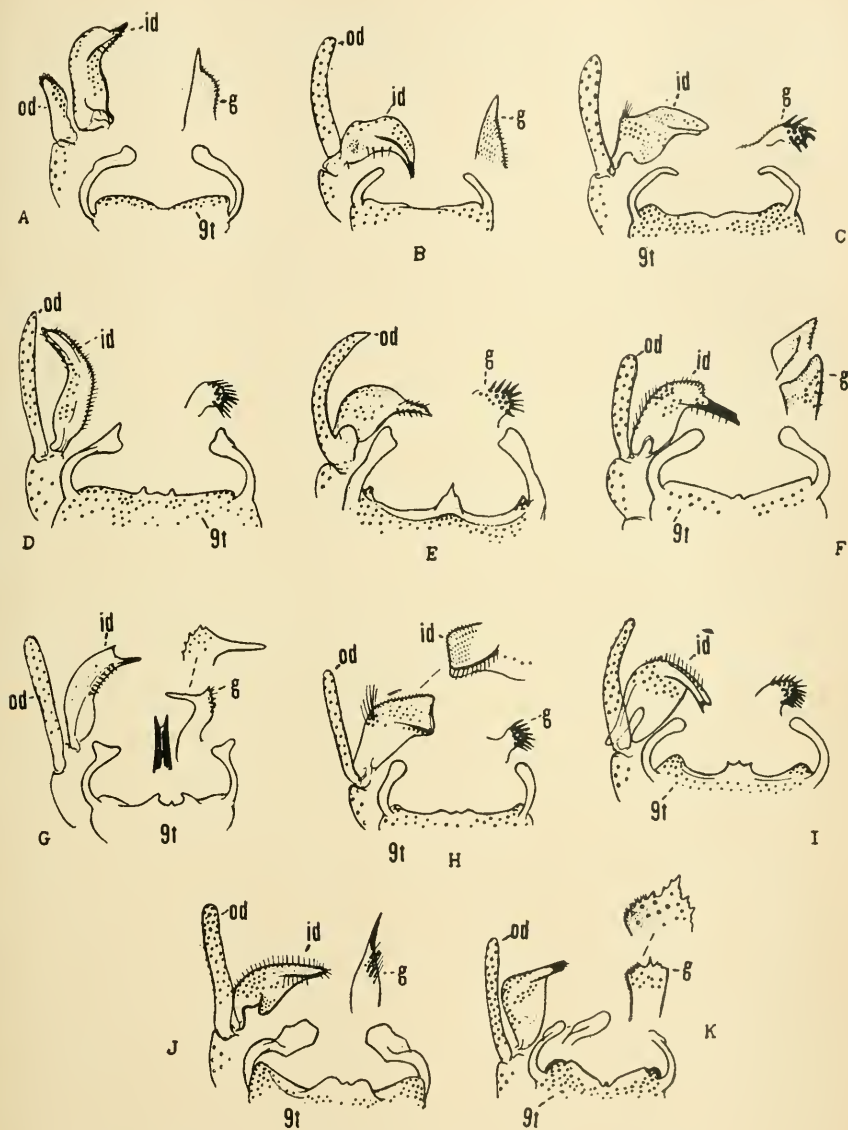
(Aug.) N. J., southw. to S. C. (Transition, Austral).

**D. (*Oropeza*) *obscura* (Johns.) (Fig. 26, D).**

1909. *Oropeza obscura* Johnson; Proc. Boston Soc. Nat. Hist., 34:122.

Figs.—Johnson, *Ibid.*, pl. 15, fig. 7 (ven.), fig. 10 (hyp.). Alexander, Cfls. N. Y., 1, pl. 43, fig. 186 (wing); 1919. Dickinson, Cfls. Wisc., p. 212, fig. 114 (wing); 1932.

Mesonotum opaque dark brown, pleura almost uniform dull brown. Antennae (♂) relatively long, if bent backward extending

FIGURE 26. *Dolichopeza (Oropceza)*; male hypopygia.

- |                                       |  |
|---------------------------------------|--|
| A. <i>D. (O.) carolus</i> n.n.        | G. <i>D. (O.) similis</i> (Johns.)       |
| B. <i>D. (O.) dorsalis</i> (Johns.)   | H. <i>D. (O.) subalbipes</i> (Johns.)    |
| C. <i>D. (O.) johnsonella</i> (Alex.) | I. <i>D. (O.) tridenticulata</i> (Alex.) |
| D. <i>D. (O.) johnsonella</i> (Alex.) | J. <i>D. (O.) venosa</i> (Johns.)        |
| E. <i>D. (O.) polita</i> (Johns.)     | K. <i>D. (O.) walleysi</i> (Alex.)       |
| F. <i>D. (O.) sayi</i> (Johns.)       |  |

Symbols: *g*, gonapophysis; *id*, inner dististyle; *od*, outer dististyle; *t*, tergite.



to base of second abdominal segment. Knobs of halteres dark brown. Tarsi a trifle paler than the brown tibiae. Wings strongly infumed; stigma moderately dark brown. Male hypopygium (Fig. 26, D). ♂. L. 8-9 mm.; w. 10-11 mm.; antenna, about 4-4.5 mm. ♀. L. 10-11 mm.; w. 10-11 mm.

(Mid-June - Aug.) Ont., Que., N. B., Me., N. H., Vt., Mass., R. I., N. Y., N. J., Pa., westw. to Mich., Wisc. and Minn., southw. to Va., N. C., S. C., Tenn. and Fla.

Connecticut.—Kent Falls, July 23-24, 1931 (C. P. A.); Riverton, July 23, 1931 (C. P. A.); Tunxis State Park, July 23, 1931 (C. P. A.).

**D. (*Oropeza*) *polita* (Johns.) (Fig. 26, E).**

1909. *Oropeza obscura polita* Johnson; *Ibid.*, 34: 122-123.

Fig.—Johnson, *Ibid.*, pl. 15, fig. 8 (abnorm. ven.).

General coloration dark brown, the surface usually shiny, more rarely opaque reddish brown. Antennae (♂) shorter than in *obscura*, if bent backward extending about to root of halteres. Outer two-thirds of abdomen almost black. Male hypopygium. (Fig. 26, E). ♂. L. 9-10 mm.; w. 10.5-12 mm.; antenna, about 2.8-3 mm. ♀. L. 11-12 mm.; w. 11-12 mm.

(July, Aug.) Que., N. H., Vt., Mass., N. Y., N. J., westw. to Ind. and Mich., southw. to Va. and N. C. (Canadian, Transition).

Connecticut.—Kent Falls, Aug. 19, 1931 (C. P. A.); Norfolk, July 24, 1931 (C. P. A.).

**D. (*Oropeza*) *sayi* (Johns.) (Fig. 26, F).**

1823. *Tipula annulata* Say; Journ. Acad. Nat. Sci. Philadelphia, 3: 25 (preoccupied).

1909. *Oropeza sayi* Johnson; Proc. Boston Soc. Nat. Hist., 34: 118-119.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 16, fig. 5 (ven.); 1908. Johnson, Proc. Boston Soc. Nat. Hist., 34, pl. 15, fig. 2 (hyp.), fig. 3 (wing): 1909.

Mesonotum with distinct dark brown areas on praescutum and scutum; pleura with large dark areas. Halteres chiefly pale or with knobs only slightly darkened. Tarsi paling to brownish yellow. Stigmal spot dark brown. Abdomen yellow, ringed with brownish black, the latter forming a more or less complete longitudinal median stripe above. Male hypopygium (Fig. 26, F): outer dististyle pale. ♂. L. 9.5-10.5 mm.; w. 10.5-11.5 mm.

(June, July) N. B., Me., N. H., Vt., Mass., N. Y., N. J., Pa., westw. to Ohio, Ind. and Mich., southw. to Va., Tenn. and Fla.

Connecticut.—Kent Falls, June 12-13, 1931 (C.P.A.); Saptree Run State Park, June 14, 1933 (C. P. A.); Tyler Lake, June 13, 1931 (C. P. A.).

**D. (*Oropeza*) *similis* (Johns.) (Figs. 24, B; 26, G).**

1909. *Oropeza similis* Johnson; Proc. Boston Soc. Nat. Hist., 34: 119.

Figs.—Johnson, *Ibid.*, pl. 15, fig. 4 (hyp.). Dickinson, Cfls. Wisc., p. 212, fig. 113 (wing); 1932.

Very similar to *sayi* in general appearance. Praescutal stripes and darkened areas of pleura distinct. Halteres yellow. Legs chiefly yellow. Stigma dark brown; a dark seam along vein *Cu*. Male hypopygium (Fig. 26, G). ♂. L. 10-11 mm.; w. 11-12 mm. ♀. L. 12-13 mm.; w. 11.5-13.5 mm.

(June, early July) Ont., Me., N. H., Mass., N. Y., Pa., westw. to n. Ind., Mich. and Wisc.

Connecticut.—Tyler Lake, June 13, 1931 (C. P. A.).

**D. (*Oropeza*) *subalbipes* (Johns.) (Fig. 26, H).**

1909. *Oropeza subalbipes* Johnson; *Ibid.*, 34: 121-122.

Figs.—Johnson, *Ibid.*, pl. 15, fig. 5 (abnorm. ven.), 11 (hyp.).

Similar in general appearance to *carolus*, differing very conspicuously in the male hypopygium (Fig. 26, H): lateral arms of tergite dilated at tips; inner dististyle broad, truncate at apex. ♂. L. 9 mm.; w. 11-11.5 mm. ♀. L. 12-13 mm.; w. 11-12 mm.

(June-Aug.) Ont., Me., N. H., Mass., N. Y., N. J., Pa., westw. to Ind., Mich. and Tenn., southw. to S. C., Fla., Ala. and La. (Transition, Austral).

Connecticut.—Brooklyn, June 15, 1933 (C. P. A.); East River, 1910 (Ely); Kent Falls, May 31, 1931 (C. P. A.); Saptree Run State Park, June 14, 1933 (C. P. A.); Stafford Springs, June 14, 1933 (C. P. A.).

**D. (*Oropeza*) *tridenticulata* Alex. (Fig. 26, I).**

1931. *Dolichopeza (Oropeza) tridenticulata* Alexander; Bull. Brooklyn Ent. Soc., 26: 177-178.

Closely allied to *obscura*. Tarsi a little paler than tibiae. Wings with stigma relatively pale brown, only a little darker than the ground; no dark seam along vein *Cu*. Male hypopygium (Fig. 26, I). ♂. L. about 10 mm.; w. 11 mm.

(Early July) Ont., Mass., westw. to Ind., Mich., and Mo., southw. to S. C. (Canadian).

**D. (*Oropeza*) *venosa* (Johns.) (Fig. 26, J).**

1909. *Oropeza venosa* Johnson; Proc. Boston Soc. Nat. Hist., 34: 120.

Fig.—Johnson, *Ibid.*, pl. 15, fig. 9 (hyp.).

Brown. Praescutal stripes and pleural areas conspicuous, brown. Knobs of halteres dark brown. Legs obscure yellow, the tarsi clearer yellow. Wings with the stigma dark brown; a brown seam along vein *Cu*. Abdominal tergites with a brown median stripe, at incisures extended laterad almost to margins. Male hypopygium (Fig. 26, J). ♂. L. 10-11 mm.; w. 11-12.5 mm. ♀. L. 12-13 mm.; w. 12-13 mm.

(June-early July) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., westw. to Ind. and Mich., southw. to S. C. (Canadian).

Connecticut.—Hamden, June 29, 1928 (R. B. F.); Kent Falls, June 12-13, 1931 (C. P. A.); Norfolk, June 9, 1929; June 12, 1931 (C. P. A.); Riverton, June 12, 1931 (C. P. A.); Saptree Run State Park, June 14, 1933 (C. P. A.); Union, June 14, 1933 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.); W. Hartford, June 10, 1929 (R. B. F.); Winsted, June 9, 1929 (C. P. A.).

**D. (*Oropeza*) *walleyi* (Alex.) (Fig. 26, K).**1931. *Oropeza walleyi* Alexander; Can. Ent., 63:139-140.

Generally similar to *sayi* in most regards. Pleural darkened areas not distinct, only the ventral sternopleurite a little darker. Knobs of halteres slightly infuscated. Legs brownish yellow. Wings with stigma moderately darkened; no dark seam along vein *Cu*. Abdominal tergites with a brown median stripe. Male hypopygium (Fig. 26, K). ♂. L. 9 - 10 mm.; w. 11 - 11.5 mm. ♀. L. 11 - 12 mm.; w. 12 mm.

(June, July) Que., N. H., Vt., N. Y., N. J., westw. to Ind. and Mich. (Canadian).

**Brachyremna Osten Sacken**1886. *Brachyremna* Osten Sacken; Berlin. Ent. Zeitschr., 30:161.

A small genus (about 12 species) of essentially Neotropical crane-flies. Our local species has a vertical dance over a height of some 3 to 4 feet and was aptly termed "the King of the dancing Tipulids" by the late Mr. Charles W. Johnson. The insect is common in open Austral woodlands. The early stages are imperfectly known but are apparently spent in decaying wood.

**Brachyremna dispellens (Walk.) (Fig. 24, C).**1860. *Tipula dispellens* Walker; Trans. Ent. Soc. London, (n. s.), 5:334.

Figs.—Johnson, Proc. Boston Soc. Nat. Hist., 34, pl. 16, fig. 16 (ven.); 1909. Alexander, Journ. N. Y. Ent. Soc., 20:227, text-fig. (hyp.), pl. 16, fig. b (wing); 1912. Alexander, Cfls. N. Y., 1, pl. 43, fig. 188 (wing); 1919.

Mesonotal praescutum light brown, the extreme margin more whitish; three pale brown stripes, more or less bordered by darker, the median one further divided by a pale vitta; scutellum and mediotergite with two narrow, white, intermediate lines. Pleura whitish, with delicate brown longitudinal stripes. Femora brownish black; tibiae and tarsi whitish. ♂. L. 11.5 - 17 mm.; w. 15 - 21 mm. ♀. L. 15 - 17 mm.; w. 16 - 18 mm.

(June, July) N. J., Ind., Ill., Ky., Tenn., southw. to Fla. and Tex. (on Continent into Tropical Cent. and S. Amer.).

**Tanyptera Latreille**1805. *Tanyptera* Latreille; Hist. Nat. Crust. et Ins., 14:286.1832. *Xiphura* Brullé; Ann. Soc. Ent. France, 1:206.

A small group of Holarctic crane-flies whose specific limits are still poorly understood. In our faunal region, three nominal species are found but the remarkable variation in color strongly indicates that the number of valid forms is less than the figure given and it is very possible that but a single species is found within our limits.

Dr. Townes has recently reported the capture at Ithaca, N. Y., May 31, 1936, of a mating pair, the male being *frontalis*, the female *fumipennis*. The adults frequent open mesophytic or mixed woodlands. They are highly polished, black and yellow to red, superficially resembling ichneumonid Hymenoptera more than they do other crane-flies. The larvae live in the relatively sound wood of prostrate hardwood trees.

*Key to Species*

1. Wings smoky black; body-coloration black, male with feet and abdomen black, female with feet and base of abdomen reddish yellow.....**fumipennis**
- Wings not black..... 2
2. Wings strongly tinted with topazine yellow, the stigma dark brown, in cases with the wing-tip infumed; body-coloration varying from black to yellow; legs reddish yellow.....**topazina**
- Wings hyaline, stigma brown; body-coloration ranging from black to yellow  
**frontalis**

**Tanyptera frontalis** (O. S.) (Fig. 25, A).

1864. *Ctenophora frontalis* Osten Sacken; Proc. Ent. Soc. Philadelphia, 3:48-49.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 14, fig. 3 (ven.); 1908. Alexander, Cfls. N. Y., 1, pl. 43, fig. 191 (wing); 1919. Dickinson, Cfls. Wisc., p. 213, fig. 115 (wing); 1932.

Coloration ferruginous to black. Wings hyaline; stigma dark brown. ♂. L. 12-16 mm.; w. 10-12 mm.

(May, June) Que., N. S., Me., N. H., Vt., Mass., N. Y., N. J., westw. to Ill. and Wisc., southw. to Md.

Connecticut.—Tyler Lake, June 13, 1931 (C. P. A.).

**T. fumipennis** (O. S.)

1864. *Ctenophora fumipennis* Osten Sacken; Proc. Ent. Soc. Philadelphia, 3:47.

Black; wings strongly suffused with blackish; in female, legs and base of abdomen reddish yellow. ♂. L. 13-15 mm.; w. 12-14 mm. ♀. L. 20-22 mm.; w. 13-15 mm.

(Late May-early June) Que., N. H., Vt., Mass., N. Y., N. J., westw. to Minn., Wisc. and Ill., southw. to Va. and N. C.

Connecticut.—Hamden, May 25 (A. B. C.); June 4, 1926 (P. G.); Mt. Carmel, June 10, 1916 (Q.S.L.); Norfolk, June 5, 1919 (M.P.Z.); S. Meriden, May 28 (H.L.J.); Stamford, June 5, 1930 (B.T.R.L.); W. Granby, June 8, 1929 (C. P. A.).

**T. topazina** (O. S.)

1864. *Ctenophora topazina* Osten Sacken; Proc. Ent. Soc. Philadelphia, 3:47-48.

Fig.—Dickinson, Cfls. Wisc., p. 213, fig. 116 (wing); 1932.

Coloration ferruginous to black; abdomen pale, with a dark dorso-median stripe, in cases abdomen entirely black. Wings tinted



with yellow; stigma dark brown; in cases, wing-tip infumed. ♂. L. 15-20 mm.; w. 13-15 mm. ♀. L. 20-22 mm.; w. 16 mm.

(May-early July) Ont., Que., Me., N. H., Vt., Mass., N. Y., Ohio, westw. to Wis.

*Tanyptera succedens* (Walker), described in 1856 from Canada, is a doubtful form that is usually placed with *frontalis*. It is the prior name for species in our local fauna.

### Ctenophora Meigen

1800. *Flabellifera* Meigen; Nouv. Class. Mouch., p. 13 (nom. nud.).

1803. *Ctenophora* Meigen; Illiger's Mag., 2: 263.

1910. *Phoroctenia* Coquillett; Proc. U. S. Nat. Mus., 37: 589.

In this genus, a condition exists that is quite comparable to that found in *Tanyptera*. There are supposed to be nearly a score of species, including two in the local fauna, but the exact status of these flies remains in question. The extreme polymorphism of color found here has been discussed by Johannsen (Maine Agr. Expt. Sta., Bull. 177: 32-35; 1910). The adults are not commonly met with in nature, being found flying about in open woodlands. The larvae live in decaying wood.

#### Key to Species

1. Wings variously patterned, either entirely darkened, or yellowish, with the entire apex beyond cord strongly infumed; body either black, or yellow with dark markings.....**apicata**
- Wings nearly hyaline, tinged with yellow in costal region; a large brown cloud between cord and wing-tip, not reaching the apex; thorax yellow, with a cuneate median brown stripe.....**nubecula**

### *Ctenophora apicata* (O. S.) (Fig. 25, B).

1864. *Ctenophora apicata* Osten Sacken; Proc. Ent. Soc. Philadelphia, 3: 46.

Figs.—Johannsen, Maine Agr. Expt. Sta. Bull. 177, fig. 14 (wing); 1910. Alexander, Cfs. N. Y., 1, pl. 43, figs. 189-190 (wing); 1919.

Coloration very varied, ranging from black to reddish yellow, with dark markings. The dark phase in both sexes has the mid-femora black, tibiae and tarsi yellow, the body chiefly polished black; wings blackish brown, with restricted clearer spots along cord. The yellow phase, likewise involving both sexes, is chiefly polished reddish yellow, with restricted black areas; wings yellow, darkened apically. ♂. L. 13-15 mm.; w. 13-15 mm. ♀. L. 18-20 mm.; w. 15-17 mm.

(June-Aug.) Ont., Que., N. B., Me., N. H., Vt., Mass., R. I., N. Y.

Connecticut.—Colebrook, 1905 (American Museum Nat. Hist., part of W. M. Wheeler collection); Killingly, July 3, 1919; Stonington, July 26, 1906 (J. A. H.), Aug. 14, 1914 (I. W. D.); Wallingford, July 14, 1922 (S. W. B.); Waterford, July 18, 1914 (I. W. D.); Woodbury, July 16, 1913 (W. E. B.).

**C. nubecula** (O. S.)

1864. *Otenophora nubecula* Osten Sacken; Proc. Ent. Soc. Philadelphia, 3:45-46.

If this fly is distinct from *apicata*, it will be separated best by the wing-pattern, as described in key. It will probably be found to be polychroic, as in *apicata*. ♂. L. 13-15 mm.; w. 13-15 mm. ♀. L. 19-20 mm.; w. 16-18 mm.

(June) Que., Mass., N. Y., N. J., w. to Ill., Tenn. and Mo.

Connecticut.—Rowayton, June 16, 1909 (C. W. J.).

*Otenophora dorsalis* Walker (1848), described from Newfoundland, is a doubtful species.

**Prionocera** Loew

1844. *Prionocera* Loew; Stett. Ent. Zeitg., 5:170.

1863. *Stygeropsis* Loew; Berlin. Ent. Zeitschr., 7:298.

A small genus of essentially northern crane-flies. The commonest local species, *fuscipennis*, is found in open marshes, where the larvae live in the rich organic mud.

*Key to Species*

1. Wings with the cells beyond cord darker brown than those in basal cells; obliterative areas along cord very conspicuous.....**electa**  
Cells of wing about equal in color on both sides of cord..... 2
2. Wings with a strong fulvous suffusion; obliterative areas at cord restricted to end of *Rs* and basal section of *M*<sub>1+2</sub>; praescutum with a capillary dark brown median line.....**fuscipennis**  
Wings with a pale brownish to brownish subhyaline tinge; pale areas at cord more extensive; praescutum with a pale median line..... 3
3. Frontal prolongation of head dark dorsally, broadly yellow on sides...**dimidiata**  
Frontal prolongation of head entirely brownish black.....**sordida**

**Prionocera dimidiata** (Lw.) (Fig. 25, C).

1865. *Stygeropsis dimidiata* Loew; Berlin. Ent. Zeitschr., 9:129.

Ashy-gray, opaque, the praescutum with four dark gray stripes. Abdominal tergites gray, narrowly dark brown medially, broadly yellow laterally; caudal margins very narrowly bordered by pale. ♂. L. 12-13 mm.; w. 13-14 mm. ♀. L. 13-14 mm.; w. 14-15.5 mm.

(July) Man., westw. and northwestw. to Alta. and Alaska.

**P. electa** Alex.

1927. *Prionocepa electa* Alexander; Can. Ent., 59:188-189.

General coloration gray; praescutum yellowish gray, with four dark brown stripes; pleura blue-gray. Wings grayish white, apical cells strongly infumed; obliterative band before cord very conspicuous. ♂. L. about 11.5 mm.; w. 13 mm.

(July) Lab.—Arctic Canada.

**P. fuscipennis** (Lw.) (Fig. 24, E).1865. *Stygeropis fuscipennis* Loew; Berlin. Ent. Zeitschr., 9:129.1901. *Tipula illustris* Doane; Journ. N. Y. Ent. Soc., 9:97-98.

Figs.—Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 12, figs. 61-63, 67 (hyp.); 1904. Alexander, Cfls. N. Y., 1, pl. 43, fig. 194 (wing); 1919. Dickinson, Cfls. Wisc., p. 214, fig. 117 (wing); 1932.

Mesonotal praescutum yellowish, the three stripes more yellowish gray, with a capillary dark brown median vitta that ends before suture; mediotergite darker posteriorly; pleura whitish gray, dorso-pleural membrane light yellow. Wings with a strong fulvous tinge, costal border more yellowish. Abdomen reddish brown throughout. ♂. L. 9-12 mm.; w. 11-14 mm.

(Apr.; June-Aug.) Ont., Que., Me., N. H., Vt., Mass., R. I., N. Y., N. J., Ind., westw. and northwestw. to Idaho, Colo., Wash., Alta. and B. C.

**P. sordida** (Lw.)1863. *Stygeropis sordida* Loew; Berlin. Ent. Zeitschr., 7:298.

Brownish black, opaque, including the entire frontal prolongation of head. Praescutal stripes poorly delimited. ♂. L. 11-12 mm.; w. 10-12.5 mm.

(June, July) Mass., northwestw. to Man. and Alta.

**Longurio** Loew1869. *Longurio* Loew; Berlin. Ent. Zeitschr., 13:2-3.1916. *Togotipula* Matsumura; Thous. Ins. Japan, Addit. 2:465.

A small genus, including about a dozen species in the eastern Nearctic, southern Ethiopian and eastern Palearctic regions. One of the local species, *testaceus*, is the largest crane-fly in the fauna. The adult flies occur near rapidly-flowing woodland streams. The larvae are aquatic, living in sand or gravel in the stream-bed, or, more rarely, in saturated submerged wood. The Nearctic species, including the genotype, *testaceus*, have the squamae naked and the tibiae without spurs.

*Key to Subgenera*

1. Wings with cell  $M_1$  sessile..... **Aeschnasoma**  
 Wings with cell  $M_1$  petiolate..... **Longurio**

**Subgenus Aeschnasoma** Johnson1909. *Aeschnasoma* Johnson; Proc. Boston Soc. Nat. Hist., 34:115-116.**Longurio** (*Aeschnasoma*) **rivertonensis** (Johns.)1909. *Aeschnasoma rivertonensis* Johnson; *Ibid.*, 34:116.

Figs.—Johnson, *Ibid.*, pl. 16, fig. 13 (wing), figs. 14, 15 (hyp.).

General coloration reddish brown, the praesentum with four clearer reddish brown stripes that are narrowly bordered by dark brown lines; vague dark areas near wing-root. Legs reddish brown, the tips of tibiae narrowly infuscated. Wings strongly tinged with reddish brown, more saturated in costal region. Abdomen reddish brown. ♂. L. 33-35 mm.; w. 18-22 mm.; abdomen alone, 27-28 mm. ♀. L. about 40 mm.; w. 23-24 mm.

(June, July) N. J., Va., N. C.

### Subgenus *Longurio* Loew

#### *Key to Species*

1. Large (wing, ♂, over 25 mm., abdomen over 30 mm.); cell  $M_1$  of wings with very short petiole.....**testaceus**  
 Smaller (wing, ♂, under 20 mm., abdomen under 25 mm.); cell  $M_1$  of wings with long petiole.....**minus**

#### *L. (Longurio) minus* Alex.

1914. *Longurio minus* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1914:605.

Figs.—Alexander, *Ibid.*, pl. 27, fig. 32 (wing). Alexander, Cfls. N. Y., 1, pl. 43, fig. 193 (wing); 1919.

General coloration brownish yellow, thoracic stripes indistinct, pleura dull yellow. Legs brownish yellow, the tips of femora and tibiae broadly brown. Wings subhyaline, cell *Sc* and apex very narrowly infused; stigma and a conspicuous cloud on anterior cord, dark brown; cell  $M_1$  long-petiolate; *m-cu* at or close to midlength of cell *1st M*<sub>2</sub>;  $M_{3+4}$  distinct, shorter than distal section of  $Cu_1$ . ♂. L. 20-22 mm.; w. 14-16.5 mm.; abdomen alone, 16-18 mm. ♀. L. 25-27 mm.; w. 16-16.5 mm.; abdomen alone, 20-22 mm.

(June-Aug.) N. C., S. C., Tenn., Ga. (In mts.)

#### *L. (Longurio) testaceus* Lw. (Fig. 24, F).

1869. *Longurio testaceus* Loew; Berlin. Ent. Zeitschr., 13:3.

Figs.—Alexander, Cfls. N. Y., 1, pl. 43, fig. 192 (wing); pl. 49, fig. 256 (hyp.); pl. 53, fig. 329 (hyp.); 1919.

Mesonotal praesentum obscure yellow, with three reddish brown stripes, the median one paler yellow medially, divided by a capillary dark brown vitta; an extensive pale yellow median line, including scutum, scutellum and base of mediotergite; pleura pruinose in front, more whitish behind. Legs obscure yellow; tips of femora and tibiae conspicuously dark brown. Wings (Fig. 24, F) pale gray, brightened at base; narrow brown seams along cord and vein *Cu*;  $M_{3+4}$  subequal to distal section of  $Cu_1$ . ♂. L. 45-50 mm.; w. 26-28 mm.; abdomen alone, 36-42 mm. ♀. L. 45-60 mm.; w. 28-33 mm.; abdomen alone, 38-50 mm.

(July) Me., N. H., Mass., N. Y., N. J., southw. to Va., N. C., S. C., Ga., Tenn. and nw. Fla.

### Nephrotoma Meigen

1800. *Pales* Meigen; Nouv. Class. Mouch., p. 14 (nom. nud.).  
 1803. *Nephrotoma* Meigen; Illiger's Mag., 3:262.  
 1834. *Pachyrrhina* Macquart; Hist. Nat. Ins., Dipt., 1:88.

A large genus of often similar flies, especially characteristic of the Holarctic and Ethiopian Regions, much less common in Australasia and the Neotropics. As a rule, members of this genus may be told from *Tipula* by the polished body, in our commonest species (*ferruginca*) of a rusty-red, in other species testaceous or yellow, often variegated with black. A very few species are opaque, while, conversely, a small number of *Tipula* species (*Nobilotipula*, *Nitiditipula*) have the body polished. The immature stages are chiefly spent in earth or in leaf mold.

The present account is based chiefly on a treatment by Dietz (1918), since I have not been able to study the types of several of the species. Many of these have been based on details of coloration and the validity of certain species is questionable. Much work must be done before we have an accurate idea of synonymy and distribution of these flies in the present fauna. In 1939, while the present paper was ready for the press, Professor J. Speed Rogers was able to examine the Dietz types and has furnished me with a statement of his opinion concerning the identity of many of the species. I have added his notes following the species in question.

#### Key to Species

- |  |                               |
|--|-------------------------------|
| 1. Head and thorax almost uniformly black; abdomen reddish basally, the terminal segments black.....   | <b>altissima erythrophrys</b> |
| General coloration of body yellow or brownish yellow, often with black or rusty markings.....  |                               |
| 2. Thoracic stripes black .....  | 2                             |
| 2. Thoracic stripes, when present, not black.....  | 3                             |
| 3. Anterior ends of lateral praescutal stripes curved laterad into an opaque velvety-black spot.....   | 4                             |
| Lateral praescutal stripes straight .....  | 6                             |
| 4. Occiput opaque, yellow; wing-tip clear .....  | <b>virescens</b>              |
| Occiput with a polished triangular brand; wing-tip darkened.....   | 5                             |
| 5. Sides of pronotal scutum and the abdomen conspicuously spotted with black or dark brown; pleura variegated with reddish brown to dark brown; mouth parts darkened ..... | <b>incurva</b>                |
| Pronotal scutum and abdomen chiefly yellow; pleural spots ochre-yellow; mouth parts yellow .....   | <b>perdita</b>                |
| 6. A black spot between antennal bases .....   | 7                             |
| No black spot between antennal bases .....   | 8                             |
| 7. Wings nearly hyaline, only the stigma, a seam on anterior cord and the very narrow apex darkened.....   | <b>pedunculata</b>            |
| Wings with the costal region conspicuously yellow, the other cells before cord strongly suffused with brown; cells beyond cord more nearly clear .....                     | <b>lugens</b>                 |
| 8. Median region of mesonotal scutum with a dark line; a velvety-black spot opposite anterior end of lateral praescutal stripe but entirely disconnected therefrom .....   | <b>sphagnicola</b>            |
| Median region of scutum pale; no black velvety spot, as above .....  | 9                             |



9. Posterior vertex obscure yellow, with a broad median darkening that attains the margin of the eye or nearly so; wings tinged with brownish, especially along cord and in apical portion; flagellar segments ( $\delta$ ) strongly incised ..... **penumbra**  
 A narrow black median stripe on the otherwise bright-colored posterior vertex; wings clear light yellow; flagellar segments ( $\delta$ ) less strongly incised ..... **vittula**
10. Mesonotum opaque or nearly so..... 11  
 Mesonotum polished..... 19
11. Wings with macrotrichia in cells..... **hirsutula**  
 Wings without macrotrichia..... 12
12. Lateral and caudal margins of abdominal tergites black... **macrocera dietziella**  
 Abdominal tergites not so patterned, with linear black lateral dashes..... 13
13. Antennae ( $\delta$ ) elongate, if bent backward extending to beyond midlength of abdomen..... 14  
 Antennae short in both sexes..... 16
14. Male hypopygium with the 8th sternite terminating in a median cone..... **macrocera gnata**  
 Male hypopygium with the 8th sternite terminating in two finger-like lobes. 15
15. Flagellar segments bicolorous..... **macrocera macrocera**  
 Flagellar segments uniformly dark brown or black..... **macrocera atrocera**
16. Male hypopygium enlarged; inner dististyle appearing as a conspicuous serpentine rod ..... **cornifera**  
 Male hypopygium small; inner dististyle inconspicuous..... 17
17. Antennal flagellum entirely dark brown..... **tenuis nigroantennata**  
 Antennal flagellum weakly bicolorous; bases of segments restrictedly yellowish ..... 18
18. Appendage of aedeagus small, inconspicuous..... **tenuis tenuis**  
 Appendage of aedeagus large and protuberant, strongly elbowed, **tenuis hamata**
19. Lateral praescutal stripes curved laterad into an opaque velvety-black spot.. 20  
 Lateral praescutal stripes not as above ..... 23
20. Occiput opaque, immaculate ..... **punctum**  
 Occiput with polished brand..... 21
21. Flagellar segments weakly bicolorous; a brown median line on anterior vertex ..... **calinota**  
 Flagellar segments unicolorous; vertex unmarked..... 22
22. Mesonotal scutum with a narrow black median stripe; antennal flagellum blackish ..... **opacivittata**  
 Mesonotal scutum without such a stripe; antennae entirely yellowish..... **evasa**
23. Flagellar segments unicolorous..... 24  
 Flagellar segments bicolorous ..... 31
24. Antennae entirely yellow to brownish yellow..... 25  
 Antennal flagellum beyond base uniformly blackened..... 26
25. Occiput shiny, with a large triangular spot that is a little darker; antennal flagellum brownish yellow..... **festina**  
 Occiput with a narrow dark brown line; antennae yellow..... **temeraria**
26. Occiput entirely polished but chiefly pale in color..... 27  
 Occiput opaque, with polished triangular brand ..... 28
27. Posterior vertex and occiput unicolorous..... **sodalis**  
 Posterior vertex and occiput with a narrow black median stripe..... **occipitalis**
28. A black spot at lateral end of transverse suture..... 29  
 No such blackened area ..... 30
29. Abdominal tergites with row of dark spots..... **ferruginea**  
 Abdominal tergites each with latero-posterior margins black..... **beutenmuelleri**
30. Stigma brownish yellow ..... **occipitalis**  
 Stigma dark brown ..... **gracilicornis**
31. Flagellar segments at base dark brown or black..... 32  
 Flagellar segments at base yellow..... 37
32. Occiput polished ..... 33  
 Occiput opaque, with a polished triangle..... 36

33. No blackish tinge at lateral ends of transverse suture; thoracic stripes poorly defined ..... 34  
 A blackened area at lateral end of transverse suture; thoracic stripes more clearly indicated ..... 35
34. Orange; abdominal tergites with lateral rows of black spots.....**xanthostigma**  
 Testaceous to ferrugineous; abdominal tergites with a lateral stripe, the segments banded posteriorly with black.....**cingulata**
35. Abdomen with dorsal and lateral rows of black spots.....**obliterate**  
 Abdomen with lateral stripes; tergites banded posteriorly with black.....**wyalusingensis**
36. Wings with cells *C* and *Sc* hyaline; stigma subfuscous.....**abbreviata**  
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37. Antennae with 13 segments..... 38  
 Antennae with 16 or more segments..... 41
38. A black spot before anterior end of each lateral praescutal stripe...**clandestina**  
 No such darkened marks on praescutum..... 39
39. Lateral and posterior margins of abdominal tergites black.....**approximata**  
 Abdominal tergites with lateral rows of black spots..... 40
40. Flagellar segments excised beneath; abdominal tergites with median row of spots .....**breviorcornis**  
 Flagellar segments cylindrical; abdominal tergites with a continuous dark stripe .....**stigmatica**
41. Antennae (♂) 19-segmented .....**eucera**  
 Antennae (♂) with 16 or 17 segments..... 42
42. Stigma yellowish brown; wing-apex not darkened.....**euceroides**  
 Stigma dark brown; wing-apex distinctly darkened.....**polymera**

### **Nephrotoma abbreviata (Lw.)**

1863. *Pachyrrhina abbreviata* Loew; Berlin. Ent. Zeitschr., 7:295.

Occiput orange; brand of moderate size, shiny, concolorous; palpi pale; antennae yellow, flagellar segments darkened basally. Thoracic stripes ochraceous; ends of suture black. Wings hyaline; stigma subfuscous; apex infuscated. Abdomen variegated with black, the median area larger trigonal, lateral areas minute. ♀. L. about 11-12 mm.; w. 11-12 mm.

Miss. (Austral). Recorded by Dickinson (1932) from Wisc., probably in error.

Prof. Rogers considers this as very possibly being a member of the *ferruginea* complex of forms and only doubtfully distinct from *ferruginea*.

### **N. altissima erythrophrys (Will.)**

1877. *Pachyrrhina altissima* Osten Sacken; Bull. U. S. Geol. Surv., 3:210.

1893. *P. erythrophrys* Williston; Kansas Univ. Quart., 2:63.

Fig.—Dickinson. Cfls. Wisc., p. 216, fig. 118 (wing); 1932.

Typical form almost entirely black, sides of posterior vertex obscure reddish. Form *erythrophrys* with more reddish coloration, especially the basal abdominal segments; terminal segments entirely blackened. ♂. L. 9-11 mm.; w. 8-10 mm. ♀. L. 16-18 mm.; w. 11-12 mm.

(June, July) Rocky Mt. Reg., Alta. to N. M., eastw. to Minn., Wisc., Ill. and Mich.; Man. and w. Ont. (Hudsonian, high Canadian).

Prof. Rogers is of the opinion that this species and form may represent extreme melanistic types of *lugens* and be placed as subspecies under that species.

**N. approximata** (Dtz.)

1918. *Pachyrhina approximata* Dietz; Trans. Amer. Ent. Soc., 44: 136-137.

Figs.—Dietz, *Ibid.*, pl. 5, fig. 19 (wing); pl. 7, fig. 33 (hyp.).

Close to *breviorcornis*. Antennae ( $\delta$ ) long, slender, if bent backward extending to beyond base of abdomen; flagellar segments brown, ferruginous at bases. Occiput shiny; median stripe dark. Thoracic stripes rusty brown. Wings grayish; stigma brownish yellow. Abdominal tergites with black lateral stripes, margined posteriorly with brown.  $\delta$ . L. 12 mm.; w. 12 mm.

(Aug.) Pa.

Considered by Prof. Rogers as being identical with *breviorcornis*, the supposed differences in coloration of the abdomen apparently being due to post-mortem changes.

**N. beutenmuelleri** (Dtz.)

1918. *Pachyrhina beutenmuelleri* Dietz; Trans. Amer. Ent. Soc., 44: 130-131.

Fig.—Dietz, *Ibid.*, pl. 5, fig. 14 (wing).

Close to *ferruginea*. Flagellum beyond basal segment blackish; a dark brown orbital spot; occipital brand shiny, rusty, produced cephalad to summit of vertical tubercle. Thoracic stripes rusty; lateral ends of suture blackened. Abdominal segments bordered laterally and posteriorly with black.  $\delta$ . L. 10.5 mm.; w. 10.5 mm.

(Sept.) Pa.—N. C., westw. to Mich. Recorded by Dickinson (1932) from Wisc., perhaps erroneously.

Prof. Rogers considers this to represent only a variant, or perhaps merely an individual variation of *ferruginea*.

**N. breviornis** (Doane)

1908. *Pachyrhina breviornis* Doane; Ent. News, 19: 178-179.

Fig.—Dickinson, Cfs. Wisc., p. 219, fig. 126 (wing); 1932.

General coloration yellow; thoracic stripes reddish brown. Antennae with flagellar segments gently excised on lower face. Abdomen with rows of spots; median tergal row less distinct behind.  $\delta$ . L. 13-14 mm.; w. 12.5-13 mm.

(June, July) Ont., Que., N. H., Mass., N. Y., westw. to Ill., Mich., Wisc., and Ia., southw. to N. C. and S. C.

Connecticut.—Kent Falls, June 12-13, July 23-24, 1931 (C. P. A.); Union, Aug. 17-18, 1928 (C. F. C.); W. Granby, June 8, 1929 (C. P. A.).



**N. calinota** (Dtz.)1918. *Pachyrhina calinota* Dietz: Trans. Amer. Ent. Soc., 44: 121-122.Fig.—Dietz, *Ibid.*, pl. 4, fig. 7 (wing).

Yellow; thoracic stripes silvery-gray pruinose, margined with ferruginous; median stripe further divided by a black line; median region of scutum with an elongate dark spot. Frontal prolongation of head and posterior vertex with a median brown line. Abdominal tergites with a series of large brown median spots. ♂. L. 13 mm.; w. 11 mm. ♀. L. 18 mm.; w. 12 mm.

(June, July) N. H., N. Y., westw. to Mich., southw. to Md. and Tenn.

**N. cingulata** (Dtz.)1918. *Pachyrhina cingulata* Dietz: Trans. Amer. Ent. Soc., 44: 131-132.Figs.—Dietz, *Ibid.*, pl. 5, fig. 17 (wing), pl. 7, fig. 30 (hyp.).

Close to *xanthostigma*. General coloration testaceous to ferruginous, the praescutal stripes ill-defined. Antennae (♂) elongate; flagellar segments bicolored, dark brown basally. Wings strongly tinged with yellow, costal and cubital regions more saturated; stigma pale brown. Abdomen with tergites banded posteriorly with black, more evident in female. ♂. L. 13 mm.; w. 11 mm. ♀. L. 16 mm.; w. 13 mm.

(June-Aug.) Pa.; in marshy locality.

Prof. Rogers states that this is the species commonly recognized by authors as being *xanthostigma* but is not identical with the type specimen of Loew's species.

**N. clandestina** (Dtz.)1921. *Pachyrhina clandestina* Dietz: Trans. Amer. Ent. Soc., 47: 262.

Close to *brevicornis*. Antennae with flagellar segments excised beneath. Thorax sulfur-yellow; praescutal stripes reddish brown, sharply defined; a well-defined black area at humerus. Abdomen with a lateral row of oblique dark dashes. ♀. L. 15.5 mm.; w. 13.5 mm.

(June) Pa.

Prof. Rogers has noted that this is very close to *brevicornis*, of which it may be found to represent a valid race.

**N. cornifera** (Dtz.)1918. *Pachyrhina cornifera* Dietz: Trans. Amer. Ent. Soc., 44: 120-121.Figs.—Dietz, *Ibid.*, pl. 4, fig. 6 (wing), pl. 6, fig. 25 (hyp.).

Yellow, opaque; praescutal stripes yellowish red, more shiny. Flagellar segments beyond second brown. Wings tinged with yellow; stigma dark brown. Abdomen with lateral spots on tergites; male

hypopygium large and conspicuous, the inner dististyle appearing as a slender, twisted, serpentine rod. ♂. L. 14 mm.; w. 15 mm.

(July) Va., N. C., n. Fla. (Austral).

**N. eucera** (Lw.)

1863. *Pachyrrhina eucera* Loew; Berlin. Ent. Zeitschr., 7: 296.

General coloration yellow. Occiput unmarked, entirely polished. Antennae (♂) elongate, 19-segmented; of ♀ shorter, 15-segmented; flagellar segments strongly excised beneath. Wings yellow; stigma more brownish yellow. ♂. L. about 14-15 mm.; w. 14-15 mm. ♀. L. 18-20 mm.; w. 17-18 mm.

(May-Aug.) Que., Mass., R. 1., N. Y., Pa., westw. to Wisc., Ia., Mo. and Kan., southw. to Va., s. Ill. and Tenn. (Transition).

Connecticut.—Danbury, June 15, 1909 (C.W.J.).

**N. euceroïdes** Alex.

1919. *Nephrotoma euceroïdes* Alexander; Can. Ent., 51: 172.

Generally similar to *eucera*. Antennae (♂) shorter, 17-segmented; terminal segment very reduced. Praescutal stripes reddish brown, distinct. Wings grayish yellow; stigma pale. ♂. L. 14-14.5 mm.; w. 13.5-15 mm.

(June) Que., N. B., Me., N. H., Mass., N. Y., westw. to Mich. (Canadian).

Connecticut.—Guilford, June 6, 1905 (W. E. B.); Norfolk, June 9, 1929 (C. P. A.); Southington, May 28, 1930 (R. B. F.); Storrs, 1931, 1932 (C. S. C.); Tyler Lake, June 13, 1931 (C. P. A.).

**N. evasa** (Dtz.)

1918. *Pachyrrhina evasa* Dietz; Trans. Amer. Ent. Soc., 44: 124-125.

Fig.—Dietz, *Ibid.*, pl. 4, fig. 10 (wing).

Characters as in *calinota*. Antennae (♀) entirely yellowish. Occiput with triangular brand. Scutum without median black line. Abdominal segments yellow with pale brown subterminal triangles, the caudal borders ferruginous. ♀. L. 18 mm.; w. 13.5 mm.

(July) Mich.

Prof. Rogers believes this may prove to have been based on a general individual of *calinota*.

**N. ferruginea** (Fabr.) (Fig. 24, G).

1805. *Tipula ferruginea* Fabricius; Syst. Antl., p. 28.

Figs.—Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 11, figs. 55, 56 (hyp.); 1904. Alexander, Cfs. N. Y., 1, pl. 44, fig. 198 (wing); 1919. Young, Cornell Univ., Agr. Expt. Sta., Mem. 44: 283, pl. 9, fig. 3 (thorax); 1921. Dickinson, Cfs. Wisc., p. 220, fig. 129 (wing); 1932.

Readily told by the rusty-red stripes, in conjunction with the blackened ends of the transverse suture. Outer end of cell  $R_5$  usually with a small group of macrotrichia. ♂. L. 10-12 mm.; w. 10-11 mm. ♀. L. 15-16 mm.; w. 11-12 mm.

(May, June; Aug., Sept.) Generally distributed in eastern North America, westw. to Alta., Colo. and N. M., southw. to Ga., La. and Tex.

Connecticut.—Compo Beach, May 23, 1916 (I. N. G.); Cromwell, Willow Isl., Aug. 9, 1924 (Unger); East River, Sept. 10 (Ely); Granby, May 21, 1917 (M. P. Z.); Hamden, May 24, 1926 (J. L. R.), Aug. 31, 1932 (N. T.); Hartland, June 9, 1929 (C. P. A.); Kent Falls, June 12-13, 1931 (C. P. A.); Mansfield, June 25, 1920 (J. A. M.); Milford, June 12, 1917 (M. P. Z.); New Haven, May 26, 1910 (A. B. C.), June 6, 1916 (B. H. W.), June 23, 1923 (W. E. B.); Prospect, Aug. 15, 1906 (W. E. B.); Salisbury, Aug. 5, 1928 (G. C. C.); Storrs, June 25-28, 1920 (J. A. M.); Wallingford, June 17, 1913 (Q. S. L.).

### **N. festina** (Dtz.)

1918. *Pachyrrhina festina* Dietz; Trans. Amer. Ent. Soc., 44:126-127 (as lapsus, *perfidia*, l. c., p. 128).

Fig.—Dietz, *Ibid.*, pl. 5, fig. 12 (wing).

Close to *sodalis*. Coloration pale yellow, the praescutal stripes chestnut brown to reddish brown. Antennae very slender; outer flagellar segments uniformly brownish yellow, not excised. Abdomen yellow, tergites with ill-defined pale brown median stripe and lateral series of black dashes. ♂. L. 12.5 mm.; w. 12.5 mm.

(July, Aug.) Ont., westw. to Ind., Mich. and Man., southw. to Pa., Md. and N. C.

Prof. Rogers states that this proves to be a straight synonym of *gracilicornis*.

### **N. gracilicornis** (Lw.)

1864. *Pachyrrhina gracilicornis* Loew; Berlin. Ent. Zeitschr., 8:66.

Close to *sodalis*. Occiput subopaque, immaculate. Antennae slender, of moderate length; flagellar segments beyond first dark brown. Praescutal stripes brownish ochreous. Stigma brown. Abdominal tergites with a median brown stripe and lateral black dashes. ♂. L. 11-12 mm.; w. 13-14 mm. ♀. L. 15-16 mm.; w. 13-14 mm.

(July, Aug.) N. Y., Md., westw. to Mich.

### **N. hirsutula** (Dtz.)

1918. *Pachyrrhina hirsutula* Dietz; Trans. Amer. Ent. Soc., 44:118-119 (as lapsus, *pilosula*, l. c., p. 110).

Fig.—Dietz, *Ibid.*, pl. 4, fig. 4 (wing).

Close to *macrocera*. Cells of wing with sparse macrotrichia. ♂. L. 11.5 mm.; w. 12.5 mm.

(May) Pa.

This and other species of the genus defined by Dietz as having macrotrichia scattered over the wing-surface may be based on artifacts, such as setae broken from the veins and merely lying loose on the wing-surface. Prof. Rogers has confirmed the above observation and found that this name is based on *macrocera* with detached macrotrichia of the veins lying caught among the microtrichia.

**N. incurva** (Lw.)

1863. *Pachyrrhina incurva* Loew: Berlin. Ent. Zeitschr., 7:293.

Figs.—Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 11, figs. 52, 53 (hyp.); 1904. Alexander, Cfls. N. Y., 1, pl. 44, fig. 204 (wing); 1919. Dickinson, Cfls. Wisc., p. 216, fig. 119 (wing); 1932.

General coloration yellow, conspicuously variegated by black, including three praescutal stripes, the outer pair curved laterad into an opaque black spot. Pleura variegated by reddish or reddish brown. Wing-tip narrowly darkened. ♂. L. 10-11.5 mm.; w. 10-12 mm. ♀. L. 15-17 mm.; w. 13 mm.

(June-Aug.) Ont., Que., N. B., N. S., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Mich., Wisc., Minn., southw. to N. C., S. C., Tenn. and Fla. (Canadian, Transition).

Connecticut.—Branford, July 15, 1904 (H.W.W.); Cornwall Bridge, June 12, 1931 (C. P. A.); Hamden, July 11, 1914 (W. E. B.).

**N. lugens** (Lw.)

1864. *Pachyrrhina lugens* Loew: Berlin. Ent. Zeitschr., 8:63.

Figs.—Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 11, figs. 51, 54 (hyp.); 1904. Alexander, Cfls. N. Y., 1, pl. 44, fig. 202 (wing); 1919. Dickinson, Cfls. Wisc., p. 217, fig. 122 (wing); 1932.

Orange-yellow, heavily patterned with black. Head with three small spots on front and orbits, additional to the relatively small occipital brand. Thoracic stripes subopaque. Costal border of wing more yellow than remainder; stigma dark brown. Basal five abdominal segments conspicuously banded with black. ♂. L. 11-13 mm.; w. 11-12 mm. ♀. L. 16-17 mm.; w. 12-13 mm.

(May, June; rarely July, Sept.) Ont., Que., N. B., N. S., Me., N. H., Vt., Mass., N. Y., westw. to Minn., Wisc., and Ill., southw. to N. C.

Connecticut.—Guilford, June 14, 1918 (B.H.W.); Hamden, June 23, 1926 (R. B. F.); Hartland, June 9, 1929 (C. P. A.); New Haven, May 24, 1910 (A. B. C.), June 14, 1910 (W. E. B.); Salem, June 12, 1929 (W. E. B.); Storrs; W. Granby, June 8, 1929 (C. P. A.).

**N. macrocera** (Say)

1823. *Tipula macrocera* Say; Journ. Acad. Nat. Sci. Philadelphia, 3:24.

Figs.—Alexander, Cfls. N. Y., 1, pl. 44, fig. 200 (wing); 1919. Dickinson, Cfls. Wisc., p. 217, fig. 123 (wing); 1932.

Thoracic dorsum yellow or orange-yellow, opaque or nearly so, without markings. Antennae (♂) very long; flagellar segments bicolorated. Abdominal tergites with lateral black dashes; sternites with median line of same. ♂. L. 12-13 mm.; w. 13-14 mm.; antenna 10-11 mm. ♀. L. 17-18 mm.; w. 15-16 mm.

(May-July) N. H., Vt., Mass., N. Y., N. J., Pa., westw. to Wisc., Ia., Mo. and Kan., southw. to S. C., Tenn., Ga., and n. Fla.

Connecticut.—East River, July 26, 1911 (Ely); Hartland, June 9, 1929 (C. P. A.)  
Kent Falls, June 12-13, 1931 (C. P. A.); Norfolk, July 24, 1931 (C. P. A.); Sap-  
tree Run State Park, June 14, 1933 (C. P. A.); Union, June 14, 1933 (C. P. A.)  
Windsor, Aug. 6, 1929 (C. P. A.).

**N. m. atrocera** (Dtz.) (Dietz, l. c., 44:118; 1918)

As in typical form but with antennal flagellum uniformly brownish black to black. Abdomen with terminal segments slightly more blackened.

(June, July) Ct., Pa.

Connecticut.—Saptree Run State Park, June 14, 1933 (C. P. A.).

Considered by Rogers as a somewhat melanistic individual of *macrocera*.

**N. m. gnata** (Dtz.) (Dietz, l. c., 44:118; 1918)

Male hypopygium with 8th sternite terminating in a median conelike structure; in typical *macrocera*, terminating in two digitiform lobes.

(Aug.) Wisc.

Prof. Rogers places this in the strict synonymy of *macrocera*.

**N. m. dietziella** nom. nov. (*virgata* Dietz, Trans. Amer. Ent. Soc., 47:260; 1921, nec *virgata* Coquillett, 1898)

Abdomen with posterior and lateral borders of abdominal tergites black.

(July, Aug.) Me., Pa.

**N. obliterated** (Dtz.)

1918. *Pachyrhina obliterated* Dietz: Trans. Amer. Ent. Soc., 44:133-134.

Figs.—Dietz, *Ibid.*, pl. 5, fig. 15 (wing), pl. 7, fig. 31 (hyp.).

Close to *xanthostigma*. General coloration polished sulfur-yellow; lateral ends of praescutal stripe suffused with black. Antennae relatively short; flagellar segments bicolorous, blackened basally. Abdomen with a dark dorsal stripe and lateral dashes. ♂. L. 14 mm.; w. 12.5 mm. ♀. L. 16-17 mm.; w. 15-15.5 mm.

(July, Aug.) Ont., Pa., Mich.

A synonym of *sodalis*, according to Prof. Rogers.

**N. occipitalis** (Lw.)

1864. *Pachyrhina occipitalis* Loew; Berlin. Ent. Zeitschr., 8:65.

General coloration yellow, the praescutal stripes reddish to ochraceous. A narrow dark brown stripe on posterior vertex and occiput. Wings grayish yellow; stigma yellowish. Abdominal tergites with



a median brown vitta and less evident lateral streaks. ♀. L. 13-15 mm.; w. 13-14 mm.

(June, July; Sept.) Alta., Sask., Ont., Que., N. B., Mich. (Hudsonian, high Canadian).

**N. opacivittata** (Dtz.)

1918. *Pachyrhina opacivittata* Dietz; Trans. Amer. Ent. Soc., 44: 123.

Fig.—Dietz, *Ibid.*, pl. 4, fig. 9 (wing).

Close to *calinota*. Posterior vertex unmarked. Flagellar segments relatively stout and moderately incised. Praescutal stripes reddish brown, the median one behind divided by a narrow black vitta. ♂. L. 12-12.5 mm.; w. 11-12 mm.

(Aug.) Mass., Wisc., Man.

**N. pedunculata** (Lw.)

1863. *Pachyrhina pedunculata* Loew; Berlin. Ent. Zeitschr., 7: 293.

Figs.—Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 11, figs. 58, 59 (hyp.); 1904. Alexander, Cfls. N. Y., 1, pl. 44, fig. 203 (wing); 1919. Dickinson, Cfls. Wisc., p. 217, fig. 121 (wing); 1932.

Yellow with black markings. A small black spot between bases of antennae. Wings almost uniformly subhyaline; stigma and very narrow apex darker. ♂. L. 12-13 mm.; w. 12-13 mm. ♀. L. 16-18 mm.; w. 12-14 mm.

(Late May-early Aug.) Ont., Que., N. B., N. S., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Wisc., Ill., and Minn. (Canadian).

Connecticut.—Reported from Connecticut by the Experiment Station, without more accurate data.

**N. penumbra** Alex.

1915. *Nephrotoma penumbra* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1915: 467-468.

Figs.—Alexander, *Ibid.*, pl. 16, fig. 1 (wing); Cfls. N. Y., 1, pl. 44, fig. 205 (wing); 1919.

Coloration obscure yellow, variegated by black or brownish black. Frontal prolongation of head trivittate with dark brown. Antennal flagellum black; flagellar segments strongly incised. Dark markings on vertex and occiput broad, especially at anterior end. Abdomen with middorsal black stripe. ♂. L. 12-13.5 mm.; w. 12-13.5 mm. ♀. L. 16-18 mm.; w. 14-15 mm.

(July) N. B., N. H.; alpine and subalpine portions of Mt. Washington, 4000-6290 ft. (Hudsonian).

**N. perdita** (Dtz.)

1918. *Pachyrhina perdita* Dietz; Trans. Amer. Ent. Soc., 44: 116-117.

Fig.—Dickinson, Cfls. Wisc., p. 217, fig. 120 (wing); 1932.

Close to *incurva*, differing chiefly in colorational details. ♀. L. about 17 mm.; w. 14.5 mm.

(July-Aug.) Wisc., Man. (Canadian).

Prof. Rogers believes this to be synonymous with *nevilis*, which is considered as being a valid western race of *incurva*.

### **N. polymera** (Lw.)

1863. *Pachyrrhina polymera* Loew; Berlin. Ent. Zeitschr., 7: 297.

Figs.—Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 11, figs. 50, 60 (hyp.); 1904. Dickinson, Cfls. Wisc., p. 219, fig. 127 (wing); 1932.

Yellow; praescutal stripes rusty. Antennae of ♂ 16-segmented, of ♀ 14-segmented; bicolorous. Wings yellowish; stigma brownish black; wing-tip darkened. ♂. L. 11-13 mm.; w. 12-14 mm. ♀. L. 15-16 mm.; w. 13-14 mm.

(May-June; Sept.) Ont., N. H., Vt., Mass., N. Y., westw. to Wisc., Ia., and Kan., southw. to S. C. and Tenn. (Transition).

Connecticut.—Kent Falls, June 12-13, 1931 (C. P. A.); New Haven, July 1, 1928 (W. E. B.); Portland, June 24, 1932 (N. T.).

### **N. punctum** (Lw.)

1863. *Pachyrrhina punctum* Loew; Berlin. Ent. Zeitschr., 7: 294.

Occiput opaque, unmarked. Antennae with outer flagellar segments blackish. Pronotum yellow. Praescutal stripes brownish black; a velvety-black spot opposite anterior end of lateral stripe. Wings with blackish brown stigma. Intermediate abdominal segments with a blackish subtriangular area. ♀. L. 15 mm.; w. 13 mm.

(May-July) Me., N. H., Mass., R. I., N. J., Pa., Ill., Mich.

### **N. sodalis** (Lw.)

1864. *Pachyrrhina sodalis* Loew; Berlin. Ent. Zeitschr., 8: 64.

Head orange; antennal flagellum beyond second segment black. Praescutum polished, the stripes brownish ochreous; lateral ends of suture blackish; scutellum and postnotum ochreous, unmarked. Wings grayish yellow; costal region and stigma light yellow. Abdominal tergites with a median stripe and a series of lateral black dashes. ♀. L. 17-18 mm.; w. 14-15 mm.

(May-Sept.) Ont., Que., N. H., Mass., N. Y., N. J., westw. to Mich. and Wisc., southw. to N. C.

Connecticut.—Loew's type taken in Connecticut, without closer data; East River, Sept. 10, 2♂ (Ely); Storrs, June 1928; Windsor, June 5, 1925 larvae, emerged Sept. 9, 1925 (W. E. B.), June 5, 1925 (W. E. B.), June 10, 1925 (B. H. W.); Yalesville, June 27, 1906 (P. L. B.).

### **N. sphagnicola** Alex.

1920. *Nephrotoma sphagnicola* Alexander; Can. Ent., 52: 110-111.

Close to *incurva*. Occipital brand broadly subtriangular. Scutum with a narrow black median stripe, in addition to the areas on

the lobes. Wings yellowish; stigma dark brown: wing-tip and a seam on cord darker brown. Abdomen with a broken black dorso-median stripe, with more brownish lateral stripes. ♀. L. 13.5-14 mm.; w. 10.5-12 mm.

(June, Aug.) Ill., Mich.

**N. stigmatica** (Dtz.)

1918. *Pachyrrhina stigmatica* Dietz; Trans. Amer. Ent. Soc., 44: 137-138.

Figs.—Dietz, *Ibid.*, pl. 5, fig. 20 (wing), pl. 7, fig. 34 (hyp.).

Close to *breviorcornis*. Flagellar segments not excised beneath. Abdominal tergites with a continuous median brown stripe; lateral stripes usually interrupted. ♂. L. 14 mm.; w. 12.5 mm.

(Aug.) Pa.

Prof. Rogers considers that this is either *breviorcornis* or extremely close to it.

**N. suturalis** (Lw.)

1863. *Pachyrrhina suturalis* Loew; Berlin. Ent. Zeitschr., 7: 295.

Occiput opaque, the brand concolorous. Antennal flagellum bicolorous, yellow, the bases of segments black. Thoracic stripes ochraceous, the suture black. Wings brownish gray; costal and stigmal regions pale brown. Abdomen unmarked. ♀. L. 10-11 mm.; w. 10-11 mm.

S. C., Ga., Fla., Ala., coastal.

This form, with its synonym *costomarginata* Dietz, apparently represents an austral or austroriparian race of *ferruginea*.

**N. temeraria** (Dtz.)

1918. *Pachyrrhina temeraria* Dietz; Trans. Amer. Ent. Soc., 44: 128.

Fig.—Dickinson, Cfls. Wisc., p. 220, fig. 128 (wing); 1932.

Characters as in *festina*. Antennae (♀) entirely pale yellow. Occiput with a narrow brown vitta. ♀. L. 17.5 mm.; w. 13 mm.

(June, July) Mich., Wisc.

Prof. Rogers indicates that this represents, at most, a race of *gracilicornis*.

**N. tenuis** (Lw.)

1863. *Pachyrrhina tenuis* Loew; Berlin. Ent. Zeitschr., 7: 297.

Figs.—Alexander, Cfls. N. Y., 1, pl. 44, fig. 199 (wing); 1919. Dickinson, Cfls. Wisc., p. 218, fig. 124 (wing); 1932.

Coloration yellow, in life strongly tinged with green. Occiput opaque, immaculate. Antennae short in both sexes; flagellar segments brownish black, restrictedly yellowish at bases. Thorax opaque,

the stripes a little more rusty. Wings yellowish subhyaline, the costal border and stigma clearer yellow. Abdominal tergites with a lateral series of black dashes. ♂. L. 11-12 mm.; w. 12-13 mm. ♀. L. 16-17 mm.; w. 13-14 mm.

(May-Sept.) Ont., Que., N. S., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Wisc., southw. to Va., N. C., and Tenn.

Connecticut.—Branford, Aug. 22, 1904 (H. W. W.); Danbury, June 15, 1909 (C. W. J.); New Haven, May 27, 1904 (W. E. B.), June 8, 1904 (W. E. B.), June 9, 1905 (B. H. W.); Storrs, May 1933; Tolland, June 23, 1932 (N. T.); Westville, June 11, 1905 (W. E. B.), June 13, 1907 (W. E. B.).

**N. t. hamata** (Dtz.) (Dietz, Trans. Amer. Ent. Soc., 44:121: 1918)

Fig.—Dietz, *Ibid.*, pl. 7, fig. 28 (hyp.).

Differs from typical *tenuis* in genitalic structures. Gonapophyses rod-like, strongly bent at midlength.

(Aug.) N. Y.

Considered by Prof. Rogers as a straight synonym of *tenuis*.

**N. t. nigroantennata** (Dtz.) (Dietz, Trans. Amer. Ent. Soc., 47:261; 1921)

Differs from typical *tenuis* in the entirely dark brown antennal flagellum.

(July) Pa.

Held by Prof. Rogers as being well within the normal color range of typical *tenuis* and not separable therefrom.

**N. virescens** (Lw.)

1864. *Pachyrrhina virescens* Loew; Berlin. Ent. Zeitschr., 8:62.

Coloration in life strongly greenish, paling to yellow in preserved specimens. Occipital brand lacking. Median praescutal stripe divided by a pale line; lateral stripes and scutal areas chiefly reddish; anterior ends of all stripes, a U-shaped mark at end of suture and a lateral spot on each scutal lobe intense velvety-black. ♂. L. 10-12 mm.; w. 10-12 mm.

(June-Sept.) N. H., Mass., N. Y., N. J., Pa., westw. to Ill., and Mich., southw. to Tenn., S. C., Ga., and n. Fla. (Transition, Austral).

Connecticut.—East River, Aug. 24, 1910 (Ely); Kent Falls, July 23-24, 1931 (C. P. A.).

**N. vittula** (Lw.)

1864. *Pachyrrhina vittula* Loew; Berlin. Ent. Zeitschr., 8:63.

Posterior vertex with a narrow but very conspicuous black vitta. Praescutal stripes and pleural markings black; scutellum yellow; mediotergite with a brown median line. Wings grayish subhyaline; stigma subfuscous. Abdominal tergites trivittate with black, the

median stripe entire, the narrower lateral stripes slightly interrupted.  
♂. L. 11 mm.; w. 12 - 12.5 mm.

(June-Aug.) Ont., Que., Nfd., Me., N. H., Mass., westw. to Alta. (Hudsonian, high Canadian).

### **N. wyalusingensis** (Dtz.)

1918. *Pachyrrhina wyalusingensis* Dietz; Trans. Amer. Ent. Soc., 44: 134-135.

Figs.—Dietz, *Ibid.*, pl. 5, fig. 16 (wing), pl. 7, fig. 32 (hyp.).

Close to *xanthostigma*. Lateral ends of suture blackened. ♂. L. 14 mm.; w. 12.5 mm.

(Aug.) Pa.

Type material now reduced to fragments and nothing can be affirmed as to its further relationships (Rogers).

### **N. xanthostigma** (Lw.)

1864. *Pachyrrhina xanthostigma* Loew; Berlin. Ent. Zeitschr., 8: 65.

Fig.—Alexander, *Cfls. N. Y.*, 1, pl. 44, fig. 201 (wing); 1919.

General coloration of thorax and abdomen polished orange. Occipital brand very large, embracing also the posterior vertex: vertical tubercle intense orange. Wings strongly suffused with yellow, the costal and apical portions more saturated. Abdominal tergites with lateral rows of black dashes. ♂. L. 12 - 13 mm.; w. 12.5 - 13 mm. ♀. L. 15 - 16 mm.; w. 13 - 14 mm.

(June-Sept.) Ont., Que., Me., N. H., Vt., Mass., N. Y., N. J., Pa., westw. to Ill., southw. to S. C. and Tenn.

Connecticut.—East River (Ely); New Haven, July 20, 1904 (determined by Johnson as *eucera*) (W. E. B.); Orange, July 14, 1924; Stonington, July 26, 1906 (J. A. H.); Wading River, July 25, 1914 (G. P. E.); Windsor, Aug. 6, 1929 (C. P. A.).

## **Tipula** Linnaeus

1758. *Tipula* Linnaeus; Syst. Nat., Ed. 10: 585.

The genus *Tipula* includes approximately one-sixth of all the crane-flies of the World and very nearly one-fourth of all those considered in the present treatment. In this vast series of species there is to be found a considerable range in size but scarcely any differences of importance in the wing venation. The chief specific characters lie in the nature of the wing-pattern and in the structure of the male hypopygium. Various attempts have been made in the past to divide this cumbersome genus into smaller groups, and, more recently, into subgenera. A notable paper by Edwards (*Ann. Mag. Nat. Hist.* (10) 8: 73-82; 1931) is a landmark in the discovery and correlation of characters suitable for the separation of the various subgeneric groups.



The immature stages frequent a wide range of ecological habitats, from species that are aquatic to others living in saturated earth and debris at the margins of streams; others in damp leaf mold in woods; others in dry earth, moss cushions, or even in relatively desiccated garden soil. The adults of some of the species are among the largest of our Diptera, while even the smallest of the local species are still far above the average size for the family.

*Key to Subgenera*

- |  |                     |
|--|---------------------|
| 1. Outer cells of wings with macrotrichia.....   | <b>Trichotipula</b> |
| Cells of wings without macrotrichia.....   | 2                   |
| 2. Coloration of body polished and patterned with yellow and black, or yellow and rusty-red, with <i>m-cu</i> inserted beyond base of cell 1st $M_2$ (at or before this cell in <i>Nephrotoma</i> ).....   | 3                   |
| Coloration of body opaque, pruinose or pollinose, usually gray brown or yellow, never with the contrasted colors found in <i>Nephrotoma</i> .....  | 4                   |
| 3. Wings with <i>m-cu</i> close to or just beyond base of cell 1st $M_2$ ; veins $M_1$ and $M_2$ with macrotrichia; ovipositor with elongated sclerotized cerci  | <b>Nitidotipula</b> |
| Wings with <i>m-cu</i> some distance beyond base of cell 1st $M_2$ ; $M$ and its branches without macrotrichia; ovipositor with short and fleshy cerci   | <b>Nobilotipula</b> |
| 4. $R_s$ unusually long, fully twice <i>m-cu</i> , in alignment with $R_{4+5}$ , the basal deflection of the latter lacking; <i>m-cu</i> uniting with $M_{3+4}$ some distance before fork of latter, very rarely at fork; anepisternum with setae; pleurotergal tubercle conspicuous; large species (wings, ♂, 22-25 mm.; ♀, 27-30 mm.)  | <b>Nippotipula</b>  |
| $R_s$ of moderate length, ranging in length to one-half longer than <i>m-cu</i> ; in rarer cases ( <i>Yamatotipula</i> , <i>Vestipler</i> , <i>Orcomyza</i> ) attaining to fully twice the length but, if so, with basal section of $R_{4+5}$ present; <i>m-cu</i> inserted at fork of $M_{3+4}$ or beyond on base of $M_1$ (except in <i>Tipula dickinsoni</i> ); anepisternum glabrous; pleurotergal tubercle lacking or but feebly developed; usually much smaller species (but in <i>valida</i> , wing, ♂, 20-24 mm. ♀, 22-24 mm.) | 5                   |
| 5. Wings with <i>m-cu</i> unusually long, so cell $M_4$ is very deep and much wider at base than at margin; vein $Cu_1$ not conspicuously constricted at point of insertion of <i>m-cu</i> ; male hypopygium with midregion of tergite extended into a median compressed blade, rarely depressed (if so, <i>Tipula idci</i> the lobe glabrous, its apex not roughened by points, as in <i>Tipula</i> and <i>Yamatotipula</i> )   | <b>Schummelia</b>   |
| Wings with <i>m-cu</i> of moderate length, so cell $M_4$ is short and but little wider at base than at margin; $Cu_1$ more constricted or shirred at point of insertion of <i>m-cu</i> ; male hypopygium with tergite not extended into a median compressed blade (in <i>Yamatotipula</i> and <i>Tipula</i> , <i>oleracea</i> group, with a median entire or bifid depressed lobe).  | 6                   |
| 6. Ovipositor with hypovalvae greatly reduced, the cerci correspondingly large, heavily sclerotized, placed horizontally and with the margins serrate; male hypopygium with the caudal portion of tergite (Fig. 27, A-D) bearing a shallow, often blackened and polished saucer; claws (♂) simple  | <b>Vestipler</b>    |
| Ovipositor with hypovalvae well-developed; cerci either reduced and fleshy ( <i>Arctotipula</i> ; <i>Lunatipula</i> , <i>bicornis</i> group), or, usually, elongate and slender, the margins never serrate; male hypopygium without a tergal saucer; claws (♂) usually with a basal tooth  | 7                   |
| 7. Male hypopygium with sclerites fused into a continuous ring (more separated in <i>iroquois</i> , which has the tergite much as in other <i>Yamatotipula</i> ); claws (♂) toothed  | 8                   |
| Male hypopygium with the ninth tergite and sternite separated by pale membrane; claws (♂) toothed or simple.   | 9                   |

8. Wings with *m-cu* usually at or near midlength of cell *1st M*<sub>2</sub>; wings not striped longitudinally, at most with costal border darkened; male hypopygium with median region of tergite produced (*oleracea* group) or notched (*ultima* group, Fig. 29, A-C). . . . . *Tipula* 247
- Wings with *m-cu* usually close to fork of *M*; wings usually with a longitudinally striped or vittate pattern, or, (*iroquois*) with apex darkened; male hypopygium with median region of tergite produced into a simple or bifid usually roughened lobe or lobes, Fig. 28, A-O. . . . . *Yamatotipula* 247
9. Wing-veins almost without trichia, there being none on *M* or its branches; squama naked; claws simple; Northern and Arctic. . . . . *Arctotipula*
- Wing-veins with conspicuous trichia; squama naked or with a group of setae; claws (♂) of local species toothed. . . . . 10
10. Squama naked; wing-pattern clouded or marbled with brown. . . . . *Oreomyza* 247
- Squama with a small group of setae; wing-pattern commonly unicolorous or subunicolorous, more rarely marmorate . . . . . *Lunatipula* 247

In the following discussion of the local species of *Tipula*, virtually all names that have been applied to the forms in question will be found, either as valid names for the species or as synonyms. There remain a few further species that are not definitely recognizable and are herein considered as being doubtful species. In order to complete the data, these remaining forms are listed herewith.

*Tipula frigida* Walker; List Dipt. Brit. Mus., 1:68; 1848. Described from Nova Scotia; type apparently lost (Edwards. *in litt.*).

*Tipula maculatipennis* Say; Long's Exped. to St. Peter's River, Append., p. 359; 1824; and Complete Writings, 1:243; 1859. Name later changed to *maculipennis* by Wiedemann (Aussereur. Zweifl. Ins., 1:46; 1828). Type lost with the destruction of the Say Collection during the 1840's. Material in the Harris Collection suggests that the species may be *dorsimacula* Walker but under the circumstances it seems best to consider the species as being unrecognizable.

*Tipula pratorum* Kirby; Fauna Boreali Americana, 4:3101; 1837. (Reprinted, Can. Ent., 13:164-165; 1881). Arctic America. Species unrecognizable from description.

*Tipula retorta* van der Wulp; Tijdschr. v. Entomol., 24:149; 1881. Described from eastern Canada; not definitely recognized since its original definition.

#### Subgenus *Trichotipula* Alexander

1915. *Tipula (Trichotipula)* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1915:468-469.

1915. *T. (Cinctotipula)* Alexander; *Ibid.*, 1915:469.

1919. *T. (Odontotipula)* Alexander; Cornell Univ. Agr. Expt. Sta. Mem. 25:939.

*Rs* short, arcuate, subequal to *m-cu*, the latter connecting with *M*<sub>4</sub> close to origin; *M*<sub>3+4</sub> short to very short. Cells beyond cord with macrotrichia. Squama naked. Tibial spur formula 1-2-2. No sternopleural setae.

## Key to Species

1. Trichiation of wing-cells extensive, including all apical cells from  $R_1$  to  $M_1$  inclusive; praescutal stripes dark. (*Trichotipula*).....**oropezoides**  
Trichiation of wing-cells restricted, confined to cells  $R_3$  to 2nd  $M_2$ , inclusive; praescutal stripes paler than the interspaces..... 2
2. Coloration bright polished yellow, reddish and black; vertex polished, with a linear median darker stripe; antennae ( $\delta$ ) short, not attaining the wing-root; trichia of cells restricted to a small group in cell  $R_5$  and, rarely, in cell  $M_1$  (*Odontotipula*).....**unifasciata**  
Coloration dull brown and yellow, the praescutal stripes paler than the interspaces; vertex opaque, unmarked; antennae ( $\delta$ ) elongate, reaching about to base of abdomen; trichia of cells including cells  $R_3$  to 2nd  $M_2$  (*Cinctotipula*). ..... 3
3. Antennae with flagellar segments bicolorous; basal enlargements of individual segments black, the remainder yellow.....**unimaculata**  
Antennae with flagellar segments uniformly darkened.....**algonquin**

**Tipula** (*Trichotipula*) **algonquin** Alex.

1915. *Tipula* (*Cinctotipula*) *algonquin* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1915: 469-471.

Figs.—Alexander, *Ibid.*, pl. 16, fig. 2 (wing), pl. 17, fig. 24; pl. 19, fig. 44; pl. 20, fig. 61 (hyp.). Alexander, Cfls. N. Y., 1, pl. 43, fig. 197 (wing); pl. 49, fig. 260; pl. 53, fig. 324 (hyp.); 1919.

Basal two antennal segments dull yellow. Praescutal stripes brownish yellow, interspaces dark brown. Abdominal tergites light yellow, posterior borders of segments with broad dark margins.  $\delta$ . L. 11.5-12.5 mm.; w. 11-12.5 mm.; antenna, 5.5-6 mm.  $\phi$ . L. 13.5-14 mm.; w. 13-13.5 mm.

(July-Sept.) Ont., Me., N. H., Vt., Mass., N. Y., N. J., Pa., westw. to Ind. and Mich., southw. to N. C. and Tenn.

Connecticut.—Salisbury, Sept. 12, 1928 (G. C. C.).

**T.** (*Trichotipula*) **oropezoides** Johns.

1909. *Tipula oropezoides* Johnson; Proc. Boston Soc. Nat. Hist., 34: 131-132.

Figs.—Alexander, Cfls. N. Y., 1, pl. 43, fig. 195 (wing), pl. 49, fig. 258, pl. 53, fig. 330 (hyp.); 1919.

General coloration dull gray to yellowish gray. Antennae short in both sexes; flagellum uniformly darkened. Male hypopygium with dorsal portion of sternite produced caudad into a slender, finger-like hairy lobe.  $\delta$ . L. 10-11.5 mm.; w. 11.5-13.5 mm.  $\phi$ . L. 14-15 mm.; w. 12.5-13.5 mm.

(Late May, June) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., westw. to Ind. and Mich., southw. to S. C., Tenn. and n. Fla.

Connecticut.—Canaan, June 10, 1928 (R. B. F.); Cornwall Bridge, May 30, 1931 (C. P. A.); East River, Sept. 10 (Ely); Kent Falls, May 31, 1931 (C. P. A.); June 12-13, 1931 (C. P. A.); Norfolk, June 9, 1929 (C. P. A.); May 31, 1931 (C. P. A.)  
Salisbury, June 10, 1928 (R. B. F.); Storrs (H. W. C.); Winsted, June 9, 1929 (C. P. A.).

**T. (*Trichotipula*) *unifasciata* (Lw.)**1863. *Pachyrrhina unifasciata* Loew; Berlin. Ent. Zeitschr., 7: 294.1919. *Tipula unifasciata* Alexander; Cornell Univ. Agr. Expt. Sta. Mem. 25: 939, 943.Figs.—Alexander, *Ibid.*, p. 862 (ven.), pl. 44, fig. 206 (wing), pl. 49, fig. 262 (hyp.); 1919.

Antennal flagellum uniformly darkened. Wings with a band at cord, together with outer radial cells, darkened; basal section of  $M_4$  erect. Abdomen yellow, the segments banded with black. Male hypopygium with dorsal portion of sternite produced caudad into a conspicuous yellow lobe. Ovipositor with elongate valves. ♂. L. 11-12 mm.; w. 10.5-11.5 mm. ♀. L. 15-17 mm.; w. 11.5-13 mm.

(Aug.-Oct.) Ont., Mass., N. Y., N. J., Pa., westw. to Ind., Ill., Mich., Ia. and Kan., southw. to S. C., Ga. and n. Fla.

**T. (*Trichotipula*) *unimaculata* (Lw.)**1864. *Pachyrrhina unimaculata* Loew; Berlin. Ent. Zeitschr., 8: 64.1919. *Tipula unimaculata* Alexander; Cornell Univ. Agr. Expt. Sta. Mem. 25: 939, 943.Figs.—Alexander, *Ibid.*, pl. 43, fig. 196 (wing), pl. 49, fig. 259 (hyp.); 1919.

Characters much as in *algonquin*. Wings yellowish; stigma dark brown, conspicuous. Abdominal segments not conspicuously ringed with dark brown. ♂. L. 9-9.5 mm.; w. 9.5-11 mm.; antenna, 6-6.5 mm. ♀. L. 12-13 mm.; w. 8.5-10.5 mm.

(Aug.-Oct.) Ont., Que., Me., Vt., Mass., N. Y., Pa., westw. to Mich. and Ill., southw. to Md. and N. C.

Connecticut.—Kent Falls, Aug. 19, 1931 (C. P. A.); Norfolk, Sept. 5-6, 1928 (G. C. C.), Sept. 12, 1928 (C. P. A.); Twin Lakes, Sept. 12, 1928 (C. P. A.).

**Subgenus *Nobilotipula* subgen. n.**(type *nobilis* Lw.)

General coloration polished yellow and black, almost as in *Nephrotoma*, the praescutal stripes and pleura slightly more pruinose in *collaris*. Macrotrichia of veins very sparse, quite lacking on  $M$  and its branches. Squama and sternopleurite naked. Tibial spur formula 1-1-2. Ovipositor with very short fleshy valves.

*Key to Species*

1. Praescutal stripes opaque, dull black or grayish black; pleura pruinose with gray, especially on ventral anepisternum and sternopleurite; basal abdominal tergite gray pruinose ..... *collaris*  
 Praescutal stripes polished black; pleura light yellow, not or scarcely pruinose; basal abdominal tergite not pruinose..... *nobilis*

***Tipula* (*Nobilotipula*) *collaris* Say**1823. *Tipula collaris* Say; Journ. Acad. Nat. Sci. Philadelphia, 3: 25.

Fig.—Alexander, Cfls. N. Y., 1, pl. 44, fig. 207 (wing); 1919.



Median praescutal stripe more or less divided by a pale vitta. Wing-tip narrowly darkened. Lateral borders of abdominal tergites and almost all of outer sternites heavily pruinose with silvery. ♂. L. 10-12 mm.; w. 11-13 mm. ♀. L. 12-14 mm.; w. 13-16 mm.

(Apr.-June) Que., Mass., R. I., N. Y., N. J., Pa., westw. to Ind. and Mich., southw. to N. C. and S. C.

Connecticut.—Kent Falls, May 31, 1931 (C. P. A.); Norfolk, May 16, 1931 (C. P. A.); Storrs, 1932 (C. H.)

**T.** (*Nobilotipula*) **nobilis** (Lw.)

1864. *Pachyrrhina nobilis* Loew; Berlin. Ent. Zeitschr., 8: 62.

Figs.—Alexander, Cfls. N. Y., 1, pl. 44, fig. 208 (wing), pl. 49, fig. 261 (hyp.); 1919.

Antennal flagellum (♂) brownish black, much paler in ♀. Abdominal sternites and tergites with lateral patches silvery, more conspicuous in female. ♂. L. 12-13 mm.; w. 12-13 mm. ♀. L. 10-12 mm.; w. 12-14 mm.

(June, July) Que., N. B., Me., N. H., Mass., N. Y., Mich., southw. to N. C.

Connecticut.—Hamden, June 2, 1928 (R. B. F.); Hartland, June 9, 1929 (C. P. A.); New Haven, June 12, 1929 (R. B. F.).

Subgenus **Nitidotipula** subgen. n.  
(type *pachyrrhinooides* Alex.)

Characters much as in *Nobilotipula*, especially in the highly polished body which is essentially as in *Nephrotoma*. *Rs* and *m-cu* subequal, the former arcuated, not transverse, as in *Nephrotoma*; cell *M*<sub>1</sub> petiolate; *m-cu* close to or beyond the fork of *M*. Macrotrichia of veins well-developed, present on *M*<sub>1</sub> and *M*<sub>2</sub>. Ovipositor with elongate sclerotized cerci.

A single species is known. The group cannot be referred to *Nephrotoma* because of the venation, nor to *Nobilotipula* because of the nature of the ovipositor.

**Tipula** (*Nitidotipula*) **pachyrrhinooides** Alex.

1915. *Tipula pachyrrhinooides* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1915: 471-472.

Figs.—Alexander, *Ibid.*, pl. 16, fig. 3 (wing). Alexander, Cfls. N. Y., 1, pl. 44, fig. 209 (wing); 1919.

A median dark stripe on vertex. Thoracic stripes reddish to black; a broad median pale yellow to whitish stripe extending from the suture to base of abdomen. Stigma pale brown; outer radial cells with dusky central darkening. Abdominal segments with caudal margins brown, more or less triangular or  $\perp$ -shaped in outline. ♂. L. 8.5-9 mm.; w. 10 mm. ♀. L. 13-13.5 mm.; w. 10 mm.

(Aug., Sept.) N. H. (Alpine summits of Mt. Washington), westw. to Minn., Sask. and Alta. (Hudsonian, high Canadian).



Subgenus **Nippotipula** Matsumura

1916. *Nippotipula* Matsumura; Thous. Ins. Japan, Add. 2: 457-458.  
 1931. *Nippotipula* Edwards; Ann. Mag. Nat. Hist., (10) 8: 77.

*Rs* very long, fully twice *m-cu*, the latter close to midlength of cell *1st M*<sub>2</sub>, and almost always uniting with *M*<sub>3+4</sub> some distance before its fork; in rare cases, *m-cu* at fork of *M*<sub>3+4</sub>; *Rs* in direct alignment with *R*<sub>4+5</sub>, the basal deflection of the latter lacking. *M* and branches naked. Squama with a group of setae. Tibial spur formula 1-2-2. Setae on sternopleurite and anepisternum. Pleurotergal tubercle well-developed. Scutal lobes with two darkened areas that are ringed with pale. The single regional species is one of the largest and finest of all our species of Tipulidae.

**Tipula** (*Nippotipula*) **abdominalis** (Say)

1823. *Ctenophora abdominalis* Say; Journ. Acad. Nat. Sci. Philadelphia, 3: 18.  
 1848. *Tipula albiflata* Walker; List Dipt. Brit. Mus., 1: 65.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 35, fig. 2 (ad. ♀); 1908. Alexander, Cfs. N. Y., 1, pl. 45, fig. 210 (wing); 1919. Dickinson, Cfs. Wisc., p. 232, fig. 141 (wing), p. 248, fig. 175 (hyp.); 1932.

Praescutum and scutum with velvety-black areas that are narrowly ringed with light gray. Pleura longitudinally striped with gray and brownish black. Femora whitish, darkened on outer half, the tips narrowly blackened, preceded by a narrow, dirty white ring; tibiae darkened, with a narrow whitish ring at extreme base. Wings subhyaline, clouded with gray; costal border with three larger brown areas, the first at arculus, second at origin *Rs*, the ocelliform third involving the stigma and extensive seams on anterior cord and outer end of *Rs*; a more or less developed cloud midway between the first two dark areas; a series of small marginal spots at ends of longitudinal veins. Position of *m-cu* variable. Abdominal tergites deep orange, bordered sublaterally with black. ♂. L. 25-30 mm.; w. 22-25 mm. ♀. L. 35-38 mm.; w. 27-30 mm.

(May-July; Aug.-Sept.; apparently two generations, more numerous in late summer.) Ont., Que., Nfd., N. B., N. S., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Mich., Wisc. and Kan., southw. to S. C., Ga., Ky., Tenn. and Fla. (to Marion Co.).

Connecticut.—New Haven, Aug. 28, 1903 (B. H. W.); N. Branford, July 3, 1931 (G. H. P.); Storrs.

Subgenus **Vestiplex** Bezzi

1924. *Vestiplex* Bezzi; Ann. Mus. Civ. Stor. Nat. Genova, 51: 230.

Nasus present or lacking. *Rs* long, fully one-half longer than *m-cu*, in cases even longer. Squama naked; branches of *M* with trichia. Tibial spur formula 1-2-2. Pleura glabrous. Male hypopygium with the posterior half of tergite forming a shallow saucer (Fig. 27, A-D), in several species heavily sclerotized and blackened and with the lateral angles produced caudad into acute spines. In the

two more southern local species, *caroliniana* and *longiventris*, the anterior border of this saucer is indicated by a blackened transverse ridge, the remainder of the area being pale. In the species with a blackened saucer, this often tends to bend ventrad and cephalad, so the only portion visible from above is the anterior or cephalic elevated rim. Ovipositor with cerci strong and powerfully constructed, heavily sclerotized, horizontally placed and with the outer edge serrate; hypovalvae very small or rudimentary.

The species are chiefly Northern and Arctic in distribution. All members of *Vestiplex* have the wings marmorate with brown, gray and white; the praescutal stripes usually strongly margined with brown; and with the male antennae strongly excised beneath, in cases very strongly so. The local species all have the basistyle of the male hypopygium unarmed, except in *caroliniana* and *longiventris*.

*Key to Species*

1. Ground-color of wing pale brown or gray, sparsely variegated with darker brown and whitish areas; cell *R* without white areas immediately beyond arculus ..... 2
- Ground-color of wing brown, more conspicuously variegated with whitish, including a large area in cell *R* just beyond arculus..... 3
2. Wings with the whitish areas restricted to small marks near posterior margin of cell *M* and in cells *1st M*<sub>1</sub> and base of *M*<sub>2</sub>..... **centralis**
- Whitish wing-pattern more extensive, including areas before and beyond origin of *R*<sub>s</sub>, a conspicuous band beyond stigma and anterior cord and a basal area from cell *M* through *1st A* ..... **perretti**
3. Wings with a conspicuous brownish area in bases of cells *R* and *M* beyond arculus ..... 4
- Wings with cells *R* and *M* just beyond arculus clear..... 7
4. Male hypopygium with basistyle armed caudally with a slender spine; tergite pale, the cephalic border of tergal saucer represented by a small median, transverse black elevation; female (known only in *longiventris*), with abdomen greatly elongated ..... 5
- Male hypopygium with basistyle unarmed; tergal saucer more extensively blackened; abdomen of normal length in both sexes..... 6
5. Antennae (♂) relatively short; flagellum bicolorous, the enlargements black, the remainder yellow; praescutum fawn-colored, the stripes bordered by brown; darkened post-arcular area more extensive..... **longiventris**
- Antennae (♂) more elongated; flagellum unicolorous, dark brown; praescutum dull gray, with four brown stripes; darkened post-arcular area reduced ..... **caroliniana**
6. Antennal flagellum distinctly bicolored throughout, the enlargements darkened, the remainder yellow; cell *2nd A* of wings uniformly whitened or with a linear brown discal streak ..... **fultonensis**
- Antennal flagellum beyond the basal segments uniformly dark brown; cell *2nd A* of wings more clouded with brown ..... **platymera**
7. Wing-pattern very pale, being scarcely darkened along cord; dark pattern restricted to small clouds at origin of *R*<sub>s</sub> and in vicinity of stigma; cell *R*<sub>3</sub> pale at base; cell *1st M*<sub>2</sub> almost uniformly pale..... **serrulata**
- Wing-pattern more developed; cell *R*<sub>3</sub> darkened at base; cell *1st M*<sub>2</sub> with outer cephalic half darkened ..... 8
8. Antennae dark throughout; flagellum entirely black, the segments (♂) very strongly excised, the outer lobe nearly equal in size to the basal enlargement; abdomen (♀) bluish gray ..... **arctica**
- Antennae indistinctly to clearly bicolorous, the flagellar segments less strongly excised; abdomen obscure yellow or brownish yellow, the tergites with a median brown stripe ..... 9

9. Antennae ( $\delta$ ) with flagellar segments slender, very feebly excised; basal enlargements dark, the remainder light yellow; male hypopygium with a strong median tooth near caudal border of the extensive tergal saucer (Fig. 27, A), the latter entirely blackened, with lateral spines; inner dististyle a little expanded and bidentate at apex..... **balioptera**
- Antennae ( $\delta$ ) with flagellar segments stouter and more strongly excised; basal enlargements dark brown, the remainder pale brown; male hypopygium with tergite pale, the saucer (Fig. 27, B) very short, without lateral spines, the caudal border with a broad U-shaped notch; inner dististyle (Fig. 27, B) narrow, the apex simple ..... **canadensis**

**Tipula** (*Vestiplex*) **arctica** Curt.

1831. *Tipula arctica* Curtis; Ross's Voyage to the Arctic Regions, p. lxxvii, pl. A, fig. 15.

1838. *T. nodulicornis* Zetterstedt; Ins. Lapponica, Dipt., p. 841.

1848. *T. glomerata* Walker; List Dipt. Brit. Mus., 1:70.

Figs.—Alexander, Rept. Can. Arctic Exped., 1913-18, III, C (Dipt.), figs. 10 (wing), 17 (antenna), 35 (hyp.), 40 (ovipositor); pl. 6 (ad. ♀); 1919.

General coloration, including abdomen of ♀ bluish gray; abdomen of ♂ with tergites more reddish yellow, trivittate with darker. Praescutal interspaces with brown punctures. Wings with cell *R* clear except for spot at origin of *Rs*. Male hypopygium with inner dististyle a narrow arcuate rod, its apex simple. ♂. L. 15-17 mm.; w. 17-18 mm. ♀. L. 21-23 mm.; w. 18-19 mm.

Arctic portions of Eurasia and North America. (Arctic-Alpine).

**T.** (*Vestiplex*) **balioptera** Lw. (Fig. 27, A).

1863. *Tipula balioptera* Loew; Berlin. Ent. Zeitschr., 7:284.

Figs.—Alexander, Cfs. N. Y., 1, pl. 46, fig. 227 (wing), pl. 50, fig. 279, pl. 54, fig. 337 (hyp.); 1919. Dickinson, Cfs. Wisc., p. 234, fig. 146 (wing), p. 249, fig. 187 (hyp.); 1932.

Readily told by the median spine of tergal saucer (Fig. 27, A). Abdominal tergites brownish yellow, with a conspicuous median brown stripe. ♂. L. 14-15 mm.; w. 14-16.5 mm. ♀ L. 20-22 mm.; w. 16-17 mm.

(Late June, July; Sept., Oct.) Subarctic North America. Ont., Que., Me., westw. to Wisc. and Alta. (Hudsonian).

**T.** (*Vestiplex*) **canadensis** Lw. (Fig. 27, B).

1864. *Tipula canadensis* Loew; Berlin. Ent. Zeitschr., 8:59.

Fig.—Alexander, Cfs. N. Y., 1, pl. 50, fig. 281, pl. 54, fig. 341 (hyp.); 1919.

Posterior border of tergal saucer of hypopygium (Fig. 27, B) with numerous pale setae on either side of midline. ♂. L. 13-16 mm.; w. 14-16.5 mm.

(June, July) Subarctic North America, southw. to Ont., Que., Labr., westw. to Alta. (Hudsonian).

**T.** (*Vestiplex*) **caroliniana** Alex.

1916. *Tipula caroliniana* Alexander; Can. Ent., 48:46-48.

Fig.—Alexander, Cfs. N. Y., 1, pl. 50, fig. 286 (hyp.); 1919.

Characters much as in *longiventris*, readily told by the more elongate male antennae, with the pedicels approximately three times as long as the basal enlargement. ♂. L. 18-19 mm.; w. 19-21 mm.

N. C. (Transition).

**T. (*Vestiplex*) *centralis* Lw.**

1864. *Tipula centralis* Loew; Berlin. Ent. Zeitschr., 8: 60.

Figs.—Alexander, Cfs. N. Y., 1, pl. 50, fig. 280, pl. 54, fig. 339, (hyp.); 1919.

Antennae with basal three flagellar segments indistinctly bicolored, the remainder uniformly dark brown. Abdomen orange; a

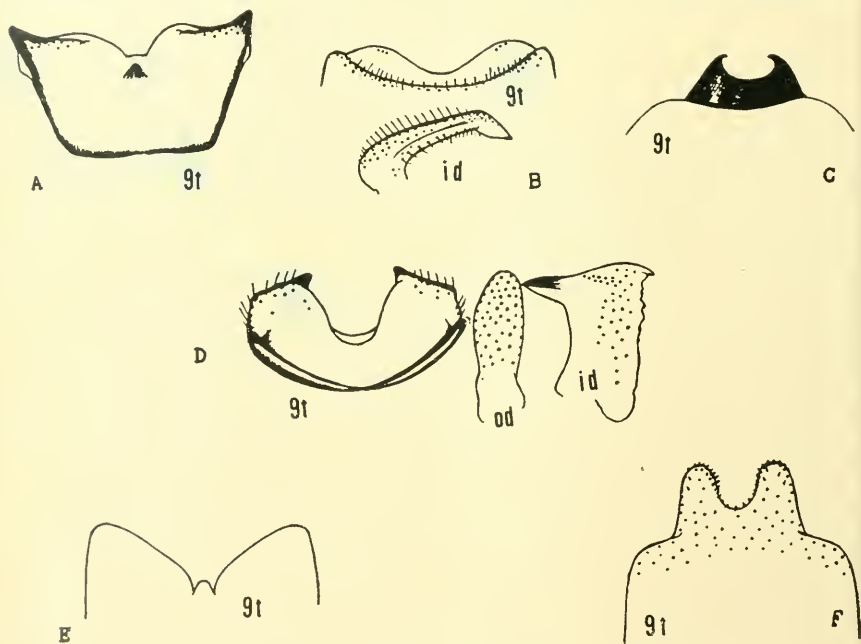


FIGURE 27. *Tipula* (*Vestiplex*, *Arctotipula*), male hypopygia.

- A. *T. (V.) balioptera* Lw.; 9t, dorsal. D. *T. (V.) fultonensis* Alex.; details.  
 B. *T. (V.) canadensis* Lw.; 9t, id. E. *T. (A.) besselsi* O.S.; 9t.  
 C. *T. (V.) perretti* Alex.; 9t. F. *T. (A.) dickinsoni* Alex.; 9t.

Symbols: *id*, inner dististyle; *od*, outer dististyle; *t*, tergite.

dorso-median stripe on tergites one to nine, interrupted by pale caudal borders, broader on segments seven to nine and here including most of segments. Male hypopygium with tergite a small black saucer. Outer dististyle relatively large, pale, dilated outwardly, the outer angles distinct to appear somewhat like the blade of an axe. ♀. L. 17 mm.; w. 17.5 mm.

Subarctic North America: Hudson Bay Region; Que., N. H. (Alpine summits). (Hudsonian).



**T. (*Vestiplex*) *fultonensis* Alex. (Fig. 27, D).**1918. *Tipula fultonensis* Alexander; Can. Ent., 50:67.1920. *T. hinei* Alexander; Ohio Journ. Sci., 20:200.

Male hypopygium with notch of tergite (Fig. 27, D. *9t*) broadly U-shaped. Outer dististyle, *od*, relatively small, narrowed beyond midlength, the apex obtuse. Inner dististyle, *id*, unusually broad, the posterior edge irregularly serrulate. ♂. L. 16-17 mm.; w. 17.5-19 mm. ♀. L. 21-22 mm.; w. 17-19 mm.

(June-Aug.) Subarctic North America, southw. to Ont., Que., N. B., Me., N. H., Vt., and N. Y., westw. to Alaska. (Hudsonian, Canadian).

**T. (*Vestiplex*) *longiventris* Lw.**1863. *Tipula longiventris* Loew; Berlin. Ent. Zeitschr., 7:278.

Figs.—Alexander, Cfls. N. Y., 1, pl. 46, fig. 229 (wing), pl. 50, fig. 285 (hyp.); 1919. Dickinson, Cfls. Wisc., p. 234, fig. 147 (wing), p. 249, fig. 182 (hyp.); 1932.

Most readily told by the structure of the male hypopygium and the unusual length of the abdomen in the female. ♂. L. 15-17 mm.; w. 18-20 mm. ♀. L. 30-35 mm.; w. 20-21 mm.; abdomen alone 26-30 mm.

(Late May-early July) Ont., Me., N. H., Vt., Mass., R. I., N. Y., N. J., Pa., westw. to Mich., Ill., Wisc., southw. to S. C. and Tex. (Canadian, Transition).

Connecticut. — Hamden, June 14, 1916 (H. L.); Manitic Lake, June 8-9, 1929 (C. P. A.); Montville, June 12, 1929 (W. E. B.); Riverton, June 12, 1931 (C. P. A.); Rowayton, June 16, 1909 (C. W. J.); Stamford, June 17, 1929, June 1, 1930 (B. T. R. L.); Storrs, May 1928, 1929; Tolland, June 23, 1932 (N. T.); Tunxis State Park, June 12, 1931 (C. P. A.).

**T. (*Vestiplex*) *perretti* Alex. (Fig. 27, C).**1928. *Tipula perretti* Alexander; Can. Ent., 60:98-99.

Antennae with flagellar segments indistinctly bicolorous, dark brown, the basal enlargements black. Abdomen bright orange, the basal six tergites narrowly trivittate with brownish black. Male hypopygium with the tergite (Fig. 27, C) appearing as a thin flattened plate that represents the usual cephalic border of the tergal saucer, the caudal margin of this plate with a broad U-shaped notch, the lateral angles decurved into triangular points. ♂. L. 13.5 mm.; w. 14.3 mm.

(July) Subarctic North America: Lab. (Hudsonian).

**T. (*Vestiplex*) *platymera* Wk.**1856. *Tipula platymera* Walker; Ins. Saundersiana, 1, Dipt.:441.1863. *T. tessellata* Loew; Berlin. Ent. Zeitschr., 7:277-278; ♀.1863. *T. septentrionalis* Loew; *Ibid.*, 7:278; ♂.1915. *T. labradorica* Alexander; Insec. Inscit. Menst., 3:128.

Figs.—Alexander, Cfls. N. Y., 1, pl. 46, fig. 228 (wing, ♀), pl. 50, fig. 283, pl. 54, fig. 338 (hyp.); 1919.

Wing-pattern of female much more tessellated and contrasted than in male. Male hypopygium much as in *fultonensis*, but cephalic



border of tergal saucer high and elevated, more or less notched medially. Inner dististyle even broader, the outer caudal angle strongly produced. ♂. L. 15-17 mm.; w. 16-19 mm. ♀. L. 23-25 mm.; w. 18-20 mm.

(June, July) Arctic and Subarctic North America, southw. to mts. of Ont., Que., N. B., N. H., Vt. and N. Y. (Hudsonian, Canadian).

**T. (*Vestiplex*) *serrulata* Lw.**

1864. *Tipula serrulata* Loew; Berlin. Ent. Zeitschr., 8: 58.

Still known only from the unique type female but apparently representing a species distinct from either *balioptera* or *canadensis*, the near allies. ♀. L. 25 mm.; w. 20.5 mm.

Subarctic North America: Hudson Bay Region. (Hudsonian).

**Subgenus *Arctotipula* Alexander**

1933. *Arctotipula* Alexander; Philippine Journ. Sci., 52: 410-411.

Distinguished from *Vestiplex* chiefly by the long, pale body vestiture, the unusually glabrous nature of the wing-veins, and the structure of the ovipositor, the cerci being abruptly narrower than the remainder of abdomen, pale and without serrations.

Nasus present or lacking. Squama naked. Male hypopygium with tergite and sternite separate. *Tipula dickinsoni* is referred here with some doubt.

*Key to Species*

1. Wings tinged with brown, stigma relatively inconspicuous; *m-cu* uniting with  $M_{3+4}$  at or before midlength; male hypopygium with tergite produced into a median lobe (Fig. 27, F).....**dickinsoni**
- Wings subhyaline, the stigma dark brown, conspicuous; *m-cu* uniting with  $M_4$  just beyond base; male hypopygium (unknown in *piliceps*) with tergite notched medially (Fig. 27, E); Arctic and Subarctic species..... 2
2. Coloration of praescutum blue-gray, with four darker, in cases nearly black, stripes, the intermediate pair tending to be confluent; a median vitta on vertex; median stripe on abdominal tergites broad; female with eighth tergite not conspicuously expanded; cerci small.....**besselsi**
- Coloration of praescutum dull light gray, with four light brown stripes; median vitta on vertex indistinct; median stripe on abdominal tergites narrow; female with eighth tergite flattened and expanded; cerci long, pale.....**piliceps**

***Tipula* (*Arctotipula*) *besselsi* O. S. (Fig. 27, E).**

1876. *Tipula besselsi* Osten Sacken; Proc. Boston Soc. Nat. Hist., 19: 42.

Antennae black throughout. Nasus lacking. Coloration of body blue-gray; lateral borders of abdominal tergites paler. Conspicuous erect pale setae on head, thoracic interspaces, sternopleurite and all coxae. Ninth tergite (Fig. 27, E): sketch of type by Nathan Banks. ♂. L. 11-12 mm.; w. 13-14 mm.; antenna, about 4-4.2 mm.

(July) Arctic North America, Greenland to Alaska.

**T.** (*Arctotipula*) **dickinsoni** Alex. (Fig. 27, F).

1932. *Tipula dickinsoni* Alexander; Bull. Publ. Mus. Milwaukee, 8: 240-242.

Figs.—*Ibid.*, p. 251, figs. 197 (wing, hyp.), by Dickinson.

Nasus elongate. Antennal flagellum with basal segments bicolorous, black, the basal enlargements dull yellow, the outer segments uniformly blackened. General coloration of notum brown; praescutum with darker brown stripes, the lateral pair more or less obsolete; pleura and coxae blue-gray. Vestiture of body relatively short and inconspicuous, lacking on sternopleurite. Hypopygium with tergite (Fig. 27, F). ♂. L. 12-13 mm.; w. 12.5-13 mm.; antenna, 4.5-4.8 mm. ♀. L. 13-13.5 mm.; w. 11-11.5 mm.

(Late May) Mich., in grass-sedge-cattail marshes; Wis., in tamarack bog. (Canadian).

**T.** (*Arctotipula*) **piliceps** Alex.

1915. *Tipula piliceps* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1915: 482-484.

Fig.—Alexander, *Ibid.*, pl. 21, fig. 85 (ovipos.).

The essential characters are given in the key. ♀. L. 14.5 mm.; w. 16 mm.

Subarctic North America.

#### Subgenus **Yamatotipula** Matsumura

1916. *Yamatotipula* Matsumura; Thousand Ins. Japan. Add. 2: 461-462.

*Rs* long, nearly if not quite twice *m-cu*, in extreme cases even longer; *m-cu* usually close to base of cell 1st  $M_2$ ,  $M_{3+4}$  being short to very short; second section of  $M_{1+2}$  and basal section of  $M_3$  often parallel to one another but the latter usually shortened by the length and obliquity of *m*. Squama naked; outer branches of *M* with macrotrichia. Tibial spur-formula 1-1-2 or 1-2-2; claws (♂) toothed. Male hypopygium strongly compressed, the tergite and sternite fused into a continuous ring; median region of tergite produced caudad into a simple or bifid depressed lobe, the apical margin of which is set with small blackened spines. Gonapophyses usually appearing as pale spatulate blades; a single or double tuft of yellow setae jutting from the notch of the ninth sternite.

Includes all members of the so-called "Vittatae" (the *tricolor* or *lateralis* group), having the wings striped longitudinally with brown and white. A few species are included that have the wings clear or nearly so and with *m-cu* slightly more distad in position (*tephrocephala*), such forms apparently being consubgeneric. The most aberrant species is *iroquois*, which has the tergite rather distinctly separated from the sternite. *Tipula dickinsoni* has a depressed tergal lobe that is very suggestive of members of this subgenus, but from other characters is referred to another subgenus (*Arctotipula*).

## Key to Species

1. Wings longitudinally striped with brown and whitish, the pattern tending to become obsolete or dilute in certain species; a dark seam on veins *Cu* and *m-cu* (*Vittatae*) ..... 2  
 Wings unmarked except for the stigmal darkening and a yellowish to brown costal border, or else (*iroquois*) with the apex of wing irregularly darkened; no dark seam on veins *Cu* and *m-cu*..... 17
2. Antennae with the scape and pedicel darkened, the flagellum uniformly light yellow throughout ..... **manahatta** 3  
 Antennae with the flagellum not uniformly yellow..... 3
3. Wings with at least the outer portion of cell *R*<sub>5</sub> white, the area nearly if not quite continuous with the pale central area in cell *M*..... 4  
 Wings with the cells beyond cord, including *R*<sub>5</sub>, darkened; (in some *fraterna*, the outer end of cell *R*<sub>5</sub> is pale but the area is isolated by dark color beyond cord) ..... 12
4. Antennae with outer flagellar segments uniformly dark brown, the more basal ones yellowish brown..... 5  
 Antennae with the flagellar segments bicolorous, yellow, the bases darkened ..... 6
5. Size large (wing, ♂, over 20 mm.); wing-pattern heavily contrasted; cell *R* chiefly dark brown, cell *M* abruptly pale; stigma yellowish; male hypopygium with median tergal lobe narrow, subtended on either side by lateral claws (Fig. 28, M) ..... **noveboracensis**  
 Size smaller (wing, ♂, 16 mm. or less); wing-pattern pale and diffuse, cells *R* and *M* chiefly pale; stigma brown; male hypopygium with median tergal lobe broad, without lateral armature ..... **vicina**
6. Wings with bases of cells *M*<sub>1</sub> and 2nd *M*<sub>2</sub> pale; cell *R* immediately before origin of *R*<sub>s</sub> not conspicuously pale, this color being confined to outer end of cell ..... 7  
 Wings with cells *M*<sub>1</sub> and 2nd *M*<sub>2</sub> uniformly darkened; cell *R* with invasion of pale coloration before origin of *R*<sub>s</sub>..... 10
7. Abdomen ochre-yellow, without lateral brown stripes; cell 1st *M*<sub>2</sub> entirely pale ..... **conspicua**  
 Abdomen with conspicuous brown sublateral stripes on tergites; cell 1st *M*<sub>2</sub> with outer half or more darkened ..... 8
8. Antennae (♂) short, if bent backward not attaining wing-root; basal half of cell *M* or nearly so dark brown ..... **caloptera**  
 Antennae (♂) longer, if bent backward extending to mid-distance between roots of wings and halteres; cell *M* with only the basal fourth or fifth darkened ..... 9
9. Wing-pattern pale and diffuse, not strongly contrasting; vein 2nd *A* not or only weakly bordered by brown ..... **strepsis**  
 Wing-pattern strongly contrasted; vein 2nd *A*, except at base, margined with brown ..... **calopteroides**
10. Wings with the dark and light pattern contrasted, the white coloration in cell *R* more extensive, reaching vein *R* or nearly so before the origin of *R*<sub>s</sub>, the dark costal border thus with its posterior margin appearing bisinuate ..... **furca**  
 Wings with the dark pattern more diffuse and less contrasted, not so conspicuously invading cell *R* before origin of *R*<sub>s</sub> and the dark costal stripe not appearing bisinuate ..... 11
11. Cell 1st *M*<sub>2</sub> entirely clear, the pale area in cells *R* and *M* thus continued uninterrupted to wing-tip; male hypopygium with apex of median lobe of tergite convexly rounded ..... **eluta**  
 Cell 1st *M*<sub>2</sub> with more than apical half darkened, separating the pale area in cell *M* from that in cell *R*<sub>5</sub>; male hypopygium with apex of median lobe of tergite gently concave (Fig. 28, D) ..... **concava**
12. Wings with a conspicuous whitish crossband at cord, reaching the posterior margin of wing in cells *M*<sub>3</sub> and *M*<sub>4</sub> ..... **fraterna**  
 Wings with the whitish crossband at cord less extensive, extending through cell 1st *M*<sub>2</sub> or only slightly beyond..... 13

13. Thoracic pleura with a transverse dark brown stripe involving the cephalic portions of the anepisternum and sternopleurite.....**subeluta**  
Thoracic pleura unmarked ..... 14
14. Wings very poorly marked with whitish, the pale areas in cell *M* and at the cord ill-defined to almost obsolete; veins brown, contrasting with the ground-color; male hypopygium with the tergal lobe at apex shallowly bifid (Fig. 28, K) .....**kennicotti**  
Wings with central portion of disk conspicuously brightened; veins yellow; male hypopygium with the tergal lobe obtuse, entire..... 15
15. Abdominal tergites with dark sublateral stripes .....**vitrea**  
Abdominal tergites without stripes ..... 16
16. Coloration of thorax and abdomen reddish brown, the terminal abdominal segments scarcely darkened; male hypopygium without a pencil of setae on either side of median lobe of tergite .....**sackeniana**  
Coloration more grayish, praescutal stripes brownish gray; outer abdominal segments extensively infuscated; male hypopygium with a pencil of long setae on either side of median lobe of tergite .....**tricolor**
17. Antennae with basal enlargements of flagellar segments light yellow, the remainder dark brown or black .....**tephrocephala**  
Antennae with the flagellum uniformly darkened, or, if bicolorous, the basal enlargements of the individual segments dark, the remainder paler..... 18
18. Costal border of wings dark brown, the color involving the cephalic border of cell *R* and all of cells *R*<sub>1</sub> and *Sc*<sub>2</sub>.....**sayi**  
Costal border of wings only moderately if at all darkened, the coloration yellowish to brownish yellow, including cells *C* and *Sc* but not passing caudad beyond level of vein *R*..... 19
19. Wing-apex darkened .....**iroquois**  
Wing-apex clear ..... 20
20. Antennal flagellum bicolorous; size large (wing, ♂, over 16 mm.)..... 21  
Antennal flagellum uniformly blackened; size smaller (wing, ♂, under 14 mm.) ..... 22
21. Stigma brown, conspicuously darker than the yellowish costal border; veins dark brown, conspicuous; male hypopygium with the tergite dark, terminating in two slender yellow finger-like lobes (Fig. 28, C).....**cayuga**  
Stigma pale brownish yellow, concolorous with the costal border; veins pale, yellowish or brownish yellow, inconspicuous against the ground; male hypopygium with the tergite terminating in an obtuse median black lobe (Fig. 28, J) .....**jacobus**
22. Abdomen gray, the tergites more brownish medially; antennae black throughout ..... 23  
Abdomen brownish yellow to obscure orange, at least basally; antennae with basal segments yellowish ..... 24
23. Male hypopygium with caudal margin of tergite bearing four lobes, there being two parallel submedian ones between the lateral divergent pair (Fig. 28, A) .....**aprilina**  
Male hypopygium with caudal margin of tergite bearing two divergent lobes, usually with a low rounded tubercle between (Fig. 28, E).....**dejecta**
24. Scutellum and postnotum gray, concolorous with the thoracic pleura; male hypopygium with caudal margin of tergite with three low lobes, the laterals fully as high as the very broad median lobe (Fig. 28, H)....**grenfelli**  
Scutellum and postnotum, including pleurotergite, light sulphur-yellow, contrasting abruptly with the light gray pleura; male hypopygium with caudal margin of tergite terminating in two submedian lobes (Fig. 28, O) .....**sulphurea**

**Tipula** (*Yamatotipula*) **aprilina** Alex. (Fig. 28, A).

1918. *Tipula aprilina* Alexander; Can. Ent., 50: 63-64.

Male hypopygium with tergite (Fig. 28, A) large, reddish brown; lateral lobes blackened, with microscopic tubercles; submedian lobes



slightly longer, more pointed, directed slightly ventrad. ♂. L. 9-11 mm.; w. 10-11.5 mm. ♀. L. 12-13 mm.; w. 11 mm.

(Apr., May) Mass., southw. to Va., N. C. and S. C. (Transition, Austral).

Connecticut.—Branford, May 12, 1933 (M. P. Z.); Storrs, April 1932, May 23, 1929 (J. A. M.).

**T. (*Yamatotipula*) *caloptera* Lw. (Fig. 28, B).**

1863. *Tipula caloptera* Loew; Berlin. Ent. Zeitschr., 7: 292.

Figs.—Alexander, Cfls. N. Y., 1, pl. 45, fig. 214 (wing); 1919. Dickinson, Cfls. Wisc., p. 228, fig. 131 (wing); 1932.

Praescutal stripes narrowly but conspicuously bordered by dark brown. Vein *2nd A* seamed with brown. Male hypopygium with median lobe of tergite (Fig. 28, B) very broad, obtuse, not subtended by lobes or hair-pencils. ♂. L. 18-22 mm.; w. 22-26 mm. ♀. L. 25-26 mm.; w. 26-28 mm.

(June-Aug.) Ont., Que., N. B., N. S., Me., N. H., Vt., Mass., R. I., N. Y., N. J., Pa., westw. to Wisc. and Mo., southw. to n. Fla. and Tenn.

Connecticut.—Cornwall Bridge, June 12, 1931 (M. M. A.); East River, June 12 (Ely); Kent Falls, June 12-13, 1931, July 23-24, 1931, Aug. 19, 1931 (C. P. A.); Sharon, Sept. 5, 1928 (G. C. C.); Stamford, July 17, 1929 (B. T. R. L.); Storrs, 1929 (C. S. C.).

**T. (*Yamatotipula*) *calopteroides* Alex.**

1919. *Tipula calopteroides* Alexander; Can. Ent., 51: 168-169.

1921. *T. antiopa* Dietz; Trans. Amer. Ent. Soc., 47: 266-267.

Close to *strepsens* and possibly only a darker southern race of same, distinguished by the larger size and more intense pattern of the wings, which are almost as dark in color as in *caloptera*. ♂. L. 17-17.5 mm.; w. 21-22 mm. ♀. L. about 25 mm.; w. 25-25.5 mm.

(May, June) Pa., southw. to N. C. and S. C.

**T. (*Yamatotipula*) *cayuga* Alex. (Fig. 28, C).**

1915. *Tipula cayuga* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1915: 485-487.

Figs.—Alexander, *Ibid.*, pl. 16, fig. 10 (wing), pl. 19, fig. 49, pl. 20, fig. 63 (hyp.). Alexander, Cfls. N. Y., 1, pl. 46, fig. 222 (wing), pl. 49, fig. 272, pl. 53, fig. 325 (hyp.); 1919.

Praescutum olive gray, the stripes reddish brown, bordered by dark brown. The structure of the hypopygium shows an obvious relationship to *tephrocephala*; ninth tergite (Fig. 28, C). ♂. L. 15-18 mm.; w. 16.5-18.5 mm. ♀. L. 23-24 mm.; w. 21-22 mm.

(Late May, June) Ont., N. B., N. S., Me., N. H., Vt., Mass., N. Y., westw. to Mich., southw. to Tenn.

Connecticut.—Cornwall Bridge, May 30, 1931, June 13, 1931 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.).



**T. (*Yamatotipula*) *concava* Alex. (Fig. 28, D).**1926. *Tipula concava* Alexander; Ent. News, 37: 294-295.

Male hypopygium, tergite (Fig. 28, D). ♂. L. 12.5-13 mm.; w. 12-13.5 mm.

(June-Aug.) Ct., westw. to Mich., Ind. and Mo., southw. to Tenn. (Transition).

Connecticut.—Cornwall Bridge, June 12, 1931 (C. P. A.); Winnipauk, June 16, 1909 (C. W. J.), recorded by Johnson (1925:36) as *eluta*.**T. (*Yamatotipula*) *conspicua* Dtz.**1917. *Tipula conspicua* Dietz; Ent. News, 28: 149-150.Figs.—Dietz, *Ibid.*, pl. 11, fig. 2 (wing, hyp.).

Male hypopygium with caudal margin of tergite extended into a cone, at base of which, on either side, with a small inconspicuous pencil of setae. ♂. L. 15.5 mm.; w. 17 mm.

(Sept.) N. C.

**T. (*Yamatotipula*) *dejecta* Wk. (Fig. 28, E).**1856. *Tipula dejecta* Walker; Ins. Saundersiana, 1, Dipt., p. 442.1901. *T. fumosa* Doane; Journ. N. Y. Ent. Soc., 9: 99-100.

Figs.—Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 12, figs. 64, 65 (hyp.); 1904. Alexander, Cfs. N. Y., 1, pl. 48, fig. 251 (wing), pl. 51, fig. 301 (hyp.); 1919.

General coloration gray, the pleura clear gray; praescutal stripes brown or grayish brown, narrowly bordered by darker. Wings weakly infused; stigma brown. Ninth tergite (Fig. 28, E): ventral face of each lobe with an acute blackened tooth. ♂. L. 8-10 mm.; w. 9.5-12 mm. ♀. L. 10-12 mm.; w. 8-12 mm.

(Apr.-June) Ont., Que., N. H., Mass., R. I., N. Y., N. J., Pa., westw. to Ind., Ill. and Mich., southw. to Md. and Va.

Connecticut.—N. Branford, May 12, 1933 (M. P. Z.); Riverton, May 17, 1931 (C. P. A.); Salisbury, May 16, 1931 (C. P. A.); Storrs, May, 1928, 1929 (C. S. C.); Tyler Lake, May 17, 1931 (C. P. A.); Westville, May 16, 1904 (W. E. B.).

**T. (*Yamatotipula*) *eluta* Lw.**1863. *Tipula eluta* Loew; Berlin. Ent. Zeitschr., 7: 290.

Fig.—Alexander, Cfs. N. Y., 1, pl. 45, fig. 217 (wing); 1919.

♂. L. 12-13 mm.; w. 12.5-13 mm. ♀. L. 14 mm.; w. 14-15 mm.

(July, Aug.) Ont., Que., N. B., N. H., Vt., Mass., N. Y., Pa., westw. to Ill., southw. to n. Fla. and Tenn.

Connecticut.—Branford, Aug. 24, 1904 (P. L. B.), Aug. 1905 (H. W. W.); Storrs, 1932 (C. S. C.). (Johnson's record for *eluta*, 1925:36, refers to *concava* Alex.).**T. (*Yamatotipula*) *fraterna* Lw. (Fig. 28, F).**1864. *Tipula fraterna* Loew; Berlin. Ent. Zeitschr., 8: 56.Antennae relatively long, bicolorous. Specimens sometimes occur that have the outer end of cell  $R_5$  whitish, this area widely separated from the pale band at cord by dark color in cells  $R_5$  to 2nd  $M_2$ .

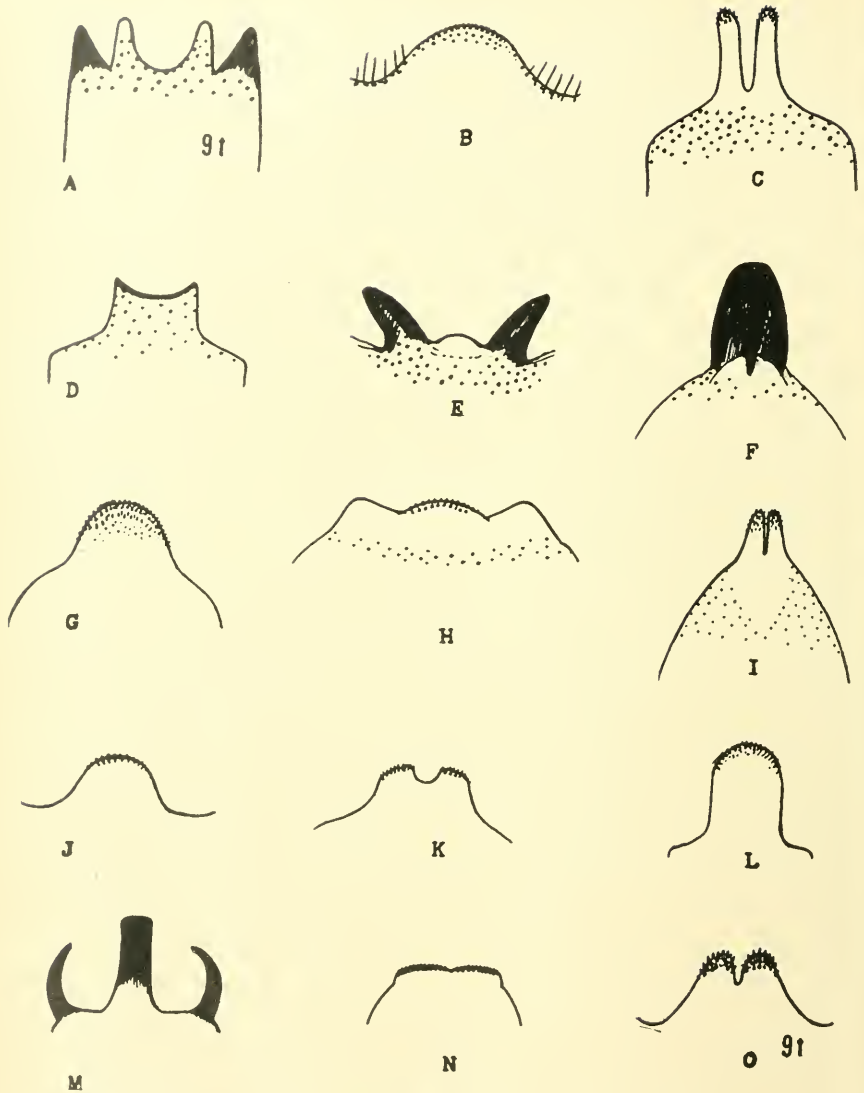


FIGURE 28. *Tipula* (*Yamatotipula*); male hypopygia, 9th tergite.

- |                                   |  |
|-----------------------------------|--|
| A. <i>T. (Y.) aprilina</i> Alex.  | I. <i>T. (Y.) iroquois</i> Alex.       |
| B. <i>T. (Y.) caloptera</i> Lw.   | J. <i>T. (Y.) jacobus</i> Alex.        |
| C. <i>T. (Y.) cayuga</i> Alex.    | K. <i>T. (Y.) kennicotti</i> Alex.     |
| D. <i>T. (Y.) concava</i> Alex.   | L. <i>T. (Y.) manahatta</i> Alex.      |
| E. <i>T. (Y.) dejecta</i> Walk.   | M. <i>T. (Y.) noveboracensis</i> Alex. |
| F. <i>T. (Y.) fraterna</i> Lw.    | N. <i>T. (Y.) sayi</i> Alex.           |
| G. <i>T. (Y.) furca</i> Walk.     | O. <i>T. (Y.) sulphurca</i> Doane.     |
| H. <i>T. (Y.) grenfelli</i> Alex. |  |

Symbol: *t*, tergite.

Male hypopygium with median lobe of tergite (Fig. 28, F) elongate, obtuse and subtruncate at apex. ♂. L. 14-15 mm.; w. 15-16 mm. ♀. L. 18-20 mm.; w. 17-17.5 mm.

(June-July) N. H., Ct., Pa., southw. to N. C., S. C., Ga. and n. Fla. (Transition, Austral).

Connecticut.—Cornwall Bridge, June 12, 1931 (C. P. A.); Farmington, June 29 (W. M.); Norwalk, July 9, 1916 (I. N. G.).

**T.** (*Yamatotipula*) **furca** Wk. (Fig. 28, G).

1848. *Tipula furca* Walker; List Dipt. Brit. Mus., 1:70.

1863. *T. bella* Loew; Berlin. Ent. Zeitschr., 7:291.

Figs.—Snodgrass, Journ. N. Y. Ent. Soc., 11, pl. 10, fig. 6 (ovipos.); 1903. Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 16, figs. 123-127 (hyp.); 1904. Alexander, Cfs. N. Y., 1, pl. 45, fig. 216 (wing), pl. 49, fig. 265 (hyp.); 1919. Dickinson, Cfs. Wisc., p. 228, fig. 130 (wing), p. 248, fig. 165 (hyp.); 1932.

Antennae (♂) relatively short, if bent backward about attaining wing-root. Cell 1st  $M_2$  entirely pale. Male hypopygium with tergal lobe (Fig. 28, G) relatively short and broad, obtuse, the margin with blackened spines. ♂. L. 13-14 mm.; w. 15-16 mm. ♀. L. 16-18 mm.; w. 16-18 mm.

(May-Sept.) Ont., Que., Me., N. H., Mass., R. I., N. Y., Pa., westw. to Wisc., Ia., Mo. and Kan., southw. to n. Fla., La. and Tex.

Connecticut.—Branford, Aug. 11, 1904 (H. L. V.), Aug. 24, 1904 (P. L. B.) May 12, 1933 (M. P. Z.); Farmington, May 16, 1933 (M. P. Z.); Kent Falls, May 17, 1931 (C. P. A.), Aug. 19, 1931 (C. P. A.); Middletown, May 26, 1929 (R. C. N.); Mt. Carmel, Aug. 27, 1904 (P. L. B.); New Haven, May 31, 1929 (R. B. F.), Oct. 19, 1913 (L. B. R.); Norfolk, June 9, 1929 (C. P. A.); Oxford, May 21, 1904 (W. E. B.); Riverton, June 8, 1929 (C. P. A.); Salisbury, Aug. 30, 1904 (W. E. B.); Storrs, May 17, 1920 (J. A. M.), May 22, 1929 (K. W.); Wallingford, Aug. 13, 1922 (S. W. B.); Windsor, June 19, 1905 (W. E. B.); Connecticut, without more accurate data, Norton, Loew's type of *bella*, Mus. Comp. Zool., No. 99.

**T.** (*Yamatotipula*) **grenfelli** Alex. (Fig. 28, H).

1928. *Tipula grenfelli* Alexander; Can. Ent., 60:96-97.

Antennae (♂) relatively long, if bent backward extending to beyond base of abdomen; flagellar segments feebly excised. Basal abdominal tergites orange, darker sublaterally. Male hypopygium with tergite (Fig. 28, H). ♂. L. 12.5-14 mm.; w. 13-13.8 mm.; antenna, about 5 mm.

(June-July) Lab. (Hudsonian).

**T.** (*Yamatotipula*) **iroquois** Alex. (Fig. 28, I).

1863. *Tipula cincta* Loew; Berlin. Ent. Zeitschr., 7:288 (preoccupied).

1915. *T. iroquois* Alexander; Insec. Inscit. Menst., 3:128.

Figs.—Alexander, Cfs. N. Y., 1, pl. 48, fig. 252 (wing), pl. 51, fig. 300, pl. 54, fig. 344 (hyp.); 1919.

Antennae uniformly blackened. Praescutum light gray, with four slightly darker gray stripes that are narrowly bordered by

brown. Abdomen dark brown, the posterior borders of tergites pale. Male hypopygium with tergite more evidently separated from sternite than usual in subgenus; outer dististyle long and slender, narrowed to a point. Tergite (Fig. 28, I) long, narrowed outwardly, terminating in two slender lobes that lie close together. ♂. L. 9-11 mm.; w. 11-13 mm. ♀. L. 12-14 mm.; w. 13-15 mm.

(May, June) Me., N. H., Mass., N. Y., N. J., Pa., Va., N. C. and Tenn. (Canadian, high Transition). Along rapidly flowing mountain streams with mossy boulders; larva presumably aquatic in moss.

Connecticut.—Kent Falls, May 17, 1931 (C. P. A.), May 30-31, 1931 (C. P. A.); Norfolk, June 9, 1929 (C. P. A.); Riverton, May 16, 1931 (C. P. A.), May 30, 1931 (C. P. A.); Winsted, May 16, 1931 (C. P. A.).

**T.** (*Yamatotipula*) **jacobus** Alex. (Figs. 22, A, B; 28, J).

1909. *Tipula perlongipes* Johnson: Proc. Boston Soc. Nat. Hist., 34: 131 (new name for *T. filipes* Walker, preoccupied, but based on mis-determination of latter).

1930. *T. jacobus* Alexander; Bull. Brooklyn Ent. Soc., 25: 277.

Figs.—Alexander, Cfs. N. Y., 1, pl. 46, fig. 223 (wing), pl. 49, fig. 268 (hyp.); 1919.

Praescutal stripes conspicuously bordered by brown. Pleura clear gray pruinose. Legs very long. Male hypopygium with tergal lobe (Fig. 28, J). ♂. L. 17-20 mm.; w. 17-21 mm.

(June, July) Mass., R. I., N. Y., N. J., Pa., southw. to n. Fla., Ga. and Tenn. (Transition, Austral).

Connecticut.—Union, June 24, 1932 (N. T.).

**T.** (*Yamatotipula*) **kennicotti** Alex. (Fig. 28, K).

1915. *Tipula kennicotti* Alexander: Proc. Acad. Nat. Sci. Philadelphia, 1915: 480-482.

1926. *T. parvemarginata* Alexander; Ent. News, 37: 295-297.

Figs.—Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1915, pl. 16, fig. 6 (wing), pl. 18, fig. 34, pl. 19, fig. 48 (hyp.); 1915. Alexander, Cfs. N. Y., 1, pl. 46, fig. 224 (wing), pl. 49, fig. 269, pl. 53, fig. 331 (hyp.); 1919.

Antennal flagellum dark brown, proximal ends of segments sometimes a little paler. Praescutal stripes margined with brown, including a persistent median vitta. Wing-pattern almost obsolete. Male hypopygium with tergal lobe (Fig. 28, K). ♂. L. 12-13 mm.; w. 12.5-14 mm. ♀. L. 14-15 mm.; w. 15-16 mm.

(June-Aug.) Man., Ind., Minn., Mich., westw. to N. Dak. and Alta.

**T.** (*Yamatotipula*) **manahatta** Alex. (Fig. 28, L).

1919. *Tipula manahatta* Alexander; Can. Ent., 51: 169-170.

Coloration reddish brown, pleura very faintly pruinose. Wings broad, rich reddish brown, centers of the cells paler, more grayish; cells beyond cord not or scarcely brightened; obliterative areas at cord restricted and interrupted. Abdomen without stripes. Male hypopygium with median tergal lobe (Fig. 28, L) relatively long, apex obtuse, simple. ♂. L. 15-16 mm.; w. 15-16 mm.

(Aug., Sept.) N. Y., southw. to Tenn. and n. Fla. (Austral).

**T.** (*Yamatotipula*) **noveboracensis** Alex. (Fig. 28, M).

1919. *Tipula noveboracensis* Alexander; Can. Ent., 51: 167-168.

Figs.—Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 16, figs. 128-131 (hyp., as *caloptera*); 1904. Alexander, Cfs. N. Y., 1, pl. 49, fig. 267 (hyp., as *caloptera*); 1919.

Antennae ( $\delta$ ) short, if bent backward ending some distance before wing-root. Wings long and narrow; cells *C* and *Sc* yellowish. Abdominal stripes conspicuous. Male hypopygium with tergite (Fig. 28, M).  $\delta$ . L. 18-22 mm.; w. 21-25 mm.  $\varphi$ . L. 25-27 mm.; w. 24-26 mm.

(May-Aug.) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., westw. to Mich., southw. to Md. (Canadian).

Connecticut.—Norfolk, May 31, 1931, June 9, 1929 (C. P. A.).

**T.** (*Yamatotipula*) **sackeniana** Alex.

1918. *Tipula sackeniana* Alexander; Can. Ent., 50: 62-63.

Close to *tricolor*, most readily distinguished by the lack of pencils of setae on the tergite of the male hypopygium. Antennae relatively long, bicolorous.  $\delta$ . L. 16.5-18 mm.; w. 15-16 mm.  $\varphi$ . L. 18-19 mm.; w. 17-17.5 mm.

(July-Sept.) Ct. and N. Y., southw. to Ga. and Tenn.

Connecticut.—Salisbury, Sept. 12, 1928 (C. P. A.); Sharon, Sept. 5, 1928 (G. C. C.).

**T.** (*Yamatotipula*) **sayi** Alex. (Fig. 28, N).

1823. *Tipula costalis* Say; Journ. Acad. Nat. Sci. Philadelphia, 3: 23 (preoccupied).

1911. *T. sayi* Alexander; Psyche, 18: 194.

Figs.—Alexander, Cfs. N. Y., 1, pl. 45, fig. 219 (wing), pl. 49, fig. 266 (hyp.); 1919. Dickinson, Cfs. Wisc., p. 229, fig. 135 (wing), p. 248, fig. 169 (hyp.); 1932.

Antennae strongly bicolored. Disk of praescutum, including interspaces, brown; lateral and cephalic borders broadly light gray. Male hypopygium with median lobe of tergite (Fig. 28, N) broad and low, truncate or barely bifid.  $\delta$ . L. 12-15 mm.; w. 11-17 mm.  $\varphi$ . L. 16-17 mm.; w. 16-17 mm.

(July-Oct.) Ont., Que., Me., N. H., Vt., Mass., R. I., N. Y., N. J., Pa., westw. to Mich., Wisc., Ia. and Ark., southw. to n. Fla. and La.

Connecticut.—Branford, Sept. 3, 1904 (H. L. V.); East River, Sept. 10 (Ely); Union, Aug. 17-18, 1928 (C. F. C.); Windsor, Aug. 6, 1929 (C. P. A.).

**T.** (*Yamatotipula*) **strepens** Lw.

1863. *Tipula strepens* Loew; Berlin. Ent. Zeitschr., 7: 291.

Figs.—Alexander, Cfs. N. Y., 1, pl. 45, fig. 215 (wing), pl. 49, fig. 264 (hyp.); 1919. Dickinson, Cfs. Wisc., p. 229, fig. 132 (wing), p. 248, fig. 166 (hyp.); 1932.

Antennal flagellum in cases only weakly bicolorous. Wing-pattern relatively pale and diffuse, without dark seam on vein *2nd A*.  $\delta$ . L. 14-16 mm.; w. 19-22 mm.  $\varphi$ . L. 19-20 mm.; w. 19-20 mm.



(May-July) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., N. J., Pa., westw. to Wisc., Mich. and Kan.

Connecticut.—Cornwall Bridge, June 12-13, 1931 (C. P. A.); Danbury, June 14, 1904 (C. W. J.); Hamden, June 2, 1928 (R. B. F.); New Haven, July 14, 1911 (A. B. C.); Manitic Lake, June 8-9, 1929 (C. P. A.); Stamford, May 20, 1929 (B. T. R. L.); Storrs, May 1929 (G. H. G.).

**T.** (*Yamatotipula*) **subeluta** Johns.

1913. *Tipula subeluta* Johnson; Bull. Amer. Mus. Nat. Hist., 32: 42-43.

Allied to *tricolor*. Antennae long, bicolorous. Wings with outer end of cell *M* darkened, separating the pale area in cell *M* from that at cord. Male hypopygium with tergal lobe relatively broad, its apex simple obtuse. ♂. L. 13-14 mm.; w. 15-16.5 mm. ♀. L. 16-18 mm.; w. 15.5-17 mm.

(Aug., Sept.) Mass. (Nantucket Isl.), southw. to Fla. (Austral).

**T.** (*Yamatotipula*) **sulphurea** Doane. (Fig. 28, O).

1901. *Tipula sulphurea* Doane; Journ. N. Y. Ent. Soc., 9: 99.

Figs.—Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 12, fig. 66 (hyp.); 1904. Alexander, Cfls. N. Y., 1, pl. 46, fig. 225 (wing), pl. 49, fig. 270 (hyp.); 1919. Dickinson, Cfls. Wisc., p. 236, fig. 154 (wing), p. 250, fig. 189 (hyp.); 1932.

Antennae (♂) elongate, if bent backward extending to opposite the 2nd abdominal segment. Sublateral dark abdominal stripes conspicuous. Male hypopygium with tergal lobe (Fig. 28, O). ♂. L. 12-13 mm.; w. 11-12 mm. ♀. L. 14-15 mm.; w. 12-13.5 mm.

(May-Aug.) Ont., Que., N. B., Me., Mass., R. I., N. Y., westw. to Ind., Mich., Wisc., Minn., Man., Sask. and Alta. (Canadian).

Connecticut.—Norfolk, June 9, 1929 (C. P. A.).

**T.** (*Yamatotipula*) **tephrocephala** Lw.

1864. *Tipula tephrocephala* Loew; Berlin. Ent. Zeitschr., 8: 62.

Figs.—Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 15, figs. 118, 120, 122 (hyp.); 1904. Alexander, Cfls. N. Y., 1, pl. 46, fig. 221 (wing), pl. 49, fig. 271 (hyp.); 1919. Dickinson, Cfls. Wisc., p. 236, fig. 153 (wing), p. 249, fig. 186 (hyp.); 1932.

Readily told from all other members of the subgenus by the pattern of the antennae. The only other regional species of this genus having such a reversal of normal pattern are *T. dickinsoni* and *T. flavibasis*, belonging to other subgeneric groups. Lobes of tergite almost as in *cayuga* but somewhat longer and more divergent. ♂. L. 14-18 mm.; w. 16-18.5 mm.

(May-early August) Ont., Que., N. B., N. S., Me., N. H., Vt., Mass., R. I., N. Y., Pa., westw. to Ind., Mich. and Wisc.

Connecticut.—Avon, June 14, 1929 (R. B. F.); Canaan, June 10, 1928 (R. B. F.); Danbury, June 15, 1909 (C. W. J.); East River, Aug. 1912 (Ely); Granby, June 8, 1929 (C. P. A.); Kent Falls, June 12-13, 1931 (C. P. A.); Montville, June 12, 1929 (R. B. F.); Putnam, June 15, 1933 (C. P. A.); Rowayton, June 16, 1910 (C. W. J.); Storrs, June 27, 1927 (C. C. G.), 1926, 1932 (R. C. N.), May 27, 1933; Tyler Lake, June 13, 1931 (C. P. A.).

**T. (*Yamatotipula*) *tricolor* Fabr. (Fig. 23, A).**1794. *Tipula tricolor* Fabricius: Ent. Syst., 4: 235.

Figs.—Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 15, figs. 119, 121 (hyp.); 1904. Alexander, Cfs. N. Y., 1, pl. 45, fig. 218 (wing), pl. 49, fig. 263 (hyp.); 1919. Dickinson, Cfs. Wisc., p. 229, fig. 133 (wing), p. 248, fig. 167 (hyp.); 1932.

Antennae strongly bicolorous. Male hypopygium with median lobe of tergite subtended by a pencil of long reddish setae that are nearly twice as long as the lobe itself. ♂. L. 17-18 mm.; w. 17-19 mm. ♀. L. 21-22 mm.; w. 17-20 mm.

(May-Sept.) Ont., Mass., N. Y., N. J., Pa., westw. to Ill., Wisc. and Ark., southw. to Fla., Ga., Ala. and Tenn.

Connecticut.—Chapinville, Aug. 27, 1904 (W. E. B.); East River, Aug. 24, 1910 (Ely); Hamden, June 2, 5, 6, 28, 1929 (R. B. F.); Middlebury, Aug. 10, 1928 (R. B. F.); New Haven, July 14, 1911 (A. B. C.); N. Haven, Aug. 2, 1905 (H. L. V.); Ridgefield, July 19, 1910; Storrs.

**T. (*Yamatotipula*) *vicina* Dtz.**1917. *Tipula vicina* Dietz: Ent. News, 28: 148-149.

Fig.—Dietz, *Ibid.*, pl. 11, fig. 2 (wing, hyp.).

Male hypopygium with median tergal lobe entire, broad, with indications of weak lateral shoulders. ♂. L. 11.5-13 mm.; w. 13-16 mm. ♀. L. 17-18 mm.; w. 15-16 mm.

(May-July) Ont., Que., N. B., Me., Vt., Mass., Ct., N. Y., Pa., Mich.

Connecticut.—Canaan, June 10, 1928 (R. B. F.); Cornwall Bridge, June 13, 1931 (M. M. A.); Hamden, June 2, 1928 (R. B. F.); Kent Falls, June 12-13, 1931 (C. P. A.); Norfolk, June 9, 1929 (C. P. A.); Norfolk, May 31, 1931 (C. P. A.); Storrs, 1932.

**T. (*Yamatotipula*) *vitrea* v. d. W.**1881. *Tipula vitrea* van der Wulp; Tijdschr. v. Ent., 24: 150.

Figs.—Van der Wulp, *Ibid.*, pl. 15, fig. 5 (wing). Dickinson, Cfs. Wisc., p. 229, fig. 134 (wing), p. 248, fig. 168 (hyp.); 1932.

The identity of this fly still remains in question. I am including it herewith chiefly on its supposed recognition by Dickinson, whose figure of its hypopygium is very suggestive of *kennicotti*. The fly seems to be closest to *tricolor*, and may prove to be identical.

(Oct.) Que., Wisc.

### Subgenus *Tipula* Linnaeus

1758. *Tipula* Linnaeus; Syst. Nat., Ed. 10: 585.

*Rs* of moderate length, about one-half longer than *m-cu* or less, the latter at or close to midlength of cell *1st M*<sub>2</sub>, closer to base in the *ultima* group. Tibial spur formula 1-2-2; claws (♂) with basal tooth. Squama and sternopleurite with or without setae. Male hypopygium with sternite and tergite fused into a continuous ring;

median region of tergite produced caudad into a depressed lobe (*oleracea* group) or notched medially (*ultima* group).

Close to *Yamatotipula* and possibly not separable therefrom. The former is maintained as a unit chiefly for convenience in handling species.

*Key to Species*

1. Squama with setae; *Sc* relatively long, *Sc*<sub>2</sub> ending in *R*<sub>1</sub> beyond three-fourths the length of *Rs*; *Rs* nearly straight, not arcuated, beyond origin running nearly parallel to *R*<sub>1</sub>; wings subhyaline, the costal border conspicuously darker; caudal margin of tergite of male hypopygium produced caudad into a median lobe (*oleracea* group)..... **paludosa** ?  
 Squama naked; *Sc* short, *Sc*<sub>2</sub> ending in *R*<sub>1</sub> opposite or just beyond midlength of *Rs*; *Rs* arcuated or diverging gradually from *R*<sub>1</sub>; wings without a dark costal border (except in *cunctans*); caudal margin of tergite of male hypopygium variously notched (*ultima* group)..... 2
2. Costal border of wing, including cells *C* and *Sc*, strongly infumed, conspicuously and abruptly darker than the pale brownish remainder of disk..... **cunctans**  
 Costal border of wing not conspicuously darker than the yellow or brownish yellow remainder of wing..... 3
3. Wings patterned with brown, including dark areas at both ends of stigma, in cell *M* and at outer end of vein *2nd A*; male hypopygium with tergite (Fig. 29, C) conspicuously notched medially, the wide lateral lobes set with blackened pegs ..... **ultima**  
 Wing-pattern obsolete or nearly so, in *tennessa* the dark cloud at end of vein *2nd A* sometimes present but small; male hypopygium with tergite not deeply notched, the apices of lobes not provided with a series of blackened pegs ..... 4
4. Wings with dark seam at end of vein *2nd A* sometimes evident; male hypopygium with apex of tergite gently notched (Fig. 29, B), the margins of lobes not blackened but each provided with a single black spine on ventral face, this directed ventrad ..... **tennessa**  
 Wings without dark areas; male hypopygium more conspicuously notched, the margins of the lobes narrowly blackened but smooth ..... **maritima**

**Tipula** (*Tipula*) **cunctans** Say. (Fig. 29, A).

1834. *Tipula cunctans* Say; Journ. Acad. Nat. Sci. Philadelphia, 3: 23.

1863. *T. casta* Loew; Berlin. Ent. Zeitschr., 7: 289; ♂.

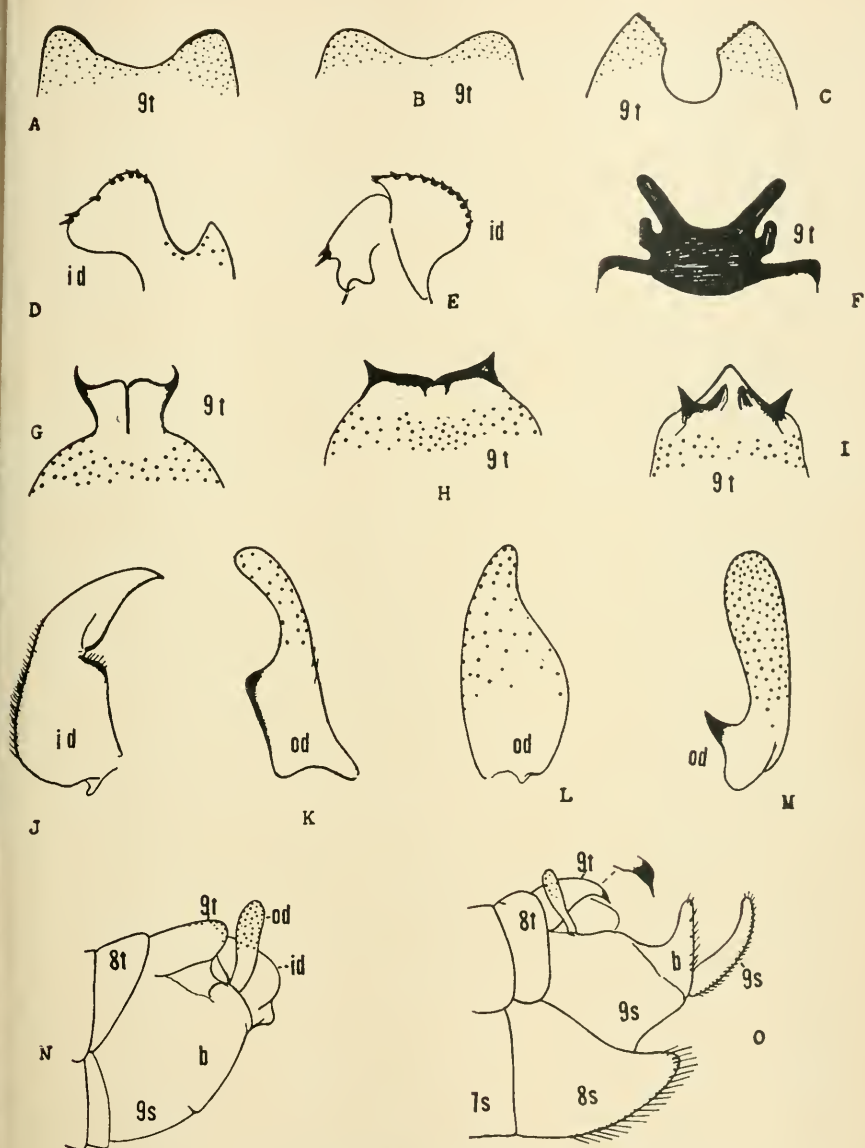
1863. *T. infuscata* Loew; *Ibid.*, 7: 289; ♀.

Figs.—Hyslop, U. S. Bur. Ent., Bull. 85, pt. 7, figs. 60, 61 (dets., ad. ♂, ♀); 1910. Alexander, Cfls. N. Y., 1, pl. 45, fig. 220 (wing); pl. 50, fig. 274, pl. 53, fig. 332 (hyp.); 1919. Dickinson, Cfls. Wisc., p. 230, fig. 136 (wing); p. 248, fig. 170 (hyp.); 1932.

Antennae with flagellum uniformly darkened or with basal segments weakly bicolored. Head and thorax gray, praescutal stripes slightly darker. Abdomen chiefly obscure yellow, the tergites with a median brown stripe. Hypopygium with tergite (Fig. 29, A); outer dististyle elongate; inner dististyle with an irregularly blackened comb on face. ♂. L. 11.5-14 mm.; w. 12-16 mm.; antenna, 3.5-4 mm. ♀. L. 15-17 mm.; w. 15-18 mm.

(Sept., Oct.) Ont., Que., N. B., Me., Mass., N. Y., N. J., Pa., westw. to Man., Ia., Kan. and Colo., southw. to Tenn., Ala. and Miss.

Connecticut.—New Haven, Oct. 16, 1903 (H. L. V.).

FIGURE 29. *Tipula* (*Tipula*, *Oreomyza*); male hypopygia.

- A. *T. (Tipula) cunctans* Say; 9t.  
 B. *T. (T.) tennesa* Alex. 9t.  
 C. *T. (T.) ultima* Alex.; 9t.  
 D. *T. (Schummeia) friendi* Alex.; id.  
 E. *T. (S.) hermannia* Alex.; id.  
 F. *T. (Oreomyza) borealis* Walk.; 9t.  
 G. *T. (O.) grata* Lw.; 9t.  
 H. *T. (O.) helderbergensis* Alex.; 9t.  
 I. *T. (O.) latipennis* Lw.; 9t.  
 J. *T. (O.) fragilis* Lw.; id.  
 K. *T. (O.) fragilis* Lw.; od.  
 L. *T. (O.) ignobilis* Lw.; od.  
 M. *T. (O.) nebulipennis* Alex.; od.  
 N. *T. (O.) insignifica* Alex.; hypopygium, lateral aspect.  
 O. *T. (O.) productella* Alex.; the same.

Symbols: *b*, basistyle; *id*, inner dististyle; *od*, outer dististyle; *s*, sternite; *t*, tergite.



**T. (*Tipula*) *maritima* Alex.**

1930. *Tipula maritima* Alexander; Occas. Pap. Boston Soc. Nat. Hist., 5: 276-277.

Antennae with flagellum bicolored, the enlargements black. Median notch of tergite narrower than in *cunctans*; outer dististyle small, expanded distally; flange on face of inner dististyle without a comb of teeth. ♂. L. 13-15 mm.; w. 14-17 mm.; antenna, about 4 mm.

(Oct.) Me., Mass. (Nantucket). (Austral).

**T. (*Tipula*) *tennessa* Alex. (Fig. 29, B).**

1920. *Tipula tennessa* Alexander; Can. Ent., 52: 226-227.

Antennal flagellum bicolored. Dark seam at end of vein 2nd A sometimes obsolete or virtually so, especially in Eastern specimens. Hypopygium with tergite (Fig. 29, B). ♂. L. 16-16.5 mm.; w. 18.5-19.5 mm.; antenna, about 4.5 mm. ♀. L. 19-21 mm.; w. 18-20 mm.

(Oct.) Mass., southw. to Tenn.

**T. (*Tipula*) *ultima* Alex. (Fig. 29, C).**

1805. *Tipula flavescens* Fabricius; Syst. Antl., p. 24 (preoccupied; *flavicans*, as written by later authors).

1915. *T. ultima* Alexander; Insec. Inscit. Menst., 3: 128.

Figs.—Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 14, fig. 108 (hyp.); 1904. Alexander, Cfls. N. Y., 1, pl. 47, fig. 232 (wing); pl. 50, fig. 273, pl. 53, fig. 333 (hyp.); 1919. Dickinson, Cfls. Wisc., p. 230, fig. 137 (wing); p. 248, fig. 171 (hyp.); 1932.

Antennal flagellum bicolorous. Head and thorax pinkish gray, praescutal stripes ill-defined. Wings strongly suffused with yellow or brownish yellow, sparsely patterned with brown; stigma clear light yellow in central portion. Median tergal abdominal stripe reddish brown, not conspicuous; hypopygium large; tergite (Fig. 29, C): a median chitinized furcula on ventral side of tergite near base of notch. ♂. L. 15-17 mm.; w. 16-19 mm. ♀. L. 17-25 mm.; w. 16-23 mm.

(Late Aug.-Oct.) Ont., Que., N. B., N. S., Me., N. H., Vt., Mass., R. I., N. Y., N. J., Pa., westw. to Sask., N. D. and Wyo., southw. to Tenn., Miss. and n. Fla.

Connecticut.—Branford, Oct. 1, 1929 (R. B. F.); E. Hartland, Sept. 1, 5, 11, 1928 (C. P. A.); New Haven, Oct. 16, 1903 (H. L. V.), Sept. 12, 1904 (B. H. W.); Norfolk, Sept. 11, 1928 (C. P. A.); Salisbury, Sept. 12, 1928 (C. P. A.); Stamford, Sept. 26, 1929, Sept. 18-Oct. 1, 1931 (B. T. R. L.); Storrs, 1929 (J. A. M.); Westville, Sept. 18, 1904 (W. E. B.); Windsor, Sept. 11, 1929 (J. A. M.).

**T. (*Tipula*) near *paludosa* Mg.**

1830. *Tipula paludosa* Meigen; Syst. Besch., 6: 289.

1930. *T. paludosa* Lackschewitz; Konowia, 9: 267-269, pl. 1, fig. 2 (hyp.)

A species very close to *paludosa* has been taken several times at and near St. Johns, Newfoundland. More material is needed before



the species can be definitely determined but it is unquestionably close to *paludosa* and *subeunctans* Alex. (*czizeki* de Jong). The latter occurs throughout Europe and northern Asia into northern Japan and may well be found to be even more widespread in the Holarctic Region. Since the species of the group are of considerable economic importance, the determination of the true status of the Newfoundland insect is much to be desired. What is undoubtedly this same species has been recorded from Cape Race, Newfoundland, by A. H. Swinton, of Totnes, England (Ent. News, 20:436; 1909), as *Tipula oleracca* Linnaeus.

### Subgenus *Schummelia* Edwards

1931. *Schummelia* Edwards; Ann. Mag. Nat. Hist. (10) 8:80-81.

*Rs* relatively short, subequal to the long *m-cu*; cell  $M_4$  deep and markedly wider at base than at margin; *m-cu* very oblique, usually placed near base of the small or medium-sized cell 1st  $M_2$ ;  $M_4$  in alignment with  $M_{3+4}$ ;  $Cu_1$  without a constriction or shirring at point of insertion of *m-cu*. Squama with setae; veins beyond cord with macrotrichia. Tibial spur formula 1-2-2. Male hypopygium with tergite and sternite separate, or (*hermannia*) fused on cephalic portion; in local species, median region of tergite produced into a compressed median blade, this more depressed in *T. idei*.

The antennae of males of the local species are elongate.

#### Key to Species

1. Wings immaculate, light yellow ( $\delta$ ) to strongly tinged with brown ( $\text{♀}$ ); *m* obliterated or very short, the outer end of cell 1st  $M_2$  strongly pointed  
annulicornis
- Wings grayish subhyaline, clouded with pale brown, including major areas before cord; *m* of normal length, the outer end of cell 1st  $M_2$  truncated... 2
2. Antennal flagellum uniformly dark brown or black; outer dististyle of hypopygium long and narrow ..... idei
- Antennal flagellum weakly to clearly bicolorous, the segments yellow to brownish yellow, the basal enlargements dark brown or black; outer dististyle of hypopygium broad and depressed ..... 3
3. Male hypopygium with median tergal blade small, subtended laterally by an acute spine; posterior appendage of inner dististyle with a blackened tooth-like lobe separated from the apex by a U-shaped notch (Fig. 29, D)  
friendi
- Male hypopygium with median tergal blade large and expanded, subtended laterally by a short spine; posterior appendage of inner dististyle bifid, the two parts separated only by a linear slit (Fig. 29, E) ..... hermannia

### *Tipula* (*Schummelia*) *annulicornis* Say.

1829. *Tipula annulicornis* Say; Journ. Acad. Nat. Sci. Philadelphia, 6:151 ( $\delta$ ).

1909. *T. jejuna* Johnson; Proc. Boston Soc. Nat. Hist., 34:132 ( $\text{♀}$ ).

Figs.—Alexander, Cfs. N. Y., 1, pl. 48, fig. 243 (wing), pl. 50, fig. 288, pl. 53, fig. 335 (hyp.); 1919.

Sexes strongly dimorphic in color. Antennae ( $\delta$ ) elongate, bicolorous, yellow, the basal enlargements of flagellar segments black; if bent backward extending to opposite or beyond two-thirds the

length of the abdomen. Thorax of male yellow, of female more reddish brown. Caudal margin of tergite of male hypopygium a compressed median blade. ♂. L. 8-9 mm.; w. 8-10 mm.; antenna, 6-6.5 mm. ♀. L. 10-11.5 mm.; w. 8-8.5 mm.

(July, Aug.) Mass., Ct., N. Y., N. J., westw. to Ind. and Mich., southw. to Md. and Tenn. (Transition).

Connecticut.—Bloomfield, Aug. 6, 1929 (C. P. A.); East River, July 23, 1911 (Ely).

**T.** (*Schummelia*) **friendi** Alex. (Fig. 29, D).

1941. *Tipula* (*Schummelia*) *friendi* Alexander: Amer. Mid. Nat., 26: 293—Figs. 6, 7 (hypopygium).

♂. L. about 11 mm.; w. 11 mm.

Characters almost as in *hermannia*, differing especially in the details of the male hypopygium.

Antennae shorter, the flagellar segments weakly bicolorous, brown, the basal enlargements blackened. Wings without dark cloud at midlength of vein *Cu*. Hypopygium with median blade of tergite smaller, subtended by long, slender spines, narrower and more distinct than in *hermannia*. Posterior appendage of inner dististyle (Fig. 29, D) with a blackened tooth-like projection separated from main body of appendage by a U-shaped notch. In *hermannia* (Fig. 29, E) the two lobules of the posterior appendage lie close together and are of very different conformation. Fleshy lobes of basistyle more oval, with more abundant setae that extend to bases of lobes; in *hermannia*, the lobes more flattened, with setae more restricted to outer half.

This interesting fly, named in honor of Dr. Roger B. Friend, is now known to range from Massachusetts southward to the higher mountains of North Carolina and Tennessee, being adult in June and July.

**T.** (*Schummelia*) **hermannia** Alex. (Fig. 29, E).

1863. *Tipula fasciata* Loew: Berlin. Ent. Zeitschr., 7: 279 (preoccupied).

1915. *T. hermannia* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1915: 480.

Figs.—Alexander, Cfls. N. Y., 1, pl. 45, fig. 211 (wing), pl. 50, fig. 287, pl. 54, fig. 343 (hyp.); 1919. Dickinson, Cfls. Wisc., p. 235, fig. 150 (wing); p. 249, fig. 184 (hyp.); 1932.

Praescutum light gray, with four darker gray stripes. Wings with an extensive dark cloud in ends of cells *R* and *M* and part of *M*<sub>4</sub> adjoining *m-cu*; petiole of cell *M*<sub>1</sub> seamed with brown. Male hypopygium enlarged; posterior lobe of inner dististyle (Fig. 29, E). ♂. L. 11-12 mm.; w. 10-11 mm.; antenna, 5-7 mm. ♀. L. 13-14 mm.; w. 12-13 mm.

(Late May-early Aug.) Ont., Que., Nfld., N. B., Me., N. H., Vt., Mass., N. Y., N. J., Pa., westw. to Wisc. and Kan., southw. to S. C., Ga., n. Fla. and Tenn. (Canadian, Transition).

Connecticut.—Granby, June 8, 1929 (C. P. A.); Kent Falls, July 23-24, 1931 (C. P. A.); Manitic Lake, June 8-9, 1929 (C. P. A.); Norwalk, May 21, 1930

(R. B. F.); Putnam, June 15, 1933 (C. P. A.); Saptree Run State Park, June 14, 1933 (C. P. A.); Stafford Springs, June 14, 1933 (C. P. A.); Tunxis State Park, June 12, 1931 (C. P. A.); Winnipauk, June 16, 1909 (C. W. J.).

**T.** (*Schummelia*) **idei** Alex.

1928. *Tipula idei* Alexander; Can. Ent., 60: 55.

Antennae more elongate than in *hermannia*. Male hypopygium with median lobe of tergite short, depressed or nearly so, glabrous. A small bifid pale lobe in notch of ninth sternite, not terminating in an elongate seta, as in *friendi* and *hermannia*.  $\delta$ . L. 10-11.5 mm.; w. 9.5-11 mm.; antenna, 7-8.5 mm.

(June, July) Ont., Que., southw. to higher mountains of N. H. (Presidential Range), and N. Y. (Adirondacks), westw. to B. C. (Hudsonian, high Canadian).

Subgenus **Oreomyza** Pokorny

1887. *Oreomyza* Pokorny; Wien. Ent. Zeitg., 6: 50.

*Rs* of moderate length; *m-cu* some distance beyond the fork of *M* except in the *fragilis* group. Squama naked; outer branches of *M* with macrotrichia. Tibial spur formula 1-2-2; claws ( $\delta$ ) simple, or, in all local species, with basal tooth. Male hypopygium with tergite and sternite distinct. Ovipositor with slender, smooth cerci.

Includes almost all members of the so-called "Marmoratae", having the wings variously clouded and spotted with brown or gray. Edwards has suggested that the name be re-instated and used to include those species with marmorate wings having the squama naked and claws of male simple. All of our local forms have toothed claws, at least on fore tarsi, and I am herewith modifying the above definition to include such species. In a few species,  $R_{1+2}$  is atrophied.

Key to Groups

1. Male hypopygium elongated, cylindrical, upturned at an angle to remainder of abdomen; ninth tergite long and narrow, its length exceeding twice the width, the apex variously armed with blackened decurved points that are not clearly visible from above; eighth sternite more or less deeply trilobed, the margins fringed with yellow setae. Lateral praescutal stripes margined anteriorly and laterally with dark brown, forming  $\Omega$ -shaped areas; median stripe bordered laterally with brown. *borealis* group
- Male hypopygium not elongated, from small to very large, not upturned, as above described; ninth tergite usually broader than long, the apex without blackened decurved points; eighth sternite with the actual margin entire or at most emarginate; in *trivittata* group sometimes with accessory lobes or brushes of setae. Praescutal stripes usually entire, when bordered with brown, the pattern not as described and the interspaces usually dotted with brown punctures and the median stripe further split by a capillary darker line ..... 2
2. Basal section of  $M_{3+4}$  short to very short, less than the basal section of  $M_{1+2}$ . *m-cu* thus joining *M* before level of *r-m*; *m-cu* less than twice *Rs*; wing-pattern very pale, gray, variegated by white areas; cell *Sc* uniformly darkened, contrasting with remainder of wing; stigma brown; no arcular darkening. Male hypopygium with eighth sternite simple or apex merely emarginate, without accessory lobes. *fragilis* group

Basal section of  $M_{3+4}$  usually longer, subequal to or longer than basal section of  $M_{1+2}$ ,  $m-cu$  joining  $M$  opposite or beyond level of  $r-m$ ; where above is questionable,  $Rs$  is more than twice  $m-cu$ ; wing-pattern usually heavy, variegated brown, gray and whitish, often with a dark area at arculus; cell  $Sc$  not darkened unless remainder of ground-color is likewise infumed. Male hypopygium with eighth sternite simple or variously provided with lobes or pencils of setae.....*trivittata* group

The *borealis* or *unca* group.

Antennae tending to be elongate. Male hypopygium with the inner dististyle very complex, its lowermost appendage forming a pale to sclerotized pendulous lobe that extends cephalad along the ventral surface of hypopygium. The species are most numerous in midsummer, being commonly found in mesophytic woodlands.

Key to Species

- 1. Antennae with at least the basal flagellar segments bicolorous, yellow, the enlargements dark ..... 2
- Antennae with flagellar segments uniform in color ..... 3
- 2. A narrow, interrupted dark stripe on dorsal thoracic pleura, extending from cervical sclerites to beneath the wing-root; male hypopygium with lower pendulous lobe of inner dististyle pale ..... **borealis**
- No darkened pleural stripe; male hypopygium with the pendulous lobe of inner dististyle strongly sclerotized, brownish black ..... **inclusa**
- 3. Antennae ( $\delta$ ) elongate, if bent backward extending about to midlength of second abdominal segment ..... 4
- Antennae shorter in both sexes, in  $\delta$ , if bent backward, extending about to base of halteres or shortly beyond ..... 5
- 4. Male hypopygium with eighth sternite deeply trilobed, fringed with long golden-yellow setae; gonapophyses relatively short and inconspicuous, not twisted, the tips decurved; ninth tergite not terminating in a median point (Fig. 29, H) ..... **helderbergensis**
- Male hypopygium with eighth sternite scarcely lobed, the setae shorter and inconspicuous; gonapophyses elongate, twisted on their own axes, jutting from genital chamber; ninth tergite projecting as a median point (Fig. 29, I) ..... **latipennis**
- 5. Wing-pattern subobsolete; size small (wing,  $\delta$ , under 12 mm.); male hypopygium with lower process of inner dististyle very long and membranous ..... **gaspensis**
- Wing-pattern distinct; size larger (wing,  $\delta$ , over 13 mm.); male hypopygium with the lower process of inner dististyle more or less sclerotized and blackened apically ..... 6
- 6. Antennal flagellum pale, yellowish brown; lower pendulous lobe of inner dististyle short, slender, claw-like ..... **grata**
- Antennal flagellum dark brown; lower pendulous lobe of inner dististyle broad, pale, the apex obtuse ..... **afflicta**

**Tipula (*Oreomyza*) afflicta** Dtz.

1914. *Tipula suspecta* Dietz; Trans. Amer. Ent. Soc., 40:351-352; (nec *suspecta* Loew, 1863).

1915. *T. afflicta* Dietz; Ent. News, 26:125.

Figs.—Dietz, Trans. Amer. Ent. Soc., 40, pl. 13, figs. 5, 6 (hyp.), pl. 14, fig. 2 (wing); 1914.

Male hypopygium with lower process of inner dististyle broad, the apex obtuse, somewhat sclerotized apically.  $\delta$ . L. 13 mm.; w. 13.5 mm.



(July) N. Y. Still known from the unique type.

**T. (*Oreomyza*) *borealis* Wk.** (Fig. 29, F).

1848. *Tipula borealis* Walker; List Dipt. Brit. Mus., 1: 66.

1863. *T. hebes* Loew; Berlin. Ent. Zeitschr., 7: 285.

Figs.—Dietz, Trans. Amer. Ent. Soc., 40, pl. 13, fig. 1 (hyp.); 1914. Alexander, Cfs. N. Y., 1, pl. 48, fig. 249 (wing); 1919. Dickinson, Cfs. Wisc., p. 233, fig. 142 (wing), p. 249, fig. 177 (hyp.); 1932.

Antennae ( $\delta$ ) elongate, if bent backward extending to beyond base of abdomen. Male hypopygium with apex of tergite truncate, with four blackened deurved points, the lateral pair shorter (Fig. 29, F).  $\delta$ . L. 13-15 mm.; w. 14-16 mm.; antenna, 6-6.5 mm.  $\eta$ . L. 16-17 mm.; w. 15-16 mm.

(June-Sept.) Ont., Que., N. B., N. S., Me., N. H., Vt., Mass., N. Y., N. J., Pa., westw. to Wisc. and Kan., southw. to S. C. and Tenn.

Connecticut.—Bloomfield, Aug. 6, 1929 (C. P. A.); Branford, Aug. 1905 (H. W. W.); E. Haddam, Aug. 25, 1929 (R. B. F.); East River, Aug. 15, 1911 (Ely); Hamden, July 31, 1928 (R. B. F.); Middlebury, Aug. 10, 1928 (R. B. F.); Stony Creek, Aug. 12, 1904 (P. L. B.); Storrs; Tyler Lake, July 23, 1931 (C. P. A.); Connecticut, without more accurate data, Norton, Loew's type of *hebes*.

**T. (*Oreomyza*) *gaspensis* Alex.**

1929. *Tipula gaspensis* Alexander; Can. Ent., 61: 233-234.

Ventral sternopleurite darkened. Male hypopygium with caudal margin of sternite not conspicuously emarginate. Abdomen with a conspicuous median brown stripe on both tergites and sternites.  $\delta$ . L. 9-10 mm.; w. 10.5-11.5 mm.; antenna, 4-4.5 mm.  $\eta$ . L. 13-13.5 mm.; w. 11.5 mm.

(June-July) Que.

**T. (*Oreomyza*) *grata* Lw.** (Fig. 29, G).

1863. *Tipula grata* Loew; Berlin. Ent. Zeitschr., 7: 281.

Fig.—Alexander, Cfs. N. Y., 1, pl. 51, fig. 292 (hyp.); 1919.

Two or three dusky areas on dorsal thoracic pleura. Male hypopygium with eighth sternite conspicuously trilobed, the setae short but dense. Ninth tergite with apex (Fig. 29, G) a flattened plate, the outer lateral angles appearing as curved acute horns.  $\delta$ . L. 12 mm.; w. 13.5-14 mm.; antenna, about 4 mm.  $\eta$ . L. 14-15 mm.; w. 14 mm.

(June-Aug.) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., westw. to Ind., Mich., Minn. and Alta.

Connecticut.—Kent Falls, June 12-13, 1931 (M. M. A.).

**T. (*Oreomyza*) *helderbergensis* Alex.** (Fig. 29, H).

1918. *Tipula helderbergensis* Alexander; Can. Ent., 50: 64-65.

Mesonotal praescutum with an elongate dark triangle at cephalic portion of each intermediate stripe. Abdomen chiefly dark brown. Male hypopygium with caudal border of tergite blackened, extended



into lateral points (Fig. 29, H). ♂. L. 12-13 mm.; w. 13-14 mm.; antenna, about 6 mm. ♀. L. 14.5 mm.; w. 14.5 mm.

(July, Aug.) Ont., N. B., N. Y., westw. to Mich.

**T. (*Orcomyza*) *inclusa* Dtz.**

1921. *Tipula inclusa* Dietz; Trans. Amer. Ent. Soc., 47: 267-268.

Lateral processes of inner dististyle of male hypopygium with all branches strongly sclerotized. ♂. L. 13 mm.; w. 14 mm.

(July, Aug.) Pa.

**T. (*Orcomyza*) *latipennis* Lw. (Fig. 29, I).**

1848. ? *Tipula resurgens* Walker; List Dipt. Brit. Mus., 1: 67.

1864. *T. latipennis* Loew; Berlin. Ent. Zeitschr., 8: 60.

1914. *T. ottawaensis* Dietz; Trans. Amer. Ent. Soc., 40: 349-351.

Figs.—Dietz, *Ibid.*, pl. 13, figs. 2-4 (hyp.), pl. 14, fig. 1 (wing). Alexander, Cfs. N. Y., 1, pl. 51, fig. 293 (hyp.); 1919. Dickinson, Cfs. Wisc., p. 233, fig. 143 (wing), p. 249, fig. 178 (hyp.); 1932.

Dark borders of intermediate praescutal stripe broad, restricting the stripe itself to a narrow vitta. Male hypopygium with upper process of inner dististyle expanded, more or less adz-shaped; ninth tergite, apex (Fig. 29, I). ♂. L. 13-14 mm.; w. 14-15 mm.; antenna, about 7 mm. ♀. L. 17-18 mm.; w. 16-17 mm.

(Late June-Aug.) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., N. J., westw. to Wisc., Man. and Alta.

The *fragilis* or *marmorata* group.

Antennae of moderate length; scape and pedicel yellow; flagellum uniformly brownish black or black, not or scarcely bicolored. General coloration gray, the praescutum with four entire brown stripes. Wings with cephalic margin of cell 1st  $M_2$  (second section of  $M_{1+2}$ ) often arched, narrowing cell  $R_5$ . Male hypopygium small; eighth sternite often modified.

A small group of chiefly autumnal craneflies. Of the local species, three (*nebulipennis*, *phoroctenia*, *productella*) have the eighth sternite modified; two (*fragilis*, *nebulipennis*) have the outer dististyle blackened and dilated at base.

Key to Species

1. Radial cells beyond cord not brightened; dark pattern of wings obsolete or nearly so ..... **insignifica**  
Bases of cell  $R_2$  and usually also of  $R_3$  brightened by whitish; dark pattern of wing evident ..... 2
2. Size very small (wing, ♂, less than 9.5 mm.); cell *Sc* and outer half of cell *C* darkened ..... **perparvula**  
Size larger (wing, ♂, 10.5 mm. or more); cell *Sc* darkened (except in *ignobilis*), cell *C* clear ..... 3
3. Male hypopygium with basistyle produced caudad into a slender lobe (Fig. 29, O) ..... **productella**  
Basistyle not produced ..... 4

4. Male hypopygium with eighth sternite of normal size, simple, the caudal margin not emarginate, provided with an apical group of setae..... 5  
 Male hypopygium with the eighth sternite enlarged, the apex more or less emarginate, its apical margin or lateral lobes provided with spines (*phoroc-tenia*) or strongly developed setae (*nebulipennis*) ..... 7
5. Ninth tergite of male hypopygium margined with blackened spines; lateral ends not produced into decurved points ..... *packardi*  
 Ninth tergite with margin smooth, or (*fragilis*) with a few scattered spines near outer end of the decurved lateral lobes ..... 6
6. Praescutal stripes ending at level of pseudosutural foveae; intermediate pair usually blunt at cephalic ends; terminal abdominal segments not conspicuously darkened; male hypopygium with outer dististyle expanded and blackened on basal portion (Fig. 29, K) ..... *fragilis*  
 Intermediate praescutal stripes extending about to anterior end of sclerite, the cephalic ends of the stripes bifid; terminal abdominal segments chiefly blackish; male hypopygium with outer dististyle a simple pale flattened blade (Fig. 29, L) ..... *ignobilis*
7. Male hypopygium with the eighth sternite strongly projecting, shovel-like; posterior margin shallowly notched and armed with a comb-like row of blackened spines; outer dististyle entirely pale ..... *phoroc-tenia*  
 Male hypopygium with the eighth sternite slightly projecting, the posterior margin with a broad, shallow, U-shaped notch, the emargination with short whitish hairs, the lobes with longer setae; outer dististyle with a blackened acute tooth at base (Fig. 29, M) ..... *nebulipennis*

**Tipula** (*Oreomyza*) **fragilis** Lw. (Figs. 29, J, K).

1863. *Tipula fragilis* Loew; Berlin. Ent. Zeitschr., 7: 279.

1863. *T. suspecta* Loew; *Ibid.*, 7: 280.

Figs.—Alexander, Cfs. N. Y., 1, pl. 48, fig. 250 (wing), pl. 51, fig. 297 (hyp.); 1919.

Tips of femora narrowly blackened. Male hypopygium with eighth sternite unmodified. Ninth tergite notched, lateral angles acute, decurved and set with a few spinous points. Outer dististyle (Fig. 29, K). Inner dististyle (Fig. 29, J) with apical point slender.  $\delta$ . L. 10-11 mm.; w. 12-13 mm.  $\text{♀}$ . L. 13-14 mm.; w. 13-14 mm.

(Sept., Oct.) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., westw. to Ind. and Alta., southw. to D. C.

Connecticut.—Norfolk, Sept. 11, 1928 (C. P. A.).

**T.** (*Oreomyza*) **ignobilis** Lw. (Fig. 29, L).

1863. *Tipula ignobilis* Loew; Berlin. Ent. Zeitschr., 7: 280.

Fig.—Alexander, Cfs. N. Y., 1, pl. 51, fig. 298 (hyp.); 1919.

Much as in *fragilis*, differing especially in hypopygial characters. Ninth tergite emarginate, the lobes short and obtuse, without spines. Outer dististyle (Fig. 29, L) broadly expanded basally but entirely pale.  $\delta$ . L. 9-10 mm.; w. 10.5-12 mm.  $\text{♀}$ . L. 12 mm.; w. 13 mm.

(June-early Aug.) N. B., Me., N. H., N. Y., westw. to Ill., southw. to S. C. and Tenn.

Connecticut.—Colebrook, Aug. 10 (W. M. W.); Portland, June 24, 1932 (N. T.).

**T.** (*Oreomyza*) **insignifica** Alex. (Fig. 29, N).

1924. *Tipula insignifica* Alexander; Occas. Pap. Boston Soc. Nat. Hist., 5: 117-118.

The usual dark and whitish wing-pattern characteristic of the group almost obsolete. Male hypopygium (Fig. 29, N) simple; tergite with a V-shaped median notch, lateral lobes obliquely truncated, unarmed. Outer dististyle simple, subcylindrical to slightly flattened, of nearly equal width throughout. Eighth sternite simple and unarmed. ♂. L. about 9 mm.; w. 11.8 mm.

(Aug., Sept.) Me. (Katahdin), N. H., alpine summits of Mt. Washington and Mt. Madison, White Mountains, 5000-5500 ft. (Hudsonian).

**T. (*Oreomyza*) *nebulipennis* Alex.** (Fig. 29, M).

1919. *Tipula nebulipennis* Alexander; Can. Ent., 51: 170-171.

Intermediate praescutal stripes nearly confluent in front. Outer abdominal segments darkened; hypopygium relatively large. Tergite with blackened spinous setae. ♂. L. 11-13 mm.; w. 11-13 mm. ♀. L. 13-14 mm.; w. 13-13.5 mm.

(Late June-early Aug.) Lab.; E. Que.; N. H., higher altitudes of Mt. Washington, 4700-5000 ft. (Hudsonian).

**T. (*Oreomyza*) *packardi* Alex.**

1928. *Tipula packardi* Alexander; Can. Ent., 60: 99-100.

Male hypopygium with outer dististyle relatively slender, pale throughout; inner dististyle compressed, arcuate, the lower apical angle produced into an acute black spine. ♂. L. 13-13.5 mm.; w. 12.5-13.2 mm.

(Aug.) Lab. (Hudsonian).

**T. (*Oreomyza*) *perparvula* Alex.**

1926. *Tipula perparvula* Alexander; Insec. Inscit. Menst., 14: 120-122.

Median praescutal stripe sometimes entire, sometimes weakly divided by a pale vitta. Abdomen blackened subterminally. Male hypopygium with outer dististyle narrow and entirely pale. ♂. L. 7.8-8 mm.; w. 9.3 mm.

(June) Man. (Canadian).

**T. (*Oreomyza*) *phoroctenia* Alex.**

1919. *Tipula phoroctenia* Alexander; Can. Ent., 51: 170.

Male hypopygium with ninth sternite emarginate, from base of notch with a stout reddish rod that is weakly and unequally bifid. Tergite with a V-shaped notch, the margin narrowly blackened, the lateral angles extended into slender blackened points. ♂. L. 13 mm.; w. 14 mm.

(Oct.) Me., westw. to B. C. (Canadian).

**T. (*Oreomyza*) *productella* Alex.** (Fig. 29, O).

1928. *Tipula productella* Alexander; Can. Ent., 60: 100-101.

Readily told from all other regional species by the caudally produced basistyle (Fig. 29, O). Lateral tergal lobes appearing as de-curved black points. Outer dististyle narrow, entirely pale, with

relatively few setae. An elongate yellow lobe arises from ninth sternite. Eighth sternite large, deeply emarginate, the lobes clothed with long yellow setae.  $\delta$ . L. about 10 mm.; w. 12.3 mm.

(Sept.) Lab. (Hudsonian).

The *trivittata* group.

Key to Species

- |   |                     |
|---|---------------------|
| 1. Tip of $R_{1+2}$ atrophied .....   | 2                   |
| $R_{1+2}$ entire .....  | 4                   |
| 2. Wings with basal fourth nearly clear, without well-defined clouds; $R_s$ and $R_3$ subequal in length; male hypopygium with basistyle produced into an acute spine .....   | <b>penobscot</b>    |
| Wings with clouds in cells $R$ and $M$ basad of origin of $R_s$ and in bases of Anal cells; $R_s$ relatively long, exceeding $R_3$ ; male hypopygium with the basistyle simple (not known to me for <i>subfasciata</i> ) .....  | 3                   |
| 3. Flagellum uniformly darkened; cell 1st $M_2$ long, subequal in length to cell $M_1$ ; praescutum with three brown stripes .....  | <b>subfasciata</b>  |
| Flagellum weakly bicolorous, dark brown, the basal enlargements of the segments brownish black; cell 1st $M_2$ shorter than cell $M_1$ ; praescutum with four brown stripes, the intermediate pair divided by a pale vitta .....  | <b>decora</b>       |
| 4. Nasus lacking .....  | 5                   |
| Nasus present .....   | 6                   |
| 5. Abdominal tergites with a dark median stripe; male hypopygium with a small median depressed bispinous plate on caudal margin of eighth sternite (Fig. 30, K) .....   | <b>serta</b>        |
| Abdominal tergites with the median stripe lacking or subobsolete; male hypopygium with a short finger-like lobe on either side of a median subquadrate fleshy plate (Fig. 30, L) .....  | <b>neptun</b>       |
| 6. Bases of cells $R$ and $M$ beyond arculus clear; white band beyond cord short, extending only into base of cell $M_3$ ; ovipositor with cerci relatively short and pale, feebly sclerotized .....  | 7                   |
| Bases of cells $R$ and $M$ with a dark spot beyond arculus; white band beyond cord completely traversing wing or nearly so, attaining the posterior margin in cell $M_3$ (exceptions in <i>stylifera</i> and <i>ternaria</i> ); ovipositor with cerci long and slender, heavily sclerotized and blackened ..... | 8                   |
| 7. Abdominal tergites pale brown, without dark stripes; male hypopygium with median plate of eighth sternite with two lateral spines on either side (Fig. 30, F); ovipositor with cerci broad .....   | <b>senega</b>       |
| Abdominal tergites obscure orange, trivittate with dark brown, the median vitta broad; male hypopygium with median plate of eighth sternite with a single lateral spine on either side (Fig. 30, D); ovipositor with cerci narrowed and subacute on apical half .....   | <b>illinoiensis</b> |
| 8. Antennae entirely darkened; pale area beyond cord of wing confined to radial field; abdominal tergites beyond the second conspicuously ringed caudally with yellow .....   | <b>ternaria</b>     |
| Antennae with at least the basal two or three segments pale; crossband beyond cord traversing the wing or virtually so; outer abdominal tergites not ringed caudally with yellow .....  | 9                   |
| 9. Antennal flagellum uniformly brownish black or black .....   | 10                  |
| Antennal flagellum distinctly bicolorous .....  | 12                  |
| 10. All femora with a subterminal yellow ring, preceded and followed by a broad black annulus; abdominal tergites with a conspicuous median black stripe; praescutal interspaces without brown dots; male hypopygium with eighth sternite provided with two long hair tufts .....                               | <b>margarita</b>    |
| All femora yellowish or brownish yellow; abdominal tergites not conspicuously trivittate with black; praescutal interspaces with abundant brown setigerous punctures; male hypopygium with eighth sternite unarmed....  | 11                  |



- 11. Male hypopygium with the notch of the ninth tergite V-shaped, the lateral margin with small denticles (Fig. 30, B); posterior margin of inner dististyle at base with an acute spine.....entomophthorae
- Male hypopygium with the notch of the ninth tergite transversely U-shaped, shallow, without lateral denticles (Fig. 30, M); posterior margin of inner dististyle not spinous .....trivittata
- 12. Male hypopygium with basistyle produced dorsad into a long slender process  
 styliifera  
 Male hypopygium with basistyle simple, not produced ..... 13
- 13. Praescutal interspaces with brown setigerous punctures.....entomophthorae  
 Praescutal interspaces not dotted with brown ..... 14
- 14. A dark spot in cell C opposite midlength of Rs; white band before cord extending unbroken from veins R to Cu; male hypopygium with tergite deeply notched medially, the lateral angles produced caudad into long acute points (Fig. 30, C) .....huron  
 No distinct dark spot in cell C near outer end; white band before cord more or less interrupted by a dark clouding in posterior portion of cell R adjoining vein M, restricting the band to isolated areas in cell M and at midlength of Rs; male hypopygium with caudal border of tergite truncate, with a small quadrate median notch, at base of which is a small denticle (Fig. 30, A) ..... 15
- 15. Pale crossband beyond cord incomplete, extending about to midlength of cell M<sub>3</sub>; antennal flagellum clearly bicolorous, light yellow, the basal enlargements black .....huntsmaniana  
 Pale crossband beyond cord complete, attaining the wing-margin in cell M<sub>3</sub>; antennal flagellum indistinctly bicolorous, brownish yellow to brown, the basal enlargements still darker, brownish black to black .....angulata

**Tipula (*Oreomyza*) angulata** Lw. (Fig. 30, A).

1864. *Tipula angulata* Loew; Berlin. Ent. Zeitschr., 8: 61.

Figs.—Alexander, Cfls. N. Y., 1, pl. 51, fig. 291; pl. 54, fig. 340 (hyp.); 1919. Dickinson, Cfls. Wisc., p. 231, fig. 138 (wing), p. 248, fig. 172 (hyp.); 1932.

Antennae relatively long, if bent backward extending to beyond base of abdomen; in cases, the antennal flagellum is so dark that the bicolorous nature is almost lost. Centers of praescutal stripes restrictedly pale. Tergite of hypopygium (Fig. 30, A). ♂. L. 12-15 mm.; w. 12.5-17.5 mm.; antenna, 5.5-6 mm. ♀. L. 14-15 mm.; w. 15-16 mm.

(June, July) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., westw. to Ill. and Wisc. (Canadian).

Connecticut.—Canaan, June 10, 1928 (R. B. F.); Riverton, June 12, 1931 (C. P. A.).

Compare notes on *decora* and *huntsmaniana*, below.

**T. (*Oreomyza*) decora** Doane.

1901. *Tipula decora* Doane; Journ. N. Y. Ent. Soc., 9: 125.

In all respects other than the atrophied R<sub>1+2</sub> almost exactly like *angulata* and the validity is very doubtful. ♂. L. 12 mm.; w. 14 mm.

(June) Que., N. Y. (Canadian).

**T. (*Oreomyza*) entomophthorae** Alex. (Fig. 30, B).

1918. *Tipula entomophthorae* Alexander; Can. Ent., 50: 385-386.

1921. *T. similissima* Dietz; Trans. Amer. Ent. Soc., 47: 263-264.



Fig.—Dickinson, Cfls. Wisc., p. 249, fig. 176 (hyp.); 1932.

Antennae ( $\delta$ ) short, if bent backward scarcely reaching the wing-root; in cases, antennal flagellum weakly bicolorous. Femora brown or yellowish brown, the tips not darkened. Abdominal tergal stripes very narrow and pale. Tergite of hypopygium (Fig. 30, B).  $\delta$ . L. 15-16 mm.; w. 15-16 mm.; antenna, 4.3-4.5 mm.  $\eta$ . L. 21-22 mm.; w. 17-18 mm.

(June-Aug.) Ont., Que., Lab., Me., N. H., Vt., N. Y., Pa., westw. to Ind., Mich., Wisc. and Alta., southw. to N. C. (Canadian).

Connecticut.—Kent Falls, June 12-13, 1931 (C. P. A.); Riverton, June 12, 1931 (C. P. A.).

**T. (*Oreomyza*) *huntsmaniana* Dtz.**

1920. *Tipula huntsmaniana* Dietz: Can. Ent., 52: 7-8.

Except for the more brightly colored antennal flagellum and slightly less complete pale band beyond the cord, the present fly is exceedingly close to *angulata*. Validity very doubtful.  $\delta$ . L. 13 mm.; w. 13.5 mm.

(June, early July) Ont., N. S. (Canadian).

**T. (*Oreomyza*) *huron* Alex. (Fig. 30, C).**

1918. *Tipula huron* Alexander; Can. Ent., 50: 66-67.

Fig.—Dickinson, Cfls. Wisc., p. 249, fig. 180 (hyp.); 1932.

Tergite of hypopygium (Fig. 30, C).  $\delta$ . L. 14 mm.; w. 15.5 mm.

(June) Wisc. (Canadian).

This may be the species reported from Wisconsin by Dickinson as *T. armata* Doane, a very different fly.

**T. (*Oreomyza*) *illinoiensis* Alex. (Fig. 30, D, I).**

1863. *Tipula versicolor* Loew; Berlin. Ent. Zeitschr., 7: 285 (preoccupied).

1915. *T. illinoiensis* Alexander; Insec. Inscit. Menst., 3: 128.

Closest to *senega*. Male hypopygium with tergite (Fig. 30, I) having lateral arms very short and broad; median lobe triangular, without oblique carinae. Eighth sternite (Fig. 30, D).  $\delta$ . L. 14-15 mm.; w. 15.5-17 mm.; antenna, about 5 mm.  $\eta$ . L. 13-19 mm.; w. 15-19 mm.

(Late May, June) Ont., N. H., westw. to Ill. and Man.

**T. (*Oreomyza*) *margarita* Alex. (Fig. 30, E).**

1918. *Tipula margarita* Alexander: Can. Ent., 50: 243-244.

Antennae very short, if bent backward extending to about two-thirds the distance to wing-root. Praesental median stripe divided by a pale vitta that is further divided by a dark capillary vitta. Sublateral dark lines on abdominal tergites narrow, the lateral margins broadly gray. In female, all three tergal stripes broad and entire,

black. Male hypopygium with the tergal lobes reddish, flattened, broadly obtuse, separated by a narrow U-shaped notch (Fig. 30, E). Hair-pencils of eighth sternite long, curved, decussate on the mid-line.  $\delta$ . L. 13-14 mm.; w. 14-14.5 mm.; antenna, about 3 mm.  $\text{♀}$ . L. 23-24 mm.; w. 18 mm.

(June) N. Y., Ohio. (Transition).

**T.** (*Oreomyza*) **penobscot** Alex. (Fig. 30, H).

1915. *Tipula penobscot* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1915: 472-474.

Figs.—Alexander, *Ibid.*, pl. 16, fig. 4 (wing), pl. 18, fig. 32, pl. 19, fig. 45 (hyp.). Alexander, Cfs. N. Y., 1, pl. 48, fig. 247 (wing), pl. 50, fig. 275, pl. 53, fig. 334 (hyp.); 1919.

Coloration gray; praescutal stripes relatively indistinct. Wings with cell *1st M*<sub>2</sub> short and wide, less than two-thirds the length of cell *M*<sub>1</sub>; dark spot at origin of *Rs* small. Tergite of hypopygium (Fig. 30, H).  $\delta$ . L. 9-11 mm.; w. 10.5-13 mm.; antenna, 3.5-4 mm.  $\text{♀}$ . L. 13-15 mm.; w. 13-15 mm.

(June, July) Ont., Que., N. B., Me., N. H., Mass., N. Y., Pa., westw. to Mich. and Alta. (Canadian).

Connecticut.—Norfolk, June 9, 1929 (C. P. A.).

**T.** (*Oreomyza*) **senega** Alex. (Figs. 30, F, G).

1863. *Tipula pallida* Loew; Berlin. Ent. Zeitschr., 7:284 (preoccupied).

1915. *T. senega* Alexander; Insec. Inscit. Menst., 3:128.

Figs.—Alexander, Cfs. N. Y., 1, pl. 45, fig. 213 (wing), pl. 50, fig. 278 (hyp.); 1919. Dickinson, Cfs. Wisc., p. 234, fig. 149 (wing), p. 250, fig. 188 (hyp.); 1932.

General coloration pale yellow; praescutum with four entire brown stripes. Flagellar segments ( $\delta$ ) strongly nodose, uniformly dark brown. Wing-pattern very pale. Male hypopygium with ninth tergite (Fig. 30, G); eighth sternite (Fig. 30, F). Ovipositor pale, the cerci broad, their tips subacute.  $\delta$ . L. 12-15 mm.; w. 14-17 mm.; antenna, 5-5.5 mm.  $\text{♀}$ . L. 12-13 mm.; w. 15-16 mm.

(May-July) Ont., Que., Me., N. H., Vt., Mass., R. I., N. Y., N. J., westw. to Wisc., Ia. and Alta.

Connecticut.—Hartland, June 9, 1929 (C. P. A.); Kent Falls, May 31, 1931 (C. P. A.), June 12-13, 1931 (C. P. A.); Riverton, May 30, 1931, June 12, 1931 (C. P. A.); Salisbury, June 10, 1928 (R. B. F.); Storrs, May 1929 (C. J. A.).

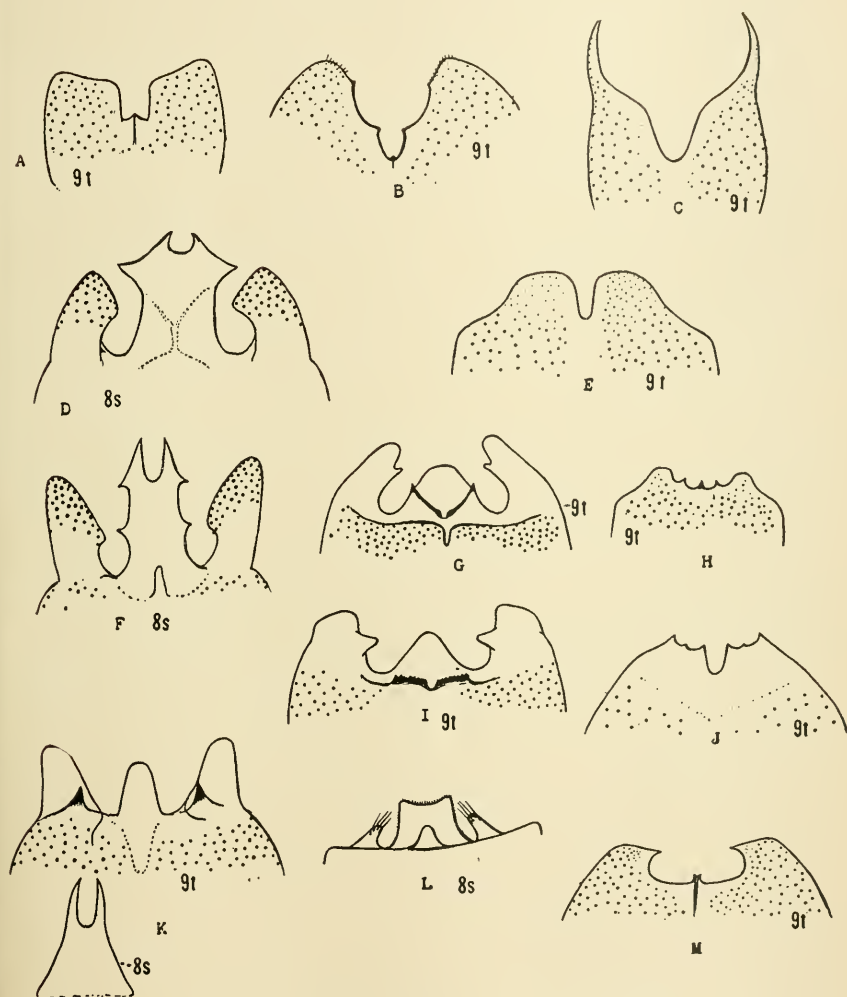
**T.** (*Oreomyza*) **serta** Lw. (Figs. 30, K).

1863. ? *Tipula discolor* Loew; Berlin. Ent. Zeitschr., 7:282 (preoccupied).

1863. *T. sertta* Loew; *Ibid.*, 7:283.

1901. *T. albonotata* Doane; Journ. N. Y. Ent. Soc., 9:120; Alexander, Can. Ent., 60:97; 1928.

1915. ? *T. ignota* Alexander; Insec. Inscit. Menst., 3:128 (new name for *discolor*).

FIGURE 30. *Tipula (Orcomyza)*; male hypopygia.

- |   |  |
|---|--|
| A. <i>T. (O.) angulata</i> Lw.; 9t.         | H. <i>T. (O.) pennsylvanica</i> Alex.; 9t. |
| B. <i>T. (O.) entomophthorae</i> Alex.; 9t. | I. <i>T. (O.) illinoensis</i> Alex.; 9t.   |
| C. <i>T. (O.) huron</i> Alex.; 9t.          | J. <i>T. (O.) ternaria</i> Lw.; 9t.        |
| D. <i>T. (O.) illinoensis</i> Alex.; 8s.    | K. <i>T. (O.) serte</i> Lw.; 8s, 9t.       |
| E. <i>T. (O.) margarita</i> Alex.; 9t.      | L. <i>T. (O.) neptun</i> Alex.; 8s.        |
| F. <i>T. (O.) senega</i> Alex.; 8s.         | M. <i>T. (O.) trivittata</i> Say; 9t.      |
| G. <i>T. (O.) senega</i> Alex.; 9t.         |  |

Symbols: s, sternite; t, tergite.

Figs.—Alexander, Cfls. N. Y., 1, pl. 50, fig. 277 (hyp.); 1919. Dickinson, Cfls. Wisc., p. 234, fig. 148 (wing), p. 249, fig. 183 (hyp.); 1932.

Antennae ( $\delta$ ) with flagellar segments strongly nodose, uniformly darkened. Praescutum with four stripes that are narrowly bordered with brown. Wings brown, with three major white areas, including an incomplete band beyond cord and isolated areas near outer end of cell *M* and before midlength of cells *Cu* and *1st A*. Median dark stripe on abdominal tergites rarely obsolete. Tergite of hypopygium (Fig. 30, K, *9t*); appendage of eighth sternite (Fig. 30, K, *8s*).  $\delta$ . L. 15-16 mm.; w. 14-16 mm.; antenna, 5-5.5 mm.  $\text{♀}$ . L. 18-23 mm.; w. 15-16 mm.

(Late May, June) Ont., Que., Lab., Me., N. H., Vt., Mass., R. I., N. Y., westw. to Minn., Wisc., Sask. and Alta.

Connecticut.—Portland, May 23, 1930 (M. P. Z.); Storrs, 1932 (C. S. C.); Unionville, June 10, 1904 (W. E. B.); Winsted, June 10, 1928 (R. B. F.).

*T. discolor* is here considered as being the same as *serta*. The wing-pattern of the unique female type is practically the same as in *serta* but the median praescutal stripe is entire.

**T. (*Oreomyza*) *stylifera* Dtz.**

1921. *Tipula stylifera* Dietz; Trans. Amer. Ent. Soc., 47: 264-265.

Praescutum with four grayish brown stripes that are narrowly margined with darker; interspaces with brown punctures. Pleura grayish white, variegated by pale brown areas. Femora dusky yellow, tips slightly darker. Pale crossband beyond cord extending to midlength of cell *M*<sub>3</sub>. Abdominal tergites yellow, without median dark stripe except on segment two; lateral borders whitish; a vague sublateral darkening.  $\delta$ . L. 14 mm.; w. 18 mm.

(June) Pa. Still known only from the unique type.

**T. (*Oreomyza*) *subfasciata* Lw.**

1863. *Tipula subfasciata* Loew; Berlin. Ent. Zeitschr., 7: 282.

Figs.—Alexander, Cfls. N. Y., 1, pl. 48, fig. 248 (wing); 1919. Dickinson, Cfls. Wisc., p. 232, fig. 140 (wing), p. 248, fig. 174 (hyp.); 1932.

Flagellar segments not excised. Head with median dark vitta. Legs yellowish brown, the individual segments undarkened. Wings narrow; *Rs* very long, nearly three times *m-cu*; petiole of cell *M*<sub>1</sub> short. The hypopygium as figured by Dickinson (possibly not correctly determined) is much as in *angulata* but median tergal notch without basal denticle.  $\delta$ . L. about 12 mm.; w. 15.5 mm.

Hudson's Bay Region; N. S., Wisc.

**T. (*Oreomyza*) *neptun* Alex. (Fig. 30, L).**

1921. *Tipula neptun* Dietz; Ent. News, 32: 300-301.

1928. *Tipula subserta* Alexander; Can. Ent., 60: 97.

Close to *serta*, differing most decisively in hypopygial characters. Abdominal tergites rich reddish brown, the median stripe lacking.

Eighth sternite (Fig. 30, L). ♂. L. 13-15 mm.; w. 14-15 mm.; antenna, 4.5-5 mm. ♀. L. 18 mm.; w. 13.5 mm.

(June, July) Que., Lab., Me. (Mt. Katahdin, summit), westw. to Colo., Wyo., Mont. and Alaska. (Hudsonian).

**T. (*Oreomyza*) *ternaria* Lw.** (Fig. 30, J).

1864. *Tipula ternaria* Loew; Berlin. Ent. Zeitschr., 8: 57.

Fig.—Alexander, Cfls. N. Y., 1, pl. 50, fig. 282 (hyp.); 1919.

Praescutal stripes dark gray, the median one margined and divided medially by capillary dark vittae. Femora reddish, the tips blackened. Male hypopygium large; tergite (Fig. 30, J) broad, narrowed outwardly, the caudal third reddish, depressed; lobes with three microscopic denticles. Eighth sternite with a small brush of yellow setae, widely separated by median area. ♂. L. 13-17.5 mm.; w. 13-15.5 mm. ♀. L. 24 mm.; w. 18 mm.

(June) Ont., Que., N. B., Me., N. H., westw. to Alta. (Hudsonian).

**T. (*Oreomyza*) *trivittata* Say.** (Fig. 30, M).

1823. *Tipula trivittata* Say; Journ. Acad. Nat. Sci. Philadelphia, 3: 26.

1856. *T. simulata* Walker; Ins. Saundersiana, 1, Dipt., p. 441; Alexander, Brooklyn Ent. Soc., 25: 277.

Figs.—Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 18, figs. 150-153 (hyp.); 1904. Greene, Ent. News, 20: 289, pl. 12 (ad. ♀); 1909. Alexander, Cfls. N. Y., 1, pl. 46, fig. 226 (wing), pl. 51, fig. 294 (hyp.); 1919. Dickinson, Cfls. Wisc., p. 231, fig. 139 (wing), p. 248, fig. 173 (hyp.); 1932.

Median praescutal stripe extensively pale in center. Femoral tips narrowly darkened. Abdominal tergites with three more or less distinct brown stripes, lateral margins gray. Tergite of hypopygium (Fig. 30, M). ♂. L. 14-18 mm.; w. 16-19 mm.; antenna, 4-4.5 mm. ♀. L. 20-22 mm.; w. 20-22 mm.

(May-Aug.) Ont., Que., Nfd., N. B., N. S., Me., N. H., Vt., Mass., N. Y., N. J., Pa., westw. to Wisc. and Ia., southw. to N. C., S. C. and Tenn.

Connecticut.—Branford, June 16, 1904 (H. L. V.); Granby, June 8, 1929 (C. P. A.); Hamden, April 23, 1924 (larva), emerged June 6, 1924 (J. L. R.), June 2, 1928 (R. B. F.); Kent Falls, May 31, 1931, June 12-13, 1931 (C. P. A.); Manic Lake, June 8-9, 1929 (C. P. A.); Middlebury, June 2, 1929 (W. E. B.); New Haven, May 27, 1929 (W. E. B.), June 18, 1933 (W. E. B.); Salem, June 12, 1929 (R. B. F.); Stamford, May 31, 1929 (B. T. R. L.); Stonington, June 7, 1906 (W. E. B.); Storrs, May 1928, 1929 (G. H. G.); Suffield, June 10, 1915 (B. H. W.); Union, June 24, 1932 (N. T.); Wading River, July 1, 1915 (G. P. E.); West Hartford, June 10, 1929 (R. B. F.); Westville, June 11, 1905 (W. E. B.).

### Subgenus *Lunatipula* Edwards

1931. *Lunatipula* Edwards; Ann. Mag. Nat. Hist., (10) 8: 81-82.

*Rs* variable in length, ranging from subequal to *m-cu* to fully twice this length; *R*<sub>1+2</sub> entire. Squama with a group of setae. Veins beyond cord with trichia. Tibial spur formula 1-2-2; claws (♂) with



basal tooth. Male hypopygium with tergite and sternite distinct; 8th sternite usually provided with fleshy lobes, tufts of setae or hair-pencils. Ovipositor with cerci long and slender, smooth; in *bicornis* group, all valves short and fleshy.

Includes the majority of the so-called "Subunicolores", having the wings unmarked or virtually so, and with the oblitative area at the cord forming a conspicuous lunule against the ground color.

*Key to Groups*

1. Wings with cell *1st M*<sub>2</sub> open by atrophy of *m*.....*aperta* (*dorsimacula* group)  
Wings with cell *1st M*<sub>2</sub> closed ..... 2
2. Wings with cell *1st M*<sub>2</sub> very small, pentagonal, the upper face (second section of *M*<sub>1+2</sub>) shorter than or subequal to the petiole of cell *M*<sub>1</sub>; ovipositor with short fleshy cerci; male hypopygium enlarged, the tergite variously armed with fleshy lobes (except in *johnsoniana*); 8th sternite without fleshy lobes .....*bicornis* group  
Wings with cell *1st M*<sub>2</sub> normally elongated, the upper face (second section of *M*<sub>1+2</sub>) exceeding the petiole of cell *M*<sub>1</sub>; ovipositor with slender sclerotized cerci; male hypopygium variously constructed, if tergite bears fleshy horns, the 8th sternite armed with lobes ..... 3
3. Male hypopygium with the basistyle produced caudad into a long spatulate blade; wings with two large dark areas basad of the stigmal darkening, these inter-connected by a pale brown wash in cell *R*.....*macrolabis* group  
Male hypopygium with the basistyle not produced into a long spatulate blade; wings rarely with a dark pattern, where this most conspicuous (*fuliginosa*, *disjuncta*, ♀) the wing-surface chiefly or entirely dark brown or blackened, or (*fuliginosa*, ♂; *dorsimacula*) without a well-defined dark area basad of origin of *Rs*..... 4
4. Male hypopygium asymmetrical, the right basistyle produced caudad into a conspicuous 2-cleft arm (Fig. 31, I); female with wing chiefly dark brown or blackish, variegated with whitish along cord and beyond stigma.....  
*fuliginosa* group  
Male hypopygium symmetrical; female without blackened wings (except in *disjuncta*, where these are uniformly darkened).....*dorsimacula* group

The *bicornis* or *fascipennis* group.

Nasus short. Antennae of moderate length; flagellum usually more or less bicolored. Wings with cell *1st M*<sub>2</sub> small, pentagonal. Male hypopygium with ninth tergite usually tumid. Ovipositor with small fleshy cerci.

*Key to Species*

1. Cell *1st M*<sub>2</sub> very small, the cephalic face (second section of *M*<sub>1+2</sub>) shorter than petiole of cell *M*<sub>1</sub>..... 2  
Cell *1st M*<sub>2</sub> more elongate, its outer end pointed; cephalic face subequal to or even slightly longer than petiole of cell *M*<sub>1</sub> ..... 6
2. Second section of vein *M*<sub>1+2</sub> with macrotrichia.....*parshleyi*  
Second section of vein *M*<sub>1+2</sub> without macrotrichia, pale and included in the oblitative streak ..... 3
3. Cells *C* and *Sc* strongly infumed; veins comprising outer end of cell *1st M*<sub>2</sub> not obliterated .....*morrisoni*  
Cells *C* and *Sc* not or but slightly darkened; veins comprising cell *1st M*<sub>2</sub>, with the exception of *M*<sub>3+4</sub>, pale and semi-obliterated..... 4
4. Cell *1st M*<sub>2</sub> entirely pale .....*megaura*  
Cell *1st M*<sub>2</sub> with both ends more or less darkened ..... 5
5. Vestiture of thorax relatively short .....*parshleyi*  
Vestiture of thorax long and conspicuous .....*bicornis*

6. Cells *C* and *Sc* strongly infumed, approximately as dark as the stigma; antennal flagellum weakly bicolored ..... *morrisoni*  
 Cells *C* and *Sc* pale yellow, much lighter than the stigma; antennal flagellum uniformly dark brown ..... *johnsoniana*

## (Supplementary Key: Males)

1. Hypopygium (Fig. 31, E) with 9th tergite not or scarcely tumid, the slender horns directed caudad; 8th sternite long, sheathing the 9th sternite, at apex with two horny points on either side ..... *parshleyi*  
 Hypopygium with 9th tergite tumid, with or without horns; 8th sternite shorter, not sheathing the 9th sternite, unarmed at apex ..... 2  
 2. Ninth tergite with four lobes or horns (Fig. 31, C) ..... *megaura*  
 Ninth tergite with two horns or else without horns ..... 3  
 3. Tergite of hypopygium without horns (Fig. 12, B) ..... *johnsoniana*  
 Tergite with horns ..... 4  
 4. Horns of tergite slender, directed dorsad and caudad (Fig. 31, A) ..... *bicornis*  
 Horns of tergite stout, directed caudad and very slightly ventrad (Fig. 31, D) ..... *morrisoni*

**Tipula** (*Lunatipula*) **bicornis** Forbes. (Figs. 24, H; 31, A).

1891. *Tipula bicornis* Forbes; State Ent. Illinois, Rept. 16:78.

Figs.—Snodgrass, Journ. N. Y. Ent. Soc., 11, pl. 10, fig. 1, pl. 11, fig. 16 (ovipos.); 1903; Trans. Amer. Ent. Soc., 30, pl. 14, figs. 94-101 (hyp.); 1904. Alexander, Cfls. N. Y., 1, pl. 46, fig. 230 (wing), pl. 52, fig. 319, pl. 55, fig. 350 (hyp.); 1919. Cole, Proc. California Acad. Sci. (4) 16:459, fig. 8 (hyp.); 1927. Dickinson, Cfls. Wisc., p. 250, fig. 196 (hyp.); 1932.

Ground color of thorax light gray, praescutum with four more brownish stripes. Male hypopygium (Fig. 31, A) with dorsal angle of basistyle produced into a spine. ♂. L. 12-13 mm.; w. 14-15 mm.

(May-early July) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Wisc., Kan. and Mo., southw. to Va. and Tenn. (Transition).

Connecticut.—Kent Falls, June 12-13, 1931 (C. P. A.); Storrs, 1929.

**T.** (*Lunatipula*) **johnsoniana** Alex. (Fig. 31, B).

1915. *Tipula johnsoniana* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1915:505-506.

1915. *T. winnemana* Alexander; Insec. Inscit. Menst., 3: 136-137.

Figs.—Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1915, pl. 17, fig. 20 (wing), pl. 18, fig. 40, pl. 19, fig. 58 (hyp.); 1915. Alexander, Cfls. N. Y., 1, pl. 52, fig. 318, pl. 55, fig. 351 (hyp.); 1919.

Praescutal stripes grayish brown, the median one entire. Male hypopygium (Fig. 31, B). ♂. L. 17.5-19.5 mm.; w. 19-22.8 mm.

(June, July) Vt., Mass., southw. to Md. (Transition).

**T.** (*Lunatipula*) **megaura** Doane. (Fig. 31, C).

1901. *Tipula megaura* Doane; Journ. N. Y. Ent. Soc., 9: 112-113.

Figs.—Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1915, pl. 17, fig. 22 (wing), pl. 18, fig. 42, pl. 19, fig. 59 (hyp.); 1915. Alexander, Cfls. N. Y., 1, pl. 46, fig. 231 (wing), pl. 52, fig. 320, pl. 55, fig. 353 (hyp.); 1919. Dickinson, Cfls. Wisc., p. 238, fig. 158 (wing), p. 250, fig. 195 (hyp.); 1932.

Antennae relatively short; flagellum very weakly bicolored.

Praescutal stripes reddish brown. Male hypopygium (Fig. 31, C).  
♂. L. 12.5-15 mm.; w. 14.5-16 mm. ♀. L. 16-18 mm.; w. 16 mm.

(June, July) Ont., Que., Vt., westw. to Mich., Wisc., Minn. and Ia. (Canadian).

**T.** (*Lunatipula*) **morrisoni** Alex. (Fig. 31, D).

1915. *Tipula morrisoni* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1915: 507-508.

Figs.—Alexander, *Ibid.*, pl. 17, fig. 21 (wing), pl. 18, fig. 41, pl. 21, figs. 82, 83 (hyp.). Alexander, Cfs. N. Y., 1, pl. 45, fig. 352 (hyp.); 1919.

Antennae indistinctly bicolorous. Coloration yellow, the praescutal stripes slightly darker. Male hypopygium (Fig. 31, D) chiefly yellowish: ventro-caudal angles of tergite produced into irregularly toothed points. ♂. L. 13-15 mm.; w. 18-19 mm. ♀. 15-16 mm.; w. 15 mm.

(May-early July) Mass., R. I., N. Y., N. J., Del., westw. to Ill. and Kan., southw. to S. C., Ky. and Miss. (Transition, Austral).

**T.** (*Lunatipula*) **parshleyi** Alex. (Fig. 31, E).

1915. *Tipula parshleyi* Alex.; Proc. Acad. Nat. Sci. Philadelphia, 1915: 510-512.

Figs.—Alexander, *Ibid.*, pl. 17, fig. 23 (wing); pl. 18, fig. 43, pl. 19, fig. 60, pl. 20, fig. 74 (hyp.); pl. 21, fig. 87 (ovipos.). Alexander, Cfs. N. Y., 1, pl. 52, fig. 321, pl. 55, fig. 354 (hyp.); 1919. Dickinson, Cfs. Wisc., p. 250, fig. 193 (hyp.); 1932.

Antennae with flagellar segments bicolorous. Coloration dull yellow, the praescutal stripes relatively indistinct, dull orange to brown. Male hypopygium (Fig. 31, E). ♂. L. 13.5-15 mm.; w. 15-17 mm. ♀. L. 14-15 mm.; w. 16.5-17.5 mm.

(June, July) Ont., Que., N. B., N. S., Me., Vt., N. H., Mass., N. Y., westw. to Wisc., Minn. and Colo. (Canadian).

#### The *macrolabis* group.

The long paddle-like blades of the basistyles readily separate the members of this group; unfortunately there seem to be no correlated characters in the female sex. Dark area in cell  $R_2$  of wings usually not quite reaching margin. Praescutal stripes four, entire.

#### Key to Species

1. Male hypopygium with the apex of paddle-like blade of basistyle (Fig. 31, F) smooth; tergite with a flattened divergent lobe on either side of median tooth ..... **macrolabis**
- Male hypopygium with apex of paddle-like blade of basistyle (Fig. 31, G) terminating in two or three acute spines; tergite with caudal margin more truncate, with a sharp median tooth ..... **youngi**

**Tipula** (*Lunatipula*) **macrolabis** Lw. (Fig. 31, F).

1864. *Tipula macrolabis* Loew; Berlin. Ent. Zeitschr., 8: 58.

1918. *T. macrolaboides* Alexander; Can. Ent., 50: 69-70.

Figs.—Alexander, Cfs. N. Y., 1, pl. 51, fig. 296, pl. 53, fig. 323 (hyp.); 1919 (as *macrolaboides*).

FIGURE 31. *Tipula* (*Lunatipula*); male hypopygia.

- A. *T. (L.) bicornis* Forbes; lateral aspect. I. *T. (L.) fuliginosa* (Say); right basistyle.
- B. *T. (L.) johnsoniana* Alex.; the same. J. *T. (L.) apicalis* Lw.; 9t.
- C. *T. (L.) megaura* Doane; the same. K. *T. (L.) australis* Doane; 8s.
- D. *T. (L.) morrisoni* Alex.; the same. L. *T. (L.) disjuncta* Walk.; 9t.
- E. *T. (L.) parshleyi* Alex.; the same. M. *T. (L.) dorsimacula* Walk.; 9t.
- F. *T. (L.) macrolabis* Lw.; b. N. *T. (L.) dietziana* Alex.; 8s.
- G. *T. (L.) youngi* Alex.; b. O. *T. (L.) duplex* Walk.; 9t.
- H. *T. (L.) fuliginosa* (Say); 9t. P. *T. (L.) ericensis* sp. nov.; 9t.

Symbols: b, basistyle; id, inner dististyle; s, sternite; t, tergite.



Antennal flagellum clearly to vaguely bicolorous. Apex of basistyle (Fig. 31, F). ♂. L. 15-17 mm.; w. 17-18 mm.; antenna, about 4.5 mm. ♀. L. 17-18 mm.; w. 18-19 mm.

(July, Aug.) Lab., Lake Superior region of Mich., westw. across subarctic North America, to Alaska, southw. along higher Rockies to N. M., crossing Bering Straits to Kamchatka. (Hudsonian).

**T. (*Lunatipula*) *youngi* Alex.** (Fig. 31, G).

1927. *Tipula youngi* Alexander; Can. Ent., 59:218-219.

Figs.—Alexander, Cfs. N. Y., 1, pl. 47, fig. 233 (wing); pl. 51, fig. 295, pl. 53, fig. 322 (hyp.); 1919. Dickinson, Cfs. Wisc., p. 233, fig. 144 (wing); p. 249, fig. 179 (hyp.); 1932.

Antennal flagellum clearly bicolorous. Praescutal stripes narrow, punctures on interspaces indicated. Apex of basistyle (Fig. 31, G). ♂. L. 17-19 mm.; w. 15-19 mm.; antenna, about 4.5-5 mm. ♀. L. 17-18 mm.; w. 18-19 mm.

(June-Aug.) N. S., Ont., Que., Me., N. H., Vt., Mass., N. Y., westw. to Mich., Wisc. and Alta. (Canadian).

Connecticut.—Kent Falls, June 12-13, 1931 (C. P. A.).

The *fuliginosa* group.

***Tipula* (*Lunatipula*) *fuliginosa* (Say).** (Figs. 31, H, I).

1823. *Otenophora fuliginosa* Say; Journ. Acad. Nat. Sci. Philadelphia, 3: 18 (♀).

1863. *Tipula speciosa* Loew; Berlin. Ent. Zeitschr., 7:288 (♂); Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1915:479-480.

Figs.—Alexander, Cfs. N. Y., 1, pl. 48, fig. 245 (wing ♂), fig. 246 (wing ♀); pl. 51, fig. 289 (hyp.); 1919.

Sexes strongly dimorphic in color. Antennae bicolorous, relatively short. *Male*. Bright orange, praescutum undarkened. Wings yellow basally, more clouded with brown apically; small brown spots at areulus and origin of *Rs*, with a vague wash in cell *R* between the two areas. Hypopygium asymmetrical, right basistyle produced caudad as a prominent bispinous arm (Fig. 31, I); left basistyle terminating in a small spine. Ninth tergite (Fig. 31, H). *Female*. Much darker, the praescutum with four pale brown stripes that are narrowly bordered by darker. Wings blackened, variegated by whitish before and at cord and beyond stigma. Abdominal tergites obscure orange with three conspicuous brownish black stripes. ♂. L. 15-16 mm.; w. 18-20 mm.; antenna, 4.5-5 mm. ♀. L. 16-17 mm.; w. 15-16 mm.

(June, July) Ont., N. H., Vt., Mass., R. I., N. Y., N. J., Pa., westw. to Mo. and Kan., southw. to N. C., Ky. and Tenn. (Transition, Austral).

Connecticut.—Hamden, June 11, 1914 (W. E. B.), June 2, 1928 (R. B. F.); Montville, June 12, 1929 (W. E. B.); New Haven, June 5, 1904 (H. L. V.); Rowayton, June 16, 1909 (C. W. J.); Storrs, 1932; W. Hartford, June 10, 1929 (R. B. F.); Wimpauk, June 12, 1915 (C. W. J.).



The *dorsimacula* group.

## Key to Species

1. Cells beyond cord of wing darkened, conspicuously variegated by whitish in radial cells beyond the stigma ..... 2  
Cells beyond cord of wing uniformly colored, subhyaline or suffused with yellow or brownish yellow, not with a white post-stigmal area (*subunicolors*); compare also *australis* and *dietziana* which may in cases be interpreted as falling under couplet la ..... 11
2. Wing-apex narrowly but conspicuously darkened, the remainder of disk clear or virtually so ..... **apicalis**  
Wing-apex not abruptly darkened and with remainder of surface clear.... 3
3. Cells basad of cord strongly infused, cells *M* to *A* variegated by whitish areas (*dorsimacula* subgroup) ..... 4  
Cells basad of cord uniformly pale in color ..... 6
4. Flagellar segments uniformly blackened ..... **dorsimacula**  
Flagellar segments bicolorous ..... 5
5. Bases of flagellar segments yellow, the remainder darkened; male hypopygium with eighth sternite simple ..... **beaulieui**  
Bases of flagellar segments brownish black, slightly darker than remainder of segments; male hypopygium with eighth sternite armed with brushes of setae ..... **eriensis**
6. Size large (wing, ♂, over 20 mm.); (*valida* subgroup)..... 7  
Size smaller (wing, ♂, less than 18 mm.) ..... 8
7. Male hypopygium with a median tuft of long yellow setae on eighth sternite; tergal horns short and inconspicuous ..... **hirsuta**  
Male hypopygium without a brush of long yellow setae on eighth sternite; tergal horns longer, prominent ..... **valida**
8. Antennal flagellum bicolorous; dark wing-pattern heavier; a dark spot at origin of *Rs* and darker seams on *m-cu* and outer section of *Cu*<sub>1</sub>; (*submaculata* subgroup) ..... 9  
Antennal flagellum uniformly darkened; dark wing-pattern greatly reduced or virtually restricted to the stigmal darkening; no dark seams at origin of *Rs* or on *m-cu* or *Cu*<sub>1</sub>; Subarctic species..... 10
9. Male hypopygium with tergal horns short; posterior lobe of inner dististyle broad, the apex truncated; gonapophyses with apical points not angularly bent ..... **mallochi**  
Male hypopygium with tergal horns (Fig. 32, I) long and slender; posterior lobe of inner dististyle produced into a slender point or with apex bifid; gonapophyses with outer ends angularly bent into long slender points.... **submaculata**
10. Male hypopygium with basistyle produced caudad into a flattened lobe. **loewiana**  
Male hypopygium with basistyle simple ..... **penicillata**
11. Cell *1st M*<sub>2</sub> open by atrophy of *m* ..... **aperta**  
Cell *1st M*<sub>2</sub> closed ..... 12
12. Antennae with bases of flagellar segments light yellow, the remainder black **flavibasis**  
Antennae with flagellum, if bicolorous, with bases of segments darker than remainder ..... 13
13. Antennae (♂) unusually elongate, if bent backward extending about to the fourth abdominal segment; wings (♀) uniformly brownish black or dark brown; hypopygium (♂) unarmed with lobes or pencils..... **disjuncta**  
Antennae shorter, in ♂ not extending caudad beyond base of abdomen; wings of both sexes pale, unblackened; hypopygium (♂) provided with lobes or hair-pencils ..... 14
14. Male hypopygium with caudal margin of tergite having two rounded emarginations, one on either side of a double median spinous point (Fig. 32, K); 8th sternite with median area provided with two parallel-sided sclerotized teeth (Fig. 32, A, G, J) (*triplex* subgroup)..... 15  
Male hypopygium without the appearance of two rounded emarginations on caudal margin of tergite; if with a median lobe, this entire (Fig. 32, B, E, M); 8th sternite without two submedian sclerotized teeth ..... 17

15. Submedian teeth of 8th sternite triangular in outline, broad basally, narrowed outwardly (Fig. 32, A); wings broad, distal section of *Cu*<sub>1</sub> and *m-cu* narrowly and sometimes very vaguely seamed with brown. . . . . **flavoubrosa**  
 Submedian teeth of 8th sternite slender, parallel-sided, separated from one another by a broad U-shaped notch (Fig. 32, G, J); wings narrower, *Cu* and *m-cu* not seamed with darker . . . . . 16
16. Male hypopygium with 8th sternite having a median depressed lobe arising ventrad and slightly cephalad of the usual submedian teeth (Fig. 32, G) **perlongipes**  
 Male hypopygium with 8th sternite having only the submedian teeth (Fig. 32, J) . . . . . **triplex**
17. Ground color of mesonotum gray or grayish, the praescutum with brown stripes; pleura light gray . . . . . 18  
 Ground color of mesonotum brownish or yellow; pleura yellow, in cases with a thin white pruinosity . . . . . 20
18. Wings with costal region and a seam along vein *Cu* conspicuously darker than the ground color; cell *1st M*<sub>2</sub> short, the second section of vein *M*<sub>1+2</sub> less than twice the basal section; antennae short. . . . . **catawba**  
 Wings without conspicuous darkening in costal region or along vein *Cu*; cell *1st M*<sub>2</sub> long, the second section of *M*<sub>1+2</sub> nearly three times the basal section; antennae longer . . . . . 19
19. Antennae of moderate length; flagellar segments beyond basal enlargements deeply constricted; praescutal stripes bordered by darker to produce the appearance of six narrow vittae; male hypopygium with eighth sternite armed with four conspicuous lobes (Fig. 31, K) . . . . . **australis**  
 Antennae longer; flagellar segments not constricted beyond basal enlargement; praescutum with three brown stripes, at least the lateral pair entire; male hypopygium with eighth sternite merely bilobed (Fig. 31, N) . . . . . **dietziana**
20. Praescutum yellow with conspicuous brown stripes; caudal margin of tergite of hypopygium with a broad V-shaped notch, the lobes divergent, dark-colored, bordered by pale yellow (Fig. 32, D) . . . . . **mainensis**  
 Coloration not as above, the praescutal stripes not dark brown; hypopygium with tergite not notched as described . . . . . 21
21. Male hypopygium with ninth tergite (Fig. 32, M) trifid, with three pointed lobes, the median one smaller; outer dististyle fleshy and setiferous, the apex a short acute point . . . . . **triton**  
 Male hypopygium with ninth tergite not trifid; if with a median protuberance, this low and obtuse; outer dististyle not as above. . . . . 22
22. Male hypopygium with lateral lobes of tergite produced into long curved horns; no median lobule; outer dististyle produced into a long blackened hook . . . . . **tuscarora**  
 Male hypopygium without long curved tergal horns; outer dististyle not produced into a blackened hook . . . . . 23
23. Lateral lobes of ninth tergite very broad and obtuse, somewhat truncated (Fig. 31, O) . . . . . **duplex**  
 Lateral lobes of ninth tergite not truncated, either pointed (Fig. 32, E, H, L) or evenly rounded (Fig. 32, B) . . . . . 24
24. Hypopygium with lateral lobes of ninth tergite rounded (Fig. 32, B) . . . . . **georgiana**  
 Hypopygium with lobes of tergite acute or subacute, not evenly rounded (Fig. 32, E, H, L) . . . . . 25
25. Abdominal tergites two to five, inclusive, each with a brown spot on lateral portion near base . . . . . **seminole**  
 Abdominal tergites without such rows of brown spots . . . . . 26
26. Praescutum opaque, with distinct stripes; wings gray, the obliterative streak at cord inconspicuous; hypopygium with tergite having a median lobe in addition to the subacute lateral lobes; eighth sternite without enlarged spinous setae, provided with two large lobes that bear large tufts of silvery setae . . . . . **monticola**  
 Praescutum polished yellow or orange-yellow, without distinct stripes; wings strongly suffused with brown, the obliterative streak very conspicuous; hypopygium with lateral tergal lobes only; eighth sternite with an enlarged spinous seta on either side. . . . . **translucida**

**Tipula** (*Lunatipula*) **aperta** Alex.

1915. *Tipula imperfecta* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1915:484-485 (preoccupied).

1918. *T. aperta* Alexander; Can. Ent., 50: 62.

Figs.—Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1915, pl. 16, fig. 9 (wing); pl. 21, fig. 86 (ovipos.); 1915. Alexander, Cfs. N. Y., 1, pl. 47, fig. 235 (wing); 1919.

Coloration grayish brown, praescutal stripes indistinct. Ovipositor with cerci relatively wide, feebly sclerotized, lying transversely. ♀. L. 11 mm.; w. 10.5 mm.

Lab. (Hudsonian).

**T.** (*Lunatipula*) **apicalis** Lw. (Fig. 31, J).

1863. *Tipula apicalis* Loew; Berlin. Ent. Zeitschr., 7: 277.

Figs.—Alexander, Cfs. N. Y., 1, pl. 48, fig. 254 (wing); pl. 51, fig. 302, pl. 54, fig. 342 (hyp.); 1919.

Flagellum uniformly brownish black. General coloration yellow; praescutal stripes three, brown. Male hypopygium with tergite (Fig. 31, J) notched, the lateral lobes glabrous; a small median lobule; on ventral surface of each lateral lobe a small acute spine directed mesad. Basistyle produced into a setiferous lobe. ♂. L. 11-13 mm.; w. 12.5-14 mm.; antenna, about 4 mm. ♀. L. 15-16 mm.; w. 14-15 mm.

(Late May-early Aug.) Ont., Que., N. S., Me., N. H., Mass., N. Y., westw. to Mich., southw. to N. C. and Tenn. (Canadian, Transition).

Connecticut.—Kent Falls, June 12, 13, 1931 (C. P. A.); W. Granby, June 8, 1929, near mossy cliff (C. P. A.).

**T.** (*Lunatipula*) **australis** Doane. (Fig. 31, K).

1901. *Tipula australis* Doane; Journ. N. Y. Ent. Soc., 9: 104-105.

Figs.—Alexander, Cfs. N. Y., 1, pl. 52, fig. 305, pl. 53, fig. 326 (hyp.); 1919.

Flagellum uniformly darkened. Male hypopygium, 8th sternite (Fig. 31, K). ♂. L. 14 mm.; w. 14 mm. ♀. L. 17 mm.; w. 14 mm.

(Mar., Apr.) Va., Md., N. C., S. C., Ga., westw. to La. and Tex. (Austral).

**T.** (*Lunatipula*) **beaulieui** Dtz.

1921. *Tipula beaulieui* Dietz; Ent. News, 32: 301-302.

Close to *dorsimacula*. Antennae relatively short. Praescutal stripes brown, margined with darker. No dark spot at origin of *Rs*. Abdomen orange-yellow, tergites with three dark brown stripes. Male hypopygium very much as in *dorsimacula*. ♂. L. 15 mm.; w. 14 mm.

Ont.

Known only from the unique type. Very questionable whether it is distinct from *dorsimacula*.

**T. (*Lunatipula*) *catawba* Alex.**1915. *Tipula catawba* Alexander; Insec. Inscit. Menst., 3: 134-136.

Antennae short; flagellum uniformly darkened. Praescutal stripes four, entire; in female, with a capillary median vitta. Hypopygium with 9th tergite much as in *georgiana*; lateral lobes subacute; 8th sternite with a long median fringe of golden yellow setae. ♂. L. 13 mm.; w. 12.5 mm.; antenna, about 3.3 mm. ♀. L. 15 mm.; w. 12.5 mm.

(Apr.) N. C., S. C.

**T. (*Lunatipula*) *dietziana* Alex. (Fig. 31, N).**1915. *Tipula dietziana* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1915: 501-504.

Figs.—Alexander, Cfs. N. Y., 1, pl. 47, fig. 238 (wing); pl. 52, fig. 306, pl. 53, fig. 327 (hyp.); 1919.

Median praescutal stripe often more or less divided by pale color and further split by a capillary dark line; lateral stripes entire. Eighth sternite (Fig. 31, N). ♂. L. 13-15 mm.; w. 15.5-17 mm.; antenna, about 6-6.2 mm. ♀. L. 20-22 mm.; w. 17-18 mm.

(Apr., early May) N. J., Pa., Md., Va., westw. to Ind. and Kan., southw. to S. C. and Tenn. (Austral).

**T. (*Lunatipula*) *disjuncta* Wk. (Fig. 31, L).**1856. *Tipula disjuncta* Walker; Ins. Saundersiana, 1, Dipt., 442.1915. *T. taughannock* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1915: 476-479.

Figs.—Alexander, *Ibid.*, pl. 16, figs. 7, 8 (wing, ♂, ♀); pl. 18, fig. 33, pl. 19, fig. 47, pl. 20, fig. 62 (hyp.). Alexander, Cfs. N. Y., 1, pl. 48, fig. 244 (wing, ♀); pl. 51, fig. 290, pl. 53, fig. 336 (hyp.); 1919. Dickinson, Cfs. Wisc., p. 238, fig. 157 (wing); p. 250, fig. 194 (hyp.); 1932.

Sexes strongly dimorphic in color. *Male*. Thoracic dorsum yellowish, with three brown stripes. Basal flagellar segments bicolorous, the outer ones brown or black. Wings brownish subhyaline. Abdominal tergites yellow, interruptedly trivittate with brown. Ninth tergite (Fig. 31, L); basistyle produced caudad into a slender blade. *Female*. Wings tending to be reduced in size. General coloration brownish black, abdominal tergites and sternites with a bright yellow median vitta, in cases more or less interrupted. ♂. L. 15-17 mm.; w. 14.5-16 mm.; antenna, about 8-9 mm. ♀. L. 15-19 mm.; w. 9.5-12.5 mm.

(May, June) Ont., Vt., N. Y., N. J., Del., Pa., westw. to Ill., Wisc. and Ia. (Transition).

**T. (*Lunatipula*) *dorsimacula* Wk. (Fig. 31, M).**1848. *Tipula dorsimacula* Walker; List Dipt. Brit. Mus., 1: 69; Alexander, Bull. Brooklyn Ent. Soc., 25: 276; 1930.1863. *T. angustipennis* Loew; Berlin. Ent. Zeitschr., 7: 286.

Figs.—Snodgrass, Journ. N. Y. Ent. Soc., 11, pl. 10, figs. 2, 5, 7-10 (ovipos.); 1903. Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 17, figs. 139-149 (hyp.); 1904.



Alexander, Cfs. N. Y., 1, pl. 45, fig. 212 (wing); pl. 50, fig. 276 (hyp.); 1919. Dickinson, Cfs. Wisc., p. 235, fig. 151 (wing); p. 249, fig. 185 (hyp.); 1932.

Antennae stout; flagellar segments not or scarcely excised; bases of segments sometimes slightly reddish. Praescutal stripes dark gray, narrowly margined with brown. White spots in cells *M* and bases of *Cu* and *1st A* conspicuous. Abdominal tergites orange, trivittate with black, the stripes sometimes more or less interrupted. Male hypopygium with tergite (Fig. 31, M) pale yellow, the lobes broadly obtuse, separated by a narrow V-shaped notch; posterior appendage of inner dististyle large and pale, bilobed at apex. ♂. L. 15-18 mm.; w. 14-19 mm.; antenna, 6.5-7 mm. ♀. L. 20-25 mm.; w. 13-16 mm.

(Apr.-early July) Ont., Que., N. B., N. S., Me., N. H., Vt., Mass., R. I., N. Y., N. J., Pa., westw. to Colo., Mont., Utah, Cal. and B. C.

Connecticut.—Ansonia, May 2, 1914 (W. E. B.); Lyme, May 14, 1911 (A. B. C.); New Haven, Apr. 29, 1925 (W. E. B.); Storrs, May 1931, 1932; Wallingford, May 4, 1926 (J. L. R.). Connecticut, no further data, part of type material of *angustipennis* Loew.

**T.** (*Lunatipula*) **duplex** Wk. (Fig. 31, O).

1848. *Tipula duplex* Walker; List Dipt. Brit. Mus., 1: 66; Alexander, Bull. Brooklyn Ent. Soc., 25: 276; 1930.

1901. *T. cinctocornis* Doane; Journ. N. Y. Ent. Soc., 9: 110.

1915. *T. mingwe* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1915: 490-492.

Figs.—Alexander, *Ibid.*, pl. 16, fig. 13 (wing); pl. 20, fig. 68 (hyp.). Alexander, Cfs. N. Y., 1, pl. 47, fig. 242 (wing), pl. 52, fig. 310 (hyp.); 1919.

Antennae strongly bicolorous. General coloration yellow; praescutal stripes poorly indicated. Male hypopygium with tergite (Fig. 31, O); inner dististyle with outer appendage elongate, terminating in an acute spine. ♂. L. 16-17 mm.; w. 18-20 mm. ♀. L. 20-22 mm.; w. 16-17 mm.

(July-Sept.) Ont., Que., N. S., N. H., Vt., Mass., N. Y., N. J., Del., westw. to Ill., Mich., Mo. and Kan., southw. to Tenn. and n. Fla. (Transition, Austral).

**T.** (*Lunatipula*) **eriensis** sp. nov. (Fig. 31, P).

General appearance most like *dorsimacula*. Nasus very small to virtually lacking. Antennae more slender, with flagellar segments feebly excised; basal segments yellow, beyond the second flagellar weakly bicolored, brownish yellow, the basal enlargements darker, brown; outer segments more uniformly darkened.

Mesonotal praescutum yellowish gray, with four more brownish gray stripes, the laterals and posterior end of submedian stripes narrowly bordered by still darker brown; a capillary median dark vitta indicated on cephalic third of sclerite; setigerous punctures brown; scutal lobes variegated with darker; mediotergite yellow. Pleura weakly pruinose. Legs yellow, the femoral tips narrowly and insensibly darkened; tarsi dark brown. Wings strongly tinged with brown, variegated with darker brown and whitish; the restricted



darker areas are on anterior cord, at origin of *Rs* and a linear streak in base of *1st A*; whitish areas include a post-stigmal brightening; a conspicuous obliterative area before cord, extending into bases of cells *M*<sub>3</sub> and *M*<sub>4</sub>; spots at base and near midlength of cells *Cu* and *1st A*; bases of cells *R* and *M* brightened; cell *M*<sub>1</sub> somewhat suffused with whitish.

Abdominal tergites brownish yellow, with a median brown stripe that is narrowly interrupted at posterior margins of segments; sub-lateral stripes obsolete; lateral borders not conspicuously pale; basal sternites gray. Male hypopygium with the tergite (Fig. 31, P) narrowed, with a conspicuous darkened median lobe, in addition to the subequal lateral yellow lobes. Outer dististyle flattened, widest at near midlength. Posterior appendage of inner dististyle conspicuous but relatively narrow, pale yellow, the apex simple and obtuse. Eighth sternite with lateral lobes short, provided with a pencil of long curved bristles; median area feebly emarginate to transverse, provided with numerous yellow setae. ♂. L. about 16 mm.; w. 16.5 mm.; antenna, about 5.5 mm.

*Holotype*, ♂, Sandusky, Ohio, June 17, 1926 (D. Lacroix); in author's collection.

**T.** (*Lunaticipula*) **flavibasis** Alex.

1918. *Tipula flavibasis* Alexander; Can. Ent., 50:414-415.

General coloration yellowish brown, without well-indicated praescutal stripes. Antennae (♂) elongate, if bent backward extending to beyond base of abdomen. Male hypopygium with tergite notched; lateral lobes flattened, subacute, slightly divergent; a small acute median tooth at base of notch. ♂. L. 11.5-12 mm.; w. 12-12.7 mm.; antenna, 4.5-5 mm. ♀. L. 15-16 mm.; w. 12.3-13.5 mm.

(Late June-Sept.) Ind., westw. to Kan. (Austral).

**T.** (*Lunaticipula*) **flavoumbrosa** Alex. (Fig. 32, A).

1918. *Tipula flavoumbrosa* Alexander; Can. Ent., 50:415-416.

Differs from *triplex* in the large size, yellow coloration of body, very broad wings, and details of the hypopygium especially the broad, triangular submedian teeth of the 8th sternite (Fig. 32, A). ♂. L. 22 mm.; w. 21.5-23.5 mm.; antenna, 6.5-7 mm. ♀. L. 21-22 mm.; w. 18 mm.

(Late May, June) Ohio, Ind., Ill., Mich. and Kan., southw. to S. C., Tenn. and n. Fla. (Austral).

**T.** (*Lunaticipula*) **georgiana** Alex. (Fig. 32, B).

1915. *Tipula georgiana* Alexander; Insec. Inscit. Menst., 3:133-134.

Fig.—Alexander, Cfs. N. Y., 1, pl. 52, fig. 311 (hyp.); 1919.

Nasus reduced. General coloration yellow; praescutal stripes poorly defined; a median darker vitta. Antennal flagellum weakly bicolorous to uniformly dark brown. Obliterative area at cord inconspicuous. Male hypopygium with tergite (Fig. 32, B). ♂. L.

11.8-14 mm.; w. 11.5-15.3 mm.; antenna, about 3.5-3.7 mm. ♀. L. 15-16 mm.; w. 14-15 mm.

(Late May-July) Mass., R. I., N. Y., N. J., westw. to Mich., southw. to S. C., Ga., Tenn. and Fla. (Transition, Austral).

Connecticut.—Storrs; Union, July 2, 1919 (S. W. B.); Windsor, June 15, 1938 (A. W. M.).

**T. (*Lunatipula*) *hirsuta* Doane.** (Fig. 32, C).

1901. *Tipula hirsuta* Doane: Journ. N. Y. Ent. Soc., 9: 113-114.

Figs.—Alexander, Cfs. N. Y., 1, pl. 51, fig. 304, pl. 54, fig. 345 (hyp.); 1919. Dickinson, Cfs. Wisc., p. 237, fig. 156 (wing); p. 250, fig. 192 (hyp.); 1932.

Closest to *valida*. Sexes feebly dimorphic in color; male light yellow, female light gray, with darker praescutal stripes. Male hypopygium with the lateral tergal horns (Fig. 32, C) unusually short, the median lobe correspondingly large; inner dististyle greatly expanded. ♂. L. 21-23 mm.; w. 22-24 mm.; antenna, about 6.5-7 mm. ♀. L. 23-25 mm.; w. 24-25 mm.

(Late May, June) Vt., Mass., R. I., N. Y., N. J., Pa., westw. to Mich. and Wisc. (Transition).

Connecticut.—Kent Falls, June 12-13, 1931 (C. P. A.).

**T. (*Lunatipula*) *loewiana* Alex.**

1915. *Tipula loewiana* Alexander: Proc. Acad. Nat. Sci. Philadelphia, 1915: 488-490.

Figs.—Alexander, *Ibid.*, pl. 16, fig. 12 (wing); pl. 19, fig. 51, pl. 20, fig. 67 (hyp.). Alexander, Cfs. N. Y., 1, pl. 47, fig. 234 (wing); pl. 52, fig. 308 (hyp.); 1919.

Coloration light gray; praescutum with four brown stripes. Abdominal tergites beyond second brown, the lateral margins broadly, the caudal more narrowly, pale. ♂. L. 15 mm.; w. 16-16.5 mm.

Subarctic North America. (Hudsonian).

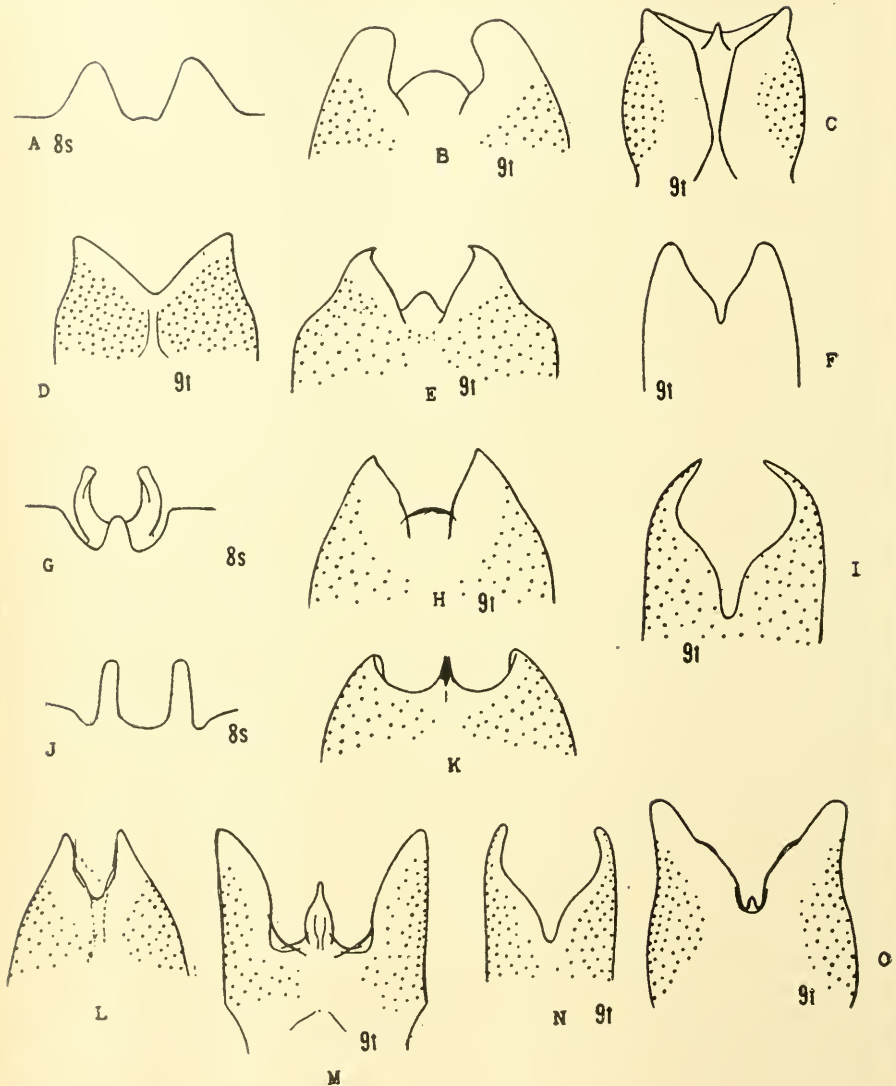
**T. (*Lunatipula*) *mainensis* Alex.** (Fig. 32, D).

1915. *Tipula mainensis* Alexander: Proc. Acad. Nat. Sci. Philadelphia, 1915: 475-476.

Figs.—Alexander, *Ibid.*, pl. 16, fig. 5 (wing); pl. 18, fig. 31, pl. 19, fig. 46, pl. 21, figs. 75, 76 (hyp.). Alexander, Cfs. N. Y., 1: 850, fig. 125, O (ant.), pl. 48, fig. 253 (wing); pl. 52, fig. 307, pl. 54, fig. 346 (hyp.); 1919.

Mesonotum yellowish, the praescutum with polished dark brown stripes, the median one more or less divided by a pale line. Antennal flagellum bicolorous. Head gray; vertex with a median dark vitta. Abdominal tergites dull yellow, with a median dark stripe; outer segments more uniformly darkened. Male hypopygium with tergite (Fig. 32, D). ♂. L. 10-11 mm.; w. 12 mm.; antenna, about 3.5 mm. ♀. L. 11-12 mm.; w. 12.5-13 mm.

(Late July, Aug.) Ont., Que., Nfld., N. B., Me., N. H., Mass., N. Y., westw. to N. D., Colo. and Alta. (Canadian, Hudsonian).

FIGURE 32. *Tipula* (*Lunatipula*); male hypopygia.

- |   |  |
|---|--|
| A. <i>T. (L.) flavoumbrosa</i> Alex.; 8s. | I. <i>T. (L.) submaculata</i> Lw.; 9t.   |
| B. <i>T. (L.) georgiana</i> Alex.; 9t.    | J. <i>T. (L.) triplex</i> Walk.; 8s.     |
| C. <i>T. (L.) hirsuta</i> Lw.; 9t.        | K. <i>T. (L.) triplex</i> Walk.; 9t.     |
| D. <i>T. (L.) mainensis</i> Alex.; 9t.    | L. <i>T. (L.) translucida</i> Doane; 9t. |
| E. <i>T. (L.) monticola</i> Alex.; 9t.    | M. <i>T. (L.) triton</i> Alex.; 9t.      |
| F. <i>T. (L.) penicillata</i> Alex.; 9t.  | N. <i>T. (L.) tuscarora</i> Alex.; 9t.   |
| G. <i>T. (L.) perlongipes</i> Johns.; 8s. | O. <i>T. (L.) valida</i> Lw.; 9t.        |
| H. <i>T. (L.) seminole</i> Alex.; 9t.     |  |

Symbols: s, sternite; t, tergite.

**T. (*Lunatipula*) mallochi** Alex.

1920. *Tipula mallochi* Alexander; Pomona Coll. Journ. Ent. & Zool., 12: 91-92.

Differs from *submaculata* chiefly in hypopygial characters. ♂. L. 15 mm.; w. 17-17.5 mm.; antenna, about 5.5-6 mm. ♀. L. 20 mm.; w. 18.5-19 mm.

(May, June) Md., westw. to Ill. and Mo., southw. to S. C., Tenn. and n. Fla. (Transition, Austral).

**T. (*Lunatipula*) monticola** Alex. (Fig. 32, E).

1915. *Tipula monticola* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1915: 492-493.

Figs.—Alexander, *Ibid.*, pl. 16, fig. 14 (wing); pl. 17, fig. 26, pl. 18, fig. 35, pl. 19, fig. 52, pl. 20, fig. 69 (hyp.). Alexander, Cfs. N. Y., 1, pl. 52, fig. 312, pl. 55, fig. 347 (hyp.); 1919.

Flagellum bicolored. Praescutal stripes orange-brown. Male hypopygium with tergite (Fig. 32, E). ♂. L. 17-18 mm.; w. 18-20 mm.; antenna, about 5-6 mm.

(Late May, June) Ont., Que., Me., N. H., Vt., Mass., R. I., N. Y., Pa. Connecticut.—Storrs, May 1929 (G. H. G.).

**T. (*Lunatipula*) penicillata** Alex. (Fig. 32, F).

1915. *Tipula penicillata* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1915: 496-497.

Fig.—Alexander, Cfs. N. Y., 1, pl. 52, fig. 314 (hyp.); 1919.

General coloration grayish, the praescutum with four dark brown stripes. Tip of wing darkened; obliterative area at cord broad; post-stigmatal brightening in cells  $R_2$  and  $R_3$ . Hypopygium with tergite (Fig. 32, F); 8th sternite extensive, with lateral tufts of decussate setae. ♂. L. 12 mm.; w. 12.6 mm.

Subarctic North America. (Hudsonian).

**T. (*Lunatipula*) perlongipes** Johns. (Fig. 32, G).

1848. *Tipula filipes* Walker; List Dipt. Brit. Mus., 1: 65 (preoccupied).

1909. *T. perlongipes* Johnson; Proc. Boston Soc. Nat. Hist., 34: 131.

(The confusion resulting from the use of the name *perlongipes* Johnson for an entirely different species in our fauna has been mentioned under *T. jacobus* Alex. The final determination of Walker's species is due to Mr. Fred W. Edwards of the British Museum of Natural History, who examined Walker's type.)

Readily told from other members of the *triplex* subgroup by the relatively narrow yellow wings and the structure of the eighth sternite of the male hypopygium (Fig. 32, G). Stigma paler than costal border. Ground-color of praescutum ranging from pale yellow to gray, the four stripes from light reddish brown to much darker brown. ♂. L. 16-18 mm.; w. 20-22 mm.; antenna, about 6.5-7 mm.

(Apr., May) N. C., westw. to Ind., southw. to Fla. (Austral).



**T. (*Lunatipula*) *seminole* Alex. (Fig. 32, H).**

1915. *Tipula seminole* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1915: 495-496.

Figs.—Alexander, *Ibid.*, pl. 16, fig. 16 (wing); pl. 17, fig. 28, pl. 18, fig. 37, pl. 19, fig. 54, pl. 21, fig. 77 (hyp.). Alexander, Cfs. N. Y., 1, pl. 55, fig. 348 (hyp.); 1919.

Ninth tergite (Fig. 32, H). Setae of eighth sternite in two flattened, relatively small brushes. ♂. L. 12.5-14 mm.; w. 12.5-14 mm.; antenna, about 4.6-5 mm. ♀. L. 22-23 mm.; w. 15.5-16 mm.

(Apr., May) N. C., Ga.

**T. (*Lunatipula*) *submaculata* Lw. (Fig. 32, I).**

1863. *Tipula submaculata* Loew; Berlin. Ent. Zeitschr., 7: 288.

Figs.—Alexander, Cfs. N. Y., 1, pl. 47, fig. 239 (wing), pl. 52, fig. 317 (hyp.); 1919. Dickinson, Cfs. Wisc., p. 233, fig. 145 (wing); p. 249, fig. 181 (hyp.); 1932.

Praesentum grayish, with four narrow brown stripes, the intermediate pair more or less obsolete at anterior ends, representing the lateral borders of a broad, more grayish, median area. Heavily-patterned individuals have the outer cells of wing much darker than those before cord. Ninth tergite (Fig. 32, I): there is some variation in length of tergal horns. ♂. L. 12-13 mm.; w. 15-16 mm.; antenna, 5-5.5 mm. ♀. L. 16-19 mm.; w. 15-19 mm.

(May-July) Ont., Que., N. S., Me., N. H., Vt., Mass., N. Y., N. J., Pa., westw. to Mich. and Wisc., southw. to S. C. and Tenn. (Canadian, Transition).

Connecticut.—Canaan, June 10, 1928 (R. B. F.); Tunxis State Park, July 23, 1931 (C. P. A.).

**T. (*Lunatipula*) *translucida* Doane. (Fig. 32, L).**

1901. *Tipula translucida* Doane; Journ. N. Y. Ent. Soc., 9: 109.

1919. *T. devia* Dietz; Ann. Ent. Soc. Amer., 12: 86-87.

Figs.—Dietz, *Ibid.*, pl. 5, figs. 1, 2 (hyp.). Alexander, Cfs. N. Y., 1, pl. 52, fig. 313 (hyp.); 1919.

Antennae bicolored, yellow, the basal enlargements of segments more or less darkened. Male hypopygium with tergite (Fig. 32, L). ♂. L. 14-16 mm.; w. 16-18 mm.; antenna, about 5 mm.

(June, July) Pa., Md., westw. to Ill., Mo. and Okla., southw. to N. C., S. C. and Tenn. (Austral).

I can see no differences between *devia* and *translucida* except the slightly more acute apex of basistyle of the former.

**T. (*Lunatipula*) *triplex* Wk. (Figs. 32, J, K).**

1848. *Tipula triplex* Walker; List Dipt. Brit. Mus., 1: 66; Alexander, Bull. Brooklyn Ent. Soc., 25: 277.

1901. *T. inermis* Doane; Jour. N. Y. Ent. Soc., 9: 112.

Figs.—Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 14, figs. 89-93 (hyp.); 1904. Alexander, Cfs. N. Y., 1, pl. 47, fig. 236 (wing), pl. 52, fig. 309 (hyp.); 1919. Dickinson, Cfs. Wisc., p. 250, fig. 190 (hyp.); 1932.



General coloration obscure yellow, praescutal stripes brown or grayish brown. Antennae obscure yellow or brownish yellow, weakly bicolorous. Male hypopygium with median tergal spines (Fig. 32, K) long and slender, needle-like. Posterior lobe of inner dististyle long and slender, almost touching the posterior basal appendage. Rods of eighth sternite (Fig. 32, J) slender, parallel-sided, separated by a wide U-shaped notch.

The more southern *umbrosa* Lw. has the median tergal spines shorter and broader, not needle-like; posterior lobe of inner dististyle relatively short and blunt. The exact limits of distribution of the two species have not been accurately determined. ♂. L. 18-20 mm.; w. 20-22 mm.; antenna, 7-7.5 mm. ♀. L. 26-28 mm.; w. 20-23 mm.

(June-Sept.) Ont., Que., Nfld., N. S., Me., N. H., Vt., Mass., R. I., westw. to Wisc. and Alta., southw. to Md. and Va. (Canadian, Transition).

Connecticut.—Norfolk, Sept. 6, 1928 (G. C. C.); South Britain, 1884 (Pierce).

**T.** (*Lunatipula*) **triton** Alex. (Fig. 32, M).

1915. *Tipula triton* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1915: 487-488.

Figs.—Alexander, *Ibid.*, pl. 16, fig. 11 (wing); pl. 19, fig. 50, pl. 20, figs. 65, 66, pl. 21, figs. 78, 79 (hyp.). Alexander, Cfs. N. Y., 1, pl. 47, fig. 240 (wing); pl. 52, fig. 315 (hyp.); 1919.

Coloration yellow, praescutal stripes light brown to reddish brown. Antennae bicolorous. Abdominal tergites three to six each with a brown lateral spot near base. Ninth tergite (Fig. 32, M). ♂. L. 13-13.5 mm.; w. 13.5 mm.; antenna, about 4.5 mm.

(May) D. C., Ind., Ky., S. C., Ga. (Austral).

**T.** (*Lunatipula*) **tuscarora** Alex. (Fig. 32, N).

1915. *Tipula tuscarora* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1915: 493-495.

Figs.—Alexander, *Ibid.*, pl. 16, fig. 15 (wing); pl. 17, fig. 27, pl. 18, fig. 36, pl. 19, fig. 53, pl. 20, fig. 64, pl. 21, fig. 80 (hyp.). Alexander Cfs. N. Y., 1, pl. 47, fig. 241 (wing); pl. 52, fig. 316, pl. 53, fig. 328, pl. 55, fig. 349 (hyp.); 1919.

Coloration yellow, praescutal stripes not or scarcely indicated. Antennae bicolored. Ninth tergite (Fig. 32, N) somewhat as in *submaculata* but horns more obtuse at tips. Readily told from all other nearctic *Tipula* species by the structure of the outer dististyle. ♂. L. 15-16 mm.; w. 17 mm.; antenna, about 4-4.2 mm.

(June) Md., Va. and Ky., westw. to Ind., Ill. and Mo., southw. to N. C. and S. C. (Austral).

**T.** (*Lunatipula*) **valida** Lw. (Fig. 32, O).

1863. *Tipula valida* Loew; Berlin. Ent. Zeitschr., 7:287.

1901. *T. calva* Doane; Journ. N. Y. Ent. Soc., 9:114.

Figs.—Alexander, Cfs. N. Y., 1, pl. 47, fig. 237 (wing); pl. 51, fig. 303 (hyp.); 1919. Dickinson, Cfs. Wisc., p. 237, fig. 155 (wing); p. 250, fig. 191 (hyp.); 1932.

Sexes feebly dimorphic in color; males with praescutum yellow, with four entire more brownish stripes; female yellowish gray, with

darker stripes. Antennae bicolorous. Male hypopygium very large; tergite (Fig. 32, O). ♂. L. 20-22 mm.; w. 20-24 mm.; antenna, 7.5-8 mm. ♀. L. 20-22 mm.; w. 22-24 mm.

(Late May-Aug.) Ont., Que., Nfd., N. B., N. S., Me., N. H., Vt., Mass., N. Y., N. J., Pa., westw. to Wisc. and Minn., southw. to N. C. (Canadian, Transition).

Connecticut.—Putnam, June 15, 1933 (C. P. A.); Short Beach (C. W. J.); Windsor, June 13, 1927 (R. B. F.).

### Subfamily CYLINDROTOMINAE

An isolated subfamily, serving in a remarkable manner to connect the Tipulinae with the Limoniini. The subfamily is of small extent, with only nine genera and about 40 recent species. The distribution is chiefly Holarctic and Antipodal.

The adult flies are sluggish, usually to be swept from rank vegetation in shaded spots. The larvae differ from those of all other crane-flies in their habit of living on the leaves of various bryophytic and spermatophytic plants, where they feed almost in the manner of certain lepidopterous caterpillars. The body of the adult fly, especially the abdomen, is elongate. The ovipositor has fleshy valves of a peculiar structure, modified for the purpose of laying eggs in plant tissues.

#### Key to Genera

1. Head and mesonotum, excepting the praescutal stripes and centers of scutal lobes, with numerous deep punctures; a deep median longitudinal groove on praescutum; wing (Fig. 33, I)..... **Triogma**
- Head and mesonotum smooth; no median praescutal groove..... 2
2. Three branches of Radius reach the wing-margin,  $R_{1+2}$  being preserved as a distinct element (Fig. 33, E) ..... **Phalacrocera**, part
- Two branches of Radius reach the margin,  $R_{1+2}$  being entirely atrophied, giving the appearance of a long backward fusion of vein  $R_1$  and the anterior branch of  $R_3$  (Fig. 33, F-1)..... 3
3. Four branches of Media reach the margin (Fig. 33, G)..... **Cylindrotoma**
- Three branches of Media reach the margin..... 4
4. Wings with crossvein  $r-m$  usually present; outer end of cell *1st*  $M_2$  almost always closed by a single transverse vein, cell  $M_1$  being present, sessile to short-petiolate; cells *2nd*  $M_2$  and  $M_3$  confluent by atrophy or partial atrophy of distal section of vein  $M_2$ ; antennae nearly simple, the lower face of individual segments not produced (Fig. 33, A, F) **Phalacrocera**, part
- Wings with crossvein  $r-m$  usually shortened to quite obliterated by the approximation or fusion of veins  $R_{4+5}$  and  $M_{2+5}$ ; outer end of cell *1st*  $M_2$  closed by two transverse veins, these being  $m$  and the basal section of  $M_2$ ; cell  $M_1$  lacking, cells *2nd*  $M_2$  and  $M_3$  distinct; antennae strongly nodulose, especially in male, the individual segments nearly cordate (Fig. 33, C, H)..... **Liogma**

### Phalacrocera Schiner

1863. *Phalacrocera* Schiner; Wien. Ent. Monatschr., 7: 224.

A limited group (ten species), distributed throughout the Holarctic Region. The venation of the more generalized species (*neovena*, *replicata*) is quite as in the genus *Tipula* and serves to interpret the

more reduced venation of the remaining members of the subfamily. In all of these, vein  $R_{1+2}$  is completely atrophied and vein  $R_1$  merges gradually into  $R_2$ , effecting the illusion of a long backward fusion of the anterior branches of  $R$  (Fig. 33, F). The missing branch of  $M$  is  $M_3$ . The free tip of vein  $Sc_2$  is preserved in all local species but the actual tip of  $Sc_1$  is atrophied. The antennae (Fig. 33, A) are 16-segmented, with a structure and appearance that is much as in *Tipula*, the segments being relatively short, with conspicuous basal verticils.

The adult flies are very sluggish in their habits. The larvae are aquatic or nearly so, living and feeding on submerged mosses and seed plants in bogs or similar places.

*Key to Species*

1.  $R_{1+2}$  entirely preserved (Fig. 33, E) ..... **neoxena**  
 $R_{1+2}$  atrophied (Fig. 33, F) ..... **tipulina**

**Phalacrocer** *neoxena* Alex. (Fig. 33, E).

1914. *Phalacrocer neoxena* Alexander: Proc. Acad. Nat. Sci. Philadelphia, 1914: 603-604.

Figs.—Alexander, *Ibid.*, pl. 25, fig. 10 (wing); 1914. Alexander, Cfls. N. Y., 1, pl. 30, fig. 9 (wing); 1919. Alexander, Gen. Ins., Fasc. 187, pl. 2, fig. 6 (wing); 1927.

General coloration dark brown, heavily pruinose, the three praescutal stripes darker gray. Femoral tips insensibly darkened. Wings very strongly suffused with brown; venation (Fig. 33, E) variable,  $r-m$  present or lost by fusion of adjoining veins. ♂. L. 11.8-12 mm.; w. 10.4-11 mm. ♀. L. 11.8 mm.; w. 10.9-11.9 mm.

(May, June) Ont., Que., N. Y., Pa., westw. to Mich.

**P. tipulina** O. S. (Fig. 33, A, F).

1865. *Phalacrocer tipulina* Osten Sacken: Proc. Ent. Soc. Philadelphia, 4: 241.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 11, fig. 2 (wing); 1908. Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1914, pl. 25, fig. 11 (wing); 1914. Alexander, Cfls. N. Y., 1, pl. 30, fig. 8 (wing), text-fig. 125, J (ant. ♂); 1919. Dickinson, Cfls. Wisc., p. 210, fig. 112 (wing); 1932.

Praescutal stripes not well-defined against the dark ground of the notum. Antennae dark, only the base of scape pale. Femoral tips abruptly blackened. Wings grayish brown, the stigma distinct; venation (Fig. 33, F) variable, in cases the element closing cell 1st  $M_2$  (i. e.,  $m$  plus basal section of  $M_3$ ) lies distad, connecting vein  $M_2$  beyond the fork of  $M_{1+2}$ ;  $R_{2+3}$  angulated and almost invariably spurred at proximal end of stigma. Abdominal tergites brown, broadly margined with brownish black. ♂. L. 11-13 mm.; w. 8.5-10 mm. ♀. L. 14-15 mm.; w. 10-11.5 mm.

(Late May-early Aug.) Ont., Que., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Mich. and Wisc.; (in sphagnum bogs).

Connecticut.—Manitic Lake, June 8-9, 1929 (C. P. A.); Putnam, June 15, 1933 (C. P. A.).

**Cylindrotoma** Macquart

1834. *Cylindrotoma* Macquart; Suit. á Buffon, 1, Hist., Nat. Ins., Dipt., p. 107.

A small group (ten species), distributed throughout the Holarctic Region. The adult flies have the antennae (Fig. 33, B) with long, nearly cylindrical flagellar segments, much longer in male than in female; in male, segments clothed with a dense erect pubescence, in addition to the verticils.

The adults may be swept from swampy and boggy places in woods. The larvae live on the leaves of many genera of higher plants, both monocotyledons and dicotyledons.

*Key to Species*

1. Tarsi pale yellow, segments two and three concolorous with the basitarsus. **americana**  
 Tarsi with basitarsus dark brown, its extreme apex and all of segments two and three abruptly light yellow.....**tarsalis**

**Cylindrotoma americana** O. S.

1865. *Cylindrotoma americana* Osten Sacken; Proc. Ent. Soc. Philadelphia, 4: 236.

Figs.—Johnson, Psyche, 19: 2, fig. 2 (ven.); 1912. Alexander, Cfs. N. Y., 1, pl. 30, fig. 6 (wing); 1919.

Pale yellow, praescutum with three distinct black stripes; centers of scutal lobes blackened; dark brown areas on ventral anepisternum and ventral sternopleurite; more or less distinct paired brown spots on posterior border of mediotergite. Tarsal segments one to three pale yellowish brown, the remaining segments darker brown. Venation variable, especially as to position of *r-m* and *m*, in cases the latter before or beyond the fork of *M*<sub>1+2</sub>. Abdominal tergites chiefly yellow medially, darkened laterally. ♂. L. 10-12 mm.; w. 9-10 mm.

(Late June, July) Ont., Que., N. B., Me., N. H., N. Y., Pa., westw. to Mich. (Hudsonian, high Canadian).

**C. tarsalis** Johns. (Fig. 33, B, G).

1912. *Cylindrotoma tarsalis* Johnson; Psyche, 19: 2 (♂).

1912. *C. ? anomala* Johnson; *Ibid.*, 19: 2-3 (♀).

Figs.—Johnson, *Ibid.*, 19: 2, text-figs. 3, 4 (ven.); 1912. Alexander, Cfs. N. Y., 1: 850, text-fig. 125, K (ant. ♂), pl. 30, fig. 7 (wing); 1919. Alexander, Gen. Ins., Fasc. 187, pl. 2, fig. 1 (wing); 1927.

Quite as in last, differing in the conspicuous light yellow intermediate tarsal segments, which contrast abruptly with the brownish black basitarsi. The darkened spots on anepisternum and mediotergite are reduced or subobsolete; mark on sternopleurite always distinct. ♂. L. 8-9 mm.; w. 7-9 mm. ♀. L. 8 mm.; w. 9 mm.

(Late June-Sept.) N. B., Vt., Ct., N. Y. (Canadian).

Connecticut.—Norfolk, June 12, 1931 (C. P. A.); Sept. 11, 1928, one dead in spider's web (C. P. A.); Sept. 12, 1928, one male flying (G. C. C.).



**Liogma** Osten Sacken

1869. *Liogma* Osten Sacken; Mon. Dipt. N. Amer., 4: 298.

A very restricted group (seven species), widespread throughout the Holarctic Region. The polished black coloration of our local species, in conjunction with the strongly nodulose antennae, renders the fly conspicuous and easily recognizable. The adults are common in deep shaded woods. The larvae feed on terrestrial mosses.

*Key to Subspecies*

1. Mesonotum and pleura chiefly polished black, the dorso-pleural membrane yellow ..... **nodicornis nodicornis**  
 Posterior sclerites of mesonotum and most of thoracic pleura yellow..... **nodicornis flaveola**

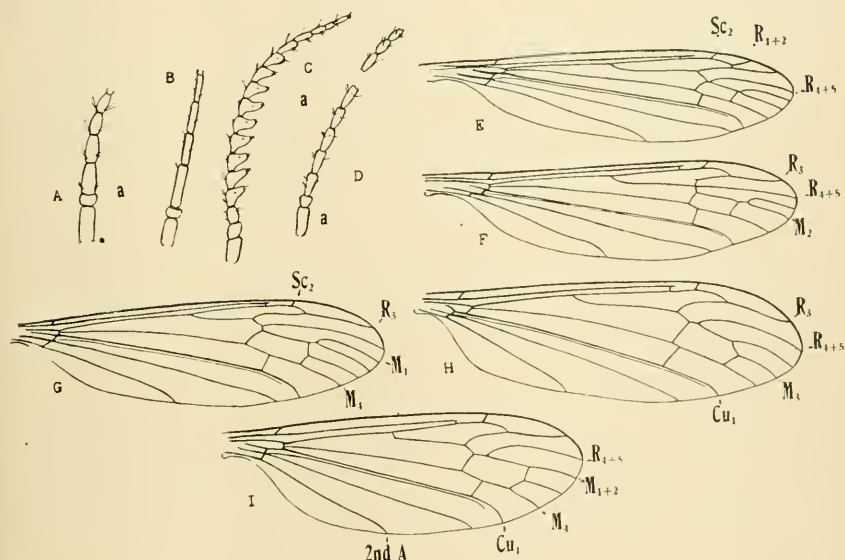


FIGURE 33. Cylindrotominae.

- A. *Phalacrocerca tipulina* O.S.; antenna, ♂, basal segments.  
 B. *Cylindrotoma tarsalis* Johns.; the same.  
 C. *Liogma nodicornis* (O.S.); antenna, ♂.  
 D. *Triogma exculpta* O.S.; antenna, ♂, base and apex.  
 E. *Phalacrocerca noxena* Alex.; wing.  
 F. *P. tipulina* O.S.; wing.  
 G. *Cylindrotoma tarsalis* Johns.; wing.  
 H. *Liogma nodicornis* (O.S.); wing.  
 I. *Triogma exculpta* O.S.; wing.
- Symbols: *a*, antenna; *A*, Anal; *Cu*, Cubitus; *M*, Media; *R*, Radius; *Sc*, Subcosta.

**Liogma nodicornis nodicornis** (O. S.) (Fig. 33, C, H).

1865. *Triogma nodicornis* Osten Sacken; Proc. Ent. Soc. Philadelphia, 4: 239.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 1, fig. 7 (wing); 1869. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 15, fig. 5 (ven.); 1908. Alexander, Cfs. N. Y., 1: 850, text-fig. 125, I (ant. ♂); pl. 30, fig. 5 (wing); 1919. Alexander, Gen. Ins., Fasc. 187, pl. 1, fig. 1 (entire insect), 6 (ant. ♂); pl. 2, fig. 9 (wing); 1927. Dickinson, Cfs. Wisc., p. 210, fig. 111 (wing); 1932.



Mesonotum and pleura chiefly polished black, the dorso-pleural membrane conspicuously yellow. Venation (Fig. 33, H) with *r-m* sometimes preserved, more often shortened and lost by fusion of adjoining veins. ♂. L. 9-12 mm.; w. 8-8.5 mm. ♀. L. 10-11 mm.; w. 9-9.5 mm.

(Late May-early July) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., N. J., Pa., westw. to Ill., Wisc. and Alta.

Connecticut.—Cornwall Bridge, June 13, 1931 (C. P. A.); Granby, June 8, 1929 (C. P. A.); Hamden, June 2, 1928 (R. B. F.); Hartland, June 9, 1929 (C. P. A.); Kent Falls, May 31, 1931, June 12-13, 1931 (C. P. A.); Manitic Lake, June 8-9, 1929 (C. P. A.); Norfolk, June 9, 1929 (C. P. A.); Riverton, June 12, 1931 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.).

### ***L. nodicornis flaveola* Alex.**

1919. *Liogma nodicornis flaveola* Alexander; Can. Ent., 51:195.

Mesonotal praescutum and scutal lobes black; scutellum, medio-tergite, except at posterior margin, and pleura, except areas on anepisternum and ventral sternopleurite, light yellow. ♂. L. 11-12 mm.; w. 8.3-8.5 mm. ♀. L. 11 mm.; w. 9 mm.

(May-early June) D. C., Va., N. C., Ind., Tenn. (more southern than typical form).

## **Triogma Schiner**

1863. *Triogma* Schiner; Wien. Ent. Monatschr., 7:223.

Only four species are known, almost evenly distributed throughout the Holarctic Region (Europe, Japan, eastern North America). The local species frequents open boggy meadows, where there is little or no shade, the sluggish adults resting on the vegetation. The larvae occur on subaquatic and aquatic mosses in this habitat. The local species is readily told by the small size, uniform brown coloration and entirely opaque, rugulose body.

### ***Triogma exculpta* O. S. (Fig. 33, D, I).**

1865. *Triogma exculpta* Osten Sacken; Proc. Ent. Soc. Philadelphia, 4:239.

Figs.—Alexander, Gen. Ins., Fasc. 187, pl. 1, fig. 7 (ant. ♂); pl. 2, fig. 11 (wing); 1927.

General coloration dull brown. Terminal segment of flagellum shorter than the penultimate (Fig. 33, D). Praescutal stripes and centers of scutal lobes impunctate. Degree of fusion of  $R_{4+5}$  with  $M_{1+2}$  variable (Fig. 33, I), in very rare cases with *r-m* distinct. ♂. L. 8-9 mm.; w. 6-7.5 mm. ♀. L. 8.5-9 mm.; w. 6.5-7.5 mm.

(Late Apr.-mid-June) N. H., Mass., Ct., N. J., Pa., westw. to Mich.

Connecticut.—Norfolk, June 9, 1929 (C. P. A.); Stamford, May 15, 1932 (B. T. R. L.).

## Subfamily LIMONIINAE

This vast subfamily includes the majority of all small and medium-sized Tipulidae throughout the World. There are five tribes, four of which are represented in the local fauna.

## Key to Tribes

1. Eyes hairy; vein  $Sc_1$  very long,  $Sc_2$  lying basad of origin of  $R_s$  (Fig. 40, A-J) ..... **Pediciini** 342
- Eyes glabrous; vein  $Sc_1$  short or of moderate length, when long (some Eriopterini),  $Sc_2$  lying distad of origin of  $R_s$ ; where  $Sc_2$  lies basad of origin of  $R_s$  (some Limoniini, Eriopterini), the entire vein  $Sc$  is shortened. .... 2
2. Free tip of  $Sc_2$  often present; veins  $R_4$  and  $R_5$  fused to margin, only two branches of  $R_s$  being present (Fig. 34, A, B); antennae usually with 14 (Limoniaria) or 16 segments..... **Limoniini**
- Free tip of  $Sc_2$  atrophied; veins  $R_4$  and  $R_5$  separate, the former usually captured by  $R_{2+3}$  to form a distinct element  $R_{2+3+4}$ ; usually with three branches of  $R_s$  present (exceptions in *Atarba*, *Elephantomyia*, *Teucholabis* and some *Gonomyia*, where  $R_4$  is captured by  $R_{2+3}$  (Figs. 44, P; 47, E, F, G)); antennae usually with 16 segments..... 3
3. Tibial spurs present..... **Hexatomini** 365
- Tibial spurs lacking ..... **Eriopterini** 424

## LIMONIINI

A considerable tribe, including within our limits, representatives of six subtribes, of which the Limoniaria are most common and well-known.

## Key to Subtribes and Genera

1. Wings with vein  $R_2$  lacking (Fig. 38, B, D)..... 2
- Wings with vein  $R_2$  present (Fig. 38, C, E-G)..... 3
2. Rostrum short and inconspicuous;  $Sc_2$  far from tip of  $Sc_1$ , lying basad of the origin of  $R_s$ , the latter vein long and straight, running close to  $R_1$  and in direct alignment with  $R_{2+3}$ ;  $r-m$  distinct (Fig. 38, D). (*Ellipteraria*)  
**Elliptera**, part
- Rostrum of moderate length, about equal to or longer than remainder of head;  $Sc_2$  at tip of  $Sc_1$ , both being about opposite the fork of  $R_s$ , the latter vein short, gently arcuated, not in alignment with  $R_{2+3}$ ;  $r-m$  often shortened or obliterated by the approximation of adjoining veins (Fig. 38, B). (*Heliaria*)..... **Helius**
3. Wings with  $m-cu$  close to or beyond the fork of  $M$ ; if before the distance not or scarcely exceeding the length of the vein itself (Figs. 34, A, B; 38, C, E, F)..... 4
- Wings with  $m-cu$  far before level of origin of  $R_s$  (Fig. 38, G). (*Orimargaria*) ..... **Orimarga**: **Diotrepha**
4. Wings with vein  $R_2$  lying far distad, beyond level of outer end of cell *1st*  $M_2$ ;  $m-cu$  beyond fork of  $M$ ; a conspicuous pale fold in distal end of cell  $Cu$ , shown in illustration by a dotted line (Fig. 38, F). (*Dicranoptycharia*) ..... **Dicranoptycha**
- Wings with  $R_2$  in almost transverse alignment with  $r-m$  and the basal half of cell *1st*  $M_2$ , at most (some *Limonia*) opposite the outer end of cell *1st*  $M_2$ ;  $m-cu$  at or slightly before fork of  $M$ ; no fold in cell  $Cu$ ..... 5
5. Wings with  $R_s$  long, straight or slightly convex (Fig. 38, C, E); antennae 16-segmented ..... 6
- Wings with  $R_s$  shorter, more concave in outline (Fig. 34, A, B); antennae 14-segmented (*Limoniaria*)..... **Limonia**

6. Anal angle of wing prominent, almost square; *Sc* lying very close to *R*, *Sc*<sub>2</sub> not evident; *Rs* long, straight or slightly convex, diverging from *R*<sub>1</sub> at an acute angle, ending approximately between the branches of *Rs* or else in alignment with *R*<sub>4+5</sub> (Fig. 38, C). (Antocharia)..... **Antocha** 333
- Anal angle of wing normally rounded; *Sc* distinct from *R*, *Sc*<sub>2</sub> far from tip of *Sc*<sub>1</sub>, lying basad of origin of *Rs*; *Rs* long, lying very close to *R*<sub>1</sub> and nearly parallel with it, its distal end in alignment with *R*<sub>2,3</sub>; basal section of *R*<sub>4+5</sub> short and arcuated, diverging at nearly a right angle from the end of *Rs* (Fig. 19, E). (Ellipteraria)..... **Elliptera**, part

1. Subtribe LIMONIARIA

**Limonia** Meigen

1800. *Amphinome* Meigen: Nouv. Class. Mouch., p. 15 (nom. nud.).  
 1803. *Limonia* Meigen: Illiger's Mag., 2:262.  
 1818. *Limnobia* Meigen: Syst. Besch. Zweifl. Ins., 1:116.

As now constituted, the subtribe includes only the genus *Limonia*, with about a score of subgenera that have long been held to represent valid generic groups. The reasons for relegating these familiar names to this lesser ranking have been given by the writer in another paper (Philippine Journ. Sci., 40:239-248; 1929).

*Limonia*, in this broad sense, will very probably be found to be the largest genus of Tipulidae, even exceeding the vast genus *Tipula*. *Limonia* is found in every region of the World, including the lesser oceanic islands, whereas *Tipula* is lacking or virtually so in certain major land areas, notably Australia and New Zealand.

In so protean a group we encounter a tremendous range in structure, involving almost all parts of the body. Thus we have species with elongate rostra (*Geranomyia*, Fig. 34, C), with others having very reduced mouth parts; other forms with branched antennal segments (*Rhipidia*, males, Fig. 34, F, G) to others that have the usual simple structure of this organ; and forms with supernumerary crossveins in certain cells of the wing (*Discobola*) or lacking such extra elements.

The adult flies are very common and familiar. The larvae live in a great variety of ecological habitats, as marine (some *Dicranomyia*, *Geranomyia*); lithophilous, living in saturated mosses and crusts of liverworts on the faces of shaded cliffs (many *Geranomyia*, some *Dicranomyia*); in decaying wood and beneath bark (*Limonia*, *Discobola*, some *Rhipidia*); in fungi (*Limonia*); and, in fact, in the great majority of ecological niches occupied by members of this family.

Key to Subgenera

1. Wings with *m* and both sections of vein *M*<sub>2</sub> lacking, cell *M*<sub>3</sub> thus being entirely obliterated (Fig. 34, B)..... **Limonia: Alexandriaria**  
 Wings with at least the distal section of *M*<sub>3</sub> preserved and usually with both sections, together with *m*, cell *M*<sub>3</sub> thus usually present (Fig. 34, A)..... 2
2. A supernumerary crossvein in cell 1st *A*, connecting the two Anal veins. **Limonia: Discobola**  
 No supernumerary crossvein in cell 1st *A*..... 3

3. Mouth parts, and especially the labial palpi, lengthened, the rostrum thus formed much longer than remainder of head and usually about as long as the combined head and thorax (Fig. 34, C)..... **Limonia: Geranomyia**  
 Mouth parts, with the labial palpi, not notably lengthened, shorter than remainder of head..... 4
4. Antennae (male) more or less branched (bipectinate, unipectinate, or subpectinate, Fig. 34, F, G); of female simply serrate, sometimes weakly so. **Limonia: Rhipidia** 326  
 Antennae simple in both sexes..... 5
5. Wings with vein  $Sc$  short,  $Sc_1$  ending opposite or before origin of  $R_s$ . **Limonia: Dicranomyia** 310  
 Wings with  $Sc$  long,  $Sc_1$  ending beyond midlength of  $R_s$  (Fig. 15, A). **Limonia: Limonia**

### Subgenus *Limonia* Meigen

#### *Key to Species*

1. Wings with numerous macrotrichia in all cells beyond cord..... **fusca**  
 Wings without macrotrichia in cells of wing..... 2
2. Wings unmarked, except for stigma when this is present; size small (w., 6 mm. or less). ..... 3  
 Wings patterned (except in *sociabilis*); size large (w., 7 mm. or more, usually over 10 mm.) ..... 4
3. No stigmal spot or brown seams to veins; free tip of  $Sc_2$  lying markedly basad of  $R_3$ , the latter thus appearing decurved into  $R_{2+3}$ ; tarsi brown. **globithorax**  
 Stigma evident, brown; paler brown seams along cord and outer end of cell 1st  $M_2$ ; free tip of  $Sc_2$  and  $R_2$  in transverse alignment; intermediate tarsal segments on all legs whitish ..... **macateei**
4. Wings subhyaline, with abundant brown spots and dots in all cells.... **simulans**  
 Wings with clouds larger, confined to vicinity of veins..... 5
5.  $R_{1+2}$  and  $R_2$  subequal in length..... 6  
 $R_{1+2}$  two or more times as long as  $R_2$ ..... 13
6. Legs uniformly dark brown..... **rara**  
 Legs chiefly yellow, the femora banded with dark brown, in rare cases the legs uniformly pale yellow..... 7
7. Wings yellow, with three eye-like brown markings, placed at origin and fork of  $R_s$  and at stigma; femora yellow, the tips narrowly dark brown, in rare cases uniformly pale..... **tricellata**  
 Wings without such an ocelliform pattern; legs with one or more dark femoral rings basad of the darkened apex (this subterminal dark ring only feebly indicated in *novae-angliae*)..... 8
8. Knobs of halteres pale at tips; male hypopygium with dististyles separate almost to base; gonapophyses with apical hair-brushes (Fig. 34, H).... 9  
 Knobs of halteres uniformly brownish black to black; male hypopygium with dististyles fused on basal half; gonapophyses without setae (except in *hudsonica*) (Fig. 34, L)..... 10
9. Femora with two brown rings..... **cinctipes**  
 Femora with three brown rings..... **immatura**
10. Wings with a large dark spot in cell  $R$  at mid-distance between the arcular area and the mark at origin of  $R_s$ ; male hypopygium with setae on gonapophyses ..... **hudsonica**  
 Wings without such a spot, being either immaculate in this field, or else with a series of three or more small dots in cell  $R$ ; male hypopygium with glabrous gonapophyses (Fig. 34, L)..... 11
11. Wings with cell  $R$  unmarked between the arcular and radial darkened areas; subterminal dark femoral band obsolete or barely evident..... **novae-angliae**  
 Wings with small dots in a linear series in cell  $R$ ; subterminal dark femoral band present..... 12



12. Intermediate praescutal stripes lacking or ill-defined, the laterals enclosing a pale median area; antennae chiefly dark brown; wings narrow, with a clear-cut dark brown pattern, the series of spots in cell *R* small and well-defined; size small (w., ♀, about 9.5 mm.)..... **faliax**  
Intermediate praescutal stripes well-marked, at least on posterior half; basal antennal segments chiefly yellow; wings broader, with the pattern paler brown, more diffuse; spots in cell *R* larger, often poorly delimited, more or less confluent; size larger (w., ♀, about 11 mm.)..... **solitaria**
13. Femora brown, the tips conspicuously yellow; wings with three large circular brown costal areas, located at origin of *Rs*, fork of *Sc* and on *R*<sub>2</sub> ..... **maculicosta**  
Femora yellow, with the apices dark brown (color unknown in *sociabilis*); wing-pattern not as described, if with three costal darkenings (*tristigma*), these small and scarcely evident ..... 14
14. Wings with conspicuous brown clouds and seams ..... 15  
Wings immaculate or nearly so, at most with three or four small brown costal dots..... 17
15. Large species (w., 15 mm. or more); apex of wing very obtuse; all cells beautifully clouded and marbled medially with gray and brown.... **parietina**  
Smaller flies (w., 12 mm. or less); apex of wing normal; wing-markings beyond cord confined to vicinity of veins or lacking; the most evident darkenings appear as a seam along cord and (in *indigena*) as a broken crossband before cord ..... 16
16. Abdominal tergites blackish, the posterior borders conspicuously pale; no transverse cloud before cord of wing ..... **badia**  
Abdominal tergites pale, the posterior borders broadly brownish black; a transverse broken crossband before cord of wing..... **indigena**
17. Wings with three small brown dots along costal border; head entirely dark; antennae pale, darkened towards tips..... **tristigma**  
Wings yellowish, without markings; head yellow, except on front; antennae yellow ..... **sociabilis**

**Limonia** (*Limonia*) **badia** (Walk.)

1848. *Limnobia badia* Walker: List Dipt. Brit. Mus., 1:46 (The *badia* of authors previous to 1930 equals *L. (Dicranomyia) humidicola* (O. S.) ).

Head black, pruinose; palpi and antennae black. Mesonotum opaque; praescutum with an indefinite median brown stripe; lateral stripes represented by small brown spots on margin before suture. Halteres pale. Wings with venation much as in *indigena*; *Rs* longer, spurred at origin; *Sc*<sub>1</sub> ending just before midlength of *Rs*. ♀. W. 9 mm.

N. S.; probably westw.

I am indebted to Dr. Fred W. Edwards for a re-description of the unique type in the British Museum.

**L. (Limonia) cinctipes** (Say) (Fig. 34, A, H).

1823. *Limnobia cinctipes* Say; Journ. Acad. Nat. Sci. Philadelphia, 3:21.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 30, fig. 3 (ven.); 1908. Alexander, Cfls. N. Y., 1, pl. 32, fig. 29 (wing); 1919. Dickinson, Cfls. Wisc., p. 186, fig. 62 (wing); 1932.

Mesonotum obscure yellow, the praescutum with four narrow dark brown stripes; pleura variegated with brown. Femora with

outer dark ring narrow and subterminal in position, the extreme tip yellow. Wing (Fig. 34, A). Abdomen yellow, narrowly margined laterally with brownish black; a more or less distinct brown crossband just beyond midlength of each segment; hypopygium pale. Male hypopygium (Fig. 34, H) with dististyles distinct; gonapophyses with a brush of setae at inner apical angle. ♂. L. 10-16 mm.; w. 13-18 mm. Like many other species in the subgenus, the present species shows great variation in size.

(Apr.-June; Aug., Sept.) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., westw. to Man., Mich., Ill., Wisc., Minn., Mo. and Alta., southw. to N. C., S. C., Fla. and Miss.

**L. (*Limonia*) fallax (Johns.)**

1909. *Limnobia fallax* Johnson; Proc. Boston Soc. Nat. Hist., 34: 125.

Fig.—Alexander, Cfs. N. Y., 1, pl. 32, fig. 32 (wing); 1919.

Pronotum and mesonotum narrowly pale medially, with a submedian brown vitta on either side, the dark stripes gradually diverging behind, leaving the scutellum and mediotergite chiefly pale; pleura yellow. The number of brown dots in cell *R* ranges from three to about twelve. ♂. L. about 7-7.5 mm.; w. 8-8.5 mm. ♀. L. 8-9 mm.; w. 9-10 mm.

(May-July) N. Y., N. J., Pa., Va., westw. to Ill., Mich., Mo. and Okla., southw. to Tenn. and N. C.

**L. (*Limonia*) fusca Meig. (Fig. 34, I).**

1804. *Limonia fusca* Meigen; Klass., 1: 54.

1856. *Limnobia turpis* Walker; Ins. Saundersiana, Dipt., 3: 300.

1859. *Dicranomyia pubipennis* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 211.

1863. *Limnobia pilipennis* Egger; Verh. zool., bot. Ges. Wien. 13: 1108.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 1, fig. 2 (wing); 1869. Alexander, Cfs. N. Y., 1, pl. 31, fig. 28 (wing); 1919.

General coloration dark brown, including antennae and halteres. Legs brown, the femora more yellowish basally. Wings tinged with brown, stigma darker; *Sc*<sub>1</sub> ending near two-thirds the length of *R*<sub>s</sub>. *Sc*<sub>2</sub> at its tip. Male hypopygium (Fig. 34, I): dorsal dististyle present; rostral spines two, abnormally three. ♂. L. 5.5-6 mm.; w. 6-7 mm. ♀. L. 6-6.5 mm.; w. 7-8 mm.

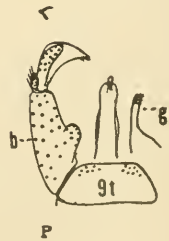
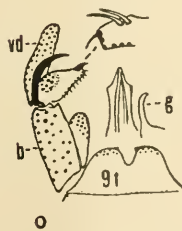
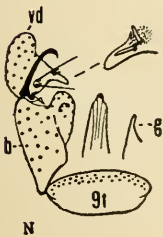
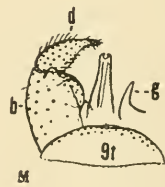
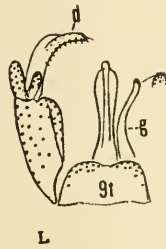
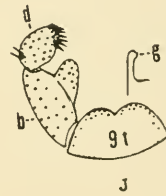
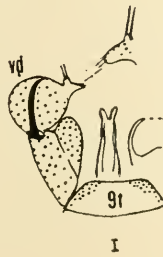
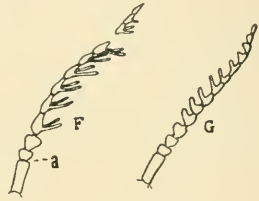
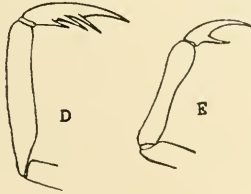
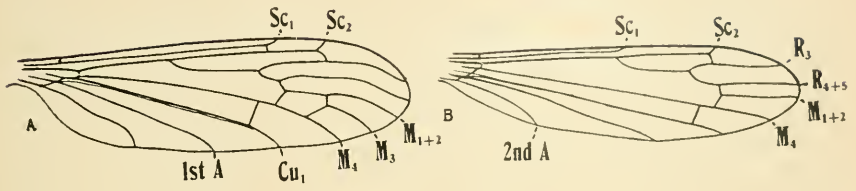
(June-Sept.) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Mich., southw. to S. C., Ga. and Tenn. (Eurasia). Near streams and in open gorges.

Connecticut.—Cornwall Bridge, Aug. 19, 1931 (C. P. A.); E. Hartland, Sept. 11, 1928 (C. P. A.); Hartland, June 9, 1929 (C. P. A.); Kent Falls, May 30-31, 1931, July 23-24, 1931 (C. P. A.); Norfolk, May 31, 1931, June 12, 1931, July 24, 1931, Sept. 6, 1928 (C. P. A., G. C. C.); Riverton, May 30, 1931, Sept. 11, 1928 (C. P. A.); Stafford Springs, June 14, 1933 (C. P. A.); Union, June 14, 1933 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.); Winsted, June 9, 1929 (C. P. A.), Sept. 5, 1928 (G. C. C.).

FIGURE 34. *Limonia*; details.

- A. *Limonia (Limonia) cinctipes* (Say); wing.
- B. *L. (Alexandriaria) whartoni* (Ndm.); wing.
- C. *L. (Geranomyia) canadensis* (Westw.); head.
- D. *L. (Limonia) indigena* (O.S.); claw, ♂.
- E. *L. (Dicranomyia) morioides* (O.S.); claw, ♂.
- F. *L. (Rhipidia) maculata* (Mg.); antenna, ♂.
- G. *L. (R.) fidelis* (O.S.); antenna, ♂.
- H. *L. (Limonia) cinctipes* (Say); hyp.
- I. *L. (L.) fusca* (Meig.); hyp.
- J. *L. (L.) globithorax* (O.S.); hyp.
- K. *L. (L.) indigena* (O.S.); hyp.
- L. *L. (L.) novae-angliae* Alex.; hyp.
- M. *L. (L.) parietina* (O.S.); hyp.
- N. *L. (L.) rara* (O.S.); hyp.
- O. *L. (L.) simulans* (Walk.); hyp.
- P. *L. (L.) triocellata* (O.S.); hyp.

Symbols: *a*, antenna; *b*, basistyle; *d*, dististyle; *g*, gonapophysis; *lp*, labial palpus; *p*, maxillary palpus; *t*, tergite; *vd*, ventral dististyle. Venation: *A*, Anal; *Cu*, Cubitus; *M*, Media; *R*, Radius; *Sc*, Subcosta.





The identity of *turpis* was settled by an examination of Walker's type by Dr. Fred W. Edwards.

**L. (*Limonia*) *globithorax* (O. S.) (Fig. 34, J).**

1869. *Dicranomyia globithorax* Osten Sacken; Mon. Dipt. N. Amer., 4: 74-75.

Figs.—Alexander, Cfs. N. Y., 1, pl. 31, fig. 27 (wing); 1919. Dickinson, Cfs. Wisc., p. 185, fig. 56 (wing); p. 155, fig. 36 (claw); p. 153, fig. 33 (ant.); 1932.

General coloration dark brown. Head, including antennae, more blackened. Halteres dark brown. Praescutum very gibbous. Wings with a strong brown tinge; no stigma;  $Sc_1$  at midlength of  $R_s$ ,  $Sc_2$  at tip of  $Sc_1$ . Male hypopygium (Fig. 34, J): a single fleshy dististyle, set apically with blackened spines. ♂. L. 4-5 mm.; w. 4.5-6 mm. ♀. L. 5-5.5 mm.; w. 5.5-6 mm.

(May-Sept.) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Mich. and Wisc., southw. to S. C., Tenn. and Fla.

Connecticut.—Cornwall Bridge, Aug. 19, 1931 (C. P. A.); Hartland, Sept. 11, 1928 (C. P. A.); W. Granby, Sept. 4, 1928 (G. C. C.).

**L. (*Limonia*) *hudsonica* (O. S.)**

1861. *Limnobia hudsonica* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1861: 289.

Closely allied to *solitaria*, most readily told by the four major dark areas in cell  $R$  of wings, the first arcular, third at origin of  $R_s$ , fourth at fork of  $R_s$ . Head and pleura heavily pruinose. Male hypopygium with apices of gonapophyses densely hairy. ♂. L. 10 mm.; w. 11 mm. ♀. L. 11-12 mm.; w. 11-12 mm.

(June, July) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., westw. to Alta., B. C. and Alaska.

**L. (*Limonia*) *immatura* (O. S.)**

1859. *Limnobia immatura* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 214.

Fig.—Dickinson, Cfs. Wisc., p. 186, fig. 61 (wing); 1932.

Very similar to *cinctipes*. General coloration of body darker. Femora with last brown ring nearly terminal in position, much narrower than the intermediate band. Stigmal area of wing sometimes almost solidly darkened. ♂. L. 8-11 mm.; w. 8.5-11.5 mm. ♀. L. 12-14 mm.; w. 12-13 mm.

(May-early July; Sept.) Ont., Me., N. H., Vt., Mass., N. Y., westw. to Man., Mich., Wisc. and B. C., southw. to N. C., S. C., Tenn. and n. Fla.

Connecticut.—East River, July 19-24, 1912 (Ely); Storrs, 1932 (H. M.).

**L. (*Limonia*) *indigena* (O. S.) (Fig. 34, K).**

1859. *Limnobia indigena* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 215.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 3, fig. 7 (hyp.); 1869. Alexander, Cfs. N. Y., 1, pl. 32, fig. 33 (wing); 1919. Dickinson, Cfs. Wisc., p. 186, fig. 63 (wing); 1932.

Mesonotum yellow, the praescutum with four dark brown stripes; scutum and scutellum extensively blackened; pleura yellow, with a complete transverse dark brown girdle on anepisternum and sternopleurite. Knobs of halteres pale yellow. Femora with two dark rings, the more basal paler in color. Wing-markings mostly confined to veins, the only areas basad of cord being longitudinal washes in cells *R*, *M*, and a common cloud in *Cu* and *1st A*. Abdominal sternites more uniformly pale than tergites; hypopygium obscure yellow. ♂. L. 8-9 mm.; w. 8-9 mm. ♀. L. 9-12 mm.; w. 9-11.5 mm.

(May-Sept.) Ont., Que., Me., N. H., Vt., Mass., N. Y., N. J., Pa., westw. to Ill., Mich., Wisc. and Ia., southw. to N. C., S. C. and Tenn.

Connecticut.—Hartland, Sept. 11, 1928 (C. P. A.); Kent Falls, May 31, 1931, June 12-13, 1931, July 23-24, 1931 (C. P. A.); Riverton, June 8, 1929 (C. P. A.); Rowayton, June 16, 1909 (C. W. J.); Saptree Run State Park, June 14, 1933 (C. P. A.); Sharon, Sept. 5, 1928 (G. C. C.); Storrs (C. S. C.).

**L. (*Limonia*) *maculicosta* (Coq.)**

1905. *Limnobia maculicosta* Coquillett; Journ. N. Y. Ent. Soc., 13:57.

Mesonotum brown, variegated with yellow. Head and antennae brown. Knobs of halteres yellow. Legs brown, the femoral tips conspicuously yellow. Wings whitish subhyaline, with very distinct seams along cord and dark washes in bases of Anal cells; in cases, a cloud at tip of *R*<sub>1+2</sub>. Abdomen brown, bases of individual segments yellow, broader on sternites. ♀. L. 11-12 mm.; w. 14-15 mm.

(Aug.) Vt., westw. to B. C. and Alaska. (Hudsonian).

**L. (*Limonia*) *macateei* (Alex.)**

1916. *Dicranomyia macateei* Alexander; Can. Ent., 48:42-43.

1921. *Dicranomyia varipes* Dietz; Trans. Amer. Ent. Soc., 47:241-242.

Fig.—Alexander, Cfls. N. Y., 1, pl. 31, fig. 26 (wing); 1919.

General coloration light reddish brown, subnitidous; pleura a trifle paler. Antennae dark throughout. Halteres dark brown. Abdominal tergites dark brown; sternites ringed caudally with yellow. ♂. L. 4-4.5 mm.; w. 5-5.5 mm. ♀. L. 4.5-5.5 mm.; w. 5-6 mm.

(June-Oct.) Ont., Me., Vt., Mass., N. Y., Pa., westw. to s. Ind. and Tenn., southw. to w. Fla.

**L. (*Limonia*) *novae-angliae* Alex. (Fig. 34, L).**

1929. *Limonia* (*Limonia*) *novae-angliae* Alexander; Ent. News, 40:44-45.

General coloration yellow; praescutum with yellow stripes, the interspaces with narrow black lines. Femora yellow, the tips black,

preceded by a clearer yellow ring; subterminal brown ring lacking or barely indicated. Wings with three major brown areas in cell *R*, with additional paler brown marginal and submarginal clouds; stigma brown, the pale central spot very reduced. In cases, with one or two smaller brown spots in cell *R*, near the arcular darkening. Abdominal tergites brownish yellow, the bases of segments clearer yellow. Male hypopygium (Fig. 34, L): dististyles fused except at tips; gonapophyses slender, tips spiculose, without hair-tufts. ♂. L. 7.5-8 mm.; w. 8-9 mm. ♀. L. 9.5-10 mm.; w. 8.5-9 mm.

(Late July-Aug.) Mass., Ct., N. Y.; open gorges, bog margins.

Connecticut.—Manitic Lake, Aug. 6, 1929 (C. P. A.).

**L. (*Limonia*) *parietina* (O. S.) (Fig. 34, M).**

1861. *Limnobia parietina* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1861: 289.

Figs.—Alexander, Cfs. N. Y., 1, pl. 32, fig. 30 (wing); 1919.

Mesonotum yellow pollinose, the praescutum with three brown stripes, the median one sometimes weakly bifid; pleura and sternum extensively blackened. Antennae pale basally, flagellum darker. Male hypopygium (Fig. 34, M) with the dististyle small. ♂. L. 13-15 mm.; w. 15-19 mm. ♀. L. 16-18 mm.; w. 16-18 mm.

(Late Aug.-Sept.) Ont., Me., N. H., Vt., Mass., Ct., N. Y., Pa., westw. to Mich. and Ill., southw. to N. C.; near wooded cliffs.

Connecticut.—Hartland, Sept. 11, 1928 (G. C. C.); Norfolk, Sept. 12, 1928 (G. C. C.).

**L. (*Limonia*) *rara* (O. S.) (Fig. 34, N).**

1869. *Picranomyia rara* Osten Sacken; Mon. Dipt. N. Amer., 4: 75-76.

Figs.—Alexander, Cfs. N. Y., 1, pl. 31, fig. 25 (wing); 1919. Dickinson, Cfs. Wisc., p. 185, fig. 58 (wing); 1932.

Mesonotum shiny obscure yellow; praescutum with three darker stripes; dorsal pleurites dark brown; sternopleurite more yellow on dorsal portion; scutellum and postnotum black. Front silvery; remainder of head, including antennae, black. Halteres dark brown. Wings brownish, with three darker brown areas, placed at origin *Rs*, fork *Sc*, and at stigma, the latter extensively surrounded by light yellow; narrow brown seams along cord and outer end cell *1st M*<sub>2</sub>; *Rs* angulated at origin. Male hypopygium (Fig. 34, N): dorsal dististyle present; ventral dististyle with two pale rostral spines; a small tubercle near base of style, bearing two very long setae; mesal lobe of basistyle bearing an additional small lobule on face. ♂. L. 5.5-7 mm.; w. 7-9 mm. ♀. L. 6-6.5 mm.; w. 7-7.5 mm.

(May-July; Aug.-Sept.) N. Y., N. J., Pa., Md., westw. to Ill., Wisc. and Ia., southw. to Ga. and c. Fla.

**L. (*Limonia*) *simulans* (Walk.) (Fig. 34, O).**1848. *Limnobia simulans* Walker; List Dipt. Brit. Mus., 1:45.1859. *Dicranomyia defuncta* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859:213.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 3, fig. 1 (hyp.); 1869. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 11, fig. 1 (wing); 1908. Alexander, Cfs. N. Y., 1, pl. 31, fig. 24 (wing); 1919.

General coloration gray, the praescutum with three blackish stripes, the median more or less divided by a pale line. Knobs of halteres black. Femora dark brown, tips black, preceded by a conspicuous yellow ring. Wings with four major brown costal areas, in addition to the abundant lesser dotting;  $Sc_1$  ending before midlength  $R_s$ . Abdomen dark brown; caudal margins of segments, especially of sternites, paler. Male hypopygium (Fig. 34, O): dorsal dististyle present; rostral spines two, pale. ♂. L. 6.5-7 mm.; w. 7.5-8 mm. ♀. L. 8-9 mm.; w. 8-10 mm.

(May-Oct.) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., w. to Ill., Mich and Wisc., southw. to S. C. and Tenn.; at margins of fast-flowing streams; on exposed rock surfaces near waterfalls.

Connecticut.—Kent Falls, Sept. 11, 1929 (A. J. W.); May 30-31, June 12, 13, July 23-24, 1931 (C. P. A.); Middletown, June 17, 1909 (C. W. J.); Storrs, May 1929 (C. J. A.); Winsted, June 9, 1929 (C. P. A.).

The identity of *L. (L.) pellucidiguttata* (Dietz) (Trans. Amer. Ent. Soc., 47:242; 1921) must remain in question and the species may well prove to be distinct. As far as known to me the fly is still represented only by the unique type taken near Hazleton, Pa., July 22, in a swampy area.

**L. (*Limonia*) *sociabilis* (O. S.)**1869. *Limnobia sociabilis* Osten Sacken; Mon. Dipt. N. Amer., 4:95-96.

Pronotum and mesonotal praescutum shiny ochre-yellow, with a broad brown median stripe; lateral stripes smaller, more or less coalescent with the median. Head with front and part of vertex brown. Halteres brownish ochreous. Wings yellow, unmarked;  $R_2$  beyond midlength of stigmal area. ♀. L. about 9 mm.

The possibility exists that this is an abnormal form of *tristigma*. As far as known to me, only the unique type, a female, from Illinois, has been discovered.

**L. (*Limonia*) *solitaria* (O. S.)**1859. *Limnobia solitaria* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859:215.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 3, fig. 6 (hyp.); 1869. Alexander, Cfs. N. Y., 1, pl. 32, fig. 31 (wing); 1919. Dickinson, Cfs. Wisc., p. 155, fig. 37 (claw); p. 153, fig. 34 (ant.); p. 152, fig. 30 (head); p. 186, fig. 60 (wing); p. 247, fig. 160 (hyp.); 1932.



Mesonotum obscure yellow, usually with four brownish black stripes, the intermediate pair sometimes obsolete in front; pleura chiefly pale, with a more or less distinct bloom. Inner brown femoral ring ill-delimited to lacking. Brown spots in cell *R* usually from four to seven, the one beneath origin *R*s more elongate. Male hypopygium with dististyles fused on basal half; apices of gonapophyses truncated, quite smooth, without setae. ♂. L. 10 - 15 mm.; w. 11 - 16 mm. ♀. L. 11 - 13 mm.; w. 11 - 13 mm.

(May-Sept.) Ont., Que., N. S., N. B., Me., N. H., Vt., Mass., N. Y., westw. to Mich., Minn., Wisc. and Alta.

Connecticut.—Cornwall Bridge, Aug. 19, 1931 (C. P. A.); Kent Falls, May 31, June 12-13, Aug. 19, 1931 (C. P. A.); Norfolk, June 9, 1929 (C. P. A.); Sharon, Sept. 5, 1928 (G. C. C.); Twin Lakes, Sept. 12, 1928 (C. P. A.).

**L. (*Limonia*) *triozellata* (O. S.)** (Figs. 23, B; 34, P).

1859. *Limnobia triozellata* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859:216.

Figs.—Crampton, Journ. Ent. & Zool., 20, fig. 23 (head); 1928. Alexander, Cfs. N. Y., 1, pl. 32, fig. 34 (wing); 1919. Dickinson, Cfs. Wisc., p. 185, fig. 57 (wing); 1932.

Mesonotum polished yellow, the black praescutal stripes broken into spots by having the intermediate portions obsolete; pleura chiefly yellow. Antennae yellow. Knobs of halteres darkened apically. Wings with restricted brown areas, additional to the ocelli, including a seam along cord and marginal clouds at ends of veins. Abdomen yellow; caudal margins of tergites brown; subterminal sternites blackened. Male hypopygium (Fig. 34, P): basistyles elongate, with mesal lobe on cephalic portion; apices of gonapophyses evenly setiferous. ♂. L. 8 - 9 mm.; w. 9 - 11 mm. ♀. L. 8 - 10 mm.; w. 9.5 - 12 mm.

(June-Sept.) Ont., Que., N. S., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Minn., Wisc., Mich., Man. and Alta., southw. to N. C., S. C., Ga. and Tenn.

Connecticut.—East River, July 28, 1910 (Ely); Riverton, June 12, 1931 (C. P. A.); Salisbury, Sept. 12, 1928 (C. P. A.); Saptree Run State Park, June 14, 1933 (C. P. A.); Twin Lakes, Sept. 12, 1928 (C. P. A.); W. Granby, Sept. 11, 1928 (C. P. A.); Winnipauk, June 16, 1909 (C. W. J.).

**L. (*Limonia*) *tristigma* (O. S.)**

1859. *Limnobia tristigma* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859:216.

Figs.—Alexander, Cfs. N. Y., 1, pl. 32, fig. 35 (wing); 1919. Dickinson, Cfs. Wisc., p. 187, fig. 64 (wing); 1932.

General coloration yellow; pronotum and praescutum with a brownish black median stripe; lateral stripes less distinct. Knobs of halteres weakly darkened. Legs yellow, femora with apex narrowly dark brown; subterminal ring ill-defined and sometimes obsolete. Wing-spots very small, placed at origin *R*s, fork *Sc* and at both ends of stigma; *R*<sub>2</sub> at midlength of stigma. Abdominal tergites light brown; sternites yellow. Male hypopygium with a single dististyle,



much like *parietina*: gonapophyses slender, with pale lateral flange.  
 ♂. L. 8-9 mm.; w. 8.5-10.5 mm. ♀. L. 9-11 mm.; w. 10-11 mm.

(July, Aug.) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Mich., Wisc. and Alta., southw. to Va., N. C. and Tenn.

On the structure of the male hypopygium, the local species of *Limonia*, s. l., fall in the following groups, based on the progressive specialization of the structure of the dististyle.

1. Dististyle single, entire.—*globithorax*, *indigena*, *parietina*, *tristigma*.  
(Fig. 34, J, K, M)
2. Dististyle single but more or less split, at least on apical half, forming an incomplete dorsal dististyle.—*cinctipes*, *fallax*, *hudsonica*, *immatura*, *novae-angliae*, *solitaria*, *triozellata*.  
(Fig. 34, H, L, P)
3. Dististyle so divided that the dorsal dististyle is complete to base, as in the subgenus *Dicranomyia*.—*fusca*, *rara*, *simulans*.  
(Fig. 34, I, N, O)

In the last major paper on the Tipulidae that he wrote, Edwards (Trans. Soc. British Ent., 5: 1-168, 31 figs., 5 pls.; 1938) has divided the British species of the subgenus *Limonia* into two subgeneric groups and this division is equally applicable to the species in our local fauna. The restricted subgenus *Limonia* Meigen would include the species in group 1, above (in key, couplets 13-17, including *badia*, *indigena*, *maculicosta*, *parietina*, *sociabilis* and *tristigma*). For the species of group 2 (in key, couplets 7-12, inclusive), the name *Metalimnobia* Matsumura (1911) is available (including *cinctipes*, *fallax*, *hudsonica*, *immatura*, *novae-angliae*, *solitaria* and *triozellata*).

### Subgenus *Discobola* O. S.

1865. *Discobola* Osten Sacken; Proc. Ent. Soc. Philadelphia, 4: 226.  
 1869. *Trochobola* Osten Sacken; Mon. Dipt. N. Amer., 4: 98.

A widely distributed group, including more than a score of species that show a curious discontinuous distribution, there being about a dozen species in North America and Eurasia, with almost as many more in New Zealand and eastern Australia. The adults of our local species seem especially characteristic of evergreen woods.

#### Key to Species

1. Knobs of halteres with conspicuous pale apices; wings with a heavy ocellate pattern but without other brown areas in the interspaces ..... **annulata**
- Knobs of halteres entirely dark brown; wings with a more delicate ocellate pattern, with additional brown dots in certain cells, especially *M*, where there is a continuous series along vein *Cu*..... **nigroclavata**

***Limonia* (*Discobola*) *annulata* (Linnaeus)** (Fig. 37, A).

1758. *Tipula annulata* Linnaeus; Syst. Nat., Ed. 10: 586.

1824. *Limnobia argus* Say; Long's Exped. to St. Peter's R., 2. Appendix: 358.

1869. *Trochobola argus* Osten Sacken; Mon. Dipt. N. Amer., 4: 98-99.

Figs.—Osten Sacken, *Ibid.*, 4, pl. 1, fig. 4 (wing). Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 28, fig. 1 (ven.); 1908. Alexander, Cfs. N. Y., 1, pl. 52, fig. 41 (wing); 1919. Dickinson, Cfs. Wisc., p. 187, fig. 65 (wing); 1932.

General coloration polished yellow or greenish yellow, the praescutum with three more or less distinct brown stripes. Antennae black, the apical pedicels of the segments a little paler. Femora with a subterminal black ring, apex clear yellow. Ground-color of wings pale yellow, the pattern pale brown. Male hypopygium (Fig. 37, A).  
 $\delta$ . L. 7.5-8.5 mm.; w. 8-10 mm.  $\text{♀}$ . L. 8-9 mm.; w. 9-11 mm.

(June-Sept.) Ont., Que., N. B., N. S., Me., N. H., Vt., Mass., R. I., N. Y., s. to Va. and Tenn., westw. and northw. to Neb., Alta. and B. C. (Northern Europe; eastern Asia, s. in mts. to Mindanao and Borneo).

Connecticut.—E. Hartland, Sept. 11, 1928 (C. P. A.); East River, Aug. 29, Sept. 1910 (Ely); Salisbury, Sept. 12, 1928 (C. P. A.); Tunxis State Park, July 23-24, 1931 (C. P. A.); Twin Lakes, Sept. 12, 1928 (C. P. A.); W. Granby, Sept. 11, 1928 (C. P. A.).

L. (*Discobola*) **nigroclavata** sp. nov.

Generally similar to *annulata* Linn., in the general coloration; subapically banded femora and ocellate wings, differing especially in the more abundant dotted wings and blackish knobs of halteres. Mesonotal praescutum with the three usual brown stripes; lateral margins of praescutum behind the pseudosutural foveae similarly infuscated; scutellum chiefly black, the base medially obscure yellow; mediotergite chiefly darker, with a yellow spot on either side at base. Pleura pale, conspicuously striped longitudinally with brown. Halteres with base of apex of stem pale, the central half of stem and the knobs dark brown. Wings with the ocellate brown pattern paler and more delicate than in *annulata*, with additional small brown spots in cells *M* and in outer radial field. Abdominal tergites brown, the caudal margins of the segments somewhat darker; basal sternites pale.  $\text{♀}$ . L. 7-8 mm.; w. 7.5-9 mm.

*Holotype*.  $\text{♀}$ , Tuxedo, N. Y., Aug. 1928 (F. W. Edwards); type in British Museum. *Paratypes*, a broken  $\text{♀}$ , Holliston, Mass., Sept. 16, 1929 (B. Gerry), Alexander Collection.  $\delta$ . Mount Desert Island, Me., Station F218, September 4, 1936 (Wm. Procter).

The discovery of a second species of *Discobola* in northeastern North America was primarily due to Dr. Edwards' intensive collecting while visiting America in 1928. I express my deep thanks to him for the privilege of describing this fly, as well as for innumerable kindly favors in the past.

Subgenus **Dicranomyia** Steph.

1829. *Dicranomyia* Stephens; Cat. Brit. Ins., 2:243.

*Key to Species*

1. Wings unusually narrow, approximately five or more times as long as wide 2  
 Wings of normal width, about four times, or a trifle more, as long as wide 4
2. Wings with cell *1st M*<sub>2</sub> open; thoracic pleura with a narrow brown longitudinal stripe; male hypopygium with tergite having a  $\lambda$ -shaped median sclerotized rod; dorsal dististyle present (Fig. 36, B) ..... **longipennis**

- Wings with cell *1st M*<sub>2</sub> closed; thoracic pleura not striped; male hypopygium having tergite without median sclerotized rod; dorsal dististyle lacking or microscopic ..... 3
3. Male hypopygium with a single spine on rostral prolongation of dististyle, this placed at near midlength of the prolongation (Fig. 35, L) ..... **lacroixi**  
Male hypopygium with two rostral spines, these placed at about one-third the length of the prolongation (Fig. 36, L) ..... **walleyi**
4. Wings with cell *1st M*<sub>2</sub> open by atrophy of *m* ..... 5  
Wings with cell *1st M*<sub>2</sub> closed ..... 11
5. Antennae with at least the basal segments pale; body shiny or subnitidous ..... 6  
Antennae dark brown throughout; body opaque ..... 7
6. Mesonotal praescutum with a dark median stripe; no brown areas on ventral sternopleurite; male hypopygium with the tergite deeply notched medially; spines of rostral prolongation of moderate length; gonapophyses with a lateral flange (Fig. 35, J) ..... **immodesta**  
Mesonotal praescutum with three more or less distinct brown stripes; ventral sternopleurites infuscated; male hypopygium with the tergite very shallowly notched medially; rostral spines very long; gonapophyses with mesal-apical lobe slender (Fig. 35, F) ..... **gladiator**
7. Wings with *Sc*<sub>1</sub> ending about opposite origin of *Rs*, the latter fully twice the basal section of *R*<sub>4+5</sub>; male hypopygium (Fig. 35, K) ..... **lowensis**  
Wings with *Sc*<sub>1</sub> ending some distance before origin of *Rs*, the latter subequal to basal section of *R*<sub>4+5</sub>. (*brevivena* and allies) ..... 8
8. Mouth parts relatively long, approximately equal in length to remainder of head ..... **rostrifera**  
Mouth parts shorter than head ..... 9
9. Rostrum obscure yellow; vein *Sc*<sub>1</sub> about one-half the length of *m-cu*; male hypopygium (Fig. 35, A) ..... **brevivena**  
Rostrum dark brown; vein *Sc*<sub>1</sub> long, subequal to or only a little shorter than *m-cu* ..... 10
10. Praescutum gray pruinose, dark brown medially ..... **adirondacensis**  
Praescutum with three stripes, the median one subnitidous ..... **floridana**
11. Antennae entirely yellow or with basal two segments yellow; body-coloration pale yellow or ochre-yellow; praescutum without distinct stripes ..... 12  
Antennae dark, brown or black, throughout; body-coloration yellowish brown, brown, gray or polished black ..... 14
12. Knobs of halteres weakly darkened; male hypopygium with the rostral prolongation bifid at apex; mesal lobe of basistyle complicated by accessory lobules (Fig. 35, D) ..... **divisa**  
Halteres pale throughout; male hypopygium with the rostral prolongation simple; mesal lobe of basistyle entire ..... 13
13. Male hypopygium with rostral prolongation extended into a long blackened point (Fig. 36, F) ..... **pudica**  
Male hypopygium with the rostral prolongation short, entirely pale in color (Fig. 36, G) ..... **pudicoides**
14. Mesonotum polished black ..... 15  
Mesonotum yellowish brown, brown or gray, generally opaque ..... 16
15. Male hypopygium with ventral dististyle small, narrowed gradually into the rostral prolongation, without a deep incision; a single rostral spine (Fig. 36, C) ..... **morioides**  
Male hypopygium with the ventral dististyle produced into a conspicuous lobe above the base of the prolongation; rostral spine lacking (Fig. 36, D) ..... **nycteris**
16. Femora brown, the tips broadly yellow; male hypopygium (Fig. 35, I) ..... **humidicola**  
Femora without paler tips ..... 17
17. Wings with a heavy brown pattern, distributed as four or five large costal areas, with additional clouds at ends of longitudinal veins ..... **decora**  
Wings unmarked or nearly so, at most the stigma and apex darkened ..... 18
18. Wings with vein *Sc*<sub>1</sub> long, subequal to or longer than *m-cu* ..... 19  
Wings with vein *Sc*<sub>1</sub> short, approximately one-half to two-thirds *m-cu* or less ..... 26

19. Halteres elongate, approximately one-half length of thorax or more..... 20  
 Halteres short ..... 22
20. Male hypopygium with a single rostral spine (Fig. 36, I) ..... **spinifera**  
 Male hypopygium with two rostral spines ..... 21
21. General coloration dark brown, more or less pruinose, the praescutal stripes confluent; male hypopygium with the rostral spines at base of prolongation; basistyle with only a simple mesal lobe (Fig. 35, H) ..... **halterata**  
 General coloration yellowish brown, the praescutum with a broad dark brown median stripe; male hypopygium with the subappressed rostral spines placed beyond midlength of prolongation; basistyle with complex mesal outgrowths (Fig. 36, H) ..... **sphagnicola**
22. Wings with  $R_s$  short, subequal to basal section of  $R_{4+5}$ ;  $Sc_1$  some distance before origin of  $R_s$  (*brevivena* group) ..... 23  
 Wings with  $R_s$  long, approximately twice the basal section of  $R_{4+5}$ ;  $Sc_1$  ending about opposite origin of  $R_s$  ..... 24
23. Praescutum with three brown stripes, the median one subnitidous ... **floridana**  
 Praescutum opaque gray, the median region dark brown ..... **adirondecensis**
24. Apical cells of wing strongly infumated, especially in radial field; femora yellow, narrowly tipped with dark brown; male hypopygium (Fig. 36, E) ..... **profunda**  
 Wings unicolorous, except for the stigma where this is present: femora dark, paler basally ..... 25
25. Wings with stigma lacking or ill-defined; male hypopygium with three to four rostral spines; ventral dististyle and basistyle without supernumerary outgrowths (Fig. 35, C) ..... **distans**  
 Wings with stigma distinct; male hypopygium with two rostral spines; ventral dististyle and basistyle with complex outgrowths (Fig. 35, B) ..... **cramptoniana**
26.  $Sc_1$  ending some distance before origin of  $R_s$ ,  $R_s$  and basal section of  $R_{4+5}$  subequal; male hypopygium (Fig. 35, A) ..... **brevivena**  
 $Sc_1$  ending opposite origin of  $R_s$  or nearly so;  $R_s$  conspicuously longer than basal section of  $R_{4+5}$  ..... 27
27. General coloration of thorax clear gray ..... 28  
 General coloration of thorax brown or brownish black, at least on praescutum; pleura not clear gray ..... 29
28. Stigma of wing appearing as a narrow dark seam to vein  $R_2$ ; male hypopygium with caudal margin of tergite convexly rounded; rostral spines from enlarged basal tubercles (Fig. 36, A) ..... **liberta**  
 Stigma of wing full, oval, of normal shape; male hypopygium with caudal margin of tergite deeply notched; rostral spines not arising from enlarged basal tubercles (Fig. 36, K) ..... **uliginosa**
29. Mesonotal praescutum with three confluent dark brown or black stripes; antennae appearing moniliform, the flagellar segments subglobular to short-oval; male hypopygium with dorsal dististyle very slender, strongly arcuated; rostral prolongation beyond the spines slender, blackened (Fig. 36, J) ..... **stulta**  
 Mesonotal praescutum without such blackened confluent stripes; antennae normal, flagellar segments oval; male hypopygium with the dorsal dististyle broad, only slightly curved; rostral prolongation beyond the spines pale ..... 30
30. Male hypopygium with rostral prolongation stout, the two spines at mid-length (Fig. 35, G) ..... **haeretica**  
 Male hypopygium with rostral prolongation long and slender, the two spines near base (Fig. 35, E) ..... **gibsoni**

The following doubtful species are omitted from the key:

- L. (*Dicranomyia*) **brevivenula** Alex. (Philippine Journ. Sci., 40: 247; 1929; new name for *L. (D.) flavescens* Dietz, preoccupied; Trans. Amer. Ent. Soc., 47: 239; 1921).

Close to *brevivena*. Thorax dull yellow, with poorly indicated praescutal stripes, the median one divided by a pale line. Rostrum dark yellow. Antennae entirely



dark brown. Head black, grayish silvery behind. Wings yellowish; cell *1st M*<sub>2</sub> closed. Abdomen yellow, the tergites a trifle darker. ♂. L. 3.5 mm.; w. 5.5 mm. Hazleton, Pa., Sept. 24.

By key runs to couplet 11; apparently a distinct species of the *brevivena* complex, distinguished by the yellow body coloration.

L. (*Dicranomyia*) **brunnea** (Doane). (Journ. N. Y. Ent. Soc., 8:184; 1900).

General coloration reddish brown, the praescutum with a capillary paler median line. Antennae brown throughout. Knobs of halteres infuscated. Legs tawny, the tips of femora and tibiae darker. Wings slightly tinged with brown; *Sc*<sub>1</sub> ending opposite origin of *Rs*; *Sc*<sub>1</sub> long. ♀. L. 8 mm.; w. 8 mm. Nantucket Is., Mass.

By key runs to couplet 25; possibly a large *distans*.

L. (*Dicranomyia*) **diversoides** (Dietz). (Trans. Amer. Ent. Soc., 47:240; 1921, as *Dicranomyia*).

Thorax entirely yellow; notum subnitidous; pleura with a slight whitish bloom. Rostrum dark brown. Antennae with outer half of scape and most of pedicel brown, the flagellum more yellowish. Knobs of halteres infuscated. Wings with a faint yellowish tinge; stigma scarcely evident; *Sc*<sub>1</sub> ending opposite origin of *Rs*, very long, approximately equal to *Rs*, the latter distinctly longer than the basal section of *R*<sub>4+5</sub>; cell *1st M*<sub>2</sub> closed. ♀. L. 4.5 mm.; w. 5.3 mm. Hazleton, Pa.; Aug. 4.

By key runs to couplet 11; apparently closest to *divisa* but rostrum dark brown.

L. (*Dicranomyia*) **isabellina** (Doane). (Journ. N. Y. Ent. Soc., 8:183-184; 1900, as *Dicranomyia*).

Thorax ochraceous. Rostrum yellowish; remainder of head yellowish brown. Antennae yellowish, slightly infuscated. Halteres pale, the knobs infuscated. Wings hyaline; stigma faintly indicated; *Sc*<sub>1</sub> ending a distance before origin of *Rs* about equal to one-half the length of stigma; *Sc*<sub>1</sub> equal to *Rs*, the latter a trifle longer than basal section of *R*<sub>4+5</sub>; cell *1st M*<sub>2</sub> closed. Abdomen brownish yellow, narrowly darker brown laterally. ♀. L. 4 mm.; w. 5.5 mm. Hazleton, Pa., late July, Sept., Oct.

By key runs to couplet 11. The infuscated knobs of halteres agree with *divisa* but not with *pubica*.

L. (*Dicranomyia*) **moniliformis** (Doane). (Doane, *Ibid.*, 8:184; 1900, as *Dicranomyia*).

The holotype was from Colorado and is almost certainly distinct from the paratype, taken on Nantucket Is., Mass. Rogers considers the species as being a synonym of *stulta*; I regard the paratype (but not the type) as probably being identical with *gibsoni*.

L. (*Dicranomyia*) **pennsylvanica** (Dietz). (Trans. Amer. Ent. Soc., 47:239-240; 1921, as *Dicranomyia*).

General coloration reddish yellow; praescutum and pronotum with a well-defined reddish brown median stripe; lateral praescutal stripes less evident, crossing suture onto scutal lobes; pleura pale. Rostrum yellow. Antennae dark brown. Halteres short, knobs dark brown. Legs pale. Wings rather narrow, hyaline, stigma pale; *Sc*<sub>1</sub> ending just before origin of *Rs*; *Sc*<sub>1</sub> equal in length to stigma; *Rs* approximately twice the basal section of *R*<sub>4+5</sub>; cell *1st M*<sub>2</sub> closed. Abdominal tergites pale brown, the caudal margins indistinctly darkened at posterior ends; sternites pale; hypopygium brownish yellow. ♂. L. 5 mm.; w. 5.5 mm. Hazleton, Pa.; July 20.

By key runs to couplet 25; description agrees fairly well with *sphagnicola*, except for the short halteres and yellow rostrum. Dietz compares this with *brevivenula* (as *flavescens*) but the venational details preclude a close relationship.

Besides the above, the following Western American species have been recorded from Pennsylvania by Dietz (Trans. Amer. Ent. Soc., 47:240-241; 1921): *gracilis* (Doane), type from Idaho; *helva* (Doane), from Colorado; *ochracea* (Doane), from Idaho. These records from the East must be held to be in error.



L. (*Dicranomyia*) **adirondacensis** (Alex.).

1922. *Dicranomyia adirondacensis* Alexander; Bull. Brooklyn Ent. Soc., 17: 62.

Close to *brevivena*. General coloration dark brown, gray pruinose. Wings with *Sc* short, *Sc*<sub>2</sub> far from the tip of *Sc*<sub>1</sub>; *Rs* short, angulated and spurred. Abdomen uniformly dark brown; male hypopygium almost as in *brevivena*. ♂. L. about 4 mm.; w. 4.3-4.5 mm.

(July-Sept.) Que., N. Y., westw. to Wisc., southw. to N. C.

L. (*Dicranomyia*) **brevivena** (O. S.) (Fig. 35, A).

1869. *Dicranomyia brevivena* Osten Sacken; Mon. Dipt. N. Amer., 4: 66-67.

Fig.—Dickinson, Cfls. Wisc., p. 182, fig. 51 (wing); 1932.

General coloration dark brown, heavily pruinose. Knobs of halteres darkened. Wings with cell 1st *M*<sub>2</sub> closed or open. Abdominal tergites dark brown; sternites yellowish. Male hypopygium (Fig. 35, A). Rostral prolongation with characteristic "goat's-head" appearance; setae at apex of prolongation small; anal tube very long, much exceeding aedeagus. ♂. L. 4-4.5 mm.; w. 4.5-5 mm. ♀. L. 5-5.5 mm.; w. 5.5-6 mm.

(June-Sept.) Ont., Que., Mass., N. Y., Pa., southw. to Fla., westw. to Oregon. Connecticut.—Hamden, July 10, 1932 (N. T.); Kent Falls, June 12-13, 1931 (C. P. A.).

L. (*Dicranomyia*) **cramptoniana** Alex. (Fig. 35, B).

1926. *Dicranomyia cramptoni* Alexander; Ent. News, 37: 47-49 (pre-occupied).

1929. *Limonia* (*Dicranomyia*) *cramptoniana* Alexander; Philippine Journ. Sci., 40: 247.

General coloration dark brown; pleura pruinose with yellowish gray. Antennae black throughout. Rostrum dark. Wings tinged with gray. Male hypopygium (Fig. 35, B) large and unusually complicated in structure. ♂. L. 5.5-5.8 mm.; w. 6-6.5 mm. ♀. L. 6.5-7 mm.; w. 6.2-6.4 mm.

(Oct.) Mass.

L. (*Dicranomyia*) **decora** (Staeg.)

1840. *Limnobia decora* Staeger; Kröjer, Naturhist. Tidsskr., 3: 47.

1920. *Dicranomyia terrae-novae* Alexander; Pomona Coll. Journ. Ent. and Zool. 12: 85-86.

Figs.—Nielsen, Vidensk. Medd. Dansk-naturh. Foren., 74: 203 (wing); 1922. Nielsen, Danmarks Fauna. Stankelben, fig. 5 (wing), 6 (hyp.); 1925.

General coloration gray, praescutum with three darker brown stripes. Antennae dark brown. Legs with femora brownish yellow, tips indistinctly darker. Wings whitish subhyaline, with a heavy dark brown pattern, including five major costal areas, the third at origin of *Rs*, the last apical; *Sc*<sub>2</sub> far from tip *Sc*<sub>1</sub>, located in 2nd dark costal area; *m-cu* about its own length before fork of *M*. Male hypo-

pygium with basistyle black, contrasting with the pale tergite and ventral dististyle; rostral prolongation very small, with two long straight spines. ♂. L. about 5-5.5 mm.; w. 7.5-7.6 mm. ♀. L. about 7-7.5 mm.; w. 7.5-7.7 mm.

(Aug.) Nfld., westw. and northw. to Alta. and Can. Arctic. (Hudsonian). (N. Eurasia).

**L. (*Dicranomyia*) *distans* (O. S.) (Fig. 35, C).**

1859. *Dicranomyia distans* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 211.

Fig.—Alexander, Cfs. Puerto Rico, pl. 44, fig. 7 (hyp.); 1932.

General coloration dark brown; pleura somewhat paler. Knobs of halteres weakly darkened. Wings with a strong brown tinge. Male hypopygium (Fig. 35, C). ♂. L. 4.5-5 mm.; w. 5.5-6 mm. ♀. L. 5.5-6 mm.; w. 5.5-6 mm.

(Nov.-Feb.) Md., Va., S. C., Ala. and Fla., southw. into Tropical America. Reported from Pa. by Dietz, presumably in error.

**L. (*Dicranomyia*) *divisa* Alex. (Fig. 35, D).**

1859. *Dicranomyia diversa* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 212 (preoccupied).

1929. *Limonia* (*Dicranomyia*) *divisa* Alexander; Philippine Journ. Sci. 40: 247.

Fig.—Alexander, Cfs. Puerto Rico, pl. 44, fig. 8 (hyp.); 1932.

Pale ochreous or brownish yellow; mesonotum unmarked. Rostrum yellow. Antennae with scape and pedicel pale; flagellum dark brown or brownish black. Wings with  $Sc_1$  long. Male hypopygium (Fig. 35, D). ♂. L. 4-4.5 mm.; w. 4.5-5 mm. ♀. L. 5.5-6 mm.; w. 5.5-6 mm.

(May-June; Oct.) Mass., N. Y., Pa., westw. to Mich., Ill., Ia., and Mo.; southw. to Ga. and Fla.; (also in higher mts. of Greater Antilles).

**L. (*Dicranomyia*) *floridana* (O. S.)**

1869. *Dicranomyia floridana* Osten Sacken; Mon. Dipt. N. Amer., 4: 67.

Closely allied to *brevivena*, differing especially in the brown rostrum and long vein  $Sc_1$ ; cell  $1st M_2$  open or closed. Male hypopygium almost as in *brevivena*.

Md., Va., S. C., Fla. (coastal); having a marine larva.

**L. (*Dicranomyia*) *gibsoni* (Alex.) (Fig. 35, E).**

1929. *Dicranomyia gibsoni* Alexander; Can. Ent., 61: 17-18.

Allied and generally similar to *haeretica*. General coloration dark brown, thorax with a sparse golden-yellow pollen. Male hypopygium (Fig. 35, E): both this species and *haeretica* have a small setiferous lobule on cephalic mesal angle of ventral dististyle. ♂. L. 7-9 mm.; w. 7-8 mm. ♀. L. about 7 mm.; w. about 8 mm.

FIGURE 35. *Limonia* (*Dicranomyia*); male hypopygia.

- A. *L. (D.) brevivena* (O.S.)
- B. *L. (D.) cramptoniana* (Alex.)
- C. *L. (D.) distans* (O.S.)
- D. *L. (D.) divisa* Alex.
- E. *L. (D.) gibsoni* Alex.
- F. *L. (D.) gladiator* (O. S.)
- G. *L. (D.) haeretica* (O. S.)
- H. *L. (D.) halterata* (O.S.)
- I. *L. (D.) humidicola* (O.S.)
- J. *L. (D.) immodesta* (O.S.)
- K. *L. (D.) iowensis* (Rog.)
- L. *L. (D.) lacroixi* (Alex.)

Symbols: *a*, aedeagus; *b*, basistyle; *dd*, dorsal dististyle; *g*, gonapophysis; *t*, tergite; *vd*, ventral dististyle.





(Aug.) Coastal northeastern N. Amer.—N. S., Me., N. H., southw. to Mass., Ct. and N. Y.

Connecticut.—Branford, July 5, 1904 (H. L. V.); Short Beach, July 14, 1904 (P. L. B.); Woodmont, July 9, 1904 (P. L. B.).

**L. (*Dicranomyia*) *gladiator* (O. S.) (Fig. 35, F).**

1859. *Dicranomyia gladiator* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 212.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 3, fig. 4 (hyp.); 1869. Rogers, Florida Ent., 9: 49, fig. 1 (hyp.); 1926.

General coloration ochraceous yellow. Wings with  $Sc_1$  exceeding *m-cu*. Male hypopygium (Fig. 35, F): outer rostral spine longer and more curved than inner. ♂. L. 5.5-6.5 mm.; w. 6-7 mm. ♀. L. 6.5-7 mm.; w. 6-7 mm.

(Aug.-Oct.) Que., Me., Mass., N. Y., Pa., westw. to Mich. and Alta., southw. to Md., N. C., Tenn. and Ga.

Connecticut.—Cornwall Bridge, Aug. 19, 1931 (C. P. A.); Putnam, July 12, 1905 (H. L. V.).

**L. (*Dicranomyia*) *haeretica* (O. S.) (Fig. 35, G).**

1869. *Dicranomyia haeretica* Osten Sacken; Mon. Dipt. N. Amer., 4: 70-71.

Figs.—Osten Sacken, *Ibid.*, pl. 1, fig. 3 (wing); 1869. Alexander, Cfs. N. Y., 1, pl. 31, fig. 17 (wing); 1919.

General coloration dark brown, with a sparse yellow pollen, median region of praescutum darker. Rostrum brownish yellow to ochreous. Antennae dark throughout. Knobs of halteres darkened. Wings with a faint brownish tinge, stigma scarcely evident; prearcular region whitish. Male hypopygium (Fig. 35, G): ventro-mesal lobe of basistyle of both this species and *gibsoni* very pale and membranous at base, the apex more sclerotized and with abundant setae. Ovipositor with cerci very small and unusually slender; hypovalvae elongate. ♂. L. about 5.5-7 mm.; w. 6.5-8.5 mm. ♀. L. about 6.5-8 mm.; w. 7-9 mm.

(May-Aug.) Ont., N. S., Me., N. H., Vt., Mass., R. I., N. Y., westw. to Mich., Alta. and Alaska; in marshes, coastal and inland.

Connecticut.—East River, July 3, 1911 (Ely); New Haven, June 14, 1915 (M. P. Z.); Orange, July 5, 1911 (S. N. S.); Woodmont, July 9, 1904 (P. L. B.).

**L. (*Dicranomyia*) *halterata* (O. S.) (Fig. 35, H).**

1869. *Dicranomyia halterata* Osten Sacken; Mon. Dipt. N. Amer., 4: 71-72.

Figs.—Alexander, Cfs. N. Y., 1, pl. 31, fig. 18 (wing); 1919. Dickinson, Cfs. Wisc., p. 182, fig. 53 (erron. ven.); 1932.

Antennae and rostrum dark throughout. Halteres with knobs infuscated. Wings with a brownish tinge, stigma darker; veins coarse. Male hypopygium (Fig. 35, H) brighter than remainder of abdomen; rostral spines at base of long prolongation. ♂. L. 7-8.5 mm.; w. 7.5-9.5 mm.

(June-Aug.) Labr., Que., N. B., N. S., N. H., Vt., Mass., N. Y., and Pa. westw. to Alta., B. C. and Alaska; in bogs.

Connecticut.—Kent Falls, June 12-13, 1931 (C. P. A.).

**L. (*Dicranomyia*) *humidicola* (O. S.)** (Fig. 35, I).

1859. *Dicranomyia humidicola* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 210.

(From 1869-1930, erroneously identified as *L. (L.) badia* (Walk.) )

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 3, fig. 2 (hyp.); 1869. Alexander, Cfs. N. Y., 1, pl. 31, fig. 20 (wing); 1919. Dickinson, Cfs. Wisc., p. 182, fig. 52 (wing); 1932.

General coloration dark brown, sparsely variegated with more reddish brown. Rostrum and antennae black. Knobs of halteres dark brown. Wings subhyaline; stigma brown; paler brown clouds in basal cells and along cord; dark pattern of wings sometimes obsolete or nearly so. Abdomen dark brown, the incisures, including the narrow bases and apices of each segment, broadly pale yellow. Male hypopygium (Fig. 35, I): ventral dististyle large and fleshy.  $\delta$ . L. 6-8.5 mm.; w. 7.5-9.5 mm.  $\text{♀}$ . L. 7.5-8 mm.; w. 8-9 mm.

(May-Nov.) Ont., Que., N. B., Me., Vt., N. Y., Pa., Mo., Okla., westw. to Cal., southw. to S. C. and Tenn. (Southw. into mts. of Cent. Amer.); along rocky streams, in gorges, etc.

Connecticut.—Cornwall Bridge, Aug. 19, 1931 (C. P. A.); Hartland, June 9, 1929 (C. P. A.); Kent Falls, May 31, June 12-13, July 23-24, 1931 (C. P. A.); Kent Falls, Aug. 19, 1931 (C. P. A.); Norfolk, Sept. 6, 11, 1928 (G. C. C.); June 9, 1929 (C. P. A.); Winsted, Sept. 5, 1928 (G. C. C.); May 16, 1931 (C. P. A.). Connecticut, no further data, recorded by Osten Sacken as *badia*.

**L. (*Dicranomyia*) *immodesta* (O. S.)** (Fig. 35, J).

1859. *Dicranomyia immodesta* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 211.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 27, fig. 3 (ven.); 1908. Rogers, Florida Ent., 9: 49, figs. 2, 2a (hyp.); 1926. Dickinson, Cfs. Wisc., p. 181, fig. 50 (wing); 1932.

General coloration yellow. Rostrum yellow. Antennae dark brown, the basal segments paler. Knobs of halteres weakly darkened. Wings with stigma scarcely evident;  $Sc_1$  longer than  $R_s$  or  $m-cu$ . Male hypopygium (Fig. 35, J).  $\delta$ . L. 5.5-6.5 mm.; w. 6.5-7.5 mm.  $\text{♀}$ . L. about 6-7 mm.; w. 7-8 mm.

(June; Aug.-Oct.) Ont., Que., N. S., Me., N. H., Vt., Mass., N. Y., Pa., southw. to N. C. and S. C., westw. to Ind., Mich., Minn., Wisc., Ia. and Alta.

Connecticut.—Kent Falls, May 31, 1931 (C. P. A.); Norfolk, Sept. 12, 1928 (C. P. A.); Salisbury, Sept. 5, 1928 (G. C. C.), Sept. 12, 1928 (C. P. A.); Stafford Springs, June 14, 1933 (C. P. A.); Union, Aug. 17-18, 1928 (C. F. C.); W. Granby, Sept. 4, 1928 (G. C. C.), Sept. 11, 1928 (C. P. A.).

**L. (*Dicranomyia*) *iowensis* (Rogers)** (Fig. 35, K).

1926. *Dicranomyia iowensis* Rogers; Florida Ent., 9: 49-52.

Figs.—Rogers, *Ibid.*, 49: fig. 3 (hyp.), 4 (wing); 1926.

General coloration opaque brown, more or less gray pruinose, pleura sometimes rather heavily so; praescutum darker brown medial-

ly. Rostrum yellow. Wings hyaline, stigma faintly darker. Abdominal tergites brown, sternites more yellow. Male hypopygium (Fig. 35, K).  $\delta$ . L. 5-6.5 mm.; w. 5.5-7 mm.  $\text{♀}$ . L. 5.5-6.5 mm.; w. 5.5-6.5 mm.

(May-July; Aug.-Oct., probably 2 generations). Que., N. B., Me., N. H., Mass., N. Y., Ind., westw. to Mich. and Ia.

Connecticut.—Hartland, June 9, 1929 (C. P. A.); Kent Falls, June 12, 13, Aug. 19, 1931 (C. P. A.); Manitic Lake, June 8-9, 1929 (C. P. A.); Norfolk, June 9, 1929 (C. P. A.); Riverton, June 8, 1929 (C. P. A.); Tyler Lake, June 13, 1931 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.).

**L. (*Dicranomyia*) *lacroixi* (Alex.) (Fig. 35, L).**

1926. *Dicranomyia lacroixi* Alexander; Ent. News, 37: 46-47.

General coloration brownish ochreous, the praescutum with three conspicuous dark brown stripes; pleura uniformly ochreous. Antennae black throughout. Wings narrow; axillary region strongly infused. Male hypopygium (Fig. 35, L).  $\delta$ . L. about 6 mm.; w. 6.9 mm.

(July) Mass.; in bogs.

**L. (*Dicranomyia*) *liberta* (O. S.) (Fig. 36, A).**

1859. *Dicranomyia liberta* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 209.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 3, fig. 3 (hyp.); 1869. Alexander, Cfs. N. Y., 1, pl. 31, fig. 21 (wing); 1919. Dickinson, Cfs. Wisc., p. 182, fig. 54 (wing); 1932.

Praescutum with a distinct brown median stripe and narrower, subobsolete lateral stripes. Rostrum and antennae black. Wings subhyaline, cord and outer end of cell *1st M*<sub>2</sub> very narrowly and vaguely seamed with brown; stigma restricted to a narrow seam on *R*<sub>1+2</sub> and *R*<sub>2</sub>. Male hypopygium (Fig. 36, A).  $\delta$ . L. 5.5-6 mm.; w. 6-7 mm.  $\text{♀}$ . L. 6.5-7 mm.; w. 6-7 mm.

(Apr.-June; Aug.-Sept.) Ont., Que., N. B., N. S., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Man., Ill., Wisc., Ia. and Kan., southw. to S. C., Ga., Fla., Ala. and Miss.

Connecticut.—Canaan, June 10, 1928 (R. B. F.); Farmington, May 16, 1933 (M. P. Z.); Hamden, June 2, 1928 (R. B. F.), Aug. 31, 1932 (N. T.); Kent Falls, June 12-13, 1931, July 23-24, 1931 (C. P. A.); Manitic Lake, June 8-9, 1929 (C. P. A.); New Haven, May 24, 1905 (W. E. B.), May 26, 1904 (H. L. V.), June 20, 1902 (E. J. S. M.); Putnam, July 12, 1905 (H. L. V.); Riverton, June 8, 1929 (C. P. A.); Salisbury, Sept. 5, 1928 (G. C. C.).

**L. (*Dicranomyia*) *longipennis* (Schumm.) (Fig. 36, B).**

1829. *Limnobia longipennis* Schummel; Beitr. zur Entomol., 1: 104.

1861. *Dicranomyia immemor* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1861: 287.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 1, fig. 1 (wing); 1869. Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 8, fig. 4 (hyp.); 1904. Alexander, Cfs. N. Y., 1, pl. 31, fig. 14 (wing); 1919. Dickinson, Cfs. Wisc., p. 181, fig. 49 (wing); 1932.

General coloration brownish yellow; praescutal stripes faintly indicated; pleural stripe continued caudad as a narrow, lateral, abdominal line. Rostrum brownish black, somewhat produced. Knobs of halteres weakly darkened. Wings very narrow, yellowish, axillary region darkened. Male hypopygium (Fig. 36, B). ♂. L. 6-7 mm.; w. 7-8 mm. ♀. L. 7-8 mm.; w. 7-8 mm.

(May-Oct.) Ont., Que., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Wisc., Man., Colo. and Wash. (Eurasia). In marshes.

Connecticut.—East River, July 11, 1910 (Ely); Hamden, July 10, 1932 (N. T.); Kent Falls, May 31, 1931 (C. P. A.); Norfolk, June 9, 1929 (C. P. A.); Riverton, June 8, 1929 (C. P. A.); W. Granby, June 8, 1929 (G. C. C.).

**L.** (*Dicranomyia*) **morioides** (O. S.) (Fig. 36, C).

1860. *Dicranomyia morioides* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1860: 17.

Fig.—Alexander, Cfs. N. Y., 1, pl. 31, fig. 23 (wing); 1919.

Pleura silvery, the ventral anepisternum and ventral sternopleurite black. Anterior vertex silvery; remainder of head blackened. Antennae black; terminal segment elongate. Knobs of halteres brownish black. Wings with a brownish tinge, stigma darker;  $Sc_1$  longer than *m-cu*. Abdominal tergites black, sternites pale brown. Male hypopygium (Fig. 36, C). ♂. L. 4-5.5 mm.; w. 4-6.5 mm. ♀. L. 4-5.5 mm.; w. 3.5-5 mm.

(May-Aug.) Ont., Que., N. B., Me., Vt., Mass., N. Y., westw. to Colo., Alta., B. C. and Alaska, southw. to Va., N. C. and Tenn. (Hudsonian, Canadian).

Connecticut.—Kent Falls, May 31, 1931, June 12-13, 1931, July 23-24, 1931, Aug. 19, 1931 (C. P. A.).

**L.** (*Dicranomyia*) **nycteris** (Alex.) (Fig. 36, D).

1927. *Dicranomyia nycteris* Alexander; Can. Ent., 59: 220.

Allied to the European *morio*; in our fauna most similar to *morioides*. Pleura silvery. Mid-coxae black basally, apical half yellow. Abdominal tergites black, weakly bicolorous; sternites two to five with caudal margins yellow. Male hypopygium (Fig. 36, D). ♂. L. about 3.5-4 mm.; w. 4-5 mm.

(June, early July) Que., N. B., westw. to Mich. and Alta. (Hudsonian).

**L.** (*Dicranomyia*) **profunda** (Alex.) (Fig. 36, E).

1925. *Dicranomyia profunda* Alex.; Occas. Pap. Boston Soc. Nat. Hist., 5: 173.

General coloration yellow to yellowish brown. Antennae dark throughout. Femora yellow, the tips very narrowly but conspicuously dark brown. Wings yellow; narrow seams at origin of *Rs*, along cord and outer end of cell *1st M*<sub>2</sub>. Male hypopygium (Fig. 36, E). ♂. L. 4.5-6 mm.; w. 5-7 mm. ♀. L. 6.5-7.5 mm.; w. 7.2-8.5 mm.

(June-Sept.) Que., N. B., Me., N. H., Vt., Mass., N. Y. (Canadian).

Connecticut.—Tunxis State Park, July 23-24, 1931 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.).

FIGURE 36. *Limonia* (*Dicranomyia*); male hypopygia.

- A. *L. (D.) liberta* (O.S.)
- B. *L. (D.) longipennis* (Schumm.)
- C. *L. (D.) morioides* (O.S.)
- D. *L. (D.) nycteris* (Alex.)
- E. *L. (D.) profunda* (Alex.)
- F. *L. (D.) pudica* (O.S.)
- G. *L. (D.) pudicoides* Alex.
- H. *L. (D.) sphagnicola* (Alex.)
- I. *L. (D.) spinifera* (Alex.)
- J. *L. (D.) stulta* (O.S.)
- K. *L. (D.) uliginosa* Alex.
- L. *L. (D.) walleyi* sp. nov.

Symbols: *a*, aedeagus; *b*, basistyle; *dd*, dorsal dististyle; *d*, dististyle; *g*, gonapophysis; *t*, tergite; *vd*, ventral dististyle.





**L. (*Dicranomyia*) *pudica* (O. S.) (Fig. 36, F).**

1859. *Dicranomyia pudica* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 212.

Fig.—Alexander, Cfs. N. Y., 1, pl. 31, fig. 22 (wing); 1919.

Body almost entirely pale yellow, including antennae, legs and halteres. Wings tinged with pale yellow; stigma lacking or barely perceptible;  $Sc_1$  short,  $Sc_2$  sometimes obsolete. Male hypopygium (Fig. 36, F). Ovipositor with cerci long and slender, gently upcurved.  $\delta$ . L. 6-7 mm.; w. 6-7 mm.

(May-July) Que., Me., N. H., Mass., N. Y., Pa., westw. to Mich. and Ill., southw. to N. C.

**L. (*Dicranomyia*) *pudicoides* Alex. (Fig. 36, G).**

1929. *Limonia (Dicranomyia) pudicoides* Alexander; Bull. Brooklyn Ent. Soc., 24: 299-300.

Characters as in *pudica*, differing in the structure of the male hypopygium (Fig. 36, G). Antennal scape and pedicel pale but flagellum a trifle darker. Wings with  $Sc_2$  usually lacking.  $\delta$ . L. 6-6.5 mm.; w. 6-6.5 mm.

(July-Sept.) N. B., Me., N. Y., westw. to Ind., southw. to Tenn.

**L. (*Dicranomyia*) *rostrifera* (O. S.)**

1869. *Dicranomyia rostrifera* Osten Sacken; Mon. Dipt. N. Amer., 4: 65-66.

Fig.—Alexander, Cfs. N. Y., 1, pl. 31, fig. 16 (wing); 1919.

General coloration dark gray, notum darker medially. Antennae black throughout. Knobs of halteres dark brown. Wings and hypopygium almost exactly as in *brevivena*.  $\delta$ . L. about 4.5 mm.; w. 5-5.5 mm.  $\text{♀}$ . L. about 5.5-6 mm.; w. 6-6.5 mm.

(Late Aug., Sept.) Que., Me., N. Y., westw. to Wisc. and Alta. (Hudsonian, Canadian).

**L. (*Dicranomyia*) *sphagnicola* (Alex.) (Fig. 36, H).**

1925. *Dicranomyia sphagnicola* Alexander; Occas. Pap. Boston Soc. Nat. Hist., 5: 173-174.

General coloration brown. Rostrum and antennae black. Wings with a faint brown tinge; stigma faintly darker;  $Sc_1$  long. Male hypopygium (Fig. 36, H).  $\delta$ . L. 4.5-5.5 mm.; w. 5.5-6.5 mm.  $\text{♀}$ . L. 5.5-6 mm.; w. 6-6.5 mm.

(June, July; Oct., probably two generations) Ont., Que., N. H., Mass., N. Y., in bogs.

Connecticut.—Granby, June 8, 1929 (C. P. A.); Kent Falls, June 12-13, 1931 (C. P. A.); Manitic Lake, June 8-9, 1929 (C. P. A.); New Haven, Oct. 16, 1903 (H. L. V.).

**L. (*Dicranomyia*) *spinifera* (Alex.) (Fig. 36, I).**

1927. *Dicranomyia spinifera* Alexander; Occas. Pap. Boston Soc. Nat. Hist., 5: 229-230.

General coloration of notum opaque brownish yellow, with three confluent dark brown stripes; pleura pruinose; sternopleurite darkened. Abdomen elongate. Male hypopygium (Fig. 36. I): anal tube with a group of about seven long setae. ♂. L. 6-8 mm.; w. 6.5-8 mm. ♀. L. 8-8.5 mm.; w. 8-8.5 mm.

(Late Aug.-Oct.) Que., N. B., Me., N. H., Vt., Mass., N. Y., westw. to Mich., southw. to N. C.

Connecticut.—E. Hartland, Sept. 11, 1928 (G. C. C.); Norfolk, Sept. 12, 1928 (C. P. A.); W. Granby, Sept. 11, 1928 (C. P. A.).

Despite its color and elongate halteres, I believe this fly to be most nearly allied to the *morio* group, rather than to *halterata* where it has been placed.

**L. (*Dicranomyia*) *stulta* (O. S.)** (Fig. 36. J).

1859. *Dicranomyia stulta* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859:210.

1911. *Furcomyia monticola* Alexander; Psyche, 18:201-202.

Figs.—Alexander, *Ibid.*, 18, pl. 16, fig. 7 (wing), figs. 12, 13 (hyp.); 1911. Alexander, Cfs. N. Y., 1, pl. 31, fig. 19 (wing); 1919. Dickinson, Cfs. Wisc., p. 183, fig. 55 (wing); 1932.

Scutal lobes darkened; pleura yellow. Antennae black. Knobs of halteres infuscated. Wings with  $Sc_1$  ending shortly beyond origin of  $R_s$ ; inner end of cell  $1st M_2$  more or less arcuated. Male hypopygium (Fig. 36. J): ventral dististyle large and fleshy. ♂. L. 5.5-6.5 mm.; w. 6-6.5 mm. ♀. L. 6.5-7.5 mm.; w. 6.5-7 mm.

(June-Aug.) Me., N. H., Mass., N. Y., westw. to Ind., Ill., Mich. and Wisc., southw. to S. C., Ga. and Tenn.

Connecticut.—Kent Falls, June 12-13, 1931 (C. P. A.); July 23-24, 1931 (C. P. A.); Saptree Run State Park, June 14, 1933 (C. P. A.); Winsted, June 9, 1929 (C. P. A.).

**L. (*Dicranomyia*) *uliginosa* Alex.** (Fig. 36. K).

1929. *Limonia* (*Dicranomyia*) *uliginosa* Alexander; Bull. Brooklyn Ent. Soc., 24:27-28.

General coloration gray; praescutum with four narrow brown stripes. Antennae dark throughout. Halteres with brown knobs. Wings with a faint brown tinge; a brown seam along vein  $Cu$  in cell  $M$ . Male hypopygium (Fig. 36. K): a small tubercle near apex of mesal lobe of basistyle. ♂. L. 5.5-7 mm.; w. 6.2-8 mm. ♀. L. 7.5 mm.; w. 8 mm.

(June, July) Que., N. H., Vt., N. Y., westw. to Mich., southw. to Tenn. and N. C. Connecticut.—Manitic Lake, June 8-9, 1929 (C. P. A.).

**L. (*Dicranomyia*) *walleyi* sp. nov.** (Fig. 36. L).

Wings long and narrow, as in *longipennis*; rostrum and palpi brownish black; general coloration gray, the thoracic pleura indistinctly striped with brown; legs chiefly black; wings whitish subhyaline, the bases of Anal cells and a seam along vein  $Cu$  brownish;

cell *1st M*<sub>2</sub> closed; male hypopygium with the long rostral prolongation of the ventral dististyle bispinous.

Rostrum and palpi brownish black, the former a little brighter at base in female. Head dark grayish brown, with a sparse yellow pollen.

Mesonotal praescutum gray laterally and on humeral region, more brownish on disk, with a broad brownish black median stripe and narrow, incomplete, lateral stripes; scutal lobes dark brown, the median area with a yellow pollen; scutellum and mediotergite dark, the former with a pale median stripe in front, the latter heavily pruinose. Pleura pale yellowish gray to buffy, striped longitudinally with darker brown, this including the entire ventral sternopleurite and a more dorsal area on anepisternum. Halteres pale, the knobs darkened. Legs very long and conspicuous; coxae and trochanters obscure yellow; remainder of legs dark brown to brownish black, the femoral bases narrowly obscure yellow. Wings long and narrow, whitish subhyaline; bases of cells *Cu*, *1st A* and *2nd A* more infumed, the color continued along vein *Cu* almost to *m-cu*; veins dark, in the prearcular, costal and subcostal fields, as well as basal half of *M*, pale. Venation: *Sc* ending opposite origin of *Rs*; cell *1st M*<sub>2</sub> closed, the veins beyond it tending to diverge.

Abdominal tergites brownish black, narrowly pale sublaterally: a narrow black pleural stripe; sternites obscure yellow, more darkened behind. Male hypopygium (Fig. 36, L) with the dististyle as in *lacroiwi*, the body of style larger and more produced; rostral prolongation dusky at apex, before midlength with two strongly curved spines that arise close together. ♂. L. about 6-7 mm.; w. 6.5-8.2 mm. ♀. L. about 8 mm.; w. 8.5 mm.

*Holotype*, ♂, Mer Bleue, Ontario, September 6, 1928 (G. S. Walley). *Allotopotype*, ♀. *Paratypes*, ♂, Lepreau Harbor, New Brunswick, September 1929 (D. Galbraith); 10 ♂ ♀, near Chandler, West Pabos R., Gaspé, Quebec, Aug. 25, 1937 (C. P. Alexander); several males and females, Mount Desert Island, Me., September, October (Brower and Procter); for detailed record of specimens, consult William Procter, Biol. Survey Mount Desert Region, Part VI, The Insect Fauna, p. 289; 1938. Type in Canadian National Collection.

Most nearly allied to *lacroiwi*, as shown by the key. I dedicate this interesting fly to the collector of the type, my friend, Mr. G. S. Walley. His specimens were found associated with *Phalacroceratipulina* O. S., *Limonia* (*Dicranomyia*) *longipennis* (Schumm.) and other crane-flies.

### Subgenus *Rhipidia* Meigen

1818. *Rhipidia* Meigen; Syst. Besch. Zweifl. Ins., 1:153.

An abundant group, wide-spread throughout the major regions of the Globe. In the local fauna, three divisions occur, separated on the nature and degree of pectination of the antennae.

1. *Rhipidia* s. s. (*maculata* group); antennae (♂) bipectinate (Fig. 34, F); *bryanti*, *maculata*.



2. *Monorhipidia* Alexander. (*uniseriata* group): antennae ( $\delta$ ) unipectinate (Fig. 34, G): *fidelis*.
3. *Arhipidia* Alexander. (*domestica* group): antennae of both sexes subpectinate to simple: *domestica*, *shannoni*.

The habits and haunts of the adult flies are much as in *Dicranomyia*. The early stages occur in decaying organic matter or beneath the bark of dead trees.

*Key to Species*

1. Wings with an abundant pale brown or gray dotting in all cells ..... 2  
Wings with the markings larger, confined to vicinity of veins ..... 3
2. Body-coloration grayish, praescutum with a broad brownish black median line; mediotergite gray; wings with a heavy brown pattern along costal margin, the dark areas subequal in extent to the interspaces; legs brown; antennae ( $\delta$ ) bipectinate ..... *maculata*  
Body-coloration yellowish brown, praescutum without a dark median line; mediotergite with a large black triangle; wings with small brownish black spots at base, at supernumerary crossvein in cell *Sc*, origin of *Rs*, fork of *Sc* and over *R<sub>2</sub>*, all these areas much smaller than interspaces; all cells with numerous paler dots; legs chiefly yellow, femoral tips weakly darkened; antennae subpectinate in both sexes ..... *shannoni*
3. Praescutum reddish brown, yellow pollinose, with narrow darker lines; pleura dull yellow, with two narrow blackish longitudinal stripes; antennae dark, with penultimate and antepenultimate segments abruptly light yellow; *m-cu* usually far before fork of *M*; antennae subpectinate in both sexes ..... *domestica*  
Praescutum brown, pruinose, with a broad, brownish black, median stripe; pleura grayish or plumbeous, the stripes narrow or lacking; antennae black throughout; *m-cu* at fork of *M*; antennae ( $\delta$ ) unipectinate or bipectinate ..... 4
4. Wings with the dark pattern beyond origin of *Rs* only, including large rounded clouds at origin and fork of *Rs*, stigma, and outer radial cells; costal cell uniformly darkened; thoracic pleura unstriped; abdomen dark brown, hypopygium paler; antennae ( $\delta$ ) unipectinate ..... *fidelis*  
Wings with a series of about five major grayish brown areas along costal margin, two being before origin of *Rs*; costal cell not uniformly darkened; thoracic pleura with a narrow longitudinal stripe; abdominal tergites yellow, the caudal half of individual segments dark brown; antennae ( $\delta$ ) bipectinate ..... *bryanti*

***Limonia (Rhipidia) bryanti* (Johns.) (Fig. 37, B).**

1909. *Rhipidia bryanti* Johnson; Proc. Boston Soc. Nat. Hist., 34: 123-124.

Figs.—Johnson, *Ibid.*, pl. 16, fig. 20 (wing); 1909. Alexander, Cfs. N. Y., 1, pl. 32, fig. 37 (wing); 1919. Dickinson, Cfs. Wisc., p. 178, fig. 45 (wing); 1932.

A small blackish spot on either side of cephalic end of praescutum; lateral praescutal stripes subobsolete; pleural stripe very narrow, that on sternopleurite even less distinct. Flagellar branches ( $\delta$ ) relatively short; of  $\eta$  relatively long, unipectinate. Legs black, basal half of fore, basal two-thirds of remaining femora, obscure yellow. Ground color of wing grayish subhyaline, the dark areas narrowly bordered by white, besides the costal areas, with narrower seams along cord and outer end of cell *1st M<sub>2</sub>*, and with gray streaks in centers of certain cells. Male hypopygium (Fig. 37, B): rostral spines three, unusually short.  $\delta$ . L. 6.5-7 mm.; w. 8-8.5 mm.  $\eta$ . L. 9-10 mm.; w. 9-9.5 mm.



(June, July; Sept.) Me., Mass., N. Y., N. J., Md., westw. to Mich., Wisc., Ill., Colo., Tex. and Ariz., southw. to Fla.

**L. (*Rhipidia*) *domestica* (O. S.) (Fig. 37, C).**

1859. *Rhipidia domestica* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 208.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 3, fig. 5 (hyp.); 1869. Alexander, Bull. Brooklyn Ent. Soc., 8, pl. 1, fig. 9 (wing); 1912. Alexander, Cfs. N. Y., 1, pl. 32, fig. 40 (wing); 1919.

Legs brownish yellow; femora and tibiae darkened at tips. Male hypopygium (Fig. 37, C). The antennal pattern is distinctive of this fly. ♂. L. 5-6 mm.; w. 5-7 mm. ♀. L. 5-6 mm.; w. 6-7 mm.

(July, Aug.) Ct., N. Y., N. J., Pa., westw. to Ia., Kan. and Tex., southw. to S. C., Ga., Fla. and Miss., thence southward into Neotropics.

Connecticut.—East River, Aug. 20, 1912 (Ely).

**L. (*Rhipidia*) *fidelis* (O. S.) (Figs. 34, G; 37, D).**

1859. *Rhipidia fidelis* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 209.

Figs.—Alexander, Cfs. N. Y., 1, text-fig. 125, B (ant. ♂), pl. 32, fig. 38 (wing); 1919.

Praescutum brown to gray, depending on degree of pruinosity. Antennae of male short-unipectinate (Fig. 34, G), of female subpectinate to nearly simple. Halteres pale. Male hypopygium (Fig. 37, D): rostral spines three, long, gently curved. ♂. L. 6-7 mm.; w. 6.5-8 mm. ♀. L. 7-8.5 mm.; w. 7-9 mm.

(May-July) Ont., Que., N. H., Vt., Mass., N. Y., westw. to Ind., Ill. and Alta., southw. to S. C., nw. Fla. and Tenn.

Connecticut.—Rowayton, June 16, 1909 (C. W. J.).

**L. (*Rhipidia*) *maculata* (Meig.) (Figs. 34, F; 37, E).**

1818. *Rhipidia maculata* Meigen; Syst. Besch. Zweifl. Ins., 1: 153.

Figs.—Meigen, *Ibid.*, pl. 5, fig. 11. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 27, fig. 1 (ven.); 1908. Alexander, Cfs. N. Y., 1, text-fig. 125, A (ant. ♂), pl. 32, fig. 36 (wing); 1919. Dickinson, Cfs. Wisc., p. 178, fig. 46 (wing); 1932.

Halteres pale. Wing-markings variable in intensity and amount. Male hypopygium (Fig. 37, E): rostral spines usually from four to eight in number. ♂. L. 5-7 mm.; w. 6-7.5 mm. ♀. L. 7-8 mm.; w. 8-9.5 mm.

(June-Sept.) Ont., Que., Me., N. H., Vt., Mass., R. I., N. Y., Pa., westw. to Cal., Alta., B. C. and Alaska, southw. to Va., Ind. and Tenn. (Eurasia).

Connecticut.—East River, July 18, 1912 (Ely); Kent Falls, Aug. 19, 1931 (C. P. A.); Norfolk, Sept. 5, 1928 (G. C. C.), Sept. 11, 1928 (C. P. A.); Salisbury, Sept. 5, 1928 (G. C. C.), Sept. 12, 1928 (C. P. A.); Sharon, Sept. 5, 1928 (G. C. C.); Twin Lakes, Sept. 12, 1928 (C. P. A.); Union, Aug. 17-18, 1928 (C. F. C.); W. Granby, Sept. 11, 1928 (C. P. A.); Winsted, Sept. 11, 1928 (C. P. A.).

**L.** (*Rhipidia*) **shannoni** (Alex.) (Fig. 37, F).

1914. *Rhipidia* (*Arhipidia*) *shannoni* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1914: 581-582.

Figs.—Alexander, *Ibid.*, pl. 27, fig. 23 (wing). Alexander, Cfs. N. Y., 1, pl. 32, fig. 39 (wing); 1919.

Mesonotum yellowish brown; praescutum without distinct stripes, the markings, when present, only near suture; pleura with two narrow longitudinal dark stripes.  $Sc_1$  ending at from one-third to one-fourth the length of *Rs*. Male hypopygium (Fig. 37, F): rostral spines two, slightly unequal. ♂. L. 5 mm.; w. 6.5-6.8 mm. ♀. L. 5.5 mm.; w. 5.8-7.2 mm.

(June-Sept.) Md., Va., s. Ind., Tenn., S. C., Ga. and Fla. (Neotropics).

### Subgenus **Alexandriaria** Garrett

1922. *Alexandriaria* Garrett; Proc. Ent. Soc. Washington, 24: 60.

Rather numerous species, occurring in many major regions of the Globe. The single local species is rare and I have seen only the type.

**Limonia** (*Alexandriaria*) **whartoni** (Ndm.) (Fig. 34, B).

1908. ? *Dicranomyia whartoni* Needham; 23rd Rept. N. Y. St. Ent. for 1907: 211-212.

Figs.—Needham, *Ibid.*, pl. 27, fig. 5 (ven.). Alexander, Cfs. N. Y., 1, pl. 31, fig. 15 (ven.); 1919.

General coloration yellowish; mesonotum darker. Head yellow; antennal flagellum yellowish. Fore legs brownish, middle and hind legs yellow. Wings hyaline; veins brownish. ♀. Expanse of wings 9.5 mm. (each wing thus about 4.2 mm.).

(Aug.) Mich.

### Subgenus **Geranomyia** Haliday

1833. *Geranomyia* Haliday; Ent. Mag., 1: 154.

A very extensive group of long-beaked crane-flies, especially numerous in species in the tropics and subtropics. Unlike the other groups of Tipulidae with elongate rostra, this in *Geranomyia* (Fig. 34, C) is constituted almost entirely of greatly lengthened labial palpi, the true front being proportionately short. In all local species, there is a supernumerary crossvein at near midlength of cell *Sc*.

The adult flies are found on vegetation, where they suck nectar from tubular flowers. The immature stages are very characteristic of hygropetric associations, such as the faces of vertical cliffs, rocky margins of streams, and similar situations where the rock surface is covered with algal growth and the surface is continually wet with falling or percolating water.

#### Key to Species

1. Wings heavily patterned with dark brown, including a series of four or five larger costal areas; tips of tibiae conspicuously blackened, of fore tibiae slightly swollen ..... *rostrata*

- Wings unmarked, except for stigma, or rarely (*diversa*) with small spots or seams along cord; tips of tibiae neither darkened nor swollen ..... 2
2. *Sc* short, *Sc*<sub>1</sub> ending opposite or just beyond origin of *Rs*; crossveins and deflections faintly seamed with darker; male hypopygium (Fig. 37, H) with rostral spines from long, unequal basal tubercles ..... *diversa*
- Sc* long, *Sc*<sub>1</sub> ending opposite or near midlength of *Rs*; wings unmarked, except for the stigmal spot; male hypopygia (Fig. 37, G) with rostral spines from short, inconspicuous tubercles ..... 3
3. Body-coloration reddish yellow, mesonotum unmarked; wings with stigma pale; legs dull yellow, femora not darkened at tips ..... *distincta*
- Body-coloration yellowish brown, the praescutum and scutum marked with darker; wings with well-defined brown stigma; legs brownish yellow, femora infuscated at tips ..... *canadensis*

***Limonia (Geranomylia) canadensis* (Westw.) (Figs. 34, C; 37, G).**

1835. *Limnobiaorhynchus canadensis* Westwood: Ann. Soc. Ent. France, 4: 684.

1859. *Geranomylia communis* Osten Sacken: Proc. Acad. Nat. Sci. Philadelphia, 1859: 207.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 27, fig. 2 (ven.); 1908. Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1916, pl. 25, fig. 1 (wing); 1916. Alexander, Cfs. N. Y., 1, text-fig. 124, A (head, ♂); pl. 31, fig. 11 (wing); 1919.

General coloration yellowish brown to grayish brown, the praescutum with three darker brown stripes; posterior sclerites of mesonotum and the pleura more pruinose. Head gray; rostrum and antennae dark. Male hypopygium (Fig. 37, G). ♂. L., excl. rostrum, 5.5-7 mm.; w. 6.5-8.5 mm.; rostrum, 3.3-3.5 mm. ♀. L., excl. rostrum, 6.5-7 mm.; w. 7.5-9 mm.; rostrum, 3.5-4 mm.

(May-July) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Alta. and Cal., southw. to S. C., Ga., Fla., La., Okla. and Tex.

Connecticut.—East River, July 10, 1910 (Ely); Kent Falls, July 23-24, 1931 (C. P. A.).

**L. (*Geranomylia*) *distincta* (Doane).**

1900. *Geranomylia distincta* Doane: Journ. N. Y. Ent. Soc., 8: 186.

Figs.—Doane, *Ibid.*, pl. 7, fig. 13 (abnormal ven.); 1900. Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1916, pl. 25, fig. 2 (wing); 1916. Alexander, Cfs. N. Y., 1, pl. 31, fig. 12 (wing); 1919.

Head grayish; rostrum yellowish, browner at base; antennae yellowish brown. Halteres pale. Legs pale yellow. ♂. L., excl. rostrum, 6.5 mm.; w. 8 mm.

(June) Que., Me., N. H., Mass., Ct., R. I., N. Y., N. J., Md., Ind., Tenn., westw. to Mich., southw. and southwestw. to Fla., Mo. and Tex. (in bogs).

Connecticut.—New Bedford, Hough (Type specimen); Putnam, June 15, 1933 (C. P. A.).

**L. (*Geranomylia*) *diversa* (O. S.) (Fig. 37, H).**

1859. *Geranomylia diversa* Osten Sacken: Proc. Acad. Nat. Sci. Philadelphia, 1859: 207.

Figs.—Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1916, pl. 25, fig. 4 (wing); 1916. Alexander, Cfs. N. Y., 1, pl. 31, fig. 13 (wing); 1919. Cole, Proc. Calif. Acad. Sci., (4) 16: 461, fig. 12 (hyp.); 1927.

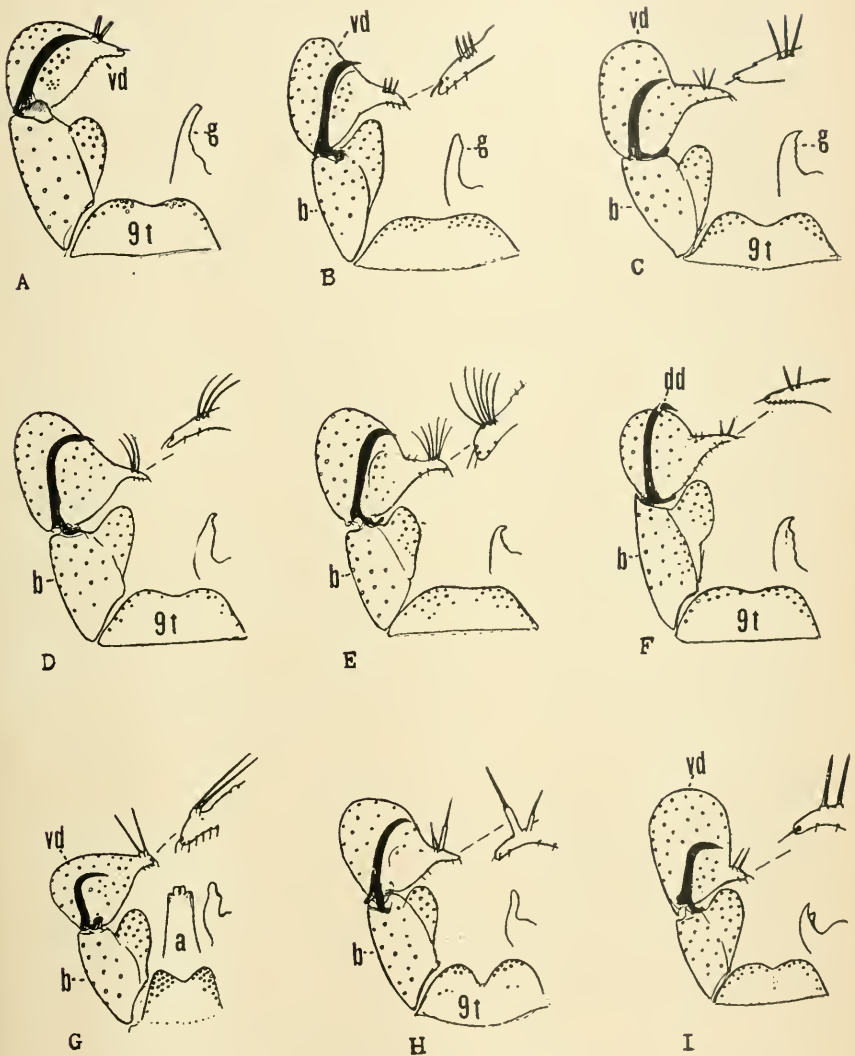


FIGURE 37. *Limonia* (*Discobola*, *Rhipidia*, *Geranomyia*): male hypopygia.

- |  |  |
|--|--|
| A. <i>L. (Discobola) annulata</i> (Linnaeus) | F. <i>L. (R.) shannoni</i> (Alex.)               |
| B. <i>L. (Rhipidia) bryanti</i> (Johns.)     | G. <i>L. (Geranomyia) canadensis</i><br>(Westw.) |
| C. <i>L. (R.) domestica</i> (O. S.)          | H. <i>L. (G.) diversa</i> (O. S.)                |
| D. <i>L. (R.) fidelis</i> (O. S.)            | I. <i>L. (G.) rostrata</i> (Say)                 |
| E. <i>L. (R.) maculata</i> (Mg.)             |  |

Symbols: *a*, aedeagus; *b*, basistyle; *dd*, dorsal dististyle; *g*, gonapophysis; *t*, tergite; *vd*, ventral dististyle.



General coloration gray; praescutum with a broad median and narrow lateral blackish stripes. Head gray; posterior vertex with a blackish area on either side; rostrum black. Knobs of halteres darkened. Legs brownish yellow; tarsi darker. Male hypopygium (Fig. 37. H). ♂. L., exclud. rostrum, 5-6.5 mm.; w. 5-6.5 mm.; rostrum 2.2-2.7 mm. ♀. L., exclud. rostrum, 6-7.5 mm.; w. 6.5-7 mm.; rostrum 2.5-2.8 mm.

(May-Oct.) Me., Mass., N. Y., westw. to Ind., Mich., Wisc. and Mo., southw. to N. C., S. C. and Tenn.

Connecticut.—Kent Falls, June 12-13, 1931, July 23-24, 1931, Aug. 19, 1931 (C. P. A.); Middletown, May 30, 1929 (R. C. N.).

L. (*Geranomyia*) **rostrata** (Say). (Fig. 37. I).

1823. *Limnobia rostrata* Say; Journ. Acad. Nat. Sci. Philadelphia, 3: 22.

1869. *Geranomyia rostrata* Osten Sacken; Mon. Dipt. N. Amer., 4: 79-80.

Figs.—Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1916, pl. 25, fig. 7 (wing); 1916. Alexander, Cfs. N. Y., 1, pl. 31, fig. 10 (wing); 1919.

Mesonotum obscure yellow, the praescutum with three confluent brownish gray stripes; scutal lobes darkened. Knobs of halteres dark brown. Male hypopygium (Fig. 37. I). ♂. L., exclud. rostrum, 5-6.5 mm.; w. 5.5-8 mm.; rostrum, 2.5-3 mm. ♀. L., exclud. rostrum, 5.5-7.5 mm.; w. 5.5-7 mm.; rostrum, 2.6-3.1 mm.

(May-Sept.) Que., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Mich., Ill. and Mo., southw. to Fla., Ala. and La.

Connecticut.—Hamden, July 11, 1932 (N. T.); Manitic Lake, June 8-9, 1929 (C. P. A.); Rowayton, June 16, 1909 (C. W. J.).

Doubtful species:

L. (*Geranomyia*) **costomaculata** (Dtz.) (Trans. Amer. Ent. Soc., 47: 237-238; 1921, as *Geranomyia*).

Close to *diversa*. Thorax dark brown, pruinose; praescutal stripes obsolete. Wing-spots as in *diversa* but larger and more conspicuous, the first area at supernumerary crossvein in cell *Sc*, the second including both origin of *Rs* and fork of *Sc*; the third, large and rhomboidal in outline, at stigma.

Hazleton, Pa.; May 27, a single ♀.

This fly may represent a valid species by the obsolete praescutal stripes, which are clearly defined in all specimens of *diversa* that I have seen.

## 2. Subtribe HELIARIA

### **Helius** St. Fargeau

1825. *Helius* St. Fargeau; Encycl. Method., Index, p. 831.

1830. *Rhamphidia* Meigen; Syst. Besch. Zweifl. Ins., 6: 281.

An extensive genus, with representatives in all major regions of the World, including New Zealand. The local species are eminently characteristic of open marshy areas where the adults may be swept from reeds and sedges, while the immature stages live in the black organic soil of the habitat.

## Key to Species

1. Rostrum short, subequal to remainder of head; legs pale yellow, with tips of femora and tibiae narrowly blackened; wings tipped with dusky, the stigma dark brown ..... **flavipes**  
 Rostrum about one-half longer than remainder of head; legs uniformly dark brown; wings subhyaline, the stigma pale brown ..... **mainensis**

**Helius (*Helius*) flavipes** (Macq.) (Fig. 38, B).

1855. *Rhamphidia flavipes* Macquart; Dipt. Exot., 5th suppl.: 17.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 14, fig. 4 (ven.); 1908. Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1916: pl. 25, fig. 13 (wing); 1916. Alexander, Cfls. N. Y., 1, pl. 33, fig. 42 (wing); 1919. Dickinson, Cfls. Wisc., p. 188, fig. 66 (wing); 1932.

Mesonotum light to dark brown; pleura more pruinose. Rostrum dark. Wings with *r-m* preserved or lost by fusion of adjoining veins (Fig. 38, B). Abdominal segments dark brown, ringed caudally with obscure yellow. ♂. L. 7-8 mm.; w. 7.5-8 mm. ♀. L. 8-10 mm.; w. 7-8.5 mm.

(May-Sept.) Ont., Que., N. H., Vt., Mass., N. Y., N. J., Pa., westw. to Mo., Kan., Man. and Alta., southw. to S. C., Ga., Fla., Ala. and Tex.

Connecticut.—Bloomfield, Aug. 6, 1929 (C. P. A.); East River, Aug. 29, 1910 (Ely); Kent Falls, Sept. 11, 1929 (A. J. W.); Manitic Lake, June 8-9, 1929, Aug. 6, 1929 (C. P. A.); Saptree Run State Park, June 14, 1933 (C. P. A.); Storrs, May 1933 (R. H.); Tyler Lake, June 13, 1931 (C. P. A.); Union, Aug. 17, 1928 (C. F. C.); Winnipauk, June 16, 1909 (C. W. J.).

**H. (*Helius*) mainensis** (Alex.) (Fig. 38, A).

1916. *Rhamphidia mainensis* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1916: 498-499.

Figs.—Alexander, *Ibid.*, pl. 25, fig. 14 (wing). Alexander, Cfls. N. Y., 1, pl. 33, fig. 43 (wing); 1919. Dickinson, Cfls. Wisc., p. 188, fig. 67 (wing); 1932.

Mesonotum light yellowish brown, the praescutum with three dark brown stripes. Head light gray, with a large brown area on vertical tubercle. Abdomen dark brown, basal sternites and hypopygium yellowish. ♂. L. 6-7.5 mm.; w. 5.8-7.7 mm.

(June-Sept.) Me., N. Y., and Md., westw. to Ill., Mich. and Wisc.

## 3. Subtribe ANTOCHARIA

**Antocha** Osten Sacken

1859. *Antocha* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 219.

A genus of moderate size (about 35 species in the typical subgenus), most numerous developed in Eastern Asia. The adult flies occur on vegetation or are found crawling on the exposed surfaces of stones, always near streams. The immature stages live on the submerged stones in such locations. The habits have been discussed by the writer (Cornell Univ. Agr. Expt. Sta. Mem. 38:800-803: 1920). The coloration varies notably and can be relied upon only within re-

stricted limits. The genitalia of the male provide the best characters for specific determination.

*Key to Species*

(Based especially on male characters)

1. General coloration of mesonotum and pleura gray; male hypopygium with the outer dististyle stout basally, narrowed to a flattened subacute apex. (Fig. 39, C)..... **saxicola**
- General coloration of mesonotum and pleura ochreous; male hypopygium with the outer dististyle not so thickened basally (Fig. 39, A, B)..... 2
2. Male hypopygium with the outer dististyle elongate, the tip broadly obtuse; gonapophyses small, curved strongly laterad (Fig. 39, A)..... **obtusa**
- Male hypopygium with the outer dististyle narrowed to an acute or subacute point; gonapophyses and other elements of the phallosome long and narrow, nearly straight (Fig. 39, B) ..... **opalizans**

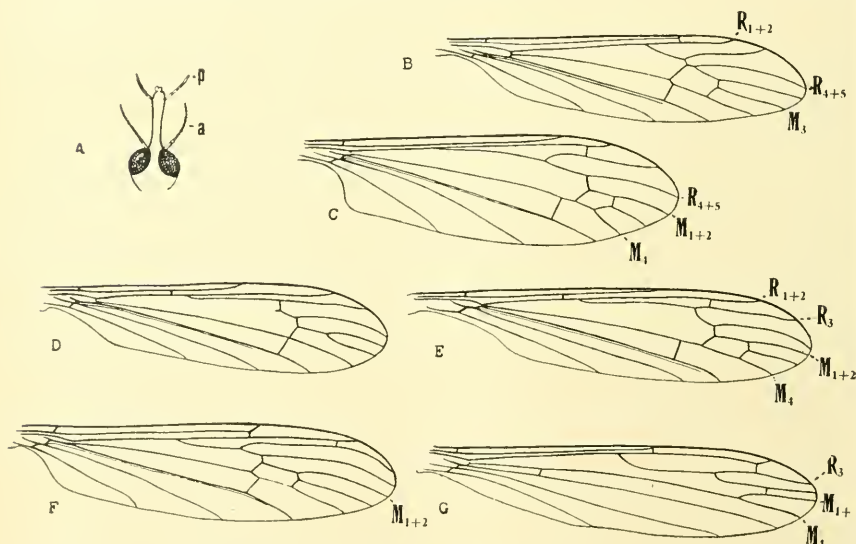


FIGURE 38. Limoniini; details of various subtribes.

- A. *Heliopsis (Heliopsis) mainensis* Alex.; head. (Heliaria).  
 B. *H. (H.) flavipes* (Macq.); wing.  
 C. *Antocha (Antocha) saxicola* O.S.; wing. (Antocharia).  
 D. *Elliptera illini* Alex.; wing. (Ellipteraria).  
 E. *E. tennessa* Alex.; wing.  
 F. *Dicranoptycha septentrionis* Alex.; wing. (Dicranoptycharia).  
 G. *Orimarga (Diotrepha) mirabilis* (O.S.); wing. (Orimargaria).

Symbols: a, antenna; p, maxillary palpus; M, Media; R, Radius.

**Antocha (Antocha) obtusa** Alex. (Fig. 39, A).

1925. *Antocha (Antocha) obtusa* Alexander; Ent. News, 36:201-202.

General coloration ochreous, the praescutum with a conspicuous brown median stripe. Male hypopygium (Fig. 39, A). ♂. L. about 4.8 mm.; w. 5.5 mm. ♀. L. about 5.2 mm.; w. 6 mm.

(May-Aug.) Que., N. Y., Mich.

**A. (*Antocha*) *opalizans* O. S. (Fig. 39, B).**

1859. *Antocha opalizans* Osten Sacken: Proc. Acad. Nat. Sci. Philadelphia, 1859: 220.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 1, fig. 11 (wing); 1869. Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 8, figs. 5, 8, 11 (hyp.); 1904. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 29, fig. 4 (ven.); 1908. Dickinson, Cts. Wisc., p. 189, fig. 68 (wing); 1932.

General coloration ochreous; praescutum with a broad median and narrow incomplete lateral brown stripes. Knobs of halteres weakly darkened. Wings opalescent, milky-white, brighter at base. Abdomen dark brown; hypopygium obscure yellow. Male hypopygium (Fig. 39, B). ♂. L. 4.5 mm.; w. 4.5-6 mm. ♀. L. 4.5-6 mm.; w. 5-6 mm.

(May-Sept.) Que., Me., N. H., Vt., Mass., N. Y., westw. to Ill. and Wisc., southw. to N. C., S. C. and Tenn.

Connecticut.—Cornwall Bridge, June 13, 1931 (C. P. A.); Kent Falls, June 12-13, July 23-24, 1931 (C. P. A.); Middletown, May 26, 1929 (R. C. N.); Norfolk, May 31, July 24, 1931 (C. P. A.); Riverton, June 8, 1929, June 12, 1931 (C. P. A.); Union, May 27, 1922 (W. E. B.).

**A. (*Antocha*) *saxicola* O. S. (Figs. 38, C; 39, C).**

1859. *Antocha saxicola* Osten Sacken: Proc. Acad. Nat. Sci. Philadelphia, 1859: 219.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 3, fig. 10 (hyp.); 1869. Alexander, Cts. N. Y., 1, pl. 33, fig. 48 (ven.); 1919.

General coloration gray or brownish gray to ochreous, the praescutum with clearer brown stripes, the median one bifid at posterior end. Male hypopygium (Fig. 39, C). ♂. L. 4-6 mm.; w. 5-7 mm. ♀. L. 4.5-5.5 mm.; w. 5-6 mm.

(May-Sept.) Que., Ont., N. S., N. H., Vt., Mass., N. Y., Pa., westw. to Mich. and Mo., southw. to Ga.

Connecticut.—Danbury, June 15, 1909 (C. W. J.); Kent Falls, Sept. 11, 1929 (A. J. W.); Riverton, June 12, 1931 (C. P. A.); Salisbury, July 16, 1926 (W. E. B.); Southington, May 28, 1920 (R. B. F.); Winnipauk, June 16, 1909 (C. W. J.).

## 4. Subtribe ELLIPTERARIA

**Elliptera** Schin.

1863. *Elliptera* Schiner: Wien. Ent. Monatschr., 7: 222.

A small genus (nine species) of Holarctic crane-flies, occurring discontinuously in the eastern and western Palaearctic and Nearctic regions. The flies favor the vicinity of waterfalls and small streamlets dripping and percolating down the faces of vertical cliffs, the adults resting on the cliff face and on nearby vegetation. The larvae live in the algal growth in this habitat (see Rogers, Occas. Papers Mus. Zool., Univ. Mich., 215: 25-27; 1930). The fly described as *Elliptera alexanderi* Johnson is a *Gonomyia* (*Lipophleps*), q. v.



## Key to Species

1. Size small (w., ♂, 7 mm. or less); wings with cell *1st M*<sub>2</sub> open by atrophy of basal section of *M*<sub>3</sub>; *R*<sub>2</sub> atrophied; basal section *R*<sub>4+5</sub> angulated and weakly spurred; *m-cu* at or close to fork of *M* (Fig. 38, D) ..... *illini*  
 Size larger (w., ♂, over 8 mm.); wings with cell *1st M*<sub>2</sub> normally closed; *R*<sub>2</sub> present as a weak element about in alignment with *r-m*; basal section *R*<sub>4+5</sub> arcuated; *m-cu* some distance before fork of *M* (Fig. 38, E).... *tennessa*

**Elliptera illini** Alex. (Fig. 38, D).

1920. *Elliptera illini* Alexander: Pomona Journ. Ent. and Zool., 12: 86-87.

General coloration obscure yellow; praescutum with three brown stripes, confluent or nearly so; pleura yellow. Wings with a faint brown tinge (Fig. 38, D). ♂. L. 4.5-5 mm.; w. 6-6.5 mm. ♀. L. about 5 mm.; w. 6 mm.

(June) Tenn., s. Ill.

**E. tennessa** Alex. (Fig. 38, E).

1926. *Elliptera tennessa* Alexander; Insec. Inscit. Menst., 14: 114-115.

General coloration ochreous yellow; praescutum with three conspicuous, confluent, brown stripes. Wings faintly tinged with brown. ♂. L. about 5.5 mm.; w. 8.3-8.5 mm. ♀. L. about 5.5-6 mm.; w. 7.5-8.5 mm.

(June) Tenn.

## 5. Subtribe DICRANOPTYCHARIA

**Dicranoptycha** O. S.

1859. *Dicranoptycha* Osten Sacken: Proc. Acad. Nat. Sci. Philadelphia, 1859: 217.

A small genus of Holarctic and Ethiopian crane-flies, having several species within our limits. The adults occur in humid to relatively dry open woodlands, in the soil of which the larvae live. The coloration of the scape of the antennae appears to vary within the limits of a single species from yellow to almost black.

## Key to Species

(Based in part on male characters)

1. Wings with a strong reddish brown or fulvous tinge; *R*<sub>s</sub> conspicuously longer than cell *1st M*<sub>2</sub>; male hypopygium (Fig. 39, E) with the lateral tergal arms acute at tips; gonapophyses covered with short points so as to appear mace-like ..... *germana*  
 Wings not strongly fulvous, tinged with grayish to pale yellow; *R*<sub>s</sub> approximately equal in length to cell *1st M*<sub>2</sub> or but slightly longer (*winnemana*); hypopygium not as above ..... 2
2. Fore femora extensively blackened, the bases restrictedly pale; remaining femora more narrowly blackened at tips ..... 3  
 Femora at most blackened only at extreme tips; in most species uniformly pale ..... 4
3. Costal fringe of wings (♂) long and conspicuous ..... *sobrigna*  
 Costal fringe of wings (♂) short and dense ..... *megaphallus*
4. Tips of femora narrowly blackened or strongly infumed; male hypopygium with outer margin of outer dististyle smooth (Fig. 39, G, K) ..... 5

- Femora uniformly pale; male hypopygium with outer margin of outer dististyle roughened (except in *pallida*)..... 7
5. Tips of femora very narrowly dark brown; abdominal tergites transversely banded, tigrine in appearance, the apical third of each segment being pale; a subterminal dark brown ring ( $\delta$ ); male hypopygium with gonapophyses very long, bifid near tips (Fig. 39, K) ..... *tigrina*
- Tips of femora more broadly and evidently blackened; abdominal tergites brownish yellow, without subterminal darkening ( $\delta$ ); male hypopygium with the gonapophyses not greatly exerted or bifid at tips ..... 6
6. Size large (L.,  $\delta$ , about 10 mm.); wings brownish yellow, the costal region more saturated; legs pale, the coloration chiefly concealed by dense black setae ..... *nigripes*
- Size small (L.,  $\delta$ , under 8 mm.); wings pale brown; legs pale yellow, the tips of femora and tibiae narrowly blackened ..... *minima*
7. Body-coloration very pale, yellow or brownish yellow; wings yellow ..... 8
- Body-coloration dark brown or gray; wings grayish to pale brown ..... 9
8. Male hypopygium with outer margin of outer dististyle microscopically roughened into points (Fig. 39, L) ..... *winnemana*
- Male hypopygium with the outer margin of outer dististyle smooth (Fig. 39, H) ..... *pallida*
9. Male hypopygium with aedeagus bifid at apex; lateral arms of tergite expanded and truncate at tips (Fig. 39, D) ..... *elsa*
- Male hypopygium with aedeagus simple; lateral arms of tergite parallel-sided or gradually narrowed to the obtusely rounded tips. (Fig. 39, I) *septemtrionis*

### *Dicranoptycha elsa* Alex. (Fig. 39, D).

1929. *Dicranoptycha elsa* Alexander; Bull. Brooklyn Ent. Soc., 24: 28-29.

Allied to *septemtrionis* in general coloration and short costal fringe of male. Male hypopygium (Fig. 39, D) with dististyles angularly bent. Aedeagus bifid at apex.  $\delta$ . L. about 9 mm.; w. 9 mm.  $\text{\textcircled{f}}$ . L. about 10 mm.; w. 9.5 mm.

(Aug.) N. Y., southw. to N. C. (Transition).

### *D. germana* O. S. (Fig. 39, E).

1859. *Dicranoptycha germana* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 217.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 27, fig. 6 (ven.); 1908. Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1916, pl. 25, fig. 10 (ven.); 1916. Alexander, Cfls. N. Y., 1, pl. 33, fig. 49 (wing); 1919.

Mesonotum yellowish brown, praescutum darker brown medially; pleura feebly pruinose. Head light gray. Femoral tips very narrowly and vaguely infumated. Costal region of wing more saturated than disk; costal fringe ( $\delta$ ) relatively short, brown; trichia of veins golden-yellow. Abdomen light brown, in  $\delta$  seventh and eighth segments with a narrow blackened subterminal ring; hypopygium yellow. Male hypopygium (Fig. 39, E).  $\delta$ . L. 9-10 mm.; w. 9.5-11 mm.  $\text{\textcircled{f}}$ . L. 9.5-12 mm.; w. 10-11.5 mm.

(Late June-early Aug.) Que., N. H., Vt., Mass., N. Y., westw. to Mich., southw. to Va., N. C. and Ind.

### *D. megaphallus* Alex. (Fig. 39, F).

1926. *Dicranoptycha megaphallus* Alexander; Psyche, 33: 57-58.

Generally similar to *sobrīna*. Knobs of halteres slightly darkened. Abdominal tergites brown, segments six and seven dark brown; hypopygium yellow. Male hypopygium (Fig. 39, F): outer dististyle relatively long and slender; aedeagus large, outline subrectangular in slide mounts. ♂. L. 7.5-8 mm.; w. 8.5-9.2 mm. ♀. L. about 10 mm.; w. 9.5 mm.

(June-July) N. C., S. C. and Tenn., southw. to n. Fla.

**D. minima** Alex. (Fig. 39, G).

1919. *Dicranoptycha minima* Alexander; Ent. News, 30: 21-22.

General coloration light brown; praescutum without stripes; dorsal pleurites faintly pruinose, ventral ones more yellowish. Male hypopygium (Fig. 39, G): outer dististyle strongly curved, outer margin entirely smooth; inner dististyle very broad. ♂. L. 6.7-7.2 mm.; w. 6.5-7.8 mm. ♀. L. about 6.5 mm.; w. 7-7.2 mm.

(July-Sept.) Ill., Kan. (Austral).

**D. nigripes** O. S.

1859. *Dicranoptycha nigripes* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 218.

Fig.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 3, fig. 11 (hyp.); 1869.

General coloration reddish yellow, posterior sclerites of mesonotum and the pleura strongly pruinose. Legs chiefly covered by a dense black pubescence; tip of femur black, preceded by a clearer yellow ring. Anterior border of wing almost ferruginous; costal fringe (♂) short and dense, black. Abdomen brownish yellow, sternites three to seven with transverse blackened areas at near midlength. Male hypopygium with ninth tergite deeply notched, margin of lobes with short but conspicuous dark setae, median area glabrous. Outer dististyle heavily blackened, strongly curved to apex, outer margin entirely smooth. ♂. L. about 10 mm.

N. C. (Brimley), Ga. (Austral).

**D. pallida** Alex. (Fig. 39, H).

1926. *Dicranoptycha pallida* Alexander; Psyche, 33: 58-59.

Mesonotum shiny brownish yellow, pleura sparsely pruinose. Remainder of body chiefly pale yellow; eighth abdominal segment (♂) dark brown. Antennae pale yellow. Legs yellow, tips of tibiae narrowly darkened. Costal fringe (♂) short. Male hypopygium (Fig. 39, H). ♂. L. 7-7.2 mm.; w. 7.2-7.8 mm. ♀. L. 9-9.5 mm.; w. 8-8.5 mm.

(July) Ind., Kan. (Austral).

**D. septemtrionis** Alex. (Figs. 38, F; 39, I).

1926. *Dicranoptycha septemtrionis* Alexander; *Ibid.*, 33: 56-57.

Generally similar to *sobrīna*. Mesonotum dark brown, sparsely dusted with gray; pleura pruinose. Legs chiefly yellow, terminal tarsal segments dark brown. Costal fringe (♂) short. Abdominal ter-

gites brown, segments seven to eight ( $\delta$ ) dark brown. Male hypopygium (Fig. 39, I) with outer dististyle conspicuously serrulate on all surfaces. Aedeagus small, subequal in size to lateral arm of tergite.  $\delta$ . L. 7-7.5 mm.; w. 8.5-9 mm.

(Aug.-Sept.) Mass., N. Y., westw. to Ind. and Mich., southw. to N. C. (Canadian).

**D. sobrina** O.S. (Fig. 39, J).

1859. *Dicranoptycha sobrina* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 218.

1859. *Dicranoptycha sororecula* Osten Sacken; *Ibid.*, 1859: 218.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 1, fig. 8 (wing), pl. 3, fig. 12 (hyp.); 1869. Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1916, pl. 25, fig. 11 (ven.); 1916. Alexander, Cfs. N. Y., 1, pl. 33, fig. 51 (ven.); 1919.

Head and thorax clear gray, without distinct markings. Abdomen light brown, segments six to eight ( $\delta$ ) more blackened; hypopygium yellow. Male hypopygium (Fig. 39, J).  $\delta$ . L. 10-12 mm.; w. 8.5-10.5 mm. ♀. L. 10-13 mm.; w. 9-11 mm.

(June, July) N. J., Pa., Md., Va., Ind., Tenn., southw. to S. C., Ga., and n. Fla. (Transition, Austral).

Connecticut.—A female, presumably of this species, was taken at Newtown, Sept. 15, 1933 (C. P. A.).

Readily told by the clear gray coloration, broadly blackened fore femora, long costal fringe and massive aedeagus of hypopygium.

**D. tigrina** Alex. (Fig. 39, K).

1919. *Dicranoptycha tigrina* Alexander; Ent. News, 30: 21.

Mesonotum dark brown, with a sparse brown to gray bloom, the posterior notum and pleura clearer gray. Antennae with basal two segments yellow, flagellum black. Wings gray. Subterminal dark ring ( $\delta$ ) involving segments six to eight. Male hypopygium (Fig. 39, K).  $\delta$ . L. 9-10 mm.; w. 8.5-10 mm. ♀. L. 10 mm.; w. 9-10 mm.

(June-Sept.) N. C., Tenn., Ind., Ill. and Kan. (Austral).

**D. winnemana** Alex. (Fig. 39, L).

1916. *Dicranoptycha winnemana* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1916: 500-501.

Figs.—Alexander, *Ibid.*, pl. 25, fig. 12 (ven.); 1916. Alexander, Cfs. N. Y., 1, pl. 33, fig. 50 (wing); 1919.

General coloration pale yellow to brownish yellow; pleura reddish yellow. Antennae with basal two segments usually dark brown, flagellum pale yellow. Legs yellow, terminal tarsal segments brown. Costal fringe ( $\delta$ ) dense and relatively long; *Rs* relatively long, about one-half longer than cell *1st M*<sub>2</sub>. Abdomen brownish yellow, segments eight and nine ( $\delta$ ) brownish black. Male hypopygium (Fig. 39, L).  $\delta$ . L. 7-8 mm.; w. 7-8.5 mm. ♀. L. 8-9 mm.; w. 8-9 mm.

(June, July) Md., Va., Ind., Ill., N. C. and Tenn., westw. to Mo., southw. to Ga. and n. Fla. (Austral).

This species and *pallida* are so pale in color as to appear almost teneral.



FIGURE 39. Limoniini: *Antocha* (*Antocharia*) and *Dicranoptycha* (*Dicranoptycharia*); male hypopygia.

A. *Antocha* (*Antocha*) *obtusa* Alex.

B. *A.* (*A.*) *opalizans* O. S.

C. *A.* (*A.*) *saxicola* O.S.

D. *Dicranoptycha* *elsa* Alex.

E. *D. germana* O.S.

F. *D. megaphallus* Alex.

G. *D. minima* Alex.

H. *D. pallida* Alex.

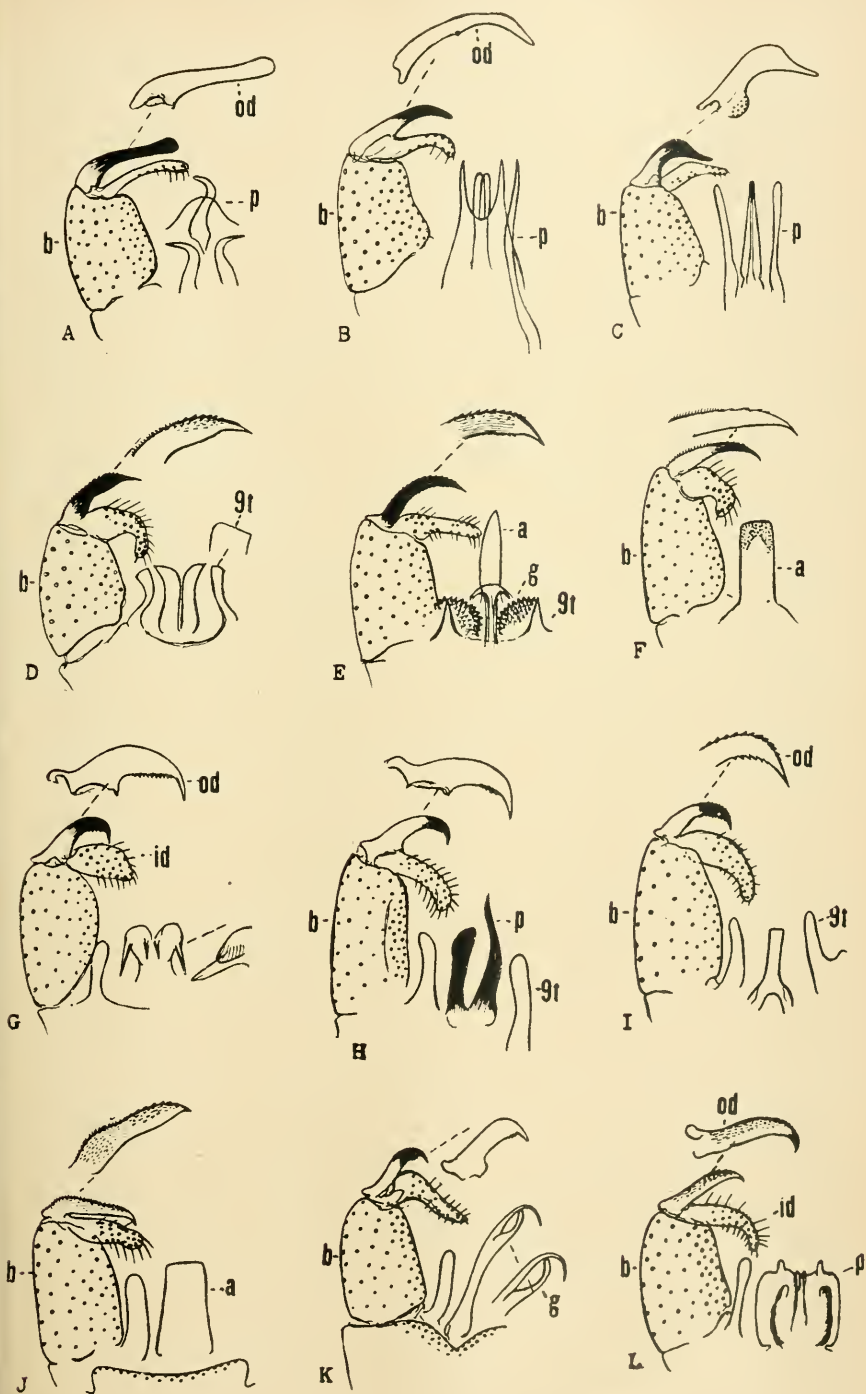
I. *D. septentrionis* Alex.

J. *D. sobrina* O.S.

K. *D. tigrina* Alex.

L. *D. winnemana* Alex.

Symbols: *a*, aedeagus; *b*, basistyle; *g*, gonapophysis; *id*, inner dististyle; *od*, outer dististyle; *p*, phallosome; *t*, tergite.



## 6. Subtribe ORIMARGARIA

**Orimarga** O. S.1869. *Orimarga* Osten Sacken; Mon. Dipt. N. Amer., 4:120.Subgenus **Diotrepha** O. S.1878. *Diotrepha* Osten Sacken; Cat. Dipt. N. Amer., ed. 2: 219-220.

*Orimarga* is a widely-distributed genus, with representatives in all major faunal areas. *Diotrepha* is found in tropical and subtropical America. A single species enters the southern limits considered in this paper. The local fly is of very strange appearance, most often found by sweeping marshy vegetation in open woodlands. The immature stages are found in decaying wood (see Rogers, Ann. Ent. Soc. America, 20: 23-26, pl. 3; 1927).

**Orimarga** (*Diotrepha*) **mirabilis** (O. S.) (Fig. 38, G).1878. *Diotrepha mirabilis* Osten Sacken; *Ibid.*, ed. 2: 220.

Fig.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 29, fig. 6 (ven.): 1908.

Body very elongate in both sexes. General coloration gray, abdomen more blackened. Legs elongate, white, the tips of femora blackened, bases and tips of tibiae more narrowly so. The somewhat remarkable venation is shown (Fig. 38, G): the recession of *m-cu* towards wing-base readily distinguishes this fly from all others in North America. ♂. L. 7.5-8 mm.; w. 4.5-5 mm. ♀. L. 8.5-9 mm.; w. 5 mm.

(June, July) S. Ind., southw. to Ga., n. Fla. and Tex. (Neotropics: Cuba and Hispaniola).

## PEDICIINI

This very primitive tribe includes a small number of genera and species, well-distinguished by the hairy eyes, unusually long  $Sc_1$ , with  $Sc_2$  opposite or before the origin of  $R_s$ , and the generalized arrangement of veins at the end of  $R_s$ . Two subtribes, the *Ularia* and *Pedicaria*, are maintained as distinct chiefly on characters of the immature stages.

The species of the subgenus *Pedicia* are among the largest and most showy species of Tipulidae within our limits. The members of the subgenera *Tricyphona* and *Nasiternella* are of medium to rather large size, and almost invariably with wings that are patterned, either with a costal darkening or with spots and clouds on the disk. The majority of the local members of the tribe fall within the limits of *Dicranota*, distinguished by the small size and, in most cases, unvariegated wings. The *Adelphomyaria*, which have been placed in the *Pediciini* on larval characters, are herein treated as being the most generalized subtribe of *Hexatomini*.

## Key to Subtribes and Genera

- |  |            |
|--|------------|
| 1. Wings with membrane covered with abundant macrotrichia (Fig. 40, A) |            |
| ( <i>Ularia</i> ) .....  | <b>Ula</b> |
| Wings with cells glabrous ( <i>Pedicaria</i> ) .....                   | <b>2</b>   |

2. Size large (wing,  $\delta$ , usually over 7 mm.; in most cases much larger); antennae with 14 or 16 segments; wings usually patterned with darker, either as a costal shading or else spotted and marbled; no supernumerary crossvein in cell  $R_1$ ; cell  $1st\ M_2$  usually closed (Fig. 40, B-D) ..... **Pedicia** 377
- Size smaller (wing,  $\delta$ , under 7 mm.; where larger, with a supernumerary crossvein in Cell  $R_1$ ); antennae with either 13 or 15 segments; wings usually immaculate, except for the stigmal darkening; cell  $1st\ M_2$  usually open by atrophy of  $m$  (Fig. 40, E-J) ..... **Dicranota**

## 1. Subtribe ULARIA

**Ula** Haliday

1833. *Ula* Haliday; Ent. Mag., 1: 153.

The genus *Ula* is very isolated in its affinities, in its various stages curiously combining the characters of the two tribes Pediciini and Hexatomini. The structure of the adult, especially the hairy eyes and general conformation of the male hypopygium, is very like the Pediciini. However, other features, especially of the larva, are more essentially Hexatomine.

The immature stages of the various species of *Ula* are found in decaying fungi. The adult flies are especially numerous in Spring and Fall, being most often swept from yew and other low-growing evergreen shrubs in cold woods and ravines.

*Key to Species*

1. Antennae short in both sexes, if bent backward ending before the root of the halteres; wings with the cord and outer end of cell  $1st\ M_2$  seamed with brown ..... **elegans**
- Antennae of male elongate, if bent backward extending to beyond the base of the abdomen; wings dusky, without a distinct pattern except the stigmal clouding ..... 2
2. Mesonotum brownish, the praescutum with a broad, clearly defined, shiny brown median stripe; antennae uniformly dark brown, including the scape and pedicel; in male of unusual length, if extended backward reaching about to midlength of abdomen ..... **longicornis**
- Mesonotum grayish brown, without clearly defined darker stripes; antennae dark brown, the scape and pedicel clear light yellow; in male relatively long, if bent backward extending about to the base of the third abdominal segment (Fig. 40, A) ..... **paupera**

**Ula elegans** O. S.

1869. *Ula elegans* Osten Sacken; Mon. Dipt. N. Amer., 4: 276-277.

Figs.—Alexander, Cfls. N. Y., 1, pl. 41, fig. 164 (wing); 1929. Dickinson, Cfls. Wisc., p. 200, fig. 90 (wing); 1932.

Antennal verticils exceeding the segments: brownish black, the two basal segments clear yellow; head clear gray. Thorax dark brown, with a yellowish pollen, the stripes ill-delimited. The darkened wing-pattern varies much in the degree and intensity of the areas, usually including the cord, outer end of cell  $1st\ M_2$ , origin of  $R_s$ , and both ends of the otherwise yellowish stigma. Male hypopygium with the gonapophyses long and conspicuous, the outer pair simple, the inner pair prolonged into needle-like points, before apex with an acute erect to slightly recurved spine.  $\delta$ . L. about 5-6 mm.; w. 6-7 mm.  $\varnothing$ . L. about 6-7 mm.; w. 7-8 mm.



(Apr.-June; Aug.-Sept.) Ont., Que., Me., N. H., Vt., Mass., N. Y., westw. to Alta. and Mont., southw. to S. C. and Tenn.

Connecticut.—Riverton, May 16, 1931 (C. P. A.); Salisbury, Sept. 5, 1928 (G. C. C.); Tunxis State Forest, May 16, 1931 (C. P. A.); W. Granby, Sept. 11, 1928 (C. P. A.).

### **U. longicornis** Dtz.

1921. *Ula longicornis* Dietz; Trans. Amer. Ent. Soc., 47: 250-251.

♂. L. about 5 mm.; w. 6.5 mm.

(Early Aug.) Pa. (mts.). Known only from the unique type.

### **U. paupera** O. S. (Fig. 40, A).

1869. *Ula paupera* Osten Sacken; Mon. Dipt. N. Amer., 4: 277-278.

Antennae of ♂ with flagellar segments elongate-fusiform, with an erect pale pubescence and short, inconspicuous verticils. Wings very rarely with dusky cloud on anterior cord. Male hypopygium with the gonapophyses small and inconspicuous. ♂. L. 5-6 mm.; w. 6-7.5 mm. ♀. L. 6-7 mm.; w. 6-6.5 mm.

(Apr.-May; Aug.-Sept.) Que., Me., N. H., Vt., Mass., N. Y., westw. to Ind. and Mich., southw. to D. C.

Connecticut.—E. Hartland, Sept. 11, 1928 (C. P. A.); Norfolk, Sept. 12, 1928 (C. P. A.); Riverton, Sept. 11, 1928, May 16, 1931 (C. P. A.); Sharon, Sept. 5, 1928 (G. C. C.); W. Granby, Sept. 11, 1928 (C. P. A.).

## 2. Subtribe **PEDICARIA**

### **Pedicia** Latr.

1809. *Pedicia* Latreille; Hist. Nat. Crust. et Ins., 4: 255.

#### *Key to Subgenera*

1. Size very large (wing, 20 mm. or more); wings with a dark pattern that is arranged as a triangle, including broad costal and cubital seams that are connected across the very oblique cord; maxillary palpi with terminal segment elongate (Fig. 40, B) ..... **Pedicia**
- Size smaller (wing, under 18 mm., usually under 15 mm.); wings never with a dark pattern distributed as above described; cord transverse or nearly so (Fig. 40, C, D); maxillary palpi with terminal segment short..... 2
2. Wings with a supernumerary crossvein in cell *M* ..... **Nasiternella**
- No supernumerary crossvein in cell *M* of wings ..... **Tricyphona**

### Subgenus **Pedicia** Latreille

The subgenus *Pedicia* includes three local species that are among the largest and most conspicuous of our crane-flies. All are readily told by the dark brown triangle on the wings, this being produced by a dark costal margin and a broad seam along vein *Cu*<sub>1</sub>, cross-connected by a similar dark seam along the unusually oblique cord. The adult flies show some features that strongly suggest the subfamily Tipulinae, notably the elongate maxillary palpi and the shirring of vein *Cu*<sub>1</sub> at the point of insertion of *m-cu*. The flies frequent wet woods, boggy areas, the shaded springy slopes of open gorges and similar situations that include cold springs or saturated springy hillsides supporting a mossy growth, wherein the large carnivorous larvae are to be found.

## Key to Species

1. Dark seam along vein *Cu* not extending distad beyond the approximate level of the cord; intermediate praescutal stripes broad and almost confluent. **contermina**  
 Dark seam along vein *Cu* extended distad onto the outer section of vein *Cu*; intermediate praescutal stripes distinct ..... 2
2. Dark seams along *Cu* and the cord broad, the former extending the entire length of the vein and thus attaining the wing-margin; intermediate praescutal stripes darker in color than the laterals ..... **albivitta**  
 Dark seams along *Cu* and the cord narrow, the former ending at about mid-length of the distal section of vein *Cu*, not attaining the wing-margin; intermediate praescutal stripes concolorous with the laterals ..... **margarita**

While the present report was in press, a fourth species of *Pedicia* has been added to the present faunal area. This has been described as *Pedicia (Pedicia) procteriana* Alexander (Bull. Brooklyn Ent. Soc., 36; April 1939). By the above key, the species runs to *contermina*, from which it is distinguished by the very deep cell  $M_4$  of wings and, especially, by the distinct structure of the male hypopygium. It is known only from Ontario (Ide) and Mount Desert Island, Me. (William Procter). This species is on the wing from late May into July.

***Pedicia (Pedicia) albivitta* Walker.**

1848. *Pedicia albivitta* Walker; List Dipt. Brit. Mus., 1:37.

Figs.—Aldrich, Psyche, 7:201, text-fig. (wing); 1895. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 26, fig. 1 (ven.); 1908. Williston, Man. N. Amer. Dipt., Ed. 3:80, fig. 1 (wing); 1908. Alexander, Cfs. N. Y., 1, pl. 42, fig. 175 (wing); 1919. Young, Cornell Univ. Agr. Expt. Sta. Mem. 44:283, pl. 9, figs. 1, 2 (thorax); 1921. Dickinson, Cfs. Wisc., (col. frontispiece, ad. ♀); 1932.

Mesonotum whitish gray; pleura light gray, the dorso-pleural region blackened. Antennae short, scape brown, flagellum obscure yellow. Head gray, with a small dark vertical tubercle. Halteres pale. Femora yellow, tips conspicuously blackened. Abdomen whitish gray, the tergites with triangular or diamond-shaped darker gray areas that are bordered by rusty-yellow, this color most extensive at incisures. ♂. L. 24-28 mm.; w. 23-24 mm. ♀. L. 30-35 mm.; w. 23-27 mm.

(July-Sept.) Ont., Que., N. S., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Man., Minn., Wisc., Ia., Mo. and Kan., southw. to Va., N. C., and S. C.

Connecticut.—Cornwall Bridge, Aug. 9, 1931 (C. P. A.); E. Hartland, Sept. 11, 1928 (C. P. A.); East River, Sept. 10 (Ely); New Haven, Sept. 12, 1904 (B. H. W.); New London (O. S.); Salisbury, Aug. 27, 1904 (W. E. B.), Sept. 5, 1928 (G. C. C.), Sept. 12, 1928 (C. P. A.); Storrs, 1929 (L. S.); Twin Lakes, Sept. 12, 1928 (C. P. A.); W. Granby, Sept. 11, 1928 (C. P. A.).

***P. (Pedicia) contermina* Walk.**

1848. *Pedicia contermina* Walker; List Dipt. Brit. Mus., 1:38.

Fig.—Alexander, Cfs. N. Y., 1, pl. 42, fig. 176 (wing); 1919.

Long held to be a mere variation of *albivitta*, now known to be distinct. Wings with the pale brownish yellow costal border extending to beyond the stigma. ♂. L. 26-30 mm.; w. 25-26 mm. ♀. L. 28-30 mm.; w. about 26 mm.

(May-July) Que., N. S., Me., N. H., Vt., Mass., N. Y., westw. to Mich., southw. to N. C.

**P. (*Pedicia*) *margarita* Alex.** (Fig. 40, B).

1929. *Pedicia margarita* Alexander; Bull. Brooklyn Ent. Soc., 24: 300-302.

Closely related to *albicitta*, differing in the small size and nature of wing-pattern. Median praescutal stripes entirely pale reddish brown. Knobs of halteres dusky. Wings relatively narrow, the dark markings correspondingly reduced in width. ♂. L. about 20-22 mm.; w. 20-22 mm. ♀. L. about 24 mm.; w. 21.5-22 mm.

(Late July-Aug.) N. B., Me., N. H., Vt., Mass., N. Y., southw. to Tenn. (Great Smokies).

#### Subgenus *Nasiternella* Wahlgren

1881. *Nasiterna* Wallengren; Ent. Tidskr., 2:179; (nec *Nasiterna* Wagler, 1832).

1904. *Nasiternella* Wahlgren; Arkiv för Zoologi., 2, No. 7: 4.

The subgenus *Nasiternella* includes the single species *hyperborea*. The female, first detected in 1933 on Mt. Washington, is subapterous.

***Pedicia* (*Nasiternella*) *hyperborea* (O. S.)**

1861. *Amalopsis hyperborea* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1861: 292.

Figs.—Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1916, pl. 28, fig. 50 (wing); 1916. Alexander, Cfs. N. Y., 1, pl. 42, fig. 182 (wing); 1919.

General coloration gray, praescutum with broad brown stripes. Antennae brown. Head gray. Halteres elongate, pale. Wings whitish, handsomely clouded and marbled with brown, including a heavier costal series. Cell *1st M*<sub>2</sub> normally closed, rarely open by atrophy of *m*. Abdomen dark brown, segments narrowly ringed caudally with paler. ♂. L. 8-9 mm.; w. 10.5-12 mm. ♀. L. about 8 mm.; w. 3.2 mm.

(Late June, July) Labr., westw. to Can. N. W. Terr., southw. to Mt. Washington, N. H. (2800'-4200'), Vt. (Killington Peak) and N. Y. (Adirondacks, Mt. Marcy, Mt. Whiteface). (Hudsonian).

#### Subgenus *Tricyphona* Zetterstedt

1838. *Tricyphona* Zetterstedt; Ins. Lapponica, Dipt., p. 851.

1856. *Amalopsis* Haliday; Ins. Britannica, Dipt., 3, add., p. xv.

The various local species of *Tricyphona* are about intermediate in size between the local species of the subgenus *Pedicia* and the forms included in the genus *Dicranota*. The flies of our species all have cell *1st M*<sub>2</sub> closed, except in abnormal specimens. The adults occur in swampy and boggy areas, a few species (as *cernalis*) along rocky mountain streams; others (as *auripennis*) found resting on the wet faces of vertical cliffs. The larvae are found in wet earth.

#### Key to Species

1. Wings with a conspicuous brown costal darkening; *r-m* connecting with *Rs* before fork; a short element *R*<sub>2+3+4</sub>. (Fig. 40, C) ..... 2

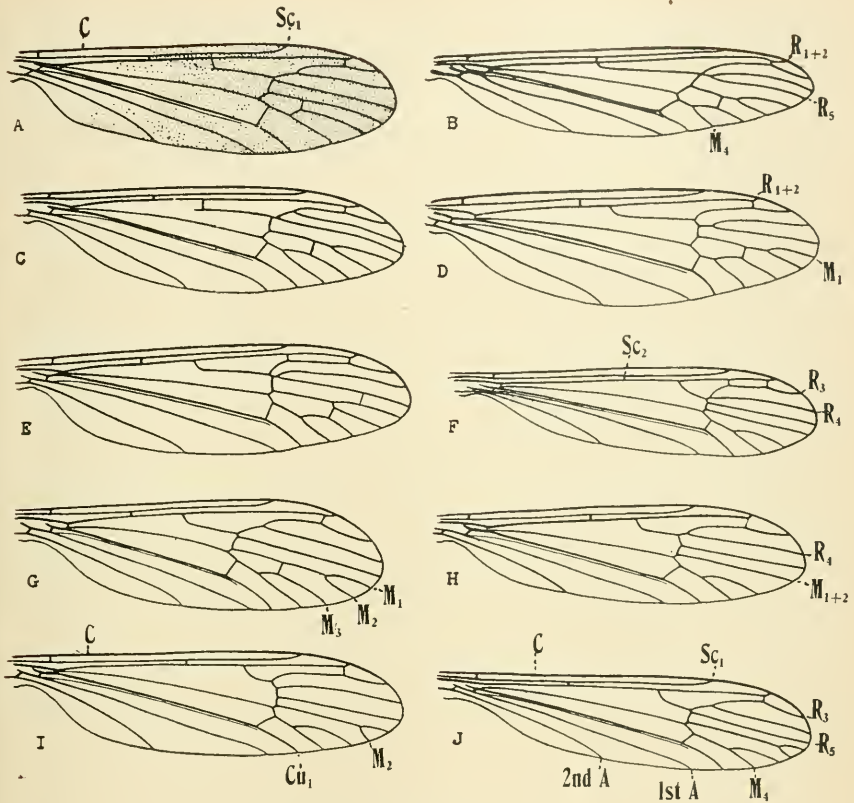


FIGURE 40. Pediciini; venation.

- |   |   |
|---|---|
| A. <i>Ula paupera</i> O.S.                        | F. <i>D. (Paradicranota) eucera</i> O.S.    |
| B. <i>Pedicia (Pedicia) margarita</i> Alex.       | G. <i>D. (Amalopina) flavicola</i> (O.S.)   |
| C. <i>P. (Tricyphona) inconstans</i> (O.S.)       | H. <i>D. (Plectromyia) modesta</i> (O.S.)   |
| D. <i>P. (T.) calcar</i> (O.S.)                   | I. <i>D. (Rhaphidolabis) cayuga</i> (Alex.) |
| E. <i>Dicranota (Eudicranota) notabilis</i> Alex. | J. <i>D. (R.) tenuipes</i> (O.S.)           |

Symbols: *A*, Anal; *C*, Costa; *Cu*, Cubitus; *M*, Media; *R*, Radius; *Sc*, Subcosta.

- Wings subhyaline, or else variegated with brown spots and clouds, the costal region not conspicuously darkened; *r-m* connecting with *Rs* at, or, usually, beyond the fork; *R*<sub>1+5</sub> forming a symmetrical fork with *R*<sub>1</sub>, not captured by *R*<sub>2+3</sub>. (Fig. 40, D) ..... 3
2. Wings narrow; a variable number of supernumerary crossveins in cell *R*<sub>4</sub>; male hypopygium with the tergite narrowed outwardly, without lateral notches (Fig. 41, D) ..... *johnsoni*
- Wings of normal width, without supernumerary crossveins in cell *R*<sub>4</sub>; male hypopygium with the caudal margin of tergite broadly and gently emarginate, fringed with numerous setulae, and with small lateral notches (Fig. 41, E) ..... *inconstans*
3. Wings yellowish, unmarked except for the stigma and a slight yellowish costal suffusion ..... 4
- Wings with brown spots, appearing as seams to certain of the veins, narrowest and least evident in *katahdin* and *pumila* ..... 5



4. Stigmal area of wings brown; male hypopygium conspicuously hairy, the dististyle with four or five prongs (Fig. 41, B); wings (♀) small and tending to be atrophied (wing, ♀, under 10 mm.) ..... **autumnalis**  
 Stigmal area of wings usually pale to feebly indicated; male hypopygium small, not conspicuously hairy; wings (♀) of normal size, over 12 mm. .... **calcar**
5. Cell  $M_3$  long-petiolate,  $M_{3+4}$  longer than  $m-cu$ ; wing-pattern chiefly as a broad brown seam along cord; size large (wing, ♂, over 13 mm.) ..... **auripennis**  
 Cell  $M_3$  sessile or short-petiolate,  $M_{3+4}$  very short or lacking; wing-pattern without a conspicuous brown seam along cord; size smaller (wing, ♂, under 10 mm.). ..... 6
6. Wings with a heavy brown pattern, including large circular clouds at  $Sc_2$  and origin of  $R_s$ , the latter not crossing cell  $C$ ; abdominal segments gray, conspicuously banded with paler; basal two antennal segments yellow, the remainder black ..... **vernalis**  
 Wings with a restricted brown pattern, extensive only in *macateei*, where the area at  $Sc_2$  crosses cell  $C$  to the margin; abdominal segments brown or brownish black throughout (except in *katahdin*, where the basal segment is pale). ..... 7
7. Wing-pattern heavy, especially a costal series of about five darkenings, some of these (at least that at  $Sc_2$ ) reaching the front margin of wing ..... **macateei**  
 Wing-pattern very restricted, including only small spots and dots at intervals along veins, with cells  $C$  and  $Sc$  nearly clear ..... 8
8. General coloration light brown, including the pleura; antennal scape pale yellow, the remainder of organ black ..... **katahdin**  
 General coloration of body gray; antennae entirely dark brown or black ..... 9
9. Wings of normal size (wing, ♂, 8-9 mm.); antennae 16-segmented. .... **paludicola**  
 Wings small and showing signs of degeneracy both of shape and venation (wing, ♂, about 5 mm.); antennae 14-segmented ..... **pumila**

**Pedicia (*Tricyphona*) auripennis** (O. S.) (Fig. 41, A).

1859. *Amolopis auripennis* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 247.

Figs.—Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1916, pl. 28, fig. 49 (wing); 1916. Alexander, Cfs. N. Y., 1, pl. 42, fig. 181 (wing); 1919.

Mesonotum yellowish gray, the praescutum with three conspicuous brown stripes; pleura yellowish gray, sparsely variegated with brown. Basal antennal segments brownish yellow, the outer segments brownish black. Head gray. Halteres pale. Legs obscure yellow, femoral tips very narrowly darkened. Abdomen generally light brown, tergites darker, their caudal margins narrowly ringed with paler, of sternites more yellowish. Male hypopygium (Fig. 41, A). ♂. L. 15-17 mm.; w. 13.5-17 mm. ♀. L. 18 mm.; w. 16 mm.

(June) Ont., Que., Me., N. H., Vt., Mass., N. Y.

Connecticut.—W. Granby, June 8, 1929 (G. C. C.); resting on face of mossy cliff.

**P. (*Tricyphona*) autumnalis** (Alex.) (Fig. 41, B).

1917. *Tricyphona autumnalis* Alexander; Can. Ent., 49: 30-31, 61-62.

Figs.—Alexander, Cfs. N. Y., 1, pl. 42, figs. 179 (wing ♂), fig. 180 (wing ♀); 1919. Dickinson, Cfs. Wisc., p. 208, fig. 106 (wing); figs. 161, 162 (hyp.); 1932.

General coloration of thorax pale yellow, the praescutum pale with three very indistinct reddish yellow stripes. Antennae with basal segments yellow, terminal ones black. Head light gray. Knobs of halteres infuscated. Wings yellowish subhyaline, costal region more saturated; stigma brown; petiole of cell  $R_4$  subequal to  $r-m$ . Abdom-

inal tergites brown, sternites yellow; terminal segments dark brown. Male hypopygium (Fig. 41, B) having unusually long setae on basistyle. ♂. L. 13.5-16 mm.; w. 13.5-15 mm. ♀. L. 20 mm.; w. 9.5 mm.

(Late July-Oct.) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y. and Pa., westw. to Mich., Wis. and Hudson's Bay.

**P. (*Tricyphona*) *calcar* (O. S.)** (Figs. 40, D; 41, C).

1859. *Amalopsis calcar* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859:247.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 2, fig. 14 (wing); 1869. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 25, fig. 2 (ven.); 1908. Williston, Man. N. Amer. Dipt., Ed. 3.:84, fig. 25, sub 4 (ven.); 1908. Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1916, pl. 28, fig. 48 (wing); 1916. Alexander, Cfs. N. Y., 1, pl. 42, fig. 178 (wing); 1919. Dickinson, Cfs. Wis., p. 208, fig. 107 (wing); 1932.

General coloration of thorax pale yellow, the praescutum with four slightly more reddish stripes, the interspaces weakly pruinose. Antennae chiefly pale yellow, outer segments brown. Head gray. Wings (Fig. 40, D) tinged with yellow; cell  $R_4$  short-petiolate. Abdomen brown above, tergites laterally and the sternites yellow; subterminal segments dark brown. Male hypopygium (Fig. 41, C). ♂. L. 10-13 mm.; w. 11-14 mm. ♀. L. 15-18 mm.; w. 13.5-15 mm.

(May, June) Ont., Que., Me., N. H., Vt., Mass., N. Y., westw. to Wis., southw. to N. C.

Connecticut.—Cornwall Bridge, May 30, 1931 (C. P. A.); June 12-13, 1931 (C. P. A.); Hartland, June 9, 1929 (C. P. A.); Norfolk, June 9, 1929 (C. P. A.); Riverton, May 30, 1931 (C. P. A.); Storrs, May 1931 (C. S. C.); Tyler Lake, May 30, 1931 (C. P. A.).

**P. (*Tricyphona*) *inconstans* (O. S.)** (Figs. 40, C; 41, E).

1859. *Amalopsis inconstans* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859:247.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 4, fig. 30 (♂ hyp.); 1869. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 25, fig. 1 (ven.); 1908. Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1916, pl. 28, fig. 47 (wing); 1916. Alexander, Cfs. N. Y., 1, pl. 42, fig. 177 (wing); 1919. Dickinson, Cfs. Wis., p. 209, fig. 108 (wing); 1932.

General coloration of notum yellow to yellowish orange, pronotum darkened medially. Antennae yellow, basal segments darker. Head brownish gray. Halteres and legs yellow. Wings (Fig. 40, C) subhyaline, costal border broadly and conspicuously infuscated; restricted brown dots at origin  $R_s$  and on anterior cord. Abdominal tergites brown, basal sternites paler. Male hypopygium (Fig. 41, E). ♂. L. 11-14 mm.; w. 10-12 mm. ♀. L. 13-16 mm.; w. 11-14 mm.

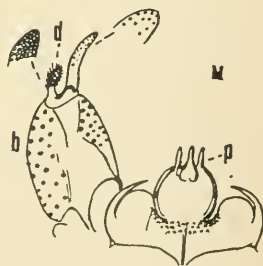
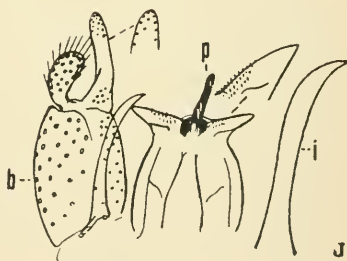
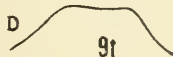
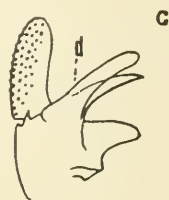
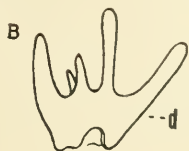
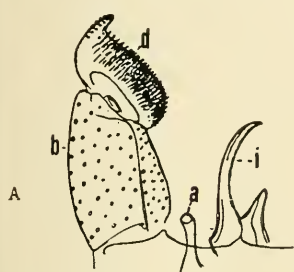
(May-Sept.) Ont., Que., Nfd., N. B., N. S., Me., N. H., Vt., Mass., R. I., N. Y., N. J., Pa., westw. to Wis., Minn. and Mo., southw. to S. C. and Ga.

Connecticut.—Danbury, June 15, 1909 (C. W. J.); East River, July 6, 1911 (Ely); Hamden, June 2, 1928 (R. B. F.); Kent Falls, Sept. 11, 1929 (A. J. W.); Manitic Lake, June 8-9, 1929 (C. P. A.); Natchaug State Forest, June 14, 1933 (C. P. A.);

FIGURE 41. Pediciini: male hypopygia.

- A. *Pedicia (Tricyphona) auripennis* (O.S.)
- B. *P. (T.) autumnalis* (Alex.); dististyle.
- C. *P. (T.) calcar* (O.S.); dististyle.
- D. *P. (T.) johnsoni* (Alex.); tergite.
- E. *P. (T.) inconstans* (O.S.)
- F. *P. (T.) paludicola* (Alex.)
- G. *Dicranota (Paradicranota) iozwa* Alex.
- H. *Pedicia (Tricyphona) vernalis* (O.S.)
- I. *Dicranota (Paradicranota) cucera* O.S.
- J. *D. (Dicranota) currani* Alex.
- K. *D. (Paradicranota) ricularis* O.S.
- L. *D. (Dicranota) divaricata* Alex.
- M. *D. (D.) noveboracensis* Alex.

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





N. Branford, July 4, 1924 (R. B. F.); Norfolk, June 9, 1929 (C. P. A.); Putnam, June 15, 1933 (C. P. A.); Riverton, May 30, June 12, 1931 (C. P. A.); Salisbury, Sept. 5, 1928 (G. C. C.); Sept. 12, 1928 (C. P. A.); Stafford Springs, June 14, 1933 (C. P. A.); Tunxis State Park, June 12-13, July 23, 1931 (C. P. A.); Tyler Lake, May 30, 1931 (C. P. A.); Union, Aug. 17, 1928 (C. S. C.); Westbrook, June 5, 1929 (R. B. F.); W. Granby, Sept. 11, 1928 (G. C. C.), June 8, 1929 (C. P. A.).

**P. (*Tricyphona*) *johnsoni* Alex. (Fig. 41, D).**

1930. *Tricyphona johnsoni* Alexander; Occas. Pap. Boston Soc. Nat. Hist., 5: 277.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 2, fig. 15 (wing); 1869. (as *inconstans*). Johnson, Psyche, 34: 217, figs. 1-4 (wings); 1927, (as *inconstans*).

Generally similar to *inconstans*, differing as follows: wings narrower, the coloration darker, including the somewhat broader costal border: cell  $R_4$  with from one to seven supernumerary crossveins. Male hypopygium with the tergite (Fig. 41, D).

(June) Mass. (Nantucket Is.), southw. to flatwoods areas of S. C., Ga. and Fla. (coastal).

**P. (*Tricyphona*) *katahdin* Alex.**

1914. *Tricyphona katahdin* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1914: 598-599.

Figs.—Alexander, *Ibid.*, 1914, pl. 25, fig. 7 (wing). Alexander, *Ibid.*, 1916, pl. 28, fig. 51 (wing); 1916. Alexander, Cfls. N. Y., 1, pl. 42, fig. 183 (wing); 1919.

Mesonotum light fawn-brown, praescutal stripes very ill-defined, the pleura light yellow. Antennae with basal segment yellow, remainder dark brown. Knobs of halteres weakly darkened. Femora yellow basally, passing into brown. Wings light yellow, with a few small brown spots, chiefly along anterior half; venation variable, *m-cu* at or before fork of  $M$ , cell  $M_3$  subsessile to long-petiolate. Abdominal tergites weakly bicolorous, brown, the apices broadly pale; sternites brownish yellow; margined laterally with brown. Male hypopygium almost as in *paludicola*.  $\delta$ . L. 6-7.5 mm.; w. 6-7 mm.  $\text{♀}$ . L. 8.8-9.5 mm.; w. 7.5-9 mm.

(Aug.) Me., Vt., westw. to Mich.

**P. (*Tricyphona*) *macateei* Alex.**

1919. *Tricyphona macateei* Alexander; Can. Ent., 51: 166.

Mesonotum yellowish gray, the praescutum with four brown stripes, intermediate pair only narrowly separated. Antennae brownish black throughout. Head dark gray. Femora brownish yellow, tips broadly dark brown. Wings nearly hyaline, with a heavy dark brown pattern. Cell  $M_3$  sessile; *m-cu* at or before fork of  $M$ . Abdominal tergites brownish gray, the caudal margins more yellowish gray. Male hypopygium almost as in *paludicola*.  $\delta$ . L. 8-8.5 mm.; w. 8-9 mm.  $\text{♀}$ . L. 9-10 mm.; w. 10-11 mm.

(Early May; Sept., Oct.) Mass., N. Y., southw. to Md. and N. C.

Connecticut.—W. Granby, Sept. 11, 1928 (G. C. C.).

**P. (*Tricyphona*) *paludicola* (Alex.) (Fig. 41, F).**

1916. *Tricyphona paludicola* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1916: 538-540.

Figs.—Alexander, *Ibid.*, 1916, pl. 28, fig. 53 (wing). Alexander, Cfls. N. Y., 1, pl. 42, fig. 184 (wing); 1919.

General coloration brownish gray, the praescutum with four brown stripes; pleura gray. Head brownish gray. Knobs of halteres infuscated. Femora obscure yellow, tips broadly brownish black. Wings sometimes nearly unimaculate; cell  $M_3$  sessile. Abdomen dark brown, including hypopygium. Male hypopygium (Fig. 41, F) with apex of basistyle set with microscopic black spines; dististyle bearing two or three small spines or spinous plates; interbase with abundant setae on distal half. ♂. L. 7-8 mm.; w. 8-9 mm. ♀. L. 10.5-11 mm.; w. 10.5-11 mm.

(May-early June). Ont., N. B., Me., Vt., Mass., N. Y., westw. to Mich.

The four species, *katahdin*, *macateei*, *paludicola* and *pumila*, all have this peculiar type of hypopygium and are unquestionably closely allied, being best separated by the characters given in the key.

**P. (*Tricyphona*) *pumila* sp. nov.**

Rostrum brownish gray; palpi dark brown. Antennae 14-segmented, dark brown throughout; flagellar segments oval, the outer ones more narrowed; terminal segment longer than the penultimate. Head yellowish gray, the center of vertex extensively infuscated; a weak low carina on vertex, possibly abnormal.

Pronotum brownish gray, the central portion a little darker. Mesonotal praescutum gray with four brown stripes, the median line more brownish gray; posterior sclerites of mesonotum clearer gray, the center of each scutal lobe with a brown triangular area. Pleura gray, the dorso-pleural region more yellowish. Halteres obscure yellow, the knobs infuscated. Legs with coxae brownish gray; trochanters brownish yellow; femora brownish black, the basal portions brighter; remainder of legs black. Wings narrow, whitish subhyaline, with a very restricted brown pattern that is chiefly costal, including small spots at ends of veins  $Sc$ ,  $R_{1+2}$  and as narrow vague seams along the cord; veins pale brown. Venation: tending to be degenerate; petiole of cell  $R_4$  elongate, exceeding cell *1st*  $M_2$ .

Abdomen brownish gray, including the hypopygium. Male hypopygium much as in *katahdin*; dististyle broadly flattened and provided with two or three spines; setae of interbasal process very dense but of moderate length only; aedeagus capitate. ♂. L. about 5.5 mm.; w. 5 x 1 mm.

*Holotype*, ♂, near Woodstock, New Brunswick, June 15, 1929 (C. P. A.); in author's collection.

The species belongs to the *paludicola* group, being most closely allied to the typical member, *paludicola*. It is the smallest and most degenerate species of the genus so far discovered in Eastern North America. More recent observations made in Michigan by Professor Rogers indicate the probability that *pumila* is scarcely distinct from *paludicola*.

**P. (*Tricyphona*) vernalis (O. S.) (Fig. 41, H).**

1861. *Amalopsis vernalis* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1861: 291.

Figs.—Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1916, pl. 28, fig. 52 (wing); 1916. Alexander, Cfls. N. Y., 1, pl. 42, fig. 185 (wing); 1919.

General coloration gray, the praescutum with three brown stripes, median stripe rarely divided by a pale vitta. Head brownish gray. Wings with a faint brown tinge, heavily spotted with darker brown. *M-cu* connecting with *M*<sub>4</sub> just beyond base; cell *1st M*<sub>2</sub> in cases open by atrophy of *m*. Male hypopygium (Fig. 41, H) with the dististyle bearing a slender, setiferous, tail-like lobe. ♂. L. 6.5-7.5 mm.; w. 8-9 mm. ♀. L. 11-12 mm.; w. 10.5-12 mm.

(Late May, June) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., southw. to N. C., S. C. and Ga.

Connecticut.—Hartland, June 9, 1929 (C. P. A.).

**Dicranota Zetterstedt**

1838. *Dicranota* Zetterstedt; Ins. Lapponica, Dipt., p. 851.

The uniting of several groups of small crane-flies into the single genus *Dicranota* has rendered this the largest genus within the tribe, with nearly a score of species occurring in our faunal limits. The members of the genus are readily told from the larger *Pediciini* by the usually unvariegated wings, generally open cell *1st M*<sub>2</sub>, and small size. The antennal structure, including number of segments, is remarkably variable among the different species. Similarly the venation is highly plastic, especially as regards the radial field, and most of the sub-generic groups here recognized are separated on slight details of venation. Such groups are admittedly artificial and are maintained chiefly for convenience in handling the unwieldy mass of species. Occasionally abnormal specimens are found in a series but since more than a single, or even several, species may be taken at a single place and date, the identification should be checked by a study of the male hypopygium. The adult flies occur along woodland streams, in gorges, in boggy areas, and similar ecological situations. The carnivorous larvae live in the wet soil in or near such places.

*Key to Subgenera*

- |  |                      |
|--|----------------------|
| 1. A supernumerary crossvein in cell <i>R</i> <sub>1</sub> about opposite end of vein <i>Sc</i> <sub>1</sub> ..... | 2                    |
| No supernumerary crossveins in cells of wing .....   | 4                    |
| 2. Cell <i>1st M</i> <sub>2</sub> closed (Figs. 23, C; 40, E) .....  | <b>Eudicranota</b>   |
| Cell <i>1st M</i> <sub>2</sub> open by atrophy of <i>m</i> .....   | 3                    |
| 3. Cell <i>M</i> <sub>1</sub> lacking (Fig. 40, F) .....   | <b>Paradicranota</b> |
| Cell <i>M</i> <sub>1</sub> present .....   | <b>Dicranota</b>     |
| 4. Cell <i>1st M</i> <sub>2</sub> closed (Fig. 40, G) .....  | <b>Amalopina</b>     |
| Cell <i>1st M</i> <sub>2</sub> open by atrophy of <i>m</i> .....   | 5                    |
| 5. Cell <i>M</i> <sub>1</sub> lacking (Fig. 40, H) .....   | <b>Plectromyia</b>   |
| Cell <i>M</i> <sub>1</sub> present (Fig. 40, I, J) .....   | <b>Rhaphidolabis</b> |

Subgenus **Eudicranota** Alex.

1934. *Eudicranota* Alexander; in Curran, Keys to the Families and Genera of North American Diptera, p. 40.

Distinguished from *Dicranota*, s.s., by the closed cell  $1st\ M_2$  and 15-segmented antennae. Within the limits of this group is to be found almost the whole range of position of vein  $R_4$  to be found in the tribe, this being retained in its primitive position on the posterior fork by *notabilis*, while being extensively captured by the upper fork, forming a long element  $R_{2+3+4}$ , in *pallida*.

Type of subgenus.—*Dicranota notabilis* Alexander (Eastern Nearctic).

Both known species occur within our limits or are regional. The only other member of the genus with cell  $1st\ M_2$  closed, is *Amalopina*, which lacks the supernumerary crossvein in cell  $R_1$  and has cell  $M_1$  long-petiolate. *Eudicranota* has the cell very short-petiolate to sessile.

## Key to Species

1. A short fork of  $R_{4+5}$ , cell  $R_4$  thus being short-petiolate,  $R_3$  sessile (Fig. 40, E) ..... *notabilis*  
 $R_3$  captured by  $R_{2+3}$ , forming a long fusion of  $R_{2+3+4}$ , cell  $R_3$  thus being long-petiolate,  $R_1$  sessile (Fig. 23, C) ..... *pallida*

**Dicranota** (*Eudicranota*) **notabilis** Alex. (Fig. 40, E).

1929. *Dicranota notabilis* Alexander; Can. Ent., 61: 18.

General coloration pale yellow. Halteres and legs yellow; tips of femora and tibiae weakly infumed. Wings pale yellow, the base and costal region a trifle darkened; stigmal area and veins of cord a little suffused; cell  $M_1$  broadly sessile. ♀. L. about 10 mm.; w. 9.5 mm.

(June) Tenn.

**D.** (*Eudicranota*) **pallida** Alex. (Fig. 23, C).

1914. *Dicranota pallida* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1914: 599-600.

Figs.—Alexander, *Ibid.*, 1914, pl. 27, fig. 31 (wing). Alexander, Cfs. N. Y., 1, pl. 41, fig. 167 (ven.); 1919.

General coloration pale yellow, scutal lobes, base of scutellum and postnotum more infuscated; pleura yellow. Femora yellow, a little darkened at tips. Wings hyaline, iridescent, costal margin a trifle infumed, especially basally;  $R$ 's long, angulated and spurred at origin; cell  $M_1$  nearly sessile (Fig. 23, C). ♀. L. 8 mm.; w. 8 mm.

(July) Me. (Mt. Desert), N. H. (White Mts.)

Subgenus **Paradicranota** Alex.

1934. *Paradicranota* Alexander; in Curran, Keys to the Families and Genera of North American Diptera, p. 40.

Distinguished from *Dicranota*, s.s., by the loss of cell  $M_1$  of wings.



Type of subgenus.—*Dicranota ricularis* Osten Sacken (Eastern Nearctic).

A weak division of the genus, paralleling *Plectromyia* in the *Rhaphidolabis* group of species. The subgenus includes a few European species (*longitarsis* Bergroth, *robusta* Lundström) and other Nearctic forms (as *eucera* Osten Sacken and *iowa* Alexander). Within the group are found species with elongate antennae in ♂ and others with the organ short in both sexes.

*Key to Species*

(Based chiefly on male characters)

1. Halteres pale; antennae short in both sexes, if bent backward ending some distance before wing-root; male hypopygium with outer angle of basistyle produced into a lobe (Fig. 41, K) ..... *ricularis*
- Halteres with knobs weakly to strongly infuscated; antennae (♂) elongate, if bent backward extending to some distance beyond base of abdomen; male hypopygium without lobe on basistyle (Fig. 41, G, I) ..... 2
2. Wings unmarked except for the pale brown stigma; mesonotal praescutum with three brown stripes; male hypopygium with inner dististyle elongate, approximately twice the small oval outer style; interbase with a long slender stem, the acute apex bent at a right angle (Fig. 41, I) ..... *eucera*
- Wings with a brown seam on anterior cord, additional to the dark brown stigma; mesonotal praescutum with four brown stripes, the intermediate pair approximated; male hypopygium with both dististyles nearly equal in length; interbase a short, powerful, beak-like blade (Fig. 41, G) ..... *iowa*

**Dicranota** (*Paradicranota*) **eucera** O. S. (Figs. 40, F; 41, I).

1869. *Dicranota eucera* Osten Sacken; Mon. Dipt. N. Amer., 4: 281-282.

Fig.—Dickinson, Cfls. Wisc., p. 209, fig. 109 (wing): 1932.

General coloration of mesonotum gray; pleura gray. Antennae dark throughout; in ♂ elongated, if bent backward extending about to base of third abdominal segment, of ♀ short, extending about to wing-root. Wings with a weak brownish tinge, stigma darker; *R*<sub>3</sub> short, angulated at origin; cell *R*<sub>5</sub> short to very short petiolate. Abdomen dark brown. Male hypopygium (Fig. 41, I). ♂. L. about 5-5.5 mm.; w. 6-7 mm.; antenna about 3 mm. ♀. L. 6-6.5 mm.; w. 7-7.5 mm.

(Apr., May) Mass., westw. to Minn., southw. to Md., Va. and N. C. Wisconsin records (Dickinson, l. c.) pertain to the next species (Rogers, *in litt.*).

**D.** (*Paradicranota*) **iowa** Alex. (Fig. 41, G).

1920. *Dicranota iowa* Alexander; Can. Ent., 52: 78-79 (♀).

1921. *D. rogersi* Alexander; *Ibid.*, 53: 136 (♂).

Generally similar to *eucera* in the elongate antennae of male. Male hypopygium (Fig. 41, G). ♂. L. 5.5-6.5 mm.; w. 6-7.5 mm. ♀. L. 7.5-8.5 mm.; w. 8-10 mm.

(June-Aug.) Que., westw. to Mich., Wisc., Minn., and Ia., southw. to Hudsonian Zone of Mt. Washington, N. H.



**D. (*Paradicranota*) *rivularis* O. S.** (Fig. 41, K).

1859. *Dicranota rivularis* Osten Sacken: Proc. Acad. Nat. Sci. Philadelphia, 1859: 281.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 2, fig. 16 (wing); 1869. Williston, Man. N. Amer. Dipt., Ed. 3:84, fig. 25, sub 2 (wing); 1908. Alexander, Cfls. N. Y., 1, pl. 41, fig. 169 (ven.); 1919.

General coloration gray, the praescutum with three dark brown stripes. Antennae black throughout. Wings with a pale brown tinge, stigma but slightly darker; *Rs* short, strongly angulated. Abdomen brownish gray, including hypopygium. Male hypopygium (Fig. 41, K): interbase a slender flattened blade, the tip acute; inner margin before midlength with several setulae. ♂. L. 5.5-6.5 mm.; w. 6.5-8 mm. ♀. L. 7.5-8.5 mm.; w. 7.5-8 mm.

(Apr., early May) N. H., Mass., southw. to Va.

Subgenus ***Dicranota*** Zetterstedt.

The typical subgenus (type, *guerini* Zetterstedt) includes four local species.

*Key to Species*

(Based chiefly on male characters)

1. Antennae (♂) short, if bent backwards not or scarcely reaching wing-root; flagellar segments short-oval ..... 2
- Antennae (♂) elongate, if bent backwards extending approximately to base of second abdominal segment; flagellar segments long-oval, their ventral face slightly produced ..... *notmani*
2. Male hypopygium without evident interbasal processes; phallosome subtended on either side by a flattened spinous blade; lateral angles of phallosome directed caudad (Fig. 41, M) ..... *noveboracensis*
- Male hypopygium with the interbasal process a long slender, nearly straight rod; phallosome a quadrate plate, the outer lateral angles produced laterad into divaricate yellow horns ..... 3
3. Male hypopygium with caudal horns of phallosome appearing as short triangular yellow blades; interbase subacute at apex (Fig. 41, J) ..... *currani*
- Male hypopygium with the caudal horns of phallosome long and slender, not triangular in outline; interbase obtusely rounded at apex (Fig. 41, L) ..... *divaricata*

***Dicranota* (*Dicranota*) *currani* Alex.** (Fig. 41, J).

1926. *Dicranota currani* Alexander; Ent. News, 37: 50.

Mesonotal praescutum yellowish gray, with three very conspicuous dark brown stripes, the broad median stripe entire except near suture. Legs brownish black, femoral bases restrictedly paler. Wings weakly tinged, the stigma pale brown. Male hypopygium (Fig. 41, J). ♂. L. about 5 mm.; w. 7-7.5 mm.

(May) Ont., Que., westw. to Minn.

**D. (*Dicranota*) *divaricata* Alex.** (Fig. 41, L).

1925. *Dicranota divaricata* Alexander; Ent. News, 36: 203-204.

Closely allied to *currani*. Median praescutal stripe more evidently divided, to produce two intermediate brown stripes. Abdominal tergites light brown, the extreme caudal margins of intermediate ter-

gites narrowly light yellow. Male hypopygium (Fig. 41, L).  $\delta$ . L. 4.5-5 mm.; w. 6.3-7 mm.

(March) N. C.

**D.** (*Dicranota*) **notmani** sp. nov.

1929. *Dicranota currani* Alexander; Bull. Brooklyn Ent. Soc., 24: 23 (erroneous record).

Very closely allied and generally similar to *currani*, differing especially in the elongate antennae of male, which, if bent backward, would reach about to base of second abdominal segment; flagellar segments long-oval, slightly produced on ventral face; terminal segment much reduced in size. Median praescutal stripe nearly entire, vaguely divided on more than anterior half by a pale vitta. Male hypopygium about intermediate in structure between that of *currani* and *dicaricata*, the caudo-lateral angles of phallosome being more slender than in former but stouter than in latter. Interbase pointed at tip, as in *currani*.

*Holotype*,  $\delta$ , Keene Valley, Essex Co., N. Y., May 26, 1920 (H. Notman); in author's collection.

Named in honor of the collector, Mr. Howard Notman, to whom I am indebted for many Tipulidae from the Adirondack Mountains.

**D.** (*Dicranota*) **noveboracensis** Alex. (Fig. 41, M).

1914. *Dicranota noveboracensis* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1914: 600.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 19, fig. 1 (ven.); 1908 (as *ricularis*). Alexander, Cfls. N. Y., 1, pl. 41, fig. 168 (wing); 1919.

General coloration gray, the praescutum with three dark brown stripes, the median one faintly divided by a pale line. Halteres pale. Wings gray, stigma pale brown; cell  $R_3$  sessile to relatively long-petiolate. Abdomen brown, sparsely pruinose. Male hypopygium (Fig. 41, M).  $\delta$ . L. 5.5-6.5 mm.; w. 6.5-7.5 mm.  $\eta$ . L. 6-6.5 mm.; w. 7.5-8 mm.

(May) Que., Mass., N. Y. Reported erroneously from Wisconsin by Dickinson.

#### Subgenus **Amalopina** Brunetti

1912. *Amalopina* Brunetti; Fauna Brit. India, Dipt. Nematocera, p. 517.

1916. *Rhaphidolabina* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1916: 540-541.

The subgenus includes a single species in the New World, with a few others in Eastern Asia. The choice of the name *Amalopina* by Brunetti was unfortunate, since it is the exact form earlier used for the entire section or tribe by Osten Sacken and others. The antennae are 15-segmented, with relatively long verticils; the wings have cell  $R_3$  long-petiolate and vein  $R_2$  slightly oblique in position. The adults of our local fly are common along shaded streams and in wet marshy places in woods. The larvae live in wet earth.

**Dicranota** (*Amalopina*) **flaveola** (O. S.) (Figs. 40, G; 42, A).

1869. *Rhaphidolabis flaveola* Osten Sacken; Mon. Dipt. N. Amer., 4: 288.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 25, fig. 3 (ven.); 1908 (as *Amalopis*, sp. ?). Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1916, pl. 28, fig. 54 (wing); 1916. Alexander, Cfs. N. Y., 1, pl. 41, fig. 170 (ven.); 1919.

General coloration pale yellow to whitish yellow, unmarked. Halteres and legs pale yellow. Wings (Fig. 40, G) pale yellow, iridescent, the veins brown, distinct. Abdomen yellow, the terminal segments weakly darkened. Male hypopygium (Fig. 42, A). ♂. L. 5-5.5 mm.; w. 5-7 mm. ♀. L. 6-7 mm.; w. 6.5-8 mm.

(Late May, Sept.) Ont., Que., Me., N. H., Vt., Mass., N. Y., westw. to Mich., southw. to Md. and N. C.

Connecticut.—Cornwall Bridge, Aug. 19, 1931 (C. P. A.); Hartland, June 8-9, 1929 (C. P. A.); Kent Falls, May 31, 1931, June 12-13, 1931, Aug. 19, 1931 (C. P. A.); Norfolk, June 9, 1929, July 24, 1931, Sept. 11, 1928 (C. P. A.); Salisbury, Sept. 5-12, 1928 (G. C. C.); Saptree Run State Park, June 14, 1933 (C. P. A.); W. Granby, Sept. 11, 1928 (C. P. A.).

Subgenus **Plectromyia** Osten Sacken

1865. *Astrolabis* Osten Sacken; Proc. Ent. Soc. Philadelphia, 4: 225 (nom. nud.).

1869. *Plectromyia* Osten Sacken; Mon. Dipt. N. Amer., 4: 282-284.

*Plectromyia* is obviously nothing but a weak off-shoot of *Rhaphidolabis*. Antennae short in both sexes. The local species are chiefly northern in distribution. The adults are most frequently found along small mountain streams, while the early stages are quite unknown.

## Key to Species

(Based chiefly on male characters)

1. Antennae 15-segmented; cell  $R_3$  long-petiolate,  $R_{2+3+4}$  exceeding  $m-cu$ ; male hypopygium with the median region of tergite produced into a Y-shaped structure that is densely set with stout setae (Fig. 42, D) ..... **petiolata**
- Antennae 13-segmented; cell  $R_3$  sessile to short-petiolate,  $R_{2+3+4}$ , when present, shorter than  $m-cu$ ; male hypopygium with the median region of tergite broadly and obtusely rounded ..... 2
2. Male hypopygium with the lateral tergal arms split at apex into two equal or nearly equal acute teeth; interbase with two short apical teeth, nearly equal in length but one more slender and obtuse (Fig. 42, B) ..... **confusa**
- Male hypopygium with the lateral tergal arms broad, one apical lobe broadly rounded; interbase with the axial spine very elongate, the lateral spine small (Fig. 42, C) ..... **modesta**

**Dicranota** (*Plectromyia*) **confusa** (Alex.) (Fig. 42, B).

1924. *Rhaphidolabis* (*Plectromyia*) *confusa* Alexander; Bull. Brooklyn Ent. Soc., 19: 63.

Almost as in *modesta*, differing most evidently in details of the male hypopygium (Fig. 42, B). ♂. L. 4-4.5 mm.; w. 4.8-5.6 mm. ♀. L. about 5 mm.; w. 5.5-6 mm.

(May, June) Que., N. B., Vt., Mass. and N. Y., southw. to N. C. and S. C. (Low Canadian).

Connecticut.—Hartland, June 9, 1929 (C. P. A.).

**D.** (*Plectromyia*) **modesta** (O. S.) (Figs. 40, H; 42, C).  
1869. *Plectromyia modesta* Osten Sacken; Mon. Dipt. N. Amer.,  
4:284.

Figs.—Osten Sacken, *Ibid.*, 4, pl. 2, fig. 18 (wing). Williston, Man. N. Amer. Dipt., Ed. 3:84, fig. 3 (wing); 1908. Alexander, Chs. N. Y., 1, pl. 41, fig. 174 (ven.); 1919.

General coloration pale brown, with three slightly darker brown praescutal stripes. Antennae dark throughout. Knobs of halteres weakly infuscated. Wings nearly hyaline; stigma scarcely indicated; veins pale brown. Abdomen brown, the hypopygium a trifle more yellowish. Male hypopygium (Fig. 42, C). ♂. L. 4.2-5 mm.; w. 5.5-6 mm. ♀. L. about 5 mm.; w. 5-5.5 mm.

(June) N. H., Vt., in mountains. (High Canadian, Hudsonian).

**D.** (*Plectromyia*) **petiolata** (Alex.) (Fig. 42, D).  
1919. *Tricyphona petiolata* Alexander; Can. Ent., 51:194-195.

(July, Aug.) Que., N. H. (Mt. Washington, 5000 feet and over), westw. to high mountains of Colo. (Hudsonian).

#### Subgenus **Rhaphidolabis** Osten Sacken

1869. *Rhaphidolabis* Osten Sacken; Mon. Dipt. N. Amer., 4:284-287.

A numerous group of small pedicine crane-flies that are most commonly found along streams and in boggy wooded areas. The early stages live in saturated earth. The adults are on the wing in Spring and Fall, and some, at least, have two generations per year.

#### Key to Species

(Based chiefly on male characters)

1. Cell  $R_3$  of wings sessile or nearly so (Fig. 40, I); male hypopygium with the median region of tergite not or scarcely produced (in *rogersiana*, produced into a broad lobe with truncated apex) ..... 2  
Cell  $R_3$  of wings long-petiolate (Fig. 40, J); male hypopygium with the tergite produced medially into a slender lobe ..... 4
2. Male hypopygium with median region of tergite merely rounded, the lateral arms appearing as paddle-like blades, with rounded tips; interbase short, bidentate at apex; wings subhyaline to pale grayish ..... 3  
Male hypopygium with median region of tergite produced into a broad lobe, its apex truncate, the lateral arms small, each bent at apex into a simple point; interbase a long, nearly straight yellow rod, its apex microscopically toothed (Fig. 42, I); wings milky-white ..... *rogersiana*
3. Coloration of thorax grayish brown, the praescutum with three dark brown stripes; abdomen dark brown, the caudal margins of segments paler; wings very pale brown,  $R_s$  short, arcuated to angulated; male hypopygium with interbase relatively narrow (Fig. 42, F) ..... *cayuga*  
Coloration of thorax reddish brown, sparsely gray, pruinose, the praescutum with three indistinct darker stripes; abdomen yellowish brown, the hypopygium bright yellow; wings nearly hyaline,  $R_s$  somewhat elongated and gently arcuate; male hypopygium with the interbase broader (Fig. 42, J) ..... *rubescens*
4. Thoracic pleura chiefly gray pruinose; male hypopygium with the basistyle bearing a conspicuous darkened hairy lobe on mesal face near base; inner dististyle somewhat bottle-shaped, broad basally, the outer half suddenly narrowed into a neck-like portion, the apex obtusely rounded (Fig. 42, H) ..... 5



- Thoracic pleura chiefly yellow, the ventral sternopleurite dark; male hypopygium without a lobe on mesal face of basistyle; inner dististyle elongate, more blade-like, gradually narrowed to a subacute tip (Fig. 42, K) ..... 6
5. Male hypopygium with interbase a flattened blade that terminates in two slender arms directed toward one another, to appear more or less like tongs; lateral arms of tergite appearing as a long, slender, strongly curved hook (Fig. 42, G) ..... **forceps**
- Male hypopygium with interbase bearing two unequal arms, one a broadly flattened blade, the shorter arm slender, sinuous; lateral arm of tergite only gently curved at apex (Fig. 42, H) ..... **persimilis**
6. Male hypopygium with interbase terminating in a slender spinous point, the structure somewhat resembling the head and beak of a bird; lateral arm of tergite only slightly curved at apex; apex of inner dististyle subacute (Fig. 42, E) ..... **avis**
- Male hypopygium with interbase a broadly flattened blade, the apex narrowed and obtusely rounded; lateral arm of tergite very strongly recurved into a hook; apex of inner dististyle more obtuse (Fig. 42, K) ..... **tenuipes**

**Dicranota** (*Rhaphidolabis*) **avis** (Alex.) (Fig. 42, E).

1926. *Rhaphidolabis* (*Rhaphidolabis*) *avis* Alexander; Ent. News, 37: 50, 51.

Closely allied to *tenuipes*, differing chiefly in the structure of the hypopygium, notably of the interbase (Fig. 42, E). Praescutal stripes broad. ♂. L. 5.5-5.8 mm.; w. 5.8-6.3 mm.

(Aug., Sept.) Mass. and Ct., southw. to Va. and N. C.

Connecticut.—Cornwall Bridge, Aug. 19, 1931 (C. P. A.); Kent Falls, Aug. 19, 1931 (C. P. A.).

**D.** (*Rhaphidolabis*) **cayuga** (Alex.) (Figs. 40, I; 42, F).

1916. *Rhaphidolabis* (*Rhaphidolabis*) *cayuga* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1916: 543-544.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 13, fig. 1 (wing); 1908 (as *tenuipes*). Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1916, pl. 28, fig. 57 (wing); 1916. Alexander, Cfs. N. Y., 1, pl. 41, fig. 173 (wing); 1919.

Antennae dark brown. Head brownish gray. Knobs of halteres dark brown. Wings (Fig. 40, I) with stigma pale brown; cell  $R_3$  shortly to broadly sessile. Male hypopygium (Fig. 42, F) brownish yellow. ♂. L. 5-5.5 mm.; w. 5.5-6.5 mm. ♀. L. 6.5-7 mm.; w. 7.5 mm.

(May, June; Aug., Sept.) Que., Me., N. H., N. Y., Pa., westw. to Mich., southw. to S. C.

Connecticut.—Norfolk, May 16, 1931, Sept. 12, 1928 (C. P. A.); Twin Lakes, Sept. 12, 1928 (C. P. A.).

**D.** (*Rhaphidolabis*) **forceps** (Alex.) (Fig. 42, G).

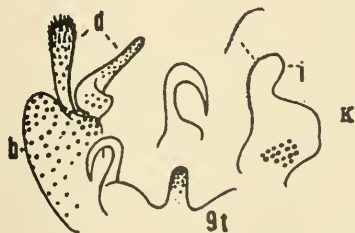
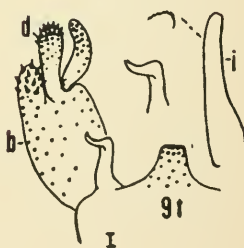
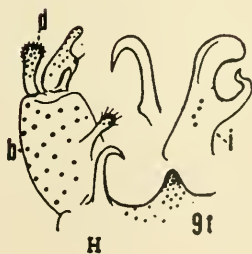
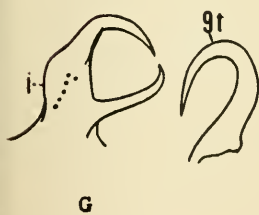
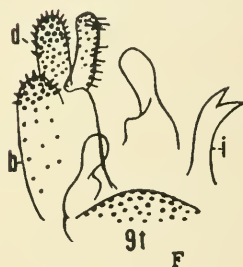
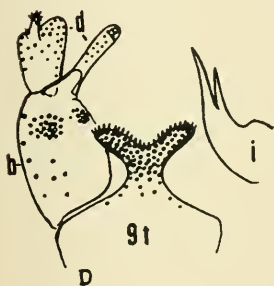
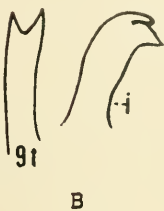
1924. *Rhaphidolabis* (*Rhaphidolabis*) *forceps* Alexander; Bull. Brooklyn Ent. Soc., 19: 63, 64.

General coloration of thorax gray, the praescutum with three dark brown stripes. Antennae black throughout. Wings with a faint brown tinge, the stigma darker;  $R_s$  weakly angulated to strongly arcuated; basal section of  $R_5$  very short to lacking. Abdomen dark brown. Male hypopygium (Fig. 42, G) much as in *persimilis*, differing es-

FIGURE 42. Pediciini: male hypopygia.

- A. *Dicranota (Amalopina) flavicola* (O.S.)
- B. *D. (Plectromyia) confusa* (Alex.)
- C. *D. (P.) modesta* (O.S.)
- D. *D. (P.) pectiolata* (Alex.)
- E. *D. (Raphidolabis) aris* (Alex.)
- F. *D. (R.) cayuga* (Alex.)
- G. *D. (R.) forcps* (Alex.)
- H. *D. (R.) persimilis* (Alex.)
- I. *D. (R.) rogersiana* (Alex.)
- J. *D. (R.) rubescens* (Alex.)
- K. *D. (R.) tenuipes* (O.S.)

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



pecially in the shape of the interbase. ♂. L. about 4.5-5.5 mm.; w. 5-6.8 mm. ♂. L. 5.5-6 mm.; w. 7-7.5 mm.

(June) Que., Me., N. H., Vt., Mass., N. Y., westw. to Ind. and Mich., southw. to Tenn.

Connecticut.—Hartland, June 9, 1929 (C. P. A.).

**D. (*Rhaphidolabis*) persimilis** (Alex.) (Fig. 42, H)

1920. *Rhaphidolabis persimilis* Alexander; Can. Ent., 52: 79-80.

General coloration of thorax, including pleura, gray; praescutal stripes distinct. Male hypopygium (Fig. 42, H). ♂. L. 4-4.5 mm.; w. 4.8-5.5 mm.

(Apr., May; Oct.) Md., Va., N. C., S. C. (Transition).

**D. (*Rhaphidolabis*) rogersiana** (Alex.) (Fig. 42, I).

1925. *Rhaphidolabis* (*Rhaphidolabis*) *rogersiana* Alexander; Ent. News, 36: 204.

General coloration of thorax gray, the praescutum with three still darker leaden-gray stripes; wings tinged with milky white, stigma pale brown; cell  $R_3$  sessile or very short-petiolate. Male hypopygium (Fig. 42, I). ♂. L. 5.2-5.5 mm.; w. 6-6.5 mm. ♀. L. 6-6.5 mm.; w. 7-7.5 mm.

(June-Aug.) Que., westw. to Mich. (Hudsonian, high Canadian).

**D. (*Rhaphidolabis*) rubescens** (Alex.) (Fig. 42, J).

1916. *Rhaphidolabis* (*Rhaphidolabis*) *rubescens* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1916: 544-545.

Figs.—Alexander, *Ibid.*, 1916, pl. 28, fig. 58 (wing). Alexander, Cfs. N. Y., 1, pl. 41, fig. 172 (wing); 1919.

Closely allied to *cayuga*. Head light silvery gray. Wings with stigma very pale to indistinct. Abdomen with hypopygium (Fig. 42, J): interbase with teeth more unequal than in *cayuga*. ♂. L. 5-5.5 mm.; w. 6-6.6 mm. ♀. L. 6-6.5 mm.; w. 7-7.5 mm.

(June; Aug.) N. B., Me., N. H., Vt., Mass., N. Y.

**D. (*Rhaphidolabis*) tenuipes** (O. S.) (Figs. 40, J; 42, K).

1869. *Rhaphidolabis tenuipes* Osten Sacken; Mon. Dipt. N. Amer., 4: 287.

Figs.—Osten Sacken, *Ibid.*, pl. 2, fig. 17 (wing). Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 19, fig. 2 (ven.); 1908. Williston, Man. N. Amer. Dipt., Ed. 3: 84, fig. 25, sub 14 (ven.); 1908. Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1916, pl. 28, fig. 56 (wing); 1916. Alexander, Cfs. N. Y., 1, pl. 41, fig. 171 (wing); 1919.

Thorax chiefly yellowish, the praescutum almost covered by three more or less confluent brown stripes. Head brown, the orbits light gray. Wings (Fig. 40, J) tinged with grayish, stigma slightly darker. Abdomen brown, the terminal segments darker. Male hypopygium (Fig. 42, K). ♂. L. 6.5-7 mm.; w. 6-7 mm. ♀. L. about 7 mm.; w. 7-7.5 mm.



(June; Aug., Sept.) Que., N. B., Me., N. H., Vt., Mass., N. Y., westw. to Mich., southw. to Md.

Connecticut.—E. Hartland, Sept. 11, 1928 (C. P. A.); Norfolk, Sept. 6, 1928 (G. C. C.); W. Granby, Sept. 11, 1928 (C. P. A.).

### HEXATOMINI

In the local fauna, the tribe Hexatomini includes eight subtribes that are readily told from all other Limoniinae, with the exception of the Pediciini, by the presence of spurs on the tibiae. All but two of these subtribes, the Atarbaria and the Elephantomyaria, are further separated from the Limoniini and aberrant Eriopterini (*Toxorhina*; *Gonomyia*; *Teucholabis*) by the presence of three branches of *Rs* reaching the wing-margin. Many of the included genera have cell  $M_1$  of the wings present, a character found in but two of the regional genera of Eriopterini (*Cladura*, *Neolimnophila*). The diverse habits of the adults and larvae of the various subtribes are indicated under the various groups.

After this manuscript was completed, a surprising addition to the tipulid fauna of eastern North America was made by the discovery in the White Mountains, New Hampshire, of *Phyllolabis lagganensis* Alexander, previously known only from Alberta. The genus *Phyllolabis* runs to complet 10 by the use of the accompanying key to the hexatomine genera. It is readily told from all others in our fauna by the loss of vein  $R_2$  and the position of *m-cu* close to the extreme outer end of cell 1st  $M_2$ , the latter character being much as in the family Trichoceridae. The species, *lagganensis*, is of medium size, dark-colored, with unmarked wings. The specimens were secured in late August, 1935, at high altitudes on Mount Madison. (Oocas. Pap. Boston Soc. Nat. Hist., 8: 275-276, fig. 3; 1936).

#### Key to Subtribes and Genera

1. Antennae with not more than 12 segments (Hexatomaria) ..... **Hexatoma** 415  
    Antennae with more than 13 segments ..... 2
2. Rostrum elongate, exceeding one-half the length of the entire body (Fig. 46, L) (Elephantomyaria) ..... **Elephantomyia**  
    Rostrum short, or of moderate length only, not exceeding in length the remainder of head ..... 3
3. Wings with two branches of *Rs* reaching the margin (Fig. 44, O) (Atarbaria) ..... **Atarbaria**  
    Wings with three branches of *Rs* reaching the margin (Fig. 44, A-E, L, N) ..... 4
4. Apical cells of wing with macrotrichia (Figs. 43, A, B, J, K; 44, I) ..... 5  
    Cells of wings without macrotrichia (excepting in stigmal area) ..... 7
5. Cell  $R_2$  of wing (Fig. 44, I) sessile or subsessile; in local species, cell  $M_1$  lacking and the macrotrichia involving cells basad of cord ..... **Uloomorpha**  
    Cell  $R_2$  of wings petiolate; cell  $M_1$  present, rarely lacking, in the latter case (*Oxydiscus cayuga*, Fig. 43, B; *Limnophila subtenuicornis*, Fig. 43, K) with macrotrichia confined to extreme apical cells of wing ..... 6
6. Small species (wing less than 5.5 mm.); antennae short in both sexes (Oxydiscaria) (Fig. 43, A, B) ..... **Oxydiscus**  
    Larger species (wing over 6 mm.); antennae of male elongate (Limnophilaria, part) (Fig. 43, J, K) ..... **Limnophila**; **Lasiomastix**
7. A supernumerary crossvein in cell *C* (Fig. 43, C) (Epiphragmaria) **Epiphragma** 368  
    No supernumerary crossvein in cell *C* ..... 8

- 8. Wings with *m-cu* at or close to fork of *M*; anterior arculus lacking (Fig. 43, D) (*Dactylolabaria*) ..... **Dactylolabis**
- Wings with *m-cu* beyond the fork of *M*, at from one-third to one-half the length of the cell *1st M*<sub>2</sub>; where close to fork of *M* (some *Pseudolimnophila*), the arculus complete ..... 9
- 9. Wings with the anterior arculus lacking (Fig. 43, E-G) (*Pseudolimnophilaria*, part) ..... 10
- Wings with the anterior arculus present (Fig. 43, H-P) ..... 11
- 10. Cell *1st M*<sub>2</sub> of wings very large, its inner end lying far proximal of the other elements of the cord (Fig. 43, E)..... **Prolimnophila**
- Cell *1st M*<sub>2</sub> of wings of normal size, its inner end straight and in approximate alignment with the elements of the anterior cord (Fig. 43, F, G) ..... **Austrolimnophila**
- 11. Wings with *Sc* relatively short, *Sc*<sub>1</sub> ending before the level of the fork of *Rs* (Fig. 44, F-H) (*Limnophilaria*, part); compare also *Limnophila albipes*, Fig. 44, C, readily separated by the white posterior tarsi ..... 12
- Wings with *Sc* longer, *Sc*<sub>1</sub> ending opposite or beyond the level of the fork of *Rs* (Figs. 43, H, I; 44, D, E); compare also *Pilaria recondita*, distinguished by the elongate antennal verticils ..... 13
- 12. Antennae with long, conspicuous verticils; tuberculate pits present, small, placed at extreme cephalic end of praescutum; *Rs* elongate, exceeding vein *R*<sub>3</sub>; cell *M*<sub>1</sub> present or lacking (Fig. 44, G, H)..... **Pilaria**
- Antennae with short verticils; tuberculate pits lacking; *Rs* short and strongly arcuated or angulated at origin; cell *M*<sub>1</sub> lacking (Fig. 44, F) ..... **Shannonomyia**
- 13. Head strongly narrowed and prolonged behind; radial and medial veins beyond cord long and sinuous; vein *R*<sub>3</sub> extending generally parallel to vein *R*<sub>1</sub>, not diverging markedly at tips; vein *2nd A* strongly curved to margin (Fig. 43, H, I). (*Pseudolimnophilaria*, part)..... **Pseudolimnophila** 314
- Head broad, not conspicuously narrowed behind; radial and medial veins more nearly straight; vein *R*<sub>3</sub> diverging strongly from vein *R*<sub>1</sub>; cell *R*<sub>3</sub> conspicuously widened at margin; vein *2nd A* not curved strongly into margin (Fig. 44, A-C). (*Limnophilaria*, part) ..... **Limnophila** 329

1. Subtribe OXYDISCARIA

**Oxydiscus** de Meijere

- 1891. *Adelphomyia* of authorities, *nec* Bergroth, Mittheil. Naturf. Ges. Bern, 1890:134.
- 1913. *Oxydiscus* de Meijere; Tijd. voor Ent., 56: 350.

The genus *Oxydiscus* is placed in the present tribe with some question. On the basis of structure of the adult, the species of the genus are hexatomine and are the smallest species of the tribe within our faunal limits. The larvae of this genus show certain features held as being characteristic of the tribe *Pediciini* and the group had earlier been placed in this latter tribe in treatments by the present writer. The immature stages occur in rich saturated organic earth.

*Key to Species*

- 1. Wings with cell *M*<sub>1</sub> lacking (Fig. 43, B) ..... **cayuga**
- Wings with cell *M*<sub>1</sub> present (Fig. 43, A) ..... 2
- 2. Coloration of body and wings clear light yellow; macrotrichia of wing-cells very restricted in number and area, occurring in the extreme outer cells only ..... **minutus**
- Coloration of thoracic notum brownish yellow to dark brown; wings tinged with gray or brown; macrotrichia of wing-cells more abundant, occurring in cells distad of level of vein *R*<sub>2</sub> ..... 3

3. Thoracic pleura clear yellow, unmarked .....**americanus**  
 Thoracic pleura yellow, with two narrow brown longitudinal stripes that  
 are best delimited in front .....**pleuralis**

**Oxydiscus americanus** (Alex.) (Fig. 43, A).

1912. *Adelphomyia americana* Alexander; Pomona Coll. Journ. Ent.,  
 4: 829-831.

Figs.—Alexander, *Ibid.*, fig. 260, A (ven.). Alexander, Ent. News, 22: 353,  
 fig. 4 (wing, as *senilis*); 1911. Alexander, Cfs. N. Y., 1, pl. 41, fig. 160 (ven.);  
 1919.

Vein  $R_2$  present (Fig. 43, A). ♂. L. about 3-3.5 mm.; w. 4.2-4.6  
 mm. ♀. L. about 4 mm.; w. 5-5.5 mm.

(Aug., Sept.) N. B., Me., N. H., Vt., Mass., N. Y., westw. to Mich., southw. to  
 N. C. and S. C.

Connecticut.—Norfolk, June 6-12, 1928 (C. P. A., G. C. C.); Salisbury, Sept. 5-12,  
 1928 (C. P. A., G. C. C.); Twin Lakes, Sept. 12, 1928 (C. P. A.); W. Granby, Sept.  
 11, 1928 (C. P. A.).

**O. cayuga** (Alex.) (Fig. 43, B).

1912. *Adelphomyia cayuga* Alexander; Pomona Coll. Journ. Ent.,  
 4: 831.

1916. *Ormosia abnormis* Dietz; Trans. Amer. Ent. Soc., 42: 137-138.

1921. *Adelphomyia hazletonensis* Dietz; *Ibid.*, 47: 252-253.

Figs.—Alexander, *Ibid.*, fig. 260, B (wing). Alexander, Cfs. N. Y., 1, pl. 41,  
 fig. 162 (ven.); 1919. Dietz, Trans. Amer. Ent. Soc., 42, pl. 10, fig. 3 (hyp.); 1916.

General coloration brown to dark brown, the pleura darkened,  
 somewhat paler behind. Vein  $R_2$  usually faint and indistinct; macro-  
 trichia of cells relatively numerous beyond level of outer end of cell  
 $1st M_2$  (Fig. 43, B). ♂. L. 3-3.5 mm.; w. 4-5 mm. ♀. L. 4.5-5 mm.;  
 w. 4.5-5 mm.

(Aug., Sept.) Me., N. H., Vt., Mass., N. Y., Pa., westw. to Ind. and Mich.

**O. minutus** (Alex.)

1911. *Adelphomyia minuta* Alexander; Can. Ent., 43: 287-288.

Figs.—Alexander, Cfs. N. Y., 1, pl. 41, fig. 161 (ven.); 1919. Crampton, Insec.  
 Inscit. Menst., 13, pl. 3, fig. 24 (thorax); 1925.

Wings with vein  $R_2$  distinct. ♂. L. about 3.3-4.4 mm.; w. 4-4.2  
 mm. ♀. L. 4.5-5 mm.; w. 4.5-4.8 mm.

(Late May, June) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., Pa., westw. to  
 Mich., southw. to N. C.

Connecticut.—Cornwall Bridge, May 30, 1931 (C. P. A.); Hartland, June 9, 1929  
 (C. P. A.); Kent Falls, May 30-31, 1931 (C. P. A.); Norfolk, May 30, 1931, June  
 12, 1931, June 9, 1929 (C. P. A.); Union, June 14, 1933 (C. P. A.).

**O. pleuralis** (Dtz.)

1921. *Adelphomyia pleuralis* Dietz; Trans. Amer. Ent. Soc., 47: 251-  
 252.

Antennae brown, the pedicel dark brown. Abdomen light brown,  
 the subterminal segments dark brown. ♂. L. about 2.5-2.8 mm.;  
 w. 3.3-3.6 mm. ♀. L. 3.3-3.8 mm.; w. 3.8-4.2 mm.

(June-Aug.) Ont., N. H., Mass., Ct., N. Y., Pa., westw. to Ind. and Mich., southw. to S. C., Tenn. and Fla.

Connecticut.—Bloomfield, Aug. 6, 1929 (C. P. A.); Cornwall Bridge, Aug. 19, 1931 (C. P. A.); Kent Falls, Aug. 19, 1931 (C. P. A.); Natchaug State Forest, June 14, 1933 (C. P. A.); Saptree Run State Park, June 14, 1933 (C. P. A.); Stafford Springs, June 14, 1933 (C. P. A.); Union, June 14, 1933 (C. P. A.).

## 2. Subtribe EPIPHRAGMARIA

### *Epiphragma* Osten Sacken

1859. *Limnophila* (*Epiphragma*) Osten Sacken: Proc. Acad. Nat. Sci. Philadelphia, 1859: 238.

The genus *Epiphragma* includes two of our most striking and beautiful species among the medium-sized Tipulidae. The immature stages are spent in moist decaying wood, while the adult flies may be swept from rank vegetation in shaded places, or appear at dusk in small dancing swarms. Elsewhere in the World, this genus and its close ally in the Southern Hemisphere, *Austrolimnophila* Alexander, are represented by a host of unusually handsome crane-flies.

#### Key to Species

1. Wings with pale brown crossbands that are narrowly margined with darker brown, these darkened areas separated by the pale ground-color; a brown ring at tip of each femur (Fig. 43, C) ..... **fascipennis**  
Wings with an irregular pattern of brown and tawny on a subhyaline ground, all darkened areas being more or less confluent on the anterior half of wing; a brown ring before tip of each femur ..... **solatrix**

***Epiphragma fascipennis* (Say) (Figs. 22, C; 43, C).**

1823. *Limnobia fascipennis* Say: Journ. Acad. Nat. Sci. Philadelphia, 3: 19.

1859. *Limnophila* (*Epiphragma*) *paronina* Osten Sacken: Proc. Acad. Nat. Sci. Philadelphia, 1859: 239.

Figs.—Snodgrass, Journ. N. Y. Ent. Soc., 11, pl. 11, fig. 18 (ovipos.); 1903. Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 9, figs. 13, 15 (hyp.); 1904. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 19, fig. 3 (ven.); pl. 31 (entire insect); 1908. Alexander, Cfls. N. Y., 1, pl. 41, fig. 158 (wing); 1919. Dickinson, Cfls. Wisc., p. 200, fig. 91 (wing); 1932.

General coloration yellowish brown, pruinose; mesonotal praescutum margined in front with chestnut-brown. Femora, in cases, with a second, subterminal brown ring. Male hypopygium (Fig. 22, C). ♂. L. 9-11 mm.; w. 9-12 mm. ♀. L. 10-12 mm.; w. 11-12 mm.

(May-Aug.) Ont., Que., N. B., Me., N. H., Vt., Mass., R. I., N. Y., westw. to Alta., southw. to Ga., Fla. and La.

Connecticut.—Branford, June 13, 1918 (B. H. W.); Cornwall Bridge, May 30, 1931 (C. P. A.); Danbury, June 15, 1909 (C. W. J.); Eastford, June 12, 1919 (B. H. W.); Hamden, June 2, 1928 (R. B. F.); Hartland, June 9, 1929 (C. P. A.); Kent Falls, May 30-31, 1931 (C. P. A.); Manitic Lake, June 8-9, 1929 (C. P. A.); New Haven, June 8, 1929 (W. E. B.); Norfolk, June 9, 1929, May 31, 1931, June 12, 1931 (C. P. A.); N. Branford, July 4, 1924 (R. B. F.); Orange, June 19, 1924 (B. H. W.); Riverton, May 30-31, 1931, June 8, 1929 (C. P. A.); Rowayton, June 10, 1909 (C. W. J.); Saptree Run State Park, June 14, 1933 (C. P. A.); Storrs, May 1933 (C.



S. C.); Tyler Lake, June 13, 1931 (C. P. A.); Waterbury, June 9, 1905 (W. E. B.); W. Hartford, June 10, 1929 (R. B. F.); Westford, June 14, 1933 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.); Willington, June 24, 1932 (N. T.); Winsted, June 10, 1928 (R. B. F.).

### **E. solatrix** (O. S.)

1859. *Limnophila* (*Epiphragma*) *solatrix* Osten Sacken: Proc. Acad. Nat. Sci. Philadelphia, 1859: 238.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 2, fig. 8 (wing); 1869. Alexander, Cfs. N. Y., 1, pl. 41, fig. 159 (wing); 1919.

General coloration brown, whitish pruinose, the mesonotal praescutum more reddish brown in front. ♂. L. 8-10 mm.; w. 8-11 mm. ♀. L. about 10 mm.; w. 11-12 mm.

(May-Aug.) N. Y. (Long Island), Md. and Va., westw. to Tenn., Ind. and Mo., southw. to Fla. and La.

## 3. Subtribe DACTYLOLABARIA

### **Dactylolabis** Osten Sacken

1859. *Dactylolabis* Osten Sacken: Proc. Acad. Nat. Sci. Philadelphia, 1859: 240.

The genus *Dactylolabis* belongs to the more generalized Hexatomi, having the anterior arculus lacking. The various species are eminently lithophilous, frequenting the vertical faces of shaded cliffs and rock exposures. The larvae live in algal growth amid percolating water in these situations, while the adult flies are to be found resting on the walls and in crannies of the rock surface. Of the local species, the adult flies of *cubitalis* and *hudsonica* are less restricted to the lithophilous habitat, being more commonly swept from rank vegetation in ravines and gorges.

#### Key to Species

1. Wings unmarked, except for the vaguely defined stigma ..... **cubitalis**  
Wings yellowish subhyaline, with a heavy spotted brownish gray pattern, this including clouds beyond the arculus, at origin of *R*<sub>s</sub>, fork of *Sc*, along cord and outer end of cell 1st *M*<sub>2</sub>, fork of *R*<sub>2,3+4</sub>, the stigma and fork of *M*<sub>1+2</sub> ..... 2
2. Wings tending to be degenerate, more or less reduced in size; costal fringe and scanty trichia of veins reduced to short spinous bristles; Arctic species ..... **rhicnoptiloides**  
Wings of normal size; costal fringe and abundant trichia of veins long and hair-like; not Arctic species ..... 3
3. A supernumerary crossvein in cell *R*<sub>s</sub>, lying opposite or just proximal of *R*<sub>2</sub> ..... **supernumeraria**  
No supernumerary crossveins in any cells of wing ..... 4
4. Femora dark brown, the tips not paler; mesonotal praescutum yellowish gray, with four clearly delimited dark brown stripes (Fig. 43, D) ..... **montana**  
Femora brown, the extreme tips paling to yellowish; mesonotal praescutum yellowish pollinose, the stripes darker but ill-defined, especially the laterals ..... **hudsonica**

Following the completion of the present report, a remarkable new species of *Dactylolabis* (*pemetica* Alexander) was discovered on Mount Desert, Maine (June 1935), and later at high altitudes on



Mount Washington, New Hampshire (August 1935), on Mount Marcy, N. Y. (July 1938) and at high altitudes in the vicinity of Mt. Mitchell, N. C. The fly has unpatterned wings, much as in *cubitalis*, to where it would run by the use of the above key. The species differs conspicuously in the dark brown mesonotum, without distinct praescutal stripes, and especially in a noteworthy sexual dimorphism that involves the shape and venation of the wings. The stigmal region in the male sex is very large and hairy, distorting the venation of the anterior radial field, the anterior branch of the sector being chiefly atrophied. The venation of the female sex is normal for the genus. (Occas. Pap. Boston Soc. Nat. Hist., 8:288-291, figs. 1, 2; 1936).

### **Dactylolabis cubitalis** (O. S.)

1869. *Limnophila cubitalis* Osten Sacken: Mon. Dipt. N. Amer., 4:229.

Figs.—Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 9, fig. 14 (hyp.); 1904. Alexander, Cfs. N. Y., 1, pl. 40, fig. 147 (wing); 1920.

General coloration gray, the brown praescutal stripes narrow and relatively inconspicuous. Femora yellow to brownish yellow, the outer segments of the legs darker, especially the tarsi. Wings with a strong yellowish suffusion, the stigma only slightly darker; *m-cu* at or close to fork of *M*. ♂. L. 8-8.5 mm.; w. 9-10.5 mm. ♀. L. 9-10 mm.; w. 10-11 mm.

(May, June) N. Y. and Ohio, westw. to Ind. and Wisc., southw. to Va. and N. C.

### **D. hudsonica** Alex.

1931. *Dactylolabis hudsonica* Alexander: Bull. Brooklyn Ent. Soc., 26:181-182.

Wings with *m-cu* beyond the fork of *M*, in most cases the distance exceeding one-half the crossvein. Male hypopygium with the basistyles dark brown. ♂. L. about 6.5 mm.; w. 8-8.5 mm. ♀. L. about 6.5-7 mm.; w. 7.5-8 mm.

(Late May-early July) Que., Me., N. H., Mass., southw. to N. C. and Tenn. (Hudsonian, Canadian, Transitional).

### **D. montana** (O. S.) (Fig. 43, D).

1859. *Limnophila (Dactylolabis) montana* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859:240.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 2, fig. 7 (ven.), pl. 4, figs. 26, 26a (hyp.); 1869. Needham, 23rd Rept. N. Y. State Ent. for 1907, pl. 13, fig. 2 (wing); 1908. Alexander, Cfs. N. Y., 1, pl. 40, fig. 148 (ven.); 1919.

General coloration gray, with a sparse pollen, the four praescutal stripes dark brown, very conspicuous. Male hypopygium with the basistyles conspicuously pale. ♂. L. 6-9 mm.; w. 8-12 mm. ♀. L. 7-8 mm.; w. 7-10 mm.

The commonest and one of the most widely distributed of the local species of the genus. It varies very greatly in size but only a single species seems to be involved. On rocky cliffs along the south

shore of Gaspé, eastern Quebec, exceptionally large specimens were found (the largest measurements given).

(May-July) Ont., Que., N. B., Me., N. H., Vt., Mass., westw. to Ind. and Ill., southw. to S. C.

Connecticut.—Kent Falls, May 30-31, June 12-13, 1931 (C. P. A.).

#### **D. rhicnoptiloides** (Alex.)

1919. *Limnophila* (*Dactylolabis*) *rhicnoptiloides* Alexander; Canadian Arctic Exped. 1913-18, Rept. 3, C: 6c.

Fig.—Alexander, *Ibid.*, pl. 1, fig. 3 (wing).

General coloration black, dusted with gray. Wings long and narrow, tending to be atrophied, especially in width; posterior marginal fringe short: *Rs* spurred at origin. ♂. L. 8-9 mm.; w. 8-10 mm.

(Aug.) Arctic North America: Ellesmereland, Lab., westw. to Canad. N. W. Terr. (Arctic, Hudsonian).

#### **D. supernumeraria** Alex.

1929. *Dactylolabis supernumeraria* Alexander; Ent. News, 40: 46.

Generally similar to *montana*, differing especially in the details of coloration and venation. Mesonotal praescutum dark brownish gray, the slightly darker brown stripes poorly defined. Wings with cell 1st  $M_2$  large, exceeding vein  $M_3$  beyond it. ♂. L. 7-8 mm.; w. 8-9 mm. ♀. L. about 8 mm.; w. 8.5-9 mm.

(June, July) N. B., Me., N. H., Vt., Mass., N. Y.

The presence of the supernumerary crossvein in cell  $R_3$  is fairly constant, though individuals are occasionally found with this present in one wing and lacking in the other.

### 4. Subtribe PSEUDOLIMNOPHILARIA

#### **Prolimnophila** Alexander

1929. *Limnophila* (*Prolimnophila*) Alexander; Bull. Brooklyn Ent. Soc., 24: 187.

The only species of *Prolimnophila* is *P. areolata* (O. S.), a medium-sized yellow crane-fly that is common in cool, hemlock-yellow birch woodlands in June. The essential features of the genus lie in the broken arculus, in conjunction with the very large cell 1st  $M_2$ , the inner end of which lies far proximad of the other elements of the cord. The early stages are unknown.

#### **Prolimnophila areolata** (O. S.) (Fig. 43, E).

1859. *Limnophila areolata* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 237.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 1, fig. 6 (wing); 1869. Alexander, Cfs. N. Y., 1, pl. 38, fig. 124 (ven.); 1919. Dickenson, Cfs. Wisc., p. 203, fig. 97 (ven.); 1932.

Head brownish yellow; antennae short in both sexes; verticils elongate, much exceeding the segments; head not strongly narrowed

behind. Mesonotum brownish yellow, without evident darker markings; tuberculate pits small, on extreme cephalic portion of praescutum; pseudosutural foveae pale and inconspicuous; pleura clearer yellow. Wings yellow, the stigma a trifle more brownish yellow;  $Sc_1$  subequal to  $m-cu$ ;  $R_s$  short, in alignment with, and approximately as long as,  $R_8$ ;  $R_{2+3}$  angulated to subangulated at origin;  $m-cu$  beyond midlength of the cell. Abdominal tergites dark brown, the sternites and hypopygium more yellowish. ♂. L. 5.5-6.5 mm.; w. 7-8 mm. ♀. L. 5.5-6.5 mm.; w. 6.5-7.5 mm.

(May-July) Ont., Que., Me., N. H., Vt., Mass., N. Y., N. J., Pa., westw. to Ill. and Wisc., southw. to N. C. and Tenn.

Connecticut.—E. Hartland, June 8, 1929 (C. P. A.); Granby, June 8, 1929 (C. P. A.); Kent Falls, May 31, June 12-13, 1931 (C. P. A.); Manic Lake, June 8-9, 1929 (C. P. A.); Norfolk, June 9, 1929, June 12, 1931 (C. P. A.); Phoenixville, June 14, 1933 (C. P. A.); Putnam, June 15, 1933 (C. P. A.); Riverton, June 12, 1931 (C. P. A.); Tunxis State Park, June 12, 1931 (C. P. A.); Tyler Lake, June 13, 1931 (C. P. A.); Union, June 14, 1933 (C. P. A.).

### Austrolimnophila Alexander

1920. *Austrolimnophila* Alexander; Arkiv för Zoologi, 13, nr. 6: 4-5.

1934. *Archilimnophila* Alexander, in Curran, Keys to The Families and Genera of North American Diptera, p. 40.

Antennae (♂) elongate (*unica* and allies) or short in both sexes (*toxonaura* and allies); verticils elongate, subequal to or exceeding the segments; head broad, not narrowed behind. No tuberculate pits; pseudosutural foveae small, marginal in position. Wings (Fig. 43, F, G) with the anterior arculus lacking;  $R_s$  short or of moderate length only, angulated at origin;  $R_2$  short, subequal to  $R_{1+2}$ ;  $R_{2+3+4}$  elongate, subequal to  $R_s$ , gently to strongly arcuated, subequal to the anterior branch of  $R_s$  (*unica* and allies) or shorter than this branch;  $m-cu$  beyond the fork of  $M$ , usually at or near midlength of cell 1st  $M_2$ .

The adult flies rest with the wings outspread, a habit characteristic of generalized hexatomine crane-flies. The early stages of *unica* are found in decaying wood. Abundant species of *Austrolimnophila* are found in the temperate portions of Australia, New Zealand and South America, though only a few occur in the northern hemisphere.

#### Key to Species

1. Wings brownish yellow, unmarked except for the slightly darker stigma;  $R_{2+3+4}$  short and very strongly arcuated, approximately one-half the length of the anterior branch of  $R_s$ ; antennae short in both sexes, if bent backward extending about to the root of the halteres; verticils longer than segments (Fig. 43, F) ..... **toxonaura**
- Wings tinged with pale brownish, sparsely to more heavily marked with brown clouds, at least the anterior cord so clouded;  $R_{2+3+4}$  elongate, only gently arcuated, in most cases subequal to the anterior branch of  $R_s$ ; antennae of male elongate, if bent backward extending to or beyond the second abdominal segment; verticils shorter than segments ..... 2
2. Wings relatively narrow, the cells correspondingly narrowed, especially cell 1st  $M_2$  which is parallel-sided;  $R_s$  relatively elongate, much exceeding its anterior branch; macrotrichia almost lacking on main stem of  $M$ , restricted

to two or three at extreme outer end; male hypopygium with the outer dististyle narrow, terminating in a short curved black spine; inner dististyle extended into a long straight apical point (Fig. 45, A) ..... *harperi*  
 Wings broad, cell *1st M*<sub>2</sub> correspondingly widened; *Rs* short, subequal to its anterior branch; long conspicuous macrotrichia on distal half of main stem of *M*; male hypopygium with the outer dististyle a flattened blade that is suddenly narrowed to a black, nearly straight point; inner dististyle bearing a blackened lateral branch at near midlength (Figs. 43, G; 45, B) ..... *unica*

***Austrolimnophila harperi* (Alex.)** (Fig. 45, A).

1926. *Limnophila harperi* Alexander; Insec. Inscit. Menst., 14: 23-24.

Mesonotal praescutum yellowish gray with three blackish stripes, the median area broad. Wings with a restricted darker brown pattern, including the stigma and clouds at origin of *Rs*, along cord and on outer end of cell *1st M*<sub>2</sub>; *m-cu* at near midlength of cell *1st M*<sub>2</sub>. Male hypopygium (Fig. 45, A). ♂. L. 7-8 mm.; w. 7.5-8.5 mm. ♀. L. 10-11 mm.; w. 9-10 mm.

(June) N. Y. (high mts.), westw. to Alta. (Hudsonian, high Canadian).

Resting on wet faces of vertical cliffs. The habits of the adults have been briefly described by the writer (Bull. Brooklyn Ent. Soc., 24: 23; 1929).

***A. toxoneura* (O. S.)** (Fig. 43, F).

1859. *Limnophila toxoneura* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 236.

Figs.—Needham, 23rd Rept. N. Y. State Ent. for 1907, pl. 18, fig. 2 (ven.); 1908. Alexander, Cfs. N. Y., 1, pl. 38, fig. 126 (ven.); 1919. Dickinson, Cfs. Wisc., p. 202, fig. 94 (wing); 1932.

Head light gray. Mesonotum brownish yellow, the praescutum with two slightly darker brown submedian stripes; lateral margin of praescutum sometimes slightly darkened; pseudosutural foveae pale; pleura yellow, usually with a more or less distinct darkening on the propleura and anepisternum. Wings (Fig. 43, F) with *Rs* short, strongly arcuated to angulated at origin; *m-cu* at near midlength of cell *1st M*<sub>2</sub>; cell *M*<sub>1</sub> deep. Abdomen elongate, in male with hypopygium blackened. ♂. L. 6-7 mm.; w. 6.5-8 mm. ♀. L. 8-9 mm.; w. 9-11 mm.

(June, July) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., westw. to Wisc., southw. to Va. and Tenn.

Connecticut.—Brooklyn, June 15, 1933 (C. P. A.); E. Hartland, June 8, 1929 (C. P. A.); Hartland, June 9, 1929 (C. P. A.); Kent Falls, June 12-13, 1931 (C. P. A.); Natchaug State Forest, June 14, 1933 (C. P. A.); Norfolk, June 9, 1929, June 12, 1931 (C. P. A.); Riverton, June 8, 1929 (C. P. A.); Tunxis State Park, June 12, 1931 (C. P. A.); Union, June 23, 1932 (N. T.).

***A. unica* (O. S.)** (Figs. 43, G; 45, B).

1869. *Limnophila unica* Osten Sacken; Mon. Dipt. N. Amer., 4: 205-206.

Figs.—Alexander, Cfs. N. Y., 1, pl. 38, fig. 114 (wing); 1919. Dickinson, Cfs. Wisc., p. 204, fig. 98 (wing); 1932.



Mesonotum dark brown, more or less pruinose, the median region of praescutum with a more or less distinct stripe of the ground-color; pleura pruinose. Wings (Fig. 43, G) with a very restricted darker pattern, most evident as a cloud on the anterior cord; macrotrichia of veins long and conspicuous; veins  $R_{1+2}$ ,  $R_2$  and  $R_{2+3}$  all short and subequal in length. Male hypopygium (Fig. 45, B). ♂. L. 7-9 mm.; w. 7-9.5 mm. ♀. L. 7.5-8 mm.; w. 9-10 mm.

(Late May-July; more rarely in Autumn) Que., N. B. Me., N. H., Mass., N. Y., west. to Wisc., southw. to D. C. (Hudsonian, Canadian).

### **Pseudolimnophila** Alexander

1919. *Pseudolimnophila* Alexander: Cornell Univ. Agr. Expt. Sta. Mem. 25: 917.

1920. *Pseudolimnophila* Alexander: *Ibid.*, Mem. 38: 848-850.

The chief points of distinction between *Pseudolimnophila* and *Limnophila* have been indicated in the key to the genera of Hexatomini. The immature stages of the two groups provide stronger and more satisfactory characters for the separation of the subtribes. In the following treatment, *Pseudolimnophila toroneura* has been removed from the present genus and placed in *Austrolimnophila*. The adult flies frequent a variety of ecological habitats that are indicated under the various species. The early stages are spent in saturated earth in the same general habitats frequented by the adult. Edwards (1938) has placed this group as a subgenus under *Limnophila* Macquart.

#### *Key to Species*

- |  |                       |
|--|-----------------------|
| 1. Cell $M_1$ lacking (Fig. 43, I) .....   | <b>noveboracensis</b> |
| Cell $M_1$ present (Fig. 43, H) .....  | 2                     |
| 2. Thoracic pleura pale, striped longitudinally with dark brown, the longest stripe being the more dorsal one .....                            | <b>contempta</b>      |
| Thoracic pleura uniform light to dark gray .....   | 3                     |
| 3. Wings yellowish, distinctly marked with pale brown at stigma and on the crossveins and deflections of longitudinal veins (Fig. 43, H) ..... | <b>luteipennis</b>    |
| Wings gray or yellowish gray, unmarked except for the stigmal area .....   | 4                     |
| 4. Size large (wing, ♂, over 7 mm.); mesonotal praescutum with a median brown stripe, the lateral stripes not or scarcely indicated .....      | <b>inornata</b>       |
| Size small (wing, ♂, under 6 mm.); mesonotal praescutum gray, with four narrow brown stripes, the lateral pair distinct .....                  | <b>australina</b>     |

### **Pseudolimnophila australina** Alex.

1927. *Pseudolimnophila australina* Alexander: Journ. N. Y. Ent. Soc., 35: 56-57.

Size small (wing, ♂, 4.5-5.5 mm.). Wings with  $R_{2+3+4}$  long and gently arcuated, from two to three times the length of the basal deflection of  $R_5$ . ♂. L. 4-4.5 mm.; w. 4.5-5.5 mm. ♀. L. about 6 mm.; w. 6-6.2 mm.

(July) Md., westw. to s. Ind. and Tenn., southw. to S. C., Fla. and Ala. (Austral).

**P. contempta** (O. S.)

1869. *Limnophila contempta* Osten Sacken; Mon. Dipt. N. Amer., 4: 218-219.

1914. *L. nigripleura* Alexander and Leonard; Proc. Acad. Nat. Sci. Philadelphia, 1914: 592-593.

Figs.—Alexander and Leonard, *Ibid.*, pl. 25, fig. 3 (wing). Alexander, Cfs. N. Y., 1, pl. 39, fig. 136 (wing); 1919.

Mesonotal praescutum light brown, with indications of four slightly darker brown stripes, best indicated behind; pseudosutural foveae pale brown. Wings yellowish gray, the stigma darker; in cases, with very pale brown clouds along the cord and outer end of cell *1st M*<sub>2</sub>; *R*<sub>2+3+4</sub> long and gently arcuated, exceeding twice the basal deflection of *R*<sub>5</sub>. ♂. L. about 5-5.5 mm.; w. about 6-6.5 mm. ♀. L. about 6-6.5 mm.; w. 6.5-7 mm.

(June-Sept.) Ont., Que., N. B., Me., N. H., Vt., N. Y., westw. to Mich. and Mo., southw. to S. C., Ga., Tenn. and n. Fla. A common fly in ravines, on shaded springy hillsides, in open gorges and similar places.

Connecticut.—Bloomfield, Aug. 6, 1929 (C. P. A.); Cornwall Bridge, Aug. 19, 1931 (C. P. A.); Kent Falls, June 12-13, 1931, July 23-24, 1931, Aug. 19, 1931 (C. P. A.); Natchaug State Forest, June 14, 1933 (C. P. A.); New Haven, Aug. 20, 1928 (G. B.); Saptree Run State Park, June 14, 1933 (C. P. A.).

**P. inornata** (O. S.) (Figs. 22, D; 23, D).

1869. *Limnophila inornata* Osten Sacken; Mon. Dipt. N. Amer., 4: 219-220.

Fig.—Alexander, Cfs. N. Y., 1, pl. 39, fig. 134 (ven.); 1919.

General coloration clear gray, the mesonotal praescutum darkened medially but without a more intense capillary median vitta, the lateral stripes obsolete or nearly so; pleura clear blue-gray; pseudosutural foveae black. Wings (Fig. 23, D) with a faint brownish tinge, unmarked except for the slightly darkened stigmal area; *R*<sub>2+3+4</sub> variable in length, in cases only a little longer than the basal deflection of *R*<sub>5</sub>, in other specimens exceeding twice this length. ♂. L. 7-8 mm.; w. 7.5-8 mm. ♀. L. about 8.5-9.5 mm.; w. 8-9 mm.

(May-Aug.) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., westw. to Ind. and Mich., southw. to Md. A very characteristic inhabitant of sphagnum bogs.

The record and figure by Dickinson (Cfs. Wisc., p. 201, fig. 93; 1932) pertains to some other crane-fly.

Connecticut.—Branford, Aug. 11, 1904 (H. L. V.); E. Haddam, May 31, 1923 (W. E. B.); Manitic Lake, June 8-9, 1929, preyed upon by a cordylurid fly (C. P. A.); Norfolk, June 9, 1929 (C. P. A.); Putnam, June 15, 1933 (C. P. A.); Stafford Springs, June 14, 1933 (C. P. A.); Stamford, June 7, 1923 (B. T. R. L.); Storrs (C. S. C.); Union, June 24, 1932 (N. T.).

**P. luteipennis** (O. S.) (Fig. 43, H).

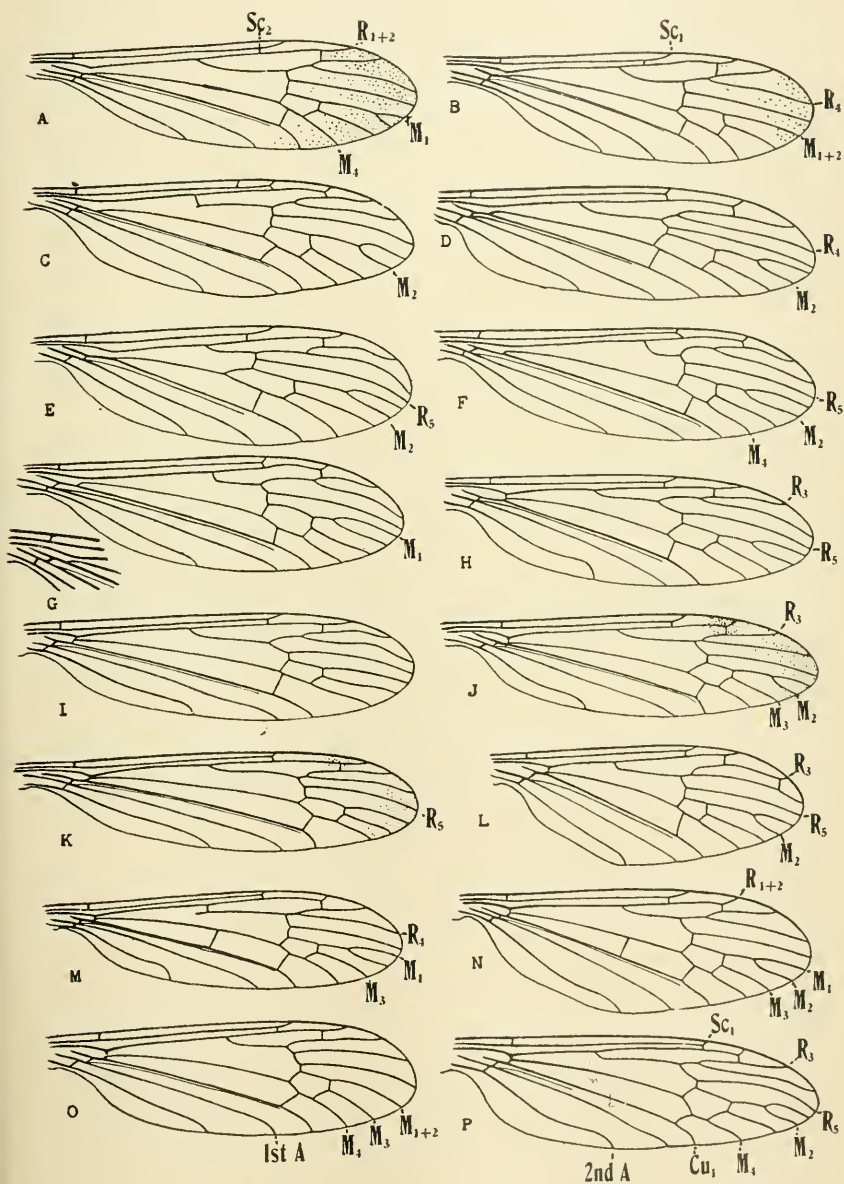
1859. *Limnophila luteipennis* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 236.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 2, fig. 10 (wing), pl. 4, fig. 25 (hyp.); 1869. Alexander, Cfs. N. Y., 1, pl. 39, fig. 135 (wing); 1919. Dickinson, Cfs. Wisc., p. 201, fig. 92 (wing); 1932.

FIGURE 43. Hexatomini; venation.

- A. *Oxydiscus americanus* (Alex.)
- B. *O. cayuga* (Alex.)
- C. *Epiphragma fascipennis* (Say)
- D. *Dactylolabis montana* (O. S.)
- E. *Prolimnophila arcolata* (O. S.)
- F. *Austrolimnophila toxoneura* (O. S.)
- G. *A. unica* (O. S.)
- H. *Pseudoimnophila luteipennis* (O. S.)
- I. *P. noveboracensis* (Alex.)
- J. *Limnophila (Lasiomastix) macrocera* (Say)
- K. *L. (L.) subtenuicornis* Alex.
- L. *L. (Dicranophragma) fuscovaria* O. S.
- M. *L. (Idioptera) fasciolata* O. S.
- N. *L. (Elacophila) aprilina* O. S.
- O. *L. (Idiolimnophila) emmelina* Alex.
- P. *L. (Eutonia) alleni* Johns.

Symbols: *A*, Anal; *Cu*, Cubitus; *M*, Media; *R*, Radius; *Sc*, Subcosta.





General coloration above gray to brownish gray, clearer gray laterally and on pleura; in most specimens with a capillary dark brown praescutal vitta. ♂. L. 7-7.5 mm.; w. 7.5-9 mm. ♀. L. 7.5-8 mm.; w. 8-8.5 mm.

(May-Sept.) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., westw. to Cal., southw. to Fla., Ala., Miss. and La. The most common member of the genus, especially characteristic of helophytic associations.

Connecticut.—East River, Sept. 1910 (Ely); Granby, June 8, 1929, Sept. 4, 1928 (C. P. A., G. C. C.); Manitic Lake, May 16, 1931, Aug. 6, 1929 (C. P. A.); Natchaug State Forest, June 14, 1933 (C. P. A.); Storrs (C. S. C.).

**P. noveboracensis** (Alex.) (Fig. 43, I).

1911. *Limnophila noveboracensis* Alexander; Psyche, 18: 196-198.

Figs.—Alexander, *Ibid.*, pl. 16, fig. 3 (ven.). Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 18, fig. 6 (ven.); 1908 (as *quadrata*). Alexander, Cfls. N. Y., 1, pl. 40, fig. 150 (ven.); 1919. Dickinson, Cfls. Wisc., p. 202, fig. 95 (wing); 1932.

General coloration yellowish brown, the notum without distinct markings; pseudosutural foveae pale, inconspicuous; thoracic pleura yellowish. Wings with a pale yellowish tinge, the stigmal area a little darker; *m-cu* somewhat variable in position, often close to fork of *M*. ♂. L. 5.2-6 mm.; w. 6-6.5 mm. ♀. L. about 7-8 mm.; w. 7-7.8 mm.

(June-Aug.) Ont., Que., Me., N. H., Vt., Mass., N. Y., westw. to Wisc., N. D. and Alta., southw. to N. C. and S. C. Especially characteristic of shaded humid woodlands near flowing water; occasionally in bogs.

Connecticut.—East River, July 4-Aug. 11, 1910 (Ely).

## 5. Subtribe LIMNOPHILARIA

### *Limnophila* Macquart

1834. *Limnophila* Macquart; Suit. à Buffon, 1, Hist. Nat. Ins. Dipt.: 95.

#### Key to Subgenera

1. Apical cells of wing with scanty macrotrichia (Fig. 43, J, K) ..... **Lasiomastix**  
No macrotrichia in apical cells of wing ..... 2
2. Supernumerary crossveins in either cell *R*<sub>3</sub> or cell *M* of wing ..... 3  
No supernumerary crossveins in any cells of wing ..... 5
3. A supernumerary crossvein in cell *R*<sub>3</sub> (Fig. 43, L) ..... **Dicranophragma**  
A supernumerary crossvein in cell *M* (Fig. 43, M, N) ..... 4
4. Wings with an interrupted cross-banded pattern; *Rs* long-spurred at origin;  
antennae of male elongate (Fig. 43, M) ..... **Idioptera**  
Wings with a spotted pattern, or else immaculate; *Rs* slightly if at all spurred  
at origin; antennae short in both sexes (Fig. 43, N) ..... **Elaeophila**
5. Cell *R*<sub>3</sub> sessile; cell *M*<sub>1</sub> lacking (Fig. 43, O) ..... **Idiolimnophila**  
Cell *R*<sub>3</sub> petiolate; cell *M*<sub>1</sub> present ..... 6
6. Very large species (wing over 16 mm.); wings with the branches of *M*  
leaving the main stem at a strong angle, cell *1st M*<sub>2</sub> thus being strongly  
hexagonal (Fig. 43, P) ..... **Eutonia**  
Smaller species (wing under 14 mm.); wings with the branches of *M* not  
strongly divergent, especially *M*<sub>3+4</sub>, cell *1st M*<sub>2</sub> being more nearly rectangular  
in outline (Fig. 44, A) ..... 7
7. Wings with *R*<sub>2+3+4</sub> short, subequal to the basal deflection of *R*<sub>5</sub>; *Rs* elongate,  
exceeding four times *R*<sub>2+3+4</sub> (Fig. 44, A); coloration polished black (*mun-*

- da, mundoides*) or gray (*rufibasis* group), the latter group having the male hypopygium with a series of teeth on margin of outer dististyle, producing a comb-like appearance (Fig. 45, L, M) ..... **Prionolabis**
- Wings with  $R_{2+3+4}$  longer (Fig. 44, B, C, E), usually exceeding the basal deflection of  $R_5$  (compare *irrorata*);  $R_s$  shorter, not exceeding three times  $R_{2+3+4}$  (compare *irrorata*); body-coloration never polished black; when gray, the male hypopygium without a comb of spines on the outer dististyle 8
8.  $R_s$  short, weakly to more strongly angulated at origin, more rarely merely arcuated (compare *lutca*);  $R_{2+3+4}$  subequal to or shorter than *m-cu* (Fig. 44, B); antennae short in both sexes ..... **Phylidorea**
- $R_s$  longer, more gently arcuated; in species with  $R_s$  shorter (compare *poetica*; *laricicola*; *albipes*, *niveitarsis*) with antennae of male elongate, and, except in *poetica*, with  $R_{2+3+4}$  elongate, considerably exceeding *m-cu* **Limnophila**

The various subgenera of *Limnophila* are highly artificial and are chiefly maintained for convenience only. The exact definition of the limits of the subgenera *Prionolabis*, *Phylidorea*, and *Limnophila*, s. s., has proved especially difficult:

*Prionolabis*, as typified by *rufibasis*, has a very distinct structure of the male hypopygium, and the nearest allied species (*simplex*, *walleyi*) are not apt to be traced elsewhere. The two polished black species (*munda*, *mundoides*) have a very different hypopygial structure but in other features are referable to *Prionolabis*.

*Phylidorea*, as typified by *ferruginea* and *adusta*, includes a considerable range of species, agreeing in the general structure of the male hypopygium. The venation usually shows  $R_s$  short and strongly angulated to spurred at origin, but this character is closely approximated by a few species with elongate antennae in the male sex that I do not think can be held as being consubgeneric with *adusta* (compare *Limnophila*, s. s.). However, it should be borne in mind that some species that are surely members of *Phylidorea* (*novae-angliae*, *siouana*) have relatively long antennae in the male sex, and there is a possibility that the above-mentioned doubtful species (*laricicola*; *albipes*, *niveitarsis*) will eventually be placed in *Phylidorea*. All three of the species named are very distinct in hypopygial and other characters and are not apt to be confused by the careful student.

*Limnophila*, as treated for the Northeastern Nearctic fauna, has been made to receive the residue after the various species have been assigned to other subgeneric groups. It is somewhat doubtful whether any of the species here placed in *Limnophila*, s. s., are strictly consubgeneric with the type. *pictipennis* Westwood, of Europe, the nearest approach being in *irrorata*. Besides the four species that approach *Phylidorea*, as listed in the above key, having elongate antennae in the male sex, only two species are left in the group as now restricted. Both of these are readily told from all other Eastern species of the genus by the diagnostic features,—*brevifurca* by its very small cell  $M_1$ , and *irrorata* by its heavily and closely irrorate wing-pattern.

A few crane-flies that presumably belong to the Hexatomini have been described by earlier workers but have not been recognized in the intervening years.

*Limnophila carbonaria* Macq.; Dipt. exot., 1: 66; 1838. Unknown: the only species known that agrees even approximately with the description is *L. macrocera* Say (1823).

*Limnophila biterminata* Walk.: Insecta Saundersiana, 1, Dipt., p. 436: 1856. Dr. Fred W. Edwards sends me the following notes on Walker's type.

Type lacking abdomen and all legs except one mid-femur and tibia. Head (crushed) dull brownish; appendages brown; antennae short. Thorax uniformly shining reddish-brown; scutellum lighter. Mid-femur scarcely darkened at tip; mid-tibial spurs black, as long as tibial diameter. Venation much as in *poetica*, but *Rs* not quite so long and less distinctly spurred;  $R_{2+3+4}$  not quite so short; *m-cu* at midlength of cell 1st  $M_2$ . Tiny brown dots at base and tip of *Rs*, over *Sc*, fork of  $R_{2+3+4}$ , over  $R_2$  and at tip of  $R_3$ . Anal area larger than shown for *poetica* (Cfls. N. Y., 1). Walker gives the length as 12 mm.; wing about 10 mm.

*Limnophila ignobilis* Walk.: Insecta Saundersiana, 1, Dipt., p. 437: 1856. Dr. Edwards states that the type is lost. Certain features of the original description are suggestive of *Hexatoma (Eriocera)*.

### Subgenus *Lasiomastix* O. S.

1859. *Limnophila (Lasiomastix)* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 233.

The essential characters of the present group lie in the presence of macrotrichia in the outer cells of the wing (Fig. 43, J, K) correlated with venational characters, such as the very short petiole of cell  $R_3$ , and the elongate antennae of the male sex. The immature stages are spent in mud or rich organic earth.

#### Key to Species

1. General coloration of mesonotum polished black; wings subhyaline, with a heavy brown pattern that is more or less cross-banded; antennae ( $\delta$ ) very elongate, approximately as long as the body, the cylindrical segments provided over their entire length with long erect setae that greatly exceed the short, subappressed verticils (Fig. 43, J) ..... **macrocera**
- General coloration dull gray; wings grayish subhyaline, unmarked, except for the stigma; antennae ( $\delta$ ) elongate, approximately one-half the length of body, the segments with short verticils at near midlength, these longer than the short dense pubescence .....
2. Cell  $M_1$  lacking (Fig. 43, K) ..... **subtenuicornis**
- Cell  $M_1$  present ..... **tenuicornis**

***Limnophila (Lasiomastix) macrocera* (Say) (Fig. 43, J).**

1823. *Limnobia macrocera* Say; Journ. Acad. Nat. Sci. Philadelphia, 3: 20.

1869. *Limnophila macrocera* Osten Sacken; Mon. Dipt. N. Amer., 4: 204-205.

Figs.—Alexander, Cfls. N. Y., 1, pl. 38, fig. 113 (wing); 1919. Crampton, Ann. Ent. Soc. Amer., 18, pl. 3, fig. 5 (thorax); 1925. Crampton, Trans. Amer. Ent. Soc., 52, pl. 14, fig. 60 (neck, prothorax); 1926.

Thoracic pleura pruinose. Antennae of female much shorter than in male, if bent backward extending about to wing-root, without erect setae; maxillary palpi elongate, exceeding the head. Wings whitish subhyaline, incompletely cross-banded with dark brown, including

areas at origin of  $R_8$ , along cord, outer end of cell  $1st\ M_2$  and wing-tip; cell  $R_3$  short-petiolate;  $m-cu$  subequal to or longer than the distal section of  $Cu_1$ . Abdomen ( $\delta$ ) bicolorous, black, the intermediate segments ringed basally with obscure yellow; hypopygium yellow; in female, abdomen more uniformly blackened.  $\delta$ . L. 7-8 mm.; w. 7.5-8 mm.  $\varphi$ . L. 10-11 mm.; w. 8.5-9 mm.

(May-Aug.) Ont., Que., N. B., Me., N. H., Vt., Mass., R. I., N. Y., Pa., westw. to Mich. and Ill., southw. to Ga. and Tenn., in s. Ga. and Fla. replaced by the subspecies *suffusa* Alex., with more heavily patterned wings. A common species, usually in swampy or marshy places.

Connecticut.—Granby, June 8, 1929 (C. P. A.); High Ridge, July 18, 1915 (G. P. E.); Natchaug State Forest, June 14, 1933 (C. P. A.); New Haven, May 26, 1904 (H. L. V.); Norfolk, July 24, 1931 (C. P. A.); Phoenixville, June 14, 1933 (C. P. A.).

**L. (*Lasiomastix*) *subtenuicornis* (Alex.) (Fig. 43, K).**

1918. *Lasiomastix subtenuicornis* Alexander: Can. Ent., 50: 61-62.

General coloration gray to brownish gray, the praescutum with three broad, slightly darker brown stripes. Antennae ( $\delta$ ) with flagellar segments subcylindrical to long-fusiform, the verticils and pubescence short; in  $\varphi$  antennae shorter, extending about to base of abdomen. Wings with cell  $R_3$  sessile to very short-petiolate.  $\delta$ . L. 7-7.5 mm.; w. 7.4-8.4 mm.  $\varphi$ . L. 8.5-9 mm.; w. 8.5-8.8 mm.

(June) Ont. and N. Y., westw. to Ind. and Mich., southw. to Tenn. Swampy and boggy woodlands.

**L. (*Lasiomastix*) *tenuicornis* O. S.**

1869. *Limnophila tenuicornis* Osten Sacken: Mon. Dipt. N. Amer., 4: 208-209.

Fig.—Alexander, Cfs. N. Y., I, pl. 38, fig. 117 (wing); 1919.

General coloration gray, the praescutal disk and scutal lobes more infuscated, pruinose laterally; pleura pruinose. Antennae ( $\delta$ ) elongate, nearly one-half the entire body, the structure almost as in the last species. Wings with cell  $R_3$  sessile to very short-petiolate. Abdomen relatively long, dark brown; hypopygium blackened.  $\delta$ . L. 7-7.5 mm.; w. 7-7.5 mm.  $\varphi$ . L. 8-9 mm.; w. 7.5-8.5 mm.

(Late May-July) Ont., Que., Me., N. H., Vt., Mass., N. Y., southw. to Va. and S. C. Connecticut.—Norfolk, May 31, 1931, June 9, 1929, June 12, 1931 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.).

### Subgenus *Dicranophragma* Osten Sacken

1859. *Limnophila* (*Dicranophragma*) Osten Sacken: Proc. Acad. Nat. Sci. Philadelphia, 1859: 240.

The subgenus *Dicranophragma* is represented in our fauna by two common species. The center of distribution for the group lies in the mountains of the Oriental Region. The adult flies may be swept from rank herbage in swampy or boggy woods, where they rest with the



wings folded incumbent over the back and with the body tilted at a strong angle to the support. The early stages are spent in rich organic mud.

*Key to Species*

1. Wings of both sexes narrow, widest opposite the central half ..... **angustula**  
 Wings broader, especially in the male, where the widest point is just behind  
 the termination of vein *2nd A* (Fig. 43, L) ..... **fuscovaria**

***Limnophila* (*Dicranophragma*) *angustula* Alex.**

1929. *Limnophila* (*Dicranophragma*) *angustula* Alexander; Bull. Brooklyn Ent. Soc., 24: 190-191.

Allied and generally similar to the next species, differing especially in the narrow wings of both sexes. Head and thorax brownish gray, the praescutal interspaces variegated with dark brown. Halteres and legs pale yellow. Wings subhyaline, with an abundant dotted and spotted brown pattern, including about five major areas along the costal field, the third and fourth, in cases, more or less confluent behind. ♂. L. 4.5-5.5 mm.; w. 4.8-7 mm. ♀. L. 5-6 mm.; w. 5-6 mm.

(Mid-June-Sept.) Me., N. H., Vt., Mass., Ct., N. Y., westw. to Mich., southw. to Tenn., N. C. and Fla.

Connecticut.—Bloomfield, Aug. 6, 1929 (C. P. A.); Bolton, July 4, 1931 (W. H. B.); Cornwall Bridge, Aug. 19, 1931 (C. P. A.); Kent Falls, June 12-13, 1931 (C. P. A.).

**L. (*Dicranophragma*) *fuscovaria* O. S. (Fig. 43, L).**

1859. *Limnophila* (*Dicranophragma*) *fuscovaria* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 240.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 18, fig. 1 (ven.); 1908. Alexander, Cfls. N. Y., 1, pl. 39, fig. 139 (wing); 1919. Dickinson, Cfls. Wis., p. 203, fig. 96 (wing ♀); 1932.

Antennae short in both sexes, the basal segments yellow, the outer segments darker. Mesonotum brownish gray, the interspaces variegated by dark brown spots and dashes; pleura clearer gray, lined longitudinally with dark brown; a circular dark spot on sternopleurite. Legs yellow, with conspicuous erect setae. Wings with an abundant dotted and spotted brown pattern, including about five costal areas, the third and fourth widely separated; costal fringe (♂) conspicuous. ♂. L. 4.5-5.5 mm.; w. 6-6.5 mm. ♀. L. 6.5-7 mm.; w. 7 mm.

(June-Aug.) Ont., Que., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Wisc. and Mo., southw. to N. C., S. C., Tenn. and Fla. Cool woodlands.

Connecticut.—Canaan, June 12, 1931 (C. P. A.); Danbury, June 15, 1909 (C. W. J.); East River, July 8, 1910 (Ely); Granby, June 8, 1929 (C. P. A.); Hartland, June 9, 1929 (C. P. A.); Kent Falls, June 12-13, 1931, July 23-24, 1931, Aug. 19, 1931 (C. P. A.); Riverton, July 23, 1931 (C. P. A.); Saptree Run State Park, June 14, 1933 (C. P. A.); Tunxis State Park, July 23-24, 1931 (C. P. A.); Tyler Lake, June 13, 1931 (C. P. A.); Westford, June 14, 1933 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.).

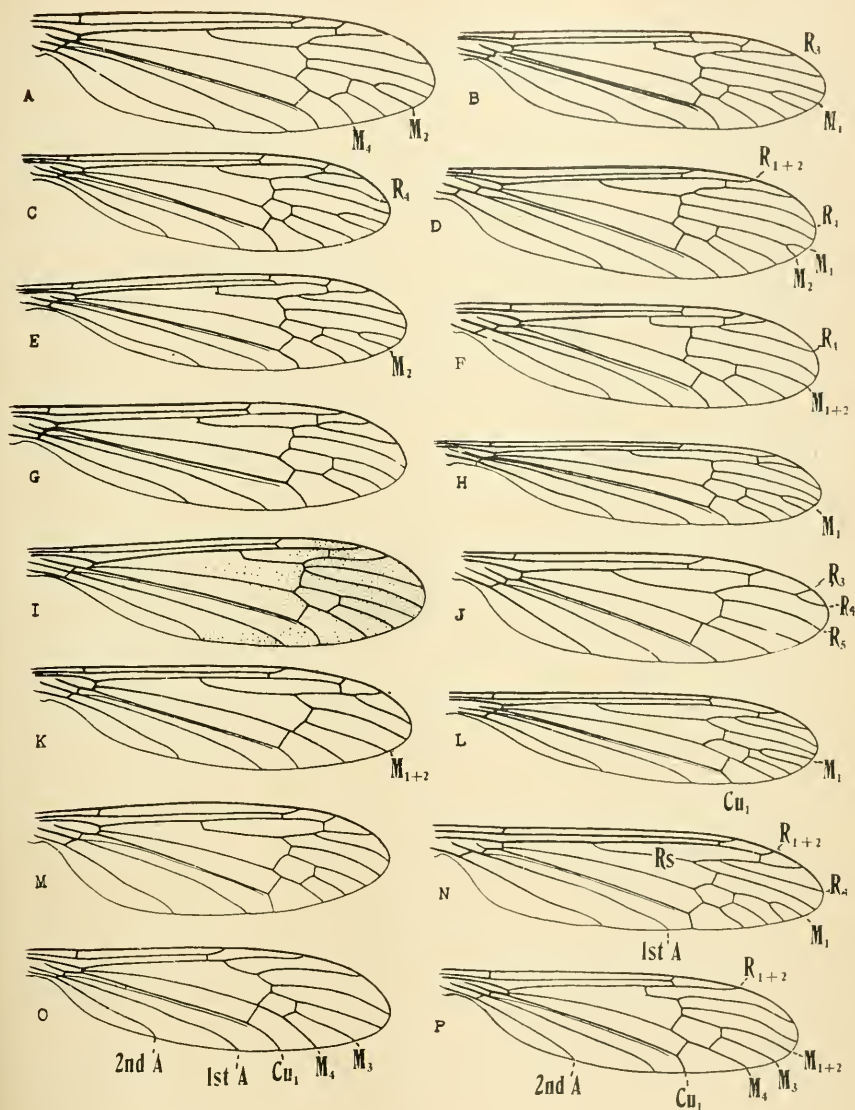


FIGURE 44. Hexatomini; venation.

- |  |  |
|--|--|
| A. <i>Limnophila (Prionolabis) rufibasis</i> O. S. | J. <i>Hexatoma (Hexatoma) megacera</i> (O. S.)           |
| B. <i>L. (Phylidorea) adusta</i> O. S.             | K. <i>H. (H.) microcera</i> Alex.                        |
| C. <i>L. albipes</i> Leonard                       | L. <i>H. (Eriocera) brevioricornis</i> Alex.             |
| D. <i>L. brevifurca</i> O. S.                      | M. <i>H. (E.) longicornis</i> (Walk.)                    |
| E. <i>L. poetica</i> O. S.                         | N. <i>H. (E.) spinosa</i> (O. S.)                        |
| F. <i>Shannonomyia lenta</i> (O. S.)               | O. <i>Atarba (Atarba) picticornis</i> O. S.              |
| G. <i>Pilaria quadrata</i> (O. S.)                 | P. <i>Elephantomyia (Elephantomyia) west-woodi</i> O. S. |
| H. <i>P. tenuipes</i> (Say)                        |  |
| I. <i>Ulomorpha pilosella</i> (O. S.)              |  |
- Symbols: A, Anal; Cu, Cubitus; M, Media; R, Radius; Rs, Radial sector.

Subgenus **Idioptera** Macquart

1834. *Idioptera* Macquart; Suit. à Buffon, 1, Hist. Nat. Ins. Dipt.: 94.

The subgenus *Idioptera* is represented in the local fauna by a single rather uncommon species. The adult flies frequent sparsely wooded marshy and boggy areas. The early stages occur in rich organic mud.

**Limnophila** (*Idioptera*) **fasciolata** O. S. (Fig. 43. M).

1869. *Limnophila fasciolata* Osten Sacken; Mon. Dipt. N. Amer., 4: 206-207.

Fig.—Alexander, Cfs. N. Y., 1, pl. 38, fig. 115 (wing); 1919.

Head and anterior part of mesonotum dark brown, the posterior sclerites of notum and the pleura more yellow, the latter with a transverse brown girdle occupying the anepisternum and sternopleurite. Antennae ( $\delta$ ) elongate, approximately one-half the body; flagellar segments long-cylindrical, with a delicate white pubescence and with verticils at near midlength that are shorter than the segments; in  $\text{♀}$ , antennae short, extending to just before wing-root. Legs yellow to whitish, the tips of femora broadly, of tibiae more narrowly, blackened. Wings relatively narrow, whitish subhyaline, with a heavy brown cross-banded pattern. In  $\text{♀}$ , wings slightly reduced in size, with the pattern somewhat heavier. Abdomen ( $\delta$ ) elongate, obscure yellow, the segments narrowly bordered by brown; hypopygium chiefly blackened. Male hypopygium with the outer dististyle terminating in a single curved spine.  $\delta$ . L. about 6.5-7 mm.; w. 6.5-8 mm.  $\text{♀}$ . L. 7-7.5 mm.; w. 6.5-6.8 mm.

(June) Me., Mass., Ct., N. Y., westw. to Mich.

Connecticut.—Manitic Lake, June 8-9, 1929 (C. P. A.).

Subgenus **Elaeophila** Rondani

1856. *Elaeophila* Rondani; Prodr. Dipterol. Italicae, 1: 182.

1864. *Ephelia* Schiner; Wien. Entomol. Monatschr., 7: 222.

There seem to be no sufficient grounds on which we can refuse to use the name *Elaeophila* (*Elaeophila*) for the group that has until recent date been called *Ephelia*. The essential characters of the subgenus lie in the presence of a supernumerary crossvein in cell *M*, in conjunction with the short antennae in both sexes, and the fundamentals of structure of the male hypopygium, especially the rather peculiar structure of the outer dististyle (Fig. 45. C-J). The adult flies rest on rank vegetation in woods and shaded gorges, more especially along streams of various sizes, the nature of the latter to some extent governing the species. Thus, *aprilina* tends to frequent small rills, while *sabrina* and *johsoni* occur especially along the margins of larger streams. The early stages live in rich organic mud near the haunts of the adult.

## Key to Species

(Based chiefly on male characters)

1. Wings pale yellow, unmarked ..... **johnsoni**  
Wings heavily spotted and clouded with brown ..... 2
2. Wing-pattern more limited, restricted to the veins, there being a single dark cloud in cell *2nd A*, this located at the end of vein *2nd A* ..... 3  
Wing-pattern more abundant, there being one or more dark clouds in cell *2nd A* proximad of the one at end of vein *2nd A* ..... 5
3. Wings broad, widest opposite the termination of vein *2nd A* ..... **aprilina**  
Wings narrower, widest opposite the central third ..... 4
4. Antennae ( $\delta$ ) short, if bent backward ending some distance before wing-root; male hypopygium with the flange of outer dististyle (Fig. 45, E) small, placed on outer half; inner dististyle (Fig. 45, K) with two pencils or tufts of setae ..... **irene**  
Antennae ( $\delta$ ) longer, if bent backward extending to shortly beyond the wing-root; male hypopygium with the flange of outer dististyle (Fig. 45, G) large, placed on basal half; inner dististyle without specially modified hair-pencils ..... **sabrina**
5. Wing-pattern abundant, with numerous dots and clouds in the cells, including a series of three or four clouds in cell *2nd A*; male hypopygium with the outer dististyle widened distally (Fig. 45, J) ..... **vernata**  
Wing-pattern more restricted, with only one or two clouds in the outer end of cell *2nd A*; male hypopygium with the outer dististyle narrowed distally (Fig. 45, H, I) ..... 6
6. Male hypopygium with the tip of the outer dististyle prolonged into a slender lobe that is bifid at apex (Fig. 45, I) ..... **solstitialis**  
Male hypopygium with the outer dististyle terminating in a simple acute apical spine (Fig. 45, H) ..... **serotinella**

***Limnophila (Elaeophila) aprilina*** O. S. (Figs. 43, N; 45, C, D).1859. *Limnophila aprilina* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 235.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 4, fig. 23 (hyp.); 1869. Alexander, Cfls. N. Y., 1, pl. 39, fig. 137 (wing); 1919. Alexander, Bull. Brooklyn Ent. Soc., 22: 64, fig. 2 (hyp.); 1927.

General coloration yellowish gray, the praescutum with four scarcely indicated brown stripes; pseudosutural foveae black, very distinct. Legs yellow, the femora and tibiae weakly darkened at tips. Wings broad in both sexes but more so in male; a series of five or more large costal areas; last marginal darkening at tip of vein *2nd A*. Male hypopygium with the flange of the outer dististyle large and conspicuous, placed on basal half of style (Fig. 45, C, D).  $\delta$ . L. 6-7 mm.; w. 7.5-8.7 mm.  $\text{♀}$ . L. 7-7.5 mm.; w. 8.5 mm.

(May, June) N. H., Vt., Mass., N. Y., southw. to N. C. and S. C. (Canadian). Connecticut.—Hartland, June 9, 1929 (C. P. A.); Kent Falls, May 31, 1931 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.).

***L. (Elaeophila) irene*** Alex. (Fig. 45, E, K).1927. *Limnophila (Ephelia) irene* Alexander; Bull. Brooklyn Ent. Soc., 22: 58.Fig.—Alexander, *Ibid.*, p. 64, fig. 3 (hyp.); 1927.

Generally similar to *aprilina* in the heavy wing-pattern that is restricted to the vicinity of the veins, the last marginal area being that



at the end of vein *2nd A.* Praesutal stripes relatively ill-delimited, straight, the laterals not confluent in front with the median vitta. Male hypopygium with outer dististyle (Fig. 45, E); inner dististyle (Fig. 45, K). ♂. L. about 5.5 mm.; w. 6-6.2 mm. ♀. L. 5.5-6.5 mm.; w. 7.5-8.5 mm.

(June, July) Ont., westw. to Mich., southw. to S. C.

*L. (Elaeophila) johnsoni* Alex. (Fig. 45, F).

1914. *Limnophila (Ephelia) johnsoni* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1914: 591.

Figs.—Alexander, *Ibid.*, pl. 25, fig. 2 (ven.); 1914. Alexander, Cfs. N. Y., 1, pl. 39, fig. 138 (ven.); 1919. Alexander, Bull. Brooklyn Ent. Soc., 22: 64, fig. 1 (hyp.); 1927.

General coloration pale yellow, the four praesutal stripes slightly darker. Male hypopygium (Fig. 45, F). ♂. L. 4-5 mm.; w. 6-7.2 mm. ♀. L. 6.5-7.5 mm.; w. 7-8.5 mm.

(Late May, June) Que., N. B., Me., N. H., Vt., Mass., N. Y., N. J., southw. to Va., Tenn., N. C. and S. C. (Canadian).

This species is strikingly distinct from all other members of the subgenus in the yellow body coloration and the immaculate wings.

*L. (Elaeophila) sabrina* Alex. (Fig. 45, G).

1929. *Limnophila (Ephelia) sabrina* Alexander; Bull. Brooklyn Ent. Soc., 24: 189-190.

Antennae (♂) with basal flagellar segments enlarged. Wings with pattern restricted to the vicinity of veins, the last dark area at end of vein *2nd A.* Male hypopygium (Fig. 45, G). ♂. L. about 5.5 mm.; w. 5.6-6.8 mm. ♀. L. about 6.5 mm.; w. 7.5 mm.

(June) Que., N. B., N. H., Vt., Mass., Ct., N. Y.

Connecticut.—Winsted, June 9, 1929 (C. P. A.).

*L. (Elaeophila) serotinella* Alex. (Fig. 45, H).

1926. *Limnophila (Ephelia) serotinella* Alexander; Bull. Brooklyn Ent. Soc., 21: 110-111.

Fig.—Alexander, *Ibid.*, 22: 64, fig. 6 (hyp.); 1927.

Size small, the wings with a heavy brown pattern that is more abundant than in *aprilina*. Wings narrow in both sexes. Male hypopygium with outer dististyle (Fig. 45, H) small, dilated on basal half, thence suddenly narrowed to the simple acute apex; outer flange spinous, blunt at tip, placed far out near apex of style. ♂. L. about 4.3 mm.; w. 5-5.3 mm. ♀. L. about 4.3 mm.; w. 4.8 mm.

(Sept.) S. C., Tenn., Fla.

*L. (Elaeophila) solstitialis* Alex. (Fig. 45, I).

1926. *Limnophila (Ephelia) solstitialis* Alexander; Bull. Brooklyn Ent. Soc., 21: 109-110.

Fig.—Alexander, *Ibid.*, 22: 64, fig. 4 (hyp.); 1927.

Wings narrow in both sexes, with an abundant brown pattern, more broken and interrupted than in *aprilina*, there being two dark areas at outer end of cell *2nd A*, the last larger, the penultimate at end of vein *2nd A*. Male hypopygium with outer dististyle (Fig. 45, I): lateral flange placed at about four-fifths the length of style. ♂. L. about 5-5.5 mm.; w. 5.5-7 mm. ♀. L. about 6-6.5 mm.; w. 7-7.5 mm.

(June-Aug.) Ont., Que., Me., N. H., Vt., Mass., N. Y., N. J., westw. to Ind. and Mich., southw. to N. C., S. C., Tenn. and Fla. (Canadian, Transition).

**L. (*Elaeophila*) *vernata* Alex.** (Fig. 45, J).

1927. *Limnophila* (*Ephelia*) *vernata* Alexander; Bull. Brooklyn Ent. Soc., 22: 59-60.

Fig.—Alexander, *Ibid.*, p. 64, fig. 5 (hyp.): 1927.

A small species with narrow wings, having an unusually abundant clouded and dotted pattern. Male hypopygium with outer dististyle (Fig. 45, J) gently widened outwardly, broadest about opposite the level of the lateral flange, the latter slender and nearly straight; apical spine gently curved. ♂. L. 4-4.3 mm.; w. 5-5.5 mm. ♀. L. about 5.3 mm.; w. 5.8 mm.

(Late Apr.-early June) N. C., s. Ind. (Transition).

#### Subgenus *Idiolimnophila* Alexander

1934. *Limnophila* (*Idiolimnophila*) Alexander; in, Curran, Key to the Families and Genera North American Diptera, p. 40.

Antennae short, the verticils coarse, exceeding the segments. Head broad, not narrowed posteriorly. Tuberculate pits obsolete or nearly so; pseudosutural foveae large, remote from margin. Wings (Fig. 43, O) with cell *R*<sub>3</sub> narrowly to broadly sessile; cell *M*<sub>1</sub> lacking; *Sc* ending opposite or just beyond the fork of *R*<sub>8</sub>, *Sc*<sub>2</sub> near the tip of *Sc*<sub>1</sub>; *m-cu* at near midlength of cell *1st M*<sub>2</sub>; anterior arculus preserved. Male hypopygium with the outer dististyle profoundly bifid, each arm terminating in an acute blackened point.

Besides the subgenotype, *emmelina* Alexander, it is highly probable that *Limnophila antennata* Coquillett (Western Nearctic) will likewise fall within the limits of the subgenus. The venation is very similar in the two species, but the elongate antennae of the male and the general structure of the male hypopygium are very distinct from the condition found in *emmelina*. The adult flies of this latter species have been swept from rank herbage along small mountain streams. The early stages are quite unknown.

***Limnophila* (*Idiolimnophila*) *emmelina* Alex.** (Fig. 43, O).

1914. *Limnophila emmelina* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1914: 597.

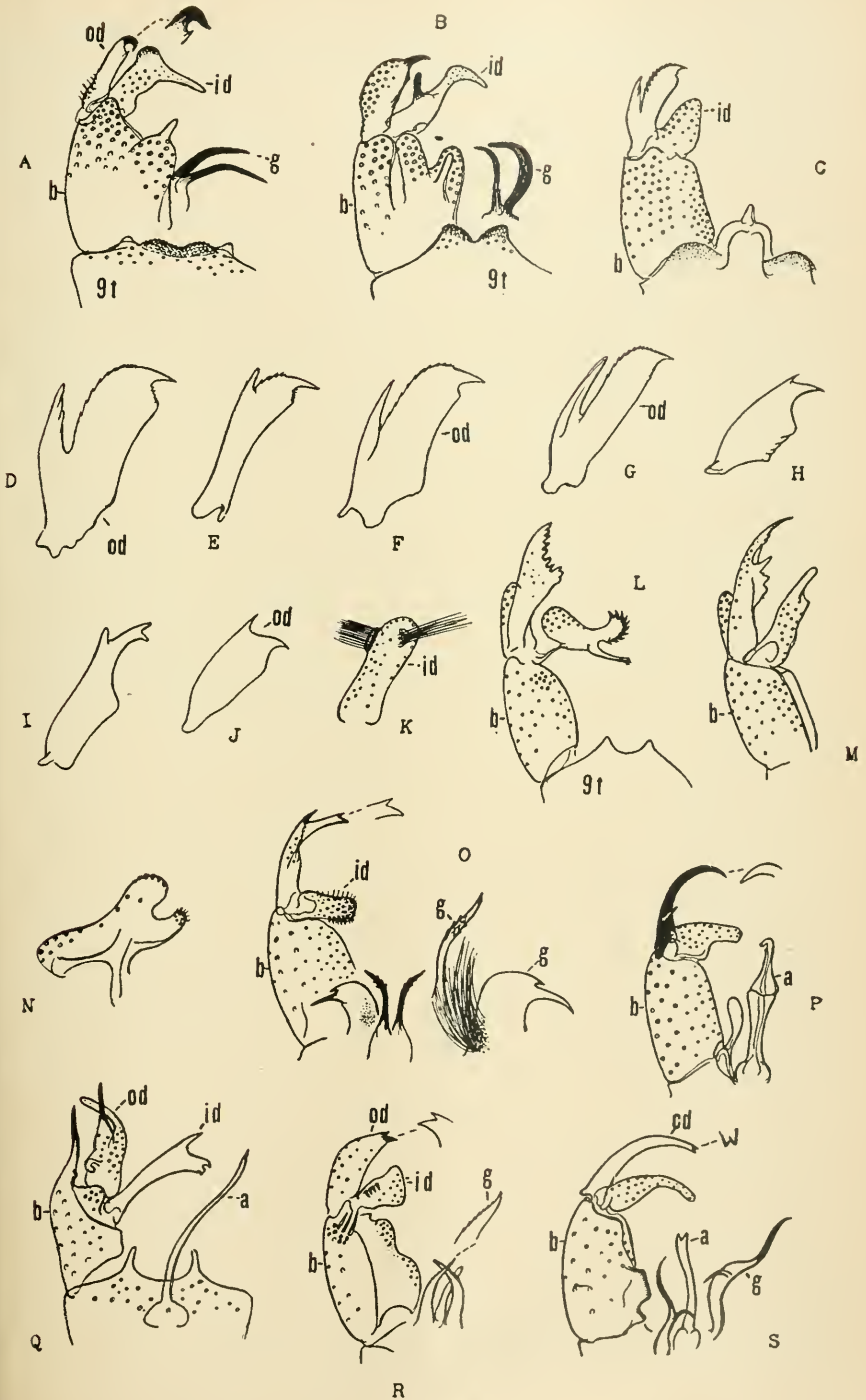
Figs.—Alexander, *Ibid.*, pl. 27, fig. 28 (ven.): 1914. Alexander, Cfs. N. Y., 1, pl. 40, fig. 151; 1919.

General coloration polished reddish yellow or brownish yellow, the praescutum without distinct darker markings, or with a more in-

FIGURE 45. Hexatomini; male hypopygia.

- A. *Austrolimmophila harperi* (Alex.)
- B. *A. unica* (O. S.)
- C. *Limmophila (Elacophila) aprilina* O. S.
- D. *L. (E.) aprilina* O. S.; *od.*
- E. *L. (E.) irene* Alex.; *od.*
- F. *L. (E.) johnsoni* Alex.; *od.*
- G. *L. (E.) sabrina* Alex.; *od.*
- H. *L. (E.) serotinella* Alex.; *od.*
- I. *L. (E.) solstitialis* Alex.; *od.*
- J. *L. (E.) vernata* Alex.; *od.*
- K. *L. (E.) irene* Alex.; *id.*
- L. *L. (Prionolabis) rufbasis* O. S.
- M. *L. (P.) simplex* Alex.
- N. *L. (P.) walleyi* Alex.; *id.*
- O. *L. albipes* Leonard
- P. *L. irrorata* Johns.
- Q. *L. laricicola* Alex.
- R. *L. niveitarsis* O. S.
- S. *L. poetica* O. S.

Symbols: *a*, aedeagus; *b*, basistyle; *g*, gonapophysis; *id*, inner dististyle; *od*, outer dististyle; *t*, tergite.





tense median darkening. Legs stout, obscure yellow, the tips of the tibiae and the tarsi darkened. Wings with a strong yellow tinge, without a stigmal darkening. Abdomen reddish yellow. ♂. L. 6-7.5 mm.; w. 7.5-9 mm.

(Late Apr.-June) Ont., Mass. and N. Y., southw. to vicinity of D. C. (Canadian, Transition).

### Subgenus **Eutonia** van der Wulp

1874. *Eutonia* van der Wulp; Tijdschr. v. Ent., 17: 147.

Two very large species of *Limnophila* fall in the present subgenus. These are by far the largest and most conspicuous of all local members of the genus, rivalling in stature and coloration the medium-sized species of *Tipula*. The adult flies of *alleni* are found in low boggy woodlands, of *marchandi* more usually in shaded ravines. The early stages are not known but from tent-trap captures of the adults are presumably to be found in organic mud.

#### Key to Species

1. Thoracic dorsum gray, the praescutum with three velvety-brown stripes, the middle one narrowly split by a line of the ground-color, the posterior interspaces reddish brown; ground-color of wings brownish yellow; basal abdominal tergites yellowish, without conspicuous brown setigerous punctures; vein  $R_2$  subequal to  $R_{1+2}$  (Fig. 43, P) ..... **alleni**
- Thoracic dorsum gray, the praescutum with three narrow velvety-brown stripes, the middle one split by a broad pale line; ground-color of wings whitish-hyaline; basal abdominal tergites gray, with conspicuous brown setigerous punctures; vein  $R_2$  about one-half  $R_{1+2}$  ..... **marchandi**

**Limnophila (*Eutonia*) *alleni*** Johns. (Fig. 43, P).

1909. *Limnophila alleni* Johnson; Proc. Boston Soc. Nat. Hist., 34: 126-127.

Figs.—Johnson, *Ibid.*, pl. 16, fig. 18 (wing). Alexander, Journ. N. Y. Ent. Soc., 24, pl. 8, fig. 1 (wing); 1916. Alexander, Cfs. N. Y., 1, pl. 39, fig. 140 (wing); 1919.

Legs yellow, the tips of femora and tibiae conspicuously blackened; tarsi brownish black. Wings heavily patterned with dark brown, the major areas being costal in distribution, leaving the small stigma yellow; cell *1st M*<sub>2</sub> longer than wide. Basal abdominal segments with caudal margins of tergites more or less darkened medially; outer segments and genitalia of both sexes dark brown. ♂. L. 23-25 mm.; w. 17-18 mm. ♀. L. 27-36 mm.; w. 20-25 mm.

(June) N. H., Vt., N. Y., westw. to O. (Canadian).

**L. (*Eutonia*) *marchandi*** Alex.

1916. *Limnophila marchandi* Alexander; Journ. N. Y. Ent. Soc., 24: 118-120.

Figs.—Alexander, *Ibid.*, pl. 8, fig. 2 (wing); 1916. Alexander, Cfs. N. Y., 1, pl. 39, fig. 141 (wing); 1919.

Generally similar to last, differing especially in the coloration of the body and wings, and in the details of venation. Wings with a

heavy dark brown pattern that is chiefly costal; branches of *M* very strongly divergent, so cell *1st M*<sub>2</sub> is about as wide as long. ♂. L. about 22 mm.; w. 18 mm. ♀. L. about 30 mm.; w. 20 mm.

(May, June) Mass., Ct., southw. to n. Fla.

Connecticut.—Farmington, June 7, 1914 (W. M.); Type: Storrs, without more exact data.

### Subgenus *Prionolabis* Osten Sacken

1859. *Limnophila (Prionolabis)* Osten Sacken: Proc. Acad. Nat. Sci. Philadelphia, 1859: 239.

The subgenus *Prionolabis* is represented in the local fauna by six species, with several others occurring in Eastern Asia. The most aberrant species is *mundoides* whose male hypopygium is very remarkable and deviates so greatly from that of the subgenotype that it will very probably require a new group name. *L. munda* and *L. terebrans* also depart in some respects from the accepted characters of the group, but undoubtedly belong here. The typical group of *Prionolabis* includes the type of the subgenus, *rufibasis*, together with *simplex* and *walleyi*. In these three species, the characters of a comb-like outer dististyle and a highly compressed aedeagus are found in the male genitalia. This flattened nature of the aedeagus is closely approached by certain species of the subgenus *Phylidorea (platyphallus group)*, indicating a probable relationship. All local species of *Prionolabis* have the antennae short in both sexes. The adult flies are found resting on vegetation in open woods, usually near water. The early stages are still unknown.

#### Key to Species

(Based chiefly on male characters)

1. Mesonotum polished black ..... 2
- Mesonotum with a gray pruinosity ..... 3
2. Wings with a brownish tinge, patterned with darker brown along cord, outer end of cell *1st M*<sub>2</sub> and vein *Cu*<sub>1</sub>; legs stout, conspicuously hairy; femora dull brownish yellow, narrowly tipped with dark brown; male hypopygium of normal limnophiline appearance ..... *munda*
- Wings hyaline or nearly so, unmarked except for the stigmal darkening; legs slender, without conspicuous setae; femora dark brown, with only the extreme bases paler; male hypopygium enlarged and very complicated in structure ..... *mundoides*
3. Male hypopygium with the outer dististyle not pectinate; legs of female short, clothed with long conspicuous setae; size small (wing, ♂, under 8 mm.) ..... *terebrans*
- Male hypopygium with the outer dististyle bearing a series of comb-like teeth along inner margin of distal half; legs of both sexes long and slender, with normal vestiture; size generally larger (wing, ♂, in all except *walleyi*, over 9 mm.) ..... 4
4. Male hypopygium with the inner dististyle simple, terminating in a single point (Fig. 45, M) ..... *simplex*
- Male hypopygium with the inner dististyle bifid (Fig. 45, L, N) ..... 5
5. Size large (wing over 9 and usually over 10 mm.); male hypopygium with the inner dististyle bearing conspicuous erect serrations, the inner arm slender (Fig. 45, L); wings with a dark seam along vein *Cu*<sub>1</sub> ..... *rufibasis*
- Size smaller (wing under 8.5 mm.); male hypopygium with the inner dististyle having both arms short and obtuse, the outer with short appressed serrations (Fig. 45, N); wings without a darkened seam along vein *Cu*<sub>1</sub> ..... *walleyi*

The identity of *L. (P.) magdalena* Dtz. (Can. Ent. 52:5-6; 1920), described from the Magdalen Islands, Eastern Quebec, remains in question. The description indicates that the name pertains to a member of the typical subgroup, calling for a species of medium size, not unlike *simplex*. The description of the male hypopygium further indicates a species having the inner dististyle simple, as in *simplex*, and the fly would run to this latter species by means of the key provided at this time.

***Limnophila (Prionolabis) munda* O. S.**

1869. *Limnophila munda* Osten Sacken; Mon. Dipt. N. Amer., 4: 226-227.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 18, fig. 4 (ven.); 1908, figure erroneous. Alexander, Journ. N. Y. Ent. Soc., 24, pl. 8, fig. 4 (wing); 1916. Alexander, Cfs. N. Y., 1, pl. 40, fig. 144 (wing); 1919.

Mesonotum polished black, the pleura more pruinose. Wings with cell  $M_1$  variable in length, from equal to its petiole to twice this length. Male hypopygium with the region of the tergite strongly produced medially, the apex broadly and shallowly emarginate; outer dististyle long and slender, its distal half more narrowed and blackened, the apex bifid, before apex on inner face with a weakly toothed flange; inner dististyle terminating in a simple compressed blade; aedeagus not conspicuously compressed. ♂. L. 7-8.5 mm.; w. 7.5-8.5 mm. ♀. L. 6.5-7.5 mm.; w. 5.5-7.5 mm.

(June, July) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., westw. to Wisc., southw. to N. C. (Canadian).

***L. (Prionolabis) mundoides* Alex.**

1916. *Limnophila mundoides* Alexander; Journ. N. Y. Ent. Soc., 24: 120-121.

Figs.—Alexander, *Ibid.*, pl. 8, fig. 3 (ven.); 1916. Alexander, Cfs. N. Y., 1, pl. 40, fig. 145 (ven.); 1919.

Polished black, including the thoracic pleura. Legs yellow, the femora tipped with brown, most extensive on the fore legs where the outer half is included, narrowest on the posterior legs. Male hypopygium enlarged and complicated in structure. Ninth tergite produced into a slender median lobe; ninth sternite produced into two longer submedian lobules; basistyles with large ventral lobes that terminate in dense brushes; outer dististyle a slender sinuous hook; inner dististyle large and massive. ♂. L. 5.4-5.6 mm.; w. 6-6.2 mm.

(May, June) Pa., Md., Va., N. C., nw. Fla. (Transition).

***L. (Prionolabis) rufibasis* O. S. (Figs. 44, A; 45, L).**

1859. *Limnophila (Prionolabis) rufibasis* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 239.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 2, fig. 3 (wing), pl. 4, fig. 27 (hyp.); 1869. Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 9, fig. 17, 21-23, 25 (hyp.); 1904. Johnson, Proc. Boston Soc. Nat. Hist., 34, pl. 16, figs. 21-23 (ven.); 1909. Alexander, Psyche, 18, pl. 16, fig. 11 (hyp.); 1911. Alexander, Cfs. N. Y., 1, pl. 40, fig. 142 (wing); 1919. Crampton, Trans. Amer. Ent. Soc., 48, pl. 10, fig. 36 (hyp.); 1923. Dickinson, Cfs. Wisc., p. 204, fig. 101 (wing); 1932.

General coloration black, dusted with gray. Praescutum yellowish gray, with scarcely indicated more shiny stripes. Legs obscure yellow, the femoral tips broadly brownish black, most extensive on the fore legs; tibiae narrowly tipped with black. Wings yellowish gray, more yellow basally; stigma dark brown; cord, outer end of cell *1st M*<sub>2</sub> and vein *Cu*<sub>1</sub> seamed with pale brown. Male hypopygium (Fig. 45, L) with the pectinations of the outer dististyle variable in number and degree. ♂. L. 8.5-11 mm.; w. 9-12 mm. ♀. L. 11-14 mm.; w. 11.5-13.5 mm.

(May, June) Ont., Que., Nfd., N. B., Me., N. H., Vt., Mass., R. I., N. Y., N. J., Pa., westw. to Wisc., southw. to N. C. and S. C.

One of the largest and most common members of the genus in the local fauna.

Connecticut.—Canaan, June 10, 1928 (R. B. F.); Cornwall Bridge, May 30, 1931 (C. P. A.); Danbury, June 15, 1909 (C. W. J.); Eastford, June 12, 1919 (W. E. B.); Hamden, June 21, 1928 (R. B. F.); Kent Falls, May 31, 1931 (C. P. A.); Meriden, May 28, 1930 (R. B. F.); Middlebury, June 2, 1919 (W. E. B.); Montville, June 12, 1929 (R. B. F.); New Haven, May 31, 1929 (R. B. F.); Norfolk, May 31, 1931, June 9, 1929, June 12, 1931 (C. P. A.); Riverton, May 30-31, 1931 (C. P. A.); Rowayton, June 16, 1909 (C. W. J.); Salisbury, June 10, 1928 (R. B. F.); Storrs, May 14, 1928, June 1, 1933, June 2, 1927 (J. A. M.); Tunxis State Park, June 12, 1931 (C. P. A.); Tyler Lake, May 30, 1931, June 13, 1931 (C. P. A.); Westbrook, June 5, 1929 (B. H. W.); W. Granby, June 8, 1929 (C. P. A.); W. Hartford, June 10, 1929 (R. B. F.).

**L. (*Prionolabis*) *simplex* Alex.** (Fig. 45, M).

1911. *Limnophila* (*Prionolabis*) *simplex* Alexander: Psyche, 18: 198-199.

Figs.—Alexander, *Ibid.*, pl. 16, fig. 10 (hyp.); 1911. Alexander, Cfls. N. Y., 1, pl. 40, fig. 143 (wing); 1919.

Generally similar to *rufibasis*, differing especially in the structure of the male hypopygium (Fig. 45, M). Outer dististyle more irregularly pectinate, with one outstanding denticle at near midlength. Wing-base not so conspicuously brightened as in *rufibasis*. ♂. L. 10-11 mm.; w. 9.5-11.5 mm.

(May, June) N. H., N. Y., southw. to N. C., Ga. and Fla.

**L. (*Prionolabis*) *terebrans* Alex.**

1916. *Limnophila terebrans* Alexander: Journ. N. Y. Ent. Soc., 24: 121-122.

Figs.—Alexander, *Ibid.*, pl. 8, fig. 5 (wing). Alexander, Cfls. N. Y., 1, pl. 40, fig. 146 (wing); 1919.

Black, the thorax covered with a yellowish gray pollen. Legs conspicuously hairy, especially in the female where they are notably shorter than in male; femora yellow, tipped with brown, most extensive on the fore legs where the outer half is included, narrowest on the posterior legs where only the tips are darkened. Male hypopygium with the outer dististyle lacking the comb-like denticles of *rufibasis* and allies. ♂. L. about 7.5 mm.; w. 7.7 mm. ♀. L. about 8 mm.; w. 8-8.3 mm.

(Late Apr., May) N. J., to vicinity of D. C.



L. (*Prionolabis walleyi* Alex. (Fig. 45, N).

1929. *Limnophila (Prionolabis) walleyi* Alexander; Bull. Brooklyn Ent. Soc., 24: 187-188.

In its relatively small size and general appearance, most resembling *simplex* but with the inner dististyle of the male hypopygium bifid as in *rufibasis*. Mesonotal praescutum dark yellowish gray pruinose, without stripes. Wings grayish yellow, inconspicuously patterned with darker; stigma small but well-defined. Male hypopygium (Fig. 45, N) with the outer dististyle weakly and irregularly pectinate. ♂. L. 6.5-7.5 mm.; w. 7-8 mm.

(May, June) Ont., and N. Y., westw. to Mich. and Ill., southw. to N. C.

### Subgenus *Phylidorea* Bigot

1854. *Phylidorea* Bigot; Ann. Soc. Ent. France, 1854: 456.

The subgenus *Phylidorea*, as typified by the European *ferruginea* (Meigen) includes, in the Northern Hemisphere, a large number of species that are very difficult of exact definition. In general, the flies are shiny reddish or yellowish, with gray heads, and with the antennae beyond the scapal segment yellowish to brownish yellow. Only two of the numerous local species have the body-coloration gray, and one of these (*subcostata*) is atypical. The various species fall into more or less natural groups that are separated primarily on the structure of the male hypopygium. These groups, as represented in the present fauna, are as follows:

1. The *subcostata* group. Male hypopygium with the outer dististyle slender, entirely blackened, bifid at apex. Aedeagus elongate, much exceeding the dististyles in length; gonapophyses simple, stout, at apex with many irregular denticles (Fig. 46, K) ..... **subcostata**
2. The *lutca* group. Male hypopygium with the aedeagus very long, subtended at near midlength by an expanded flange that is armed with small, retrorse, spinous points; at base of aedeagus with three short, blackened, spike-like apophyses. (Fig. 46, E) ..... **lutca**  
*L. fratria* also presumably falls here, agreeing in its general features, but differing in the nature of the gonapophyses (Fig. 46, D).
3. The *adusta* group. Male hypopygium with the aedeagus and subtending pair of apophyses very greatly elongated, in length exceeding either of the dististyles; basal apophyses simple or but inconspicuously branched at apex or beyond midlength (Fig. 46, A, B, F) ..... **adusta; caudifera; neadusta**
4. The *similis* group. Male hypopygium with the aedeagus and subtending pair of apophyses short, not or but slightly exceeding the dististyles in length; basal apophyses profoundly bifid (Fig. 46, C, I).
  - A. The *consimilis* subgroup.—Femora blackened, yellow basally (except in *nigrogeniculata*); cord and vein *Cu* of wings not darkened.  
..... **consimilis; fumidicosta; luteola; nigrogeniculata; persimilis**
  - B. The *similis* subgroup.—Femora yellow, with a narrow dark ring at or immediately before tips; cord and vein *Cu* of wings narrowly seamed with darker ..... **adustoïdes; auripennis; iowensis; similis**
5. The *fulvocrerosea (platyphallus)* group. Male hypopygium with the aedeagus greatly compressed, in outline appearing pod-shaped or reniform, least modified in *novae-angliae*; gonapophyses very like those of the *similis* group, of which this is obviously an offshoot (Fig. 46, G, H, J).  
..... **novae-angliae; platyphallus; siouana; and presumably terrae-novae**

The adult flies are most often found by sweeping vegetation in shaded moist places. *L. subcostata* frequents open gorges and cold boggy woods; *luteola*, *novae-angliae*, *platyphallus* and *terrae-novae* in and near margins of cold bogs. The other species occur along streams and in open woodlands. The early stages, as known, are spent in rich organic mud.

*Key to Species*

(Based chiefly on male characters)

1. General coloration of thorax light gray; wings unmarked, except for the stigma when this is evident ..... 2  
 General coloration shiny reddish or yellowish to dark brown; if at all pruinose, the wings are suffused with darker, at least on the costal and apical portions ..... 3
2. Wings with *Rs* short, angulated and often spurred at origin; *Rs* without macrotrichia; femora chiefly brownish black, their bases narrowly yellowish, this including less than the proximal half ..... **subcostata**  
 Wings with *Rs* unusually long for a member of this subgenus, about equal in length to the anterior branch of *Rs*, arcuated at origin; *Rs* with macrotrichia for almost the entire length; femora chiefly obscure yellow, the tips narrowly darkened ..... **fratria**
3. Wings unmarked, except for the slightly darker stigmal area ..... 4  
 Wings more or less patterned with darker, at least the outer radial cells clouded ..... 6
4. Abdomen (♂) uniformly brownish yellow, without a distinct dark subterminal ring; antennae (♂) brownish yellow, short, if bent backward not extending to the wing-root; male hypopygium (Fig. 46, E) with the gonapophyses appearing as three short, dagger-like, blackened points, surrounded at base by scale-like spinulae, the median point smallest ..... **lutea**  
 Abdomen (♂) brownish yellow, with a blackened subterminal ring; antennae (♂) dark brown, elongate, if bent backward extending approximately to root of halteres; male hypopygium (Fig. 46, G, J) without dagger-like, blackened gonapophyses ..... 5
5. Male hypopygium (Fig. 46, J) with the aedeagus greatly compressed, pod-shaped or reniform in outline ..... **siouana**  
 Male hypopygium (Fig. 46, G) with the aedeagus only slightly compressed ..... **novae angliae**
6. Wings with the disk clear, the costal region and apex strongly suffused with brown, the cord not or scarcely marked with darker; mesonotum dark brown; male hypopygium (as known) with the aedeagus greatly compressed, pod-shaped in outline (Fig. 46, H) ..... 7  
 Wings without such a combination of infused costal and apical regions, in conjunction with an unseamed cord (compare *fumidicosta*); mesonotum shiny reddish or ferruginous, rarely dark brown (*similis*, *neadusta*); male hypopygium with the aedeagus cylindrical or nearly so (Fig. 46, A, B, C) ..... 8
7. *Rs* almost without macrotrichia, only with two or three at near midlength ..... **terrae-novae**  
*Rs* with from ten to fifteen macrotrichia, distributed for almost the entire length ..... **platyphallus**
8. Femora uniformly yellow ..... **auripennis**  
 Femora more or less extensively dark brown at tips ..... 9
9. Wings with an apical darkening but with no seams along the cord or vein *Cu*<sub>1</sub>; femora chiefly blackened, with more than the distal half dark (except in *nigrogeniculata*). (*consimilis* subgroup) ..... 10  
 Wings with a narrow but distinct brown clouding along the cord and vein *Cu*<sub>1</sub>, in addition to the apical darkening; femora chiefly yellow, only the narrow tips dark brown to black. (*similis* subgroup) ..... 14
10. Femora yellow, the tips narrowly and conspicuously blackened **nigrogeniculata**  
 Femora, especially of fore legs, black, only the bases restrictedly brightened ..... 11

11. Wings clear light yellow, including the costal field; abdomen ( $\delta$ ) brownish yellow, without a distinct darkened subterminal ring ..... *luteola*  
 Wings grayish or yellowish subhyaline; abdomen ( $\delta$ ) with a dark brown to blackish subterminal ring (except in *persimilis*) ..... 12
12. Stigma not or scarcely indicated; wing-tip very narrowly and vaguely infumed; male hypopygium with the aedeagus elongate, black, fully one-half longer than the branched gonapophyses ..... *persimilis*  
 Stigma dark brown; wing-tip conspicuously infumed; male hypopygium with the aedeagus pale, subequal to or slightly longer than the branched gonapophyses ..... 13
13. Outer end of cell *C* strongly infumed ..... *fumidicosta*  
 Costal cell not infumed ..... *consimilis*
14. Male hypopygium with the aedeagus and gonapophyses short, not exceeding the outer dististyle in length; basal gonapophyses profoundly branched (Fig. 46, I) (*similis* group) ..... 15  
 Male hypopygium with the aedeagus and gonapophyses very elongate, exceeding the outer dististyle in length; basal gonapophyses simple or only weakly branched beyond midlength (Fig. 46, A, B, F) (*adusta* group) ..... 17
15. General coloration of mesonotum dark brown ..... *similis*  
 General coloration of mesonotum polished rusty-red ..... 16
16. Tips of femora narrowly and abruptly blackened; abdomen ( $\delta$ ) with a black subterminal ring; male hypopygium with the aedeagus black, subequal to or longer than the basal gonapophyses ..... *adustoides*  
 Tips of femora gradually but narrowly infuscated; abdomen without a dark subterminal ring; male hypopygium with the aedeagus pale, very small, shorter than the basal gonapophyses ..... *iowensis*
17. Male hypopygium with the median region of tergite produced into a conspicuous finger-like lobe; inner dististyle straight or nearly so (Fig. 46, B) ..... *caudifera*  
 Male hypopygium with the median region of tergite not so produced; inner dististyle bent at midlength into a right angle (Fig. 46, A, F) .... 18
18. Wings with dark pattern along cord reduced to a narrow line; male hypopygium (Fig. 46, F) with basal gonapophyses appearing as powerful blackened rods, each of which bears a short lateral spine at near two-thirds the length ..... *neadusta*  
 Wings with dark pattern along cord conspicuous; male hypopygium (Fig. 46, A) with basal gonapophyses appearing as very slender, unbranched rods ..... *adusta*

*Limnophila (Phylidorea) adjuncta* Dietz (Can. Ent., 52:6-7; 1920), described from Cape Breton Island, Nova Scotia, seems certainly to refer to *terrae-novae* and is so considered in this report.

***Limnophila (Phylidorea) adusta* O. S. (Figs. 44, B; 46, A).**

1859. *Limnophila adusta* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 235.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 18, fig. 5 (ven.); 1908. Alexander, Cfs. N. Y., 1, pl. 39, fig. 128 (wing); 1919. Dickinson, Cfs. Wis., p. 204, fig. 99 (wing); 1932.

General coloration shiny yellow to rusty brown, with indications of darker stripes, the pleura more pollinose. Antennae short, yellowish, the scape a little darker; head black, pruinose. Legs yellow, the femora with a narrow, nearly terminal, brown ring; tips of tibiae narrowly dark brown. Wings pale yellow, with a handsome darker pattern, including costal and apical cloudings and conspicuous seams along cord and vein *Cu*<sub>1</sub>. Abdomen ( $\delta$ ) pale brown, blackened subterminally; hypopygium fulvous-yellow. Male hypopygium (Fig.

46. A). ♂. L. 9-11 mm.; w. 8-11.5 mm. ♀. L. 11-14 mm.; w. 11-13 mm.

(Late May-Sept.) Ont., Que., N. B., Me., N. H., Vt., Mass., R. I., N. Y., N. J., Pa., westw. to Ill., Mich. and Wisc., southw. to N. C.

Connecticut.—Danbury, June 15, 1909 (C. W. J.); East River, Sept. 1910 (Ely); New Haven, June 11, 1914 (collector?); Rowayton, May 27, 1913 (collector?); Tyler Lake, June 13, 1931 (C. P. A.).

**L. (*Phylidorea*) *adustoides* Alex.**

1927. *Limnophila* (*Phylidorea*) *adustoides* Alexander: Bull. Brooklyn Ent. Soc., 22: 63-64.

Belongs to the *similis* group and subgroup. Antennal flagellum light yellow. Wings strongly suffused with yellow, the base and costal region clearer yellow to very pale brown; wing-tip broadly darkened. Abdomen brownish yellow; hypopygium dark ferruginous. Male hypopygium with aedeagus black, slender, subequal to or longer than the basal gonapophyses. ♂. L. 8-11 mm.; w. 9-11 mm. ♀. L. 10-14 mm.; w. 10.5-13 mm.

(June, July) Mass., westw. to Ind. and Tenn.

**L. (*Phylidorea*) *auripennis* Alex.**

1926. *Limnophila* (*Phylidorea*) *auripennis* Alexander: Bull. Brooklyn Ent. Soc. 21: 113-114.

Fig.—Alexander, Psyche, 18, pl. 16, fig. 9 (hyp.); 1911; as *adusta*.

Belongs to the *similis* group and subgroup. General coloration ferruginous-yellow. Antennal flagellum yellow. Wings strongly tinged with yellow, the costal margin more saturated; wing-tip and cord vaguely seamed with darker. Abdomen ferruginous-yellow, in male without a dark subterminal ring. Male hypopygium with the aedeagus slender, gently curved at apex, a trifle longer than the gonapophyses. ♂. L. 8-9 mm.; w. 8.5-9.5 mm. ♀. L. 10.5-11.5 mm.; w. 10-11 mm.

(Late May-Aug.) Ont., Que., Me., N. H., Vt., Mass., N. Y., westw. to Ill. and Mich.

Connecticut.—Storrs (C. S. C.); Union, Aug. 17-18, 1928 (C. F. C.).

**L. (*Phylidorea*) *caudifera* Alex. (Fig. 46. B).**

1927. *Limnophila* (*Phylidorea*) *caudifera* Alexander: Bull. Brooklyn Ent. Soc., 22: 111.

Belongs to the *adusta* group. Closely allied and generally similar to *adusta*, differing notably in the structure of the male hypopygium. General coloration of mesonotum shiny brown. Legs with femora bright yellow, passing into brown, the tips dark brown. Wings with a faint yellowish tinge, the costal and apical portions infuscated; a conspicuous seam along vein  $Cu_1$ , with a narrower seam along cord. Abdomen obscure brownish yellow, with a dark brown subterminal ring (♂). Male hypopygium (Fig. 46. B): basistyle with dorsal lobe provided with long yellow setae; outer dististyle very broad and



FIGURE 46. Hexatomini: *Limnophila (Phylidorea)*: male hypopygia.  
*Elephantomyia*: head.

- A. *Limnophila (Phylidorea) adusta* O. S.
- B. *L. (P.) caudifera* Alex.
- C. *L. (P.) consimilis* Dz.
- D. *L. (P.) fratria* O. S.
- E. *L. (P.) lutca* Doane
- F. *L. (P.) neadusta* Alex.
- G. *L. (P.) novae-angliae* Alex.
- H. *L. (P.) platyphallus* Alex.
- I. *L. (P.) similis* Alex.
- J. *L. (P.) sionana* Alex.
- K. *L. (P.) subcostata* Alex.
- L. *Elephantomyia (Elephantomyia) westwoodi* O. S.: head.

Symbols: *a*, aedeagus; *b*, basistyle; *g*, gonapophysis; *id*, inner dististyle;  
*od*, outer dististyle; *t*, tergite.



flattened, the tip suddenly narrowed into a slender finger-like point, near outer end of style with microscopic setulae; basal gonapophyses slender, nearly straight, heavily blackened, beyond midlength a little dilated but not branched; aedeagus and subtending apophyses of moderate length, with a long basal fusion. ♂. L. 8.5-9.5 mm.; w. 9-10 mm.

(June) N. H., Vt. and N. Y., westw. to Mich.

**L.** (*Phylidorea*) **consimilis** Dtz. (Fig. 46, C).

1921. *Limnophila consimilis* Dietz; Trans. Amer. Ent. Soc., 47: 255-256.

Belongs to the *similis* group. General coloration yellowish. Antennal flagellum yellowish brown. Head gray. Pale femoral bases narrowest on fore legs (basal fourth to fifth), widest on posterior legs (basal half). Wings yellowish subhyaline, the stigma and wing-tip weakly infumed;  $R_{2+3+4}$  with macrotrichia, in cases over the entire length. Abdomen yellowish brown, in ♂ with a slightly darker subterminal ring. Male hypopygium (Fig. 46, C) with the aedeagus and gonapophyses relatively small and weak; branches of basal gonapophyses closely appressed. ♂. L. 7-8.5 mm.; w. 7-8.5 mm. ♀. L. 9-10 mm.; w. 9-9.5 mm.

(June, July) Que., Vt., Mass., Ct., N. Y., westw. to Mich., southw. to N. C. and Tenn.

Connecticut.—East River, June 1911 (Ely).

**L.** (*Phylidorea*) **fratria** (O. S.) (Fig. 46, D).

1869. *Limnophila fratria* Osten Sacken; Mon. Dipt. N. Amer., 4: 220-221.

General coloration dark, heavily and uniformly gray pruinose, the disk of praescutum more infuscated. Antennae dark brown, the scape pruinose; flagellar segments oval. Pseudosutural foveae black, very conspicuous. Legs with tibiae brown, the tips narrowly blackened; tarsi black. Wings tinged with yellowish brown, the stigma darker. Abdominal tergites dark brown; sternites obscure yellow medially, margined with brown laterally; hypopygium bright yellow. Male hypopygium (Fig. 46, D) with the outer dististyle flattened, yellow, only the bidentate apex blackened; aedeagus very long; gonapophyses not evident in the unique available specimen, possibly modified into the curious operculate spinous cushion that occupies the median region of genital chamber. ♂. L. 8-8.5 mm.; w. 8.5-9 mm.

(June, early July) Me., N. H., Vt., N. Y., southw. to Pa.

**L.** (*Phylidorea*) **fumidicosta** Alex.

1927. *Limnophila (Phylidorea) fumidicosta* Alexander; Bull. Brooklyn Ent. Soc., 22: 115.

Belongs to the *similis* group, *consimilis* subgroup. General coloration orange-ferruginous. Antennae with pedicel and basal three or four flagellar segments yellow, the outer segments passing into pale brown. Head light gray. Legs with femora dark brown, their bases

yellow, least extensive on fore legs. Wings tinged with yellow; cell *C* beyond basal fourth distinctly infused; wing-apex darkened;  $R_{2+3+4}$  without macrotrichia. Male hypopygium with the arms of the branched gonapophyses long and slender, blackened at tips; aedeagus small, shorter than the branched apophyses. ♂. L. about 7 mm.; w. 7.8 mm.

(June) Mass., N. Y. Probably only a race or color form of *consimilis*.

**L. (*Phylidorea*) *iowensis* Alex.**

1927. *Limnophila* (*Phylidorea*) *iowensis* Alexander: Bull. Brooklyn Ent. Soc., 22: 112-113.

Belongs to the *similis* group and subgroup. Legs with tibiae brownish yellow, the tips very narrowly darkened. Wings with a yellowish tinge, the base and costal region clearer yellow. Male hypopygium with the aedeagus feebly sclerotized, weak, shorter than the basal gonapophyses. ♂. L. 9-10 mm.; w. 9-9.5 mm. ♀. L. 9-10.5 mm.; w. 9-10 mm.

(June) Mich., Ia.

**L. (*Phylidorea*) *lutea* Doane. (Fig. 46, E).**

1900. *Limnophila lutea* Doane; Journ. N. Y. Ent. Soc., 8: 191.

Figs.—Doane, *Ibid.*, pl. 8, fig. 4 (ven.); 1900. Alexander, Cfs. N. Y., 1, pl. 39, fig. 132 (ven.); 1919.

General coloration dull brownish yellow, the praescutum opaque, without darker markings. Antennae with flagellum brownish yellow to pale brown. Legs brownish yellow, the femoral bases clear yellow, the outer segments of leg passing into brown. Wings uniformly yellow, the stigma a trifle darker. Male hypopygium (Fig. 46, E) with the outer dististyle relatively slender, irregularly bidentate at apex; inner dististyle shorter, gradually narrowed to the obtuse tip; aedeagus elongate, slender, more enlarged at end, subtended by an expanded flange set with microscopic retrorse points. ♂. L. 5-7 mm.; w. 6.5-9.5 mm. ♀. L. 8-9 mm.; w. 7.5-8.5 mm.

(Late May-Aug.) N. B., Me., N. H., Vt., Mass., N. Y., southw. to Va. and Tenn.

Connecticut.—Hamden, June 11, 1914 (W. E. B.); Storrs; Tunxis State Park, June 12, 1931 (C. P. A.).

**L. (*Phylidorea*) *luteola* Alex.**

1927. *Limnophila* (*Phylidorea*) *luteola* Alexander: Bull. Brooklyn Ent. Soc., 22: 113-114.

Belongs to the *similis* group, *consimilis* subgroup. General coloration dark ferruginous. Antennal flagellum yellow, the outer segments darker; head light gray. Femora black, the bases extensively yellow, on fore legs including nearly the basal third, on the posterior legs including more than the basal half. Wings strongly suffused with yellow, including the clearer yellow basal and costal regions; stigma and wing-tip darkened;  $R_{2+3+4}$  without macrotrichia. Abdomen obscure brownish yellow, without a darkened subterminal ring in



♂, at most the eighth segment weakly infuscated. Male hypopygium with the branched gonapophyses strongly blackened; aedeagus weak, equal in length to its subtending apophyses. ♂. L. about 9 mm.; w. 9 mm. ♀. L. 8.5-10 mm.; w. 8.5-9.5 mm.

(June) Que., Vt., N. Y. Especially characteristic of cold *Iris* bogs. The unusually handsome light yellow wings distinguish the fly from the closely allied *consimilis* and *fumidicosta*.

L. (*Phylidorea*) **neadusta** Alex. (Fig. 46, F).

1927. *Limnophila* (*Phylidorea*) *neadusta* Alexander: Bull. Brooklyn Ent. Soc., 22: 110-111.

Belongs to the *adusta* group. Closely allied and generally similar to *adusta*, differing especially in the structure of the male hypopygium. Mesonotum darker colored, brown medially. Legs with the tips of the femora rather broadly infuscated. Male hypopygium (Fig. 46, F) with the median lobe of ninth tergite much more extensive, its caudal margin with a very shallow notch; outer dististyle with the apical point long and slender; outer gonapophyses and aedeagus very long and unusually slender. ♂. L. about 8.5 mm.; w. 9 mm.

(June) N. Y.

L. (*Phylidorea*) **nigrogeniculata** Alex.

1926. *Limnophila* (*Phylidorea*) *nigrogeniculata* Alexander: Bull. Brooklyn Ent. Soc., 21: 114-115.

Belongs to the *similis* group, *consimilis* subgroup. General coloration shiny ferruginous. Antennal flagellum yellow; head gray. Wing with  $R_{2+3+4}$  having macrotrichia throughout its length. Abdomen obscure yellow, with a brownish black subterminal ring (♂). Male hypopygium with the outer dististyle unusually slender and heavily chitinized, terminating in two acute teeth; branched gonapophyses with the arms unusually long and slender, blackened. ♂. L. 5-5.5 mm.; w. 6-6.5 mm. ♀. L. 6.5-8 mm.; w. 6-8 mm.

(July) Tenn.

Amplly distinct from the other members of the subgroup in the narrowly blackened tips of the femora.

L. (*Phylidorea*) **novae-angliae** Alex. (Fig. 46, G).

1914. *Limnophila novae-angliae* Alexander: Proc. Acad. Nat. Sci. Philadelphia, 1914: 594.

Figs.—Alexander, *Ibid.*, pl. 25, fig. 4 (ven.); 1914. Alexander, Cfls. N. Y., 1, pl. 39, fig. 131 (ven.); 1919.

Belongs to the *platyphallus* group. General coloration shiny reddish yellow, the mesonotum without markings. Head chiefly dark. Legs yellow, the tips of femora and tibiae narrowly darkened. Wings with a strong yellow to brownish yellow tinge, the stigma a trifle darker. Male hypopygium (Fig. 46, G) with the region of the tergite strongly produced, narrowed to a truncated lobe that bears several long powerful setae; outer dististyle entirely glabrous, narrowed into a

gently curved apical point; inner dististyle with a large basal setiferous lobe, the outer portion of style strongly bent at near midlength into a straight terminal portion. ♂. L. 6.5-7.5 mm.; w. 5.8-7.2 mm. ♀. L. 7-8 mm.; w. 6.5-7.5 mm.

(July, Aug.) Que., Me., Mass., N. Y., Pa.

L. (*Phylidorea*) **persimilis** Alex.

1927. *Limnophila* (*Phylidorea*) *persimilis* Alexander; Bull. Brooklyn Ent. Soc., 22: 62-63.

Belongs to the *similis* group, *consimilis* subgroup. General coloration of thorax ferruginous. Antennal flagellum yellow; head light silvery gray. Femora brownish black, the bases yellow, on fore legs including about basal fourth, on middle and hind legs about basal third. Wings pale yellow; sparse macrotrichia on  $R_{2+3+4}$ . Abdomen obscure yellow without a conspicuous darkened subterminal ring. ♂. L. 6.5-7 mm.; w. 6.5-7.5 mm. ♀. L. 8-9 mm.; w. 7.8-9 mm.

(June) S. Ind.

The wing-pattern is the palest of any member of the *consimilis* subgroup, in some cases being very nearly immaculate.

L. (*Phylidorea*) **platyphallus** Alex. (Fig. 46, H).

1926. *Limnophila* (*Phylidorea*) *platyphallus* Alexander; Bull. Brooklyn Ent. Soc., 21: 111-112.

General coloration chestnut-brown, the praescutum darker medially. Antennal flagellum yellowish brown; head gray. Fore and middle femora blackened, the basal fifth yellowish; posterior femora yellow with about the distal third dark brown. Halteres with darkened knobs. Wings whitish subhyaline, the costal and apical portions infuscated; usually without a darkened seam along vein  $Cu_1$  in cell *M*. Abdomen brownish yellow, with a dark subterminal ring (♂). Male hypopygium with the aedeagus a very flattened, compressed black blade (Fig. 46, H). ♂. L. 6.5-8 mm.; w. 8-9 mm. ♀. L. 10-11 mm.; w. 10-11 mm.

(June) Ont., Que., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Mich. and Alta. Connecticut.—Granby, June 8, 1929 (C. P. A.); Manitic Lake, June 8-9, 1929 (C. P. A.); Putnam, June 15, 1933 (C. P. A.).

Possibly not distinct from *terrae-novae*, which is still known only from the female sex.

L. (*Phylidorea*) **similis** Alex. (Fig. 46, I).

1911. *Limnophila similis* Alexander; Psyche, 18: 195-196.

Figs.—Alexander, *Ibid.*, pl. 16, fig. 4 (wing), fig. 8 (hyp.); 1911. Alexander, Cfs. N. Y., 1, pl. 39, fig. 129 (wing); 1919.

General coloration dark brown, sparsely pruinose, the sides of mesonotum sometimes brightened. Antennal flagellum yellow. Knobs of halteres darkened. Wings yellowish or whitish subhyaline, with a restricted brown pattern, including the costal and apical portions, and

narrow seams along the cord and vein  $Cu_1$ . Abdomen dark reddish brown, without a blackened subterminal ring. Male hypopygium (Fig. 46, I) with the aedeagus small and weak, not heavily sclerotized, about as long as its subtending apophyses; basal gonapophyses with the lateral arms slender. ♂. L. 7.5 mm.; w. 9 mm. ♀. L. 8-9 mm.; w. 10-10.5 mm.

(June, July) Ont., Que., Mass., N. Y.

L. (*Phylidorea*) **siouana** Alex. (Fig. 46, J).

1929. *Limnophila* (*Phylidorea*) *siouana* Alexander; Bull. Brooklyn Ent. Soc., 24: 188-189.

Belongs to the *platyphallus* group; closely allied to *novae-angliae*, differing especially in the structure of the male hypopygium (Fig. 46, J). Gonapophyses elongated, strongly bent beyond midlength into a long curved spine, with a small spur at bend. ♂. L. 6-6.5 mm.; w. 5.8-6.5 mm. ♀. L. about 6.5 mm.; w. about 6.7 mm.

(Late May) Ia.

L. (*Phylidorea*) **subcostata** (Alex.) (Fig. 46, K).

1911. *Phylidorea subcostata* Alexander; Can. Ent., 43: 288-289.

Fig.—Alexander, Cfls. N. Y., 1, pl. 40, fig. 149 (wing); 1919.

General coloration black, heavily dusted with gray, thinner and sometimes leaving blackish stripes visible on praescutum. Antennae black throughout; head heavily gray-dusted. Halteres yellow. Legs black, the femoral bases conspicuously yellow, more narrowly so on the fore legs. Wings subhyaline, the stigma darker; wing base and vein *Sc* brighter yellow. Abdomen brownish black. Male hypopygium (Fig. 46, K) with the tergal region slightly produced medially; basistyles stout; outer dististyle slender, unequally bifid at tip; aedeagus elongate; gonapophyses terminating in many small spinous points. ♂. L. 6-6.5 mm.; w. 5.5-7 mm. ♀. L. 6-7.5 mm.; w. 5-6.5 mm.

(May-early July) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Mich.

Connecticut.—Hartland, June 8, 9, 1929 (C. P. A.); Kent Falls, May 31, 1931 (C. P. A.); Norfolk, June 9, 1929 (C. P. A.).

L. (*Phylidorea*) **terrae-novae** Alex.

1916. *Limnophila terraenovae* Alexander; Journ. N. Y. Ent. Soc., 24: 123.

1920. *Limnophila adjuncta* Dietz; Can. Ent., 52: 6-7.

Figs.—Alexander, *Ibid.*, pl. 8, fig. 7 (wing); 1916. Alexander, Cfls. N. Y., 1, pl. 39, fig. 130 (wing); 1919.

Belongs to the *platyphallus* group. Body even darker colored than *platyphallus*. Legs dark brown. Wings more heavily patterned, including a dark seam in cell *M* adjoining vein  $Cu_1$ . The male sex is unknown, but presumably has a hypopygium not unlike that of *platyphallus*. ♀. L. 9.5-11.3 mm.; w. 9.2-11.4 mm.

(July) (Nfd.)

Subgenus *Limnophila* Macquart

The subgenus *Limnophila*, as here restricted, includes only six local species forming a very loose aggregation. Of these species, *albipes* and *niveitarsis* form one group, but the remaining species are so different among themselves that it is difficult to point out relationships. It is probable that the only local species that is strictly consubgeneric with the genotype of *Limnophila* is *irrorata* Johnson. The adult flies of *albipes* and *niveitarsis* may be swept from rank vegetation in shaded gorges and along minor mountain streams; *laricicola* and *poetica* are characteristic bog-inhabiting species; *brevifurca* frequents wet places in woods, alder swamps, and similar situations; *irrorata* inhabits the southern gum swamps, where it rests on the rich marsh vegetation. Although nothing conclusive seems to be known concerning the subject, it seems highly probable that the early stages of all of the included species above mentioned will be found to occur in rich organic earth in and near the haunts of the adult flies.

## Key to Species

1. Wings yellowish subhyaline, with an abundant irrorate brown pattern that includes small, transverse, brown dashes in all the cells; legs yellow, the tips of the femora and tibiae abruptly blackened. . . . . *irrorata*  
Wings unmarked, except for the stigmal cloud, and, in cases (*poetica*), restricted clouds at origin of *Rs* and along the cord; femora and tibiae not abruptly tipped with black . . . . . 2
2. Wings with cell *M*<sub>1</sub> very small, from one-third to one-fourth the length of its petiole (Fig. 44, D) . . . . . *brevifurca*  
Wings with cell *M*<sub>1</sub> of normal size, subequal in length to, or only a trifle shorter than, its petiole (Fig. 44, C, E) . . . . . 3
3. Posterior tarsi extensively snowy-white . . . . . 4  
Posterior tarsi not whitened, similar in color to the other tarsi . . . . . 5
4. General coloration of thorax shiny reddish yellow to brown, the mesonotum sometimes more infuscated medially; pleura clearer yellow; *Sc* short, ending about opposite two-thirds to three-fourths the length of *Rs* (Fig. 44, C) . . . . . *albipes*  
General coloration of thorax black, heavily gray pruinose; *Sc* longer, ending about opposite the fork of *Rs* . . . . . *niveitarsis*
5. Wings unmarked, except for the darker stigmal area; *Rs* relatively short, less than two times the length of *m-cu*, angulated but not spurred at origin; ground-color of head gray . . . . . *laricicola*  
Wings with faint dark clouds along cord and at origin of *Rs*; *Rs* long, more than twice the length of *m-cu*, angulated and usually spurred at origin (Fig. 44, E); ground-color of head yellow to brownish yellow . . . . . *poetica*

***Limnophila* (*Limnophila*) *albipes* Leond.** (Figs. 44, C; 45, O).  
1913. *Limnophila albipes* Leonard; Ent. News, 24: 248-249.

Figs.—Leonard, *Ibid.*, 24: 248, text-figure (wing); 1913. Alexander, Cfls. N. Y., 1, pl. 38, fig. 119 (wing); 1919.

Body not or scarcely pruinose. Antennae ( $\delta$ ) elongate, approximately one-half as long as body, of  $\eta$  shorter, extending to base of abdomen. Femora obscure yellow, the tips weakly darkened; tibiae and tarsi brown, the posterior tarsi snowy-white. Wings (Fig. 44, C) subhyaline, the stigma a little darker; *Sc*<sub>2</sub> at tip of *Sc*<sub>1</sub>; *R*<sub>2+3+4</sub> long, nearly twice the length of *m-cu*, the latter at or beyond midlength of cell 1st *M*<sub>2</sub>. Abdominal tergites dark brown, the sternites paler, in



♂ with a narrow black subterminal ring; hypopygium yellow. Male hypopygium (Fig. 45, O) with the outer dististyle bifid at apex, bearing an acute lateral spur on outer margin at about three-fourths the length; inner dististyle short and broad, its apex nearly truncate, blackened; outer gonapophyses bearing a dense brush of long yellow setae on disk; inner gonapophyses slender, microscopically toothed before apex. ♂. L. 4.5-5 mm.; w. 5.5-5.8 mm. ♀. L. 6.5-7 mm.; w. 5.8-6 mm.

(July) Vt., Mass., N. Y., N. J., southw. to S. C.

**L. (*Limnophila*) *brevifurca* O. S.** (Fig. 44, D).

1859. *Limnophila brevifurca* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 237.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 14, fig. 6 (ven.); 1908. Alexander, Cfs. N. Y., 1, pl. 38, fig. 125 (ven.); 1919.

General coloration of mesonotum brownish gray, the praescutal stripes ill-defined; pseudosutural foveae and tuberculate pits black. Antennae short in both sexes. Legs brownish yellow, the tips of femora and tibiae darkened. Wings with a faint brownish tinge, the stigma a trifle darkened (Fig. 44, D); *Rs* long; *R*<sub>2+3+4</sub> short, less than *m-cu*; *R*<sub>2</sub> about one-third to two-fifths *R*<sub>1+2</sub>. In certain specimens cell *M*<sub>1</sub> may be lost in one or even in both wings. Abdomen pale brown, darker laterally, with a dark subterminal ring; hypopygium yellow. Male hypopygium with the basistyles long and slender; outer dististyle slender, bifid at apex; interbases terminating in oval heads. ♂. L. 5-6 mm.; w. 5.5-6.5 mm. ♀. L. about 6-6.5 mm.; w. 6.5-7 mm.

(May, June; rarely in Autumn) Que., N. B., Me., N. H., Vt., Mass., westw. to Mich., southw. to S. C.

Connecticut.—Hartland, June 9, 1929 (C. P. A.); Norfolk, May 21, 1916 (W. L. M.); May 16, 1931, May 31, 1931, June 9, 1929, June 12, 1931 (C. P. A.); Kent Falls, May 31, 1931 (C. P. A.); N. Branford, May 12, 1933 (M. P. Z.); Riverton, May 17, 1931, May 30-31, 1931, June 8, 1929 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.); Winsted, May 16, 1931 (C. P. A.).

**L. (*Limnophila*) *irrorata* Johns.** (Fig. 45, P).

1909. *Limnophila irrorata* Johnson; Proc. Boston Soc. Nat. Hist., 34: 127-128.

1916. *L. irrorata* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1916: 531-532.

Figs.—Johnson, *Ibid.*, 34, pl. 16, fig. 17 (wing); 1909. Alexander, Cfs. N. Y., 1, pl. 39, fig. 133 (wing); 1919.

General coloration of mesonotum dark brown, with a sparse yellow pollen, leaving vague darker streaks. Antennae short in both sexes, black throughout. Halteres brownish yellow, the knobs dark brown. Legs conspicuously hairy; outer tarsal segments blackened. Wings with larger dark areas at origin of *Rs*, along cord and at ends of veins *R*<sub>1+2</sub> and *R*<sub>3</sub>; *R*<sub>2+3+4</sub> short to very short, in most cases about one-half *m-cu*; *R*<sub>1+2</sub> and *R*<sub>2</sub> subequal; cell *M*<sub>1</sub> about equal to its petiole; *m-cu* beyond midlength of cell 1st *M*<sub>2</sub>. Abdominal tergites

brownish yellow, narrowly darkened laterally; outer segments more infuscated; hypopygium brownish yellow. Male hypopygium (Fig. 45, P) with the outer dististyle a heavily chitinized curved hook, the apex simple; at about the basal third, the style bears a small lateral branch; inner dististyle more or less hammer-shaped.  $\delta$ . L. 7.6-7.8 mm.; w. 7-7.3 mm.  $\text{♀}$ . L. about 8 mm.; w. 7-7.5 mm.

(July, Aug.) N. J., southw. to w. Fla.

**L.** (*Limnophila*) **laricicola** Alex. (Fig. 45, Q).

1912. *Limnophila laricicola* Alexander; Psyche, 19: 167.

Figs.—Alexander, *Ibid.*, 19, pl. 13, fig. 4 (wing); 1912. Alexander, Cfls. N. Y., 1, pl. 38, fig. 120 (wing); 1919.

General coloration of mesonotum polished rusty-red, without markings. Antennae ( $\delta$ ) elongate, if bent backward extending to beyond base of abdomen; flagellar segments swollen on ventral face, black, the incisures a little paler. Halteres with darkened knobs. Legs obscure yellow, the outer tarsal segments darkened. Wings with a strong yellow tinge, the stigma a trifle darker;  $Sc_1$  ending about opposite  $r-m$ ;  $R_{2+3+4}$  long, exceeding  $m-cu$ ;  $R_{1+2}$  and  $R_2$  subequal;  $m-cu$  at or beyond midlength of cell 1st  $M_2$ . Abdomen conspicuously hairy, brownish yellow, darkened laterally; in  $\delta$  with a dark brown subterminal ring; hypopygium large; obscure yellow. Male hypopygium (Fig. 45, Q) with the tergite produced into two slender lobes that are separated by a broad U-shaped notch; outer apical angle of basistyle produced into a chitinized spine; outer dististyle conspicuously bifid, one arm a slender chitinized spine; inner dististyle elongate, expanded outwardly, shallowly bifid at apex; aedeagus elongate.  $\delta$ . L. 5.5-6 mm.; w. 5.5-6.5 mm.  $\text{♀}$ . L. 7.5-8 mm.; w. 6.5-7 mm.

(June) Vt., Mass., N. Y., westw. to Mich., southw. to Va. and Tenn.

Connecticut.—Phoenixville, June 14, 1933 (C. P. A.); Putnam, June 15, 1933 (C. P. A.); Stafford Springs, June 14, 1933 (C. P. A.).

The general appearance, especially of the female, is quite like that of a small, inconspicuous species of *Phylidorea*, such as *novae-angliae*, and care must be taken in the determination. The male hypopygium is very distinctive.

**L.** (*Limnophila*) **niveitarsis** O. S. (Fig. 45, R).

1869. *Limnophila niveitarsis* Osten Sacken: Mon. Dipt. N. Amer., 4: 209-210.

Fig.—Alexander, Cfls. N. Y., 1, pl. 38, fig. 118 (wing); 1919.

Praescutum without evident praescutal stripes; tuberculate pits lacking. Antennae ( $\delta$ ) very long, if bent backward extending to near two-thirds the length of abdomen; scape short, black; flagellum dark brown, the segments with a delicate, erect, pale pubescence; antennae in  $\text{♀}$  shorter, extending about to base of abdomen. Head light gray. Halteres yellow. Legs with femora and tibiae obscure brownish yellow, the tips darkened; tarsi dark brown, the posterior tarsi snow-white, especially the setae. Wings with a faint brownish

tinge, the stigma darker;  $R_{1+2}$  and  $R_2$  subequal;  $R_{2+3+4}$  about one-third to one-half longer than *m-cu*; petiole of cell  $M_1$  about one-half the cell; cell *1st*  $M_2$  relatively small. Abdominal tergites weakly bicolorous, brownish black, the apices more reddish brown; sternites uniformly yellow; a narrow black subterminal ring in  $\delta$ ; hypopygium obscure yellow. Male hypopygium (Fig. 45, R) with the basistyle having the mesal margin crenate; outer face of basistyle, near apex, with a group of large coarse setae; outer dististyle unusually compressed, narrowed to the bidentate blackened apex; inner dististyle short, roughly triangular in outline, the inner portion with a few microscopic spines; gonapophyses appearing as yellow decussate blades, their outer margins microscopically toothed; aedeagus short.  $\delta$ . L. 5.5-6.5 mm.; w. 6.5-8 mm. ♀. L. 7-7.5 mm.; w. 7.5-8 mm.

(June) Mass., N. Y., southw. to Md., Ind., N. C. and Tenn. (Transition).

L. (*Limnophila*) **poetica** O. S. (Figs. 44, E; 45, S).

1869. *Limnophila poetica* Osten Sacken: Mon. Dipt. N. Amer., 4: 207-208.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 18, fig. 3 (wing); 1908. Alexander, Cfs. N. Y., 1, pl. 38, fig. 116 (wing); 1919. Dickinson, Cfs. Wisc., p. 204, fig. 100 (wing); 1932.

General coloration of mesonotum yellowish to brownish yellow, subnitidous; tuberculate pits lacking; pseudosutural foveae small; pleura yellow, somewhat darker in female. Antennae ( $\delta$ ) elongate, if bent backward extending to about opposite one-third the length of the long abdomen; flagellar segments beyond first black; antennae in ♀ shorter, extending about to root of halteres. Head with center of vertex darkened. Halteres with darkened knobs. Legs with femora brownish yellow, the tips dark brown to black; tibiae yellowish brown, the tips, together with all tarsi, blackened; legs of female shorter and more conspicuously hairy. Wings (Fig. 44, E) yellowish, with a very restricted brown pattern, including the stigma and narrow seams at origin of *Rs* and along cord; wings of female darker and somewhat reduced in size. Abdomen ( $\delta$ ) elongate, yellow, with a narrow blackened subterminal ring. Male hypopygium (Fig. 45, S) with the basistyles bearing a truncated lobe on mesal face near base; outer dististyle slender, narrowed to the small bidentate apex; gonapophyses appearing as long sinuous horns, each with a small lateral branch at near midlength.  $\delta$ . L. 9-9.5 mm.; w. 8.5-9 mm. ♀. L. 8.5-9 mm.; w. about 8 mm.

(May-Aug., especially June) Ont., Que., northwestw. to Alta. and Alaska, westw. to Mich., Wisc. and Ill., southw. to Mass. (Hudsonian, Canadian).

### Shannonomyia Alexander

1929. *Shannonomyia* Alexander; Dipt. Patagonia and S. Chile, 1: 142-143.

A single species, of discordant affinities, comes within the present faunal limits. In its general appearance and venation, this fly, *S.*

*lenta*, much resembles a species of *Pilaria* or *Limnophila* (*Phylidorea*) but is equally out of place in either group. The antennae have verticils of normal size and number. The chief tendencies of venation are in the short *Rs*, with *Sc* ending shortly before its fork; position of *R*<sub>2</sub> near the fork of the long straight *R*<sub>2+3+4</sub> which is in direct alignment with *Rs*; cell *M*<sub>1</sub> lacking (Fig. 44, F). The adult flies occur on vegetation in open shaded situations, usually near water. The early stages are unknown.

**Shannonomyia lenta** (O. S.) (Fig. 44, F).

1859. *Limnophila lenta* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 241.

Figs.—Alexander, Psyche, 18, pl. 16, fig. 1 (ven.); 1911. Alexander, Cfs. N. Y., 1, pl. 40, fig. 152 (ven.); 1919.

General coloration of thorax pale brownish yellow to ochreous, without markings; pleura with a vague pruinosity. Antennae ( $\delta$ ) relatively long, if bent backward extending about to root of halteres; basal segments yellowish, the flagellum chiefly brown. Head gray, more silvery in front. Halteres and legs yellow. Wings (Fig. 44, F) with a grayish yellow tinge, the base and costal region clearer yellow; stigma and vague clouds along cord and outer end of cell 1st *M*<sub>2</sub> pale brown; veins pale. Abdomen obscure yellow, with a narrow darkened subterminal ring.  $\delta$ . L. 5-5.5 mm.; w. 5.5-6.5 mm.  $\text{♀}$ . L. 7-8 mm.; w. 7-7.5 mm.

(May-Sept.) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Mich. and Ill., southw. to Ga. and Tenn.

Connecticut.—East River, July 6, 1910 (Ely); Granby, June 8, 1929 (C. P. A.); Hamden, July 13, 1932 (P. G.); Kent Falls, June 12-13, 1931, Aug. 19, 1931 (C. P. A.); Norfolk, Sept. 6, 1928 (G. C. C.); Riverton, July 23, 1931 (C. P. A.); Sap-tree Run State Park, June 14, 1933 (C. P. A.); Sharon, Sept. 5, 1928 (G. C. C.); Tunxis State Park, July 23, 1931 (C. P. A.); Twin Lakes, Sept. 12, 1928 (C. P. A.); Tyler Lake, June 13, 1931 (C. P. A.); Westford, June 14, 1933 (C. P. A.); W. Granby, Sept. 11, 1928 (C. P. A.).

A second form of the species is described herewith.

**Shannonomyia lenta gaspeana** subsp. nov.

General coloration of body darker brown, more or less pruinose; median region of praescutum with a darker brown stripe. Antennal flagellum dark brown. Knobs of halteres infuscated. Tips of tibiae narrowly darkened. Wings with the veins darker; veins *R*<sub>3</sub> and *R*<sub>4</sub> more divergent, cell *R*<sub>3</sub> wide at margin. Abdomen, including hypopygium, dark brown.

*Holotype*,  $\delta$ . Ruisseau Castor, N. Gaspé, Que., June 27, 1931 (C. P. Alexander); in author's collection.

It is probable that additional material will show that this fly deserves full specific rank.

The status of *S. congenita* (Dtz.) (Trans. Amer. Ent. Soc., 47: 257; 1921) is still uncertain but seems to represent a dark form of *lenta*. The antennae are described as being darker brown than in the typical form and the median region of the ninth tergite of the male



hypopygium is stated to project acutely. The other genitalic characters described seem to be more apparent than real. (June, July) Pa.

### Pilaria Sintenis

1888. *Pilaria* Sintenis; Sitzber. Nat.—Ges. Dorpat. 8:398.

1919. *Eulimnophila* Alexander; Cornell Univ., Agr. Expt. Sta., mem. 25:917.

The genus *Pilaria* includes a small number of local species that present a distinctive appearance as a group, yet are rather difficult of specific separation. The essential features of venation lie in the relatively short *Sc*, which ends at from two-thirds to beyond four-fifths the length of *Rs*; the very long *Rs*, which is in alignment with  $R_{2+3+4}$  and usually also with  $R_4$ ; the position of  $R_2$  at or close to the fork of  $R_{2+3+4}$ , the feature varying somewhat in all species, where the element may lie before, opposite or beyond this fork in different specimens; the usually long fusion of  $R_{1+2}$ , shortest in species such as *stanwoodae*; and the converse alignment of the three elements constituting the anterior cord (Fig. 44, G, H). In the present fauna, there occur a few species with elongate antennae in the male, together with others having the organ short in both sexes, the latter group having unusually long conspicuous verticils on all flagellar segments, the former group with these verticils in male becoming long and conspicuous on the outer segments. Likewise there occur species having cell  $M_1$  present, while a second group of forms have lost the cell by the fusion of adjoining veins. The adults of *osborni*, *stanwoodae* and *vermontana* are characteristic inhabitants of bogs; *quadrata* and *recondita* of helophytic associations; the other species in rank shaded situations, usually near streams. The immature stages are spent in rich organic earth. As was done with *Pseudolimnophila*, Edwards (1938) has placed this group as a subgenus of *Limnophila* Macquart. In this arrangement I cannot agree, since the immature stages of both groups differ widely from the condition found in *Limnophila*.

#### Key to Species

- |   |                               |
|---|-------------------------------|
| 1. Wings with cell $M_1$ present (Fig. 44, H) .....   | 2                             |
| Wings with cell $M_1$ lacking (Fig. 44, G) .....  | 6                             |
| 2. Thoracic dorsum chiefly dark brown to black; wings narrow, with a long basal petiole, the stigma usually very distinct; antennae ( $\delta$ ) elongate, exceeding one-half the length of body .....  | <i>tenuipes</i>               |
| Thoracic dorsum reddish brown to yellowish brown; wings broader, with a shorter basal petiole and with stigma pale brown to virtually lacking; antennae short in both sexes, except in <i>vermontana</i> where the thoracic dorsum is polished reddish yellow ..... | 3                             |
| 3. Mesonotum polished reddish yellow to reddish brown .....   | 4                             |
| Mesonotum opaque yellow to brownish yellow ( <i>imbecilla</i> ) .....   | 5                             |
| 4. Wings strongly tinged with brown; head brown; antennae short in both sexes .....   | <i>recondita</i>              |
| Wings only slightly infused; head blackish, pruinose; antennae ( $\delta$ ) elongate, if bent backward extending to beyond base of abdomen .....  | <i>vermontana</i>             |
| 5. Size larger (wing, $\delta$ , over 7 mm.); head light gray .....   | <i>imbecilla imbecilla</i>    |
| Size small (wing, $\delta$ , about 6-6.5 mm.); head yellowish .....   | <i>imbecilla illinoiensis</i> |

6. Thoracic dorsum brownish black, the lateral margins yellow; pleura yellow; wings with distinct stigma; veins  $R_3$  and  $R_4$  extending generally parallel for most of their length, only gently divergent, cell  $R_2$  at margin nearly as wide as cell  $R_3$ ; antennae ( $\delta$ ) elongate, exceeding one-half the length of body ..... **edwardi**
- Thoracic dorsum not differing conspicuously from the ground-color of pleura; wings with stigma pale brown or indistinct; veins  $R_3$  and  $R_4$  strongly divergent, cell  $R_2$  at margin being about one-half of cell  $R_3$  or a trifle more; antennae short in both sexes, if bent backward extending about to wing-root ..... 7
7. General coloration of thorax blackish, gray pruinose ..... **quadrata**
- General coloration of thorax yellowish to reddish brown ..... 8
8. Thoracic pleura with a broad black longitudinal stripe ..... **osborni**
- Thoracic pleura pale yellow, immaculate ..... **stanwoodae**

### **Pilaria edwardi** (Alex.)

1916. *Limnophila edwardi* Alexander: Proc. Acad. Nat. Sci. Philadelphia, 1916: 533.

Figs.—Alexander, *Ibid.*, pl. 27, fig. 45 (wing); 1916. Alexander, Cfs. N. Y., 1, pl. 40, fig. 156 (wing); 1919.

Head blackish. Femora and tibiae light brown, the tips weakly darkened. Wings relatively narrow, very faintly tinged with brown, the stigma darker brown, hairy. Abdomen dark brown, the hypopygium more yellowish.  $\delta$ . L. 7.2 mm.; w. 8 mm.; antenna, about 5 mm.

(June) N. Y.

Known only from the unique type. It seems very possible that this may prove to be an abnormal specimen of *tenuipes*.

### **P. imbecilla imbecilla** (O. S.)

1859. *Limnophila imbecilla* Osten Sacken: Proc. Acad. Nat. Sci. Philadelphia, 1859: 237.

Figs.—Alexander, Cfs. N. Y., 1, pl. 38, fig. 122 (wing); 1919. Dickinson, Cfs. Wisc., p. 206, fig. 103 (wing); 1932.

General coloration of thorax pale brown to yellowish brown, without stripes; pseudosutural foveae pale. Antennae with scape and pedicel dark brown, basal flagellar segments yellow, the outer segments blackened. Legs obscure yellow. Wings yellowish gray, the stigma feebly darkened, the costal region clearer yellow;  $R_2$  just beyond fork of  $R_{2+3+4}$ . Abdomen pale, darkened outwardly, with a subterminal brown ring; hypopygium yellow.  $\delta$ . L. 7-8 mm.; w. 7-8.5 mm. ♀. L. about 8 mm.; w. 7.5-8 mm.

(June, July) Ont., Que., Mass., N. Y., westw. to Wisc. and Ill., southw. to Ind. and Tenn.

### **P. imbecilla illinoiensis** (Alex.)

1920. *Limnophila (Eulimnophila) imbecilla illinoiensis* Alexander: Can. Ent., 52: 226.

Very close to the typical form, differing in the small size and yellowish head, with the antennal scape pale yellow.  $\delta$ . L. 6 mm.; w. 6-6.5 mm.

(June) Ind., Ill., Ky., Tenn.

**P. osborni** (Alex.)

1914. *Limnophila osborni* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1914: 596-597.

Figs.—Alexander, *Ibid.*, pl. 25, fig. 6 (wing); 1914. Alexander, Cfs. N. Y., 1, pl. 40, fig. 154 (wing); 1919. Dickinson, Cfs. Wisc., p. 206, fig. 104 (wing, as *recondita*), 1932.

General coloration of mesonotum rich reddish brown, the posterior sclerites slightly pruinose; lateral portions of praescutum and scutum brownish black; pleura reddish yellow with a black longitudinal stripe. Femora yellowish brown, the tips weakly darkened. Wings with a brownish tinge, produced chiefly by vague seams along the veins; stigma a little darker;  $R_2$  close to fork of  $R_{2+3+4}$ . Abdominal tergites brown, becoming still darker on outer segments; a blackened subterminal ring; hypopygium obscure yellow. ♂. L. 6.3-6.5 mm.; w. 7.4-7.5 mm.

(Late Aug., Sept.) Me., westw. to Wisc. and the Rocky Mts. of Wyo. and Colo. This species is closely allied to the European *P. meridiana* (Staeger).

**P. quadrata** (O. S.) (Fig. 44, G).

1859. *Limnophila quadrata* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 241.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 2, fig. 9 (wing); 1869. Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 9, fig. 18; pl. 10, fig. 34 (hyp.); 1904. Alexander, Psyche, 18, pl. 16, fig. 2 (ven.); 1911. Alexander, Cfs. N. Y., 1, pl. 40, fig. 153 (wing); 1919.

Praescutal stripes lacking or ill-defined. Antennae black throughout. Femora obscure yellow, passing into brown at tips. Wings (Fig. 44, G) with a brownish yellow suffusion, the base and costal region clearer yellow; stigma pale;  $Sc_1$  ending about opposite two-thirds  $R_s$ ;  $R_2$  close to fork of  $R_{2+3+4}$ . Abdomen black, sparsely pruinose; hypopygium rusty-red. ♂. L. 7-8 mm.; w. 8-9 mm. ♀. L. 10-11 mm.; w. 9-10 mm.

(May-early Aug.) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., westw. to Mich. and Ia., southw. to Ga., n. Fla. and Tenn.

Connecticut.—Granby, June 8, 1929 (C. P. A.); Hamden, June 11, 1914 (W. E. B.); Natchaug State Forest, June 14, 1933 (C. P. A.); New Haven, May 31, 1929 (R. B. F.); Putnam, June 15, 1933 (C. P. A.); Southington, May 28, 1930 (R. B. F.); Tunxis State Park, June 12, July 23, 1931 (C. P. A.); Tyler Lake, June 13, July 23, 1931 (C. P. A.); Winsted, June 10, 1928 (R. B. F.).

**P. recondita** (O. S.)

1869. *Limnophila recondita* Osten Sacken; Mon. Dipt. N. Amer., 4: 212-213.

Figs.—Alexander, Cfs. N. Y., 1, pl. 38, fig. 123 (ven.); 1919. Dickinson, Cfs. Wisc., p. 206, fig. 105 (wing, as *osborni*); 1932.

Antennae obscure yellow, the outer segments darkened. Halteres and legs obscure yellow. Wings with stigma scarcely differentiated;  $Sc_1$  ending shortly before to nearly opposite the fork of  $R_s$ ;  $R_2$  some distance beyond fork of  $R_{2+3+4}$ ; cell  $M_1$  deep. Abdomen, including

the hypopygium, reddish brown. ♂. L. 8-10 mm.; w. 9-11 mm. ♀. L. 9-10 mm.; w. 9-10 mm.

(June-Aug.) Que., N. B., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Wisc., Ill., Minn. and Mo., southw. to Fla., Ala., La. and Tenn.

Connecticut.—Granby, June 8, 1929 (C. P. A.); Putnam, June 12, 1905 (H. L. V.). June 15, 1933 (C. P. A.); Tyler Lake, June 13, July 23, 1931 (C. P. A.).

In Florida, there occurs a more southern species or subspecies, *arguta* Alexander, smaller, with narrower and less infumed wings.

### **P. stanwoodae** (Alex.)

1914. *Limnophila stanwoodae* Alexander: Proc. Acad. Nat. Sci. Philadelphia, 1914: 595-596.

Figs.—Alexander, *Ibid.*, pl. 25, fig. 5 (wing); 1914. Alexander, Cfls. N. Y., 1, pl. 40, fig. 155 (wing); 1919.

General coloration of thorax yellow to pale brownish yellow; the praescutum unmarked. Antennae with scape pale, pedicel and flagellum brownish black. Head grayish brown. Femora obscure yellow, the tips narrowly darkened. Wings with a yellow suffusion, the stigma vaguely darkened;  $Sc_1$  ending about opposite four-fifths the length of  $R_s$ ,  $R_2$  some distance beyond fork of  $R_{2+3+4}$ , subequal to or only a little shorter than the unusually short  $R_{1+2}$ . Abdomen yellowish brown, with a dark brown subterminal ring; hypopygium yellowish. ♂. L. 6-7.5 mm.; w. 7-8 mm. ♀. L. 6.8-7.5 mm.; w. 6.8-8 mm.

(June) Me., N. H., Vt., Mass., N. Y., southw. to S. C.

Connecticut.—Manitic Lake, June 8-9, 1929 (C. P. A.); Montville, June 12, 1929 (W. E. B.); Natchaug State Forest, June 14, 1933 (C. P. A.); Phoenixville, June 14, 1933 (C. P. A.); Putnam, June 15, 1933 (C. P. A.); Stafford Springs, June 14, 1933 (C. P. A.).

### **P. tenuipes** (Say) (Fig. 44, H).

1823. *Limnobia tenuipes* Say; Journ. Acad. Nat. Sci. Philadelphia, 3: 21.

1869. *Limnophila tenuipes* Osten Sacken; Mon. Dipt. N. Amer., 4: 210-211.

Figs.—Alexander, Cfls. N. Y., 1, pl. 38, fig. 121 (wing); 1919. Dickinson, Cfls. Wisc., p. 206, fig. 102 (wing); 1932.

Lateral margins of praescutum broadly yellow, the posterior sclerites slightly more pruinose; pleura yellow. Antennae with basal segments pale, flagellum black; segments cylindrical, with verticils that are shorter than segments, becoming more elongate and evident on outer segments; in female, antennae shorter, extending to just beyond base of abdomen, with verticils conspicuous on all segments. Head black, sparsely pruinose. Legs brownish yellow to brown. Wings (Fig. 44, H) faintly suffused with dusky;  $R_2$  variable in position but close to fork of  $R_{2+3+4}$ . Abdomen dark brown, the sternites paler; hypopygium yellow. ♂. L. 7.5 mm.; w. 7 mm. ♀. L. 8-9.5 mm.; w. 8-9 mm.

(Late May-Sept.) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., N. J., Pa., westw. to Wisc., Ia., Mo. and Kan., southw. to Fla., Ga., Miss. and Tex.

Connecticut.—East River, Sept. 1910 (Ely); Salisbury, Sept. 12, 1928 (C. P. A.); Union, Aug. 17, 18, 1928 (C. F. C.).



**P. vermontana** Alex.1929. *Pilaria vermontana* Alexander; Ent. News, 40: 47-48.

Antennae dark brown throughout. Head grayish brown. Femora obscure yellow, the tips darkened. Wings with a pale brown tinge, the hairy stigma only a trifle darker;  $Sc_1$  ending about opposite four-fifths the length of  $R_s$ ;  $R_2$  close to fork of  $R_{2+3+4}$ ;  $R_{1+2}$  long; cell  $M_1$  present, subequal to or longer than its petiole. Abdominal tergites dark brown; sternites paler; hypopygium obscure yellow. ♂. L. 7.5-8.5 mm.; w. 8-9 mm. ♀. L. 8 mm.; w. 9.5 mm.

(June-early Aug.) Vt. to Ct.

Connecticut.—Manitic Lake, June 8-9, Aug. 6, 1929 (C. P. A.); Phoenixville, June 14, 1933 (C. P. A.).

**Ulomorpha** Osten Sacken1869. *Ulomorpha* Osten Sacken; Mon. Dipt. N. Amer., 4: 232.

*Ulomorpha* is unquestionably closely allied to *Pilaria* despite the distinctive appearance given by the conspicuously hairy wings and the sessile or subsessile cell  $R_3$ . The adult flies are usually found by being swept from rich herbaceous vegetation in low, shaded areas. The immature stages live in rich organic earth in woods.

*Key to Species*

1. General coloration of body reddish yellow to pale brown ..... *pilosella*  
 General coloration of body polished black ..... *rogersella*

**Ulomorpha pilosella** (O. S.) (Fig. 44, I).1859. *Limnophila pilosella* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 242.

Fig.—Alexander, Cfs. N. Y., 1, pl. 41, fig. 163 (wing); 1919.

Wings tinged with brownish, stigma lacking. ♂. L. 5.5-6 mm.; w. 7-7.5 mm. ♀. L. 8-8.5 mm.; w. 7.5-8 mm.

(May-July) Que., Me., N. H., Vt., Mass., N. Y., westw. to Mich. and Ind., southw. to N. C., S. C. and Tenn.

Connecticut.—Bloomfield, Aug. 6, 1929 (C. P. A.); Stafford Springs, June 14, 1933 (C. P. A.); Union, June 14, 1933 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.).

**U. rogersella** Alex.1929. *Ulomorpha rogersella* Alexander; Ent. News, 40: 48-49.

Ventral thoracic pleurites reddish yellow. Fore femora extensively blackened, the remaining femora yellow. Wings yellowish, the veins broadly seamed with darker. ♂. L. about 5.5 mm.; w. 6 mm. ♀. L. about 8 mm.; w. 7.5 mm.

(June) N. C. and S. C. (mts.), southw. to n. Fla.

6. Subtribe **Hexatomaria**

The subtribe Hexatomaria includes a single genus *Hexatoma*, with three subgenera, of which two occur in our fauna. The chief mor-

phological characters lie in the reduction in number of antennal segments, correlated with a tremendous elongation in this organ in the males of several species, and the presence of a strong protuberance or tubercle on the vertex. As regards venation, the reduction in number of branches of *Media* is very striking (Fig. 44, J-N), there being species with all four branches, including cell  $M_1$  present; many others with only three branches, and cell  $M_1$  lost by fusion of adjacent veins; while in the subgenus *Hexatoma*, cell *1st M*<sub>2</sub> is open by the entire atrophy of *m* and both sections of vein  $M_3$ , there being but two branches of the vein attaining the wing margin. In the chiefly Palaearctic subgenus *Cladolipes* Loew, the radial field is similarly reduced, cell  $R_3$  being lost by the fusion of enclosing veins, a condition that is presaged by the local *Hexatoma* (*Hexatoma*) *megacera*. The species of the subgenus *Hexatoma* and some closely allied *Eriocera* have the valves of the ovipositor short and only feebly sclerotized, while the other and more numerous species have these valves unusually long and acutely pointed.

The adult flies of certain species of *Eriocera* are among the most rapid-flying and active of all known Tipulidae, sometimes appearing in vast swarms near the banks of major streams and rivers. Their larvae live in water or saturated soil and are intensely carnivorous. When ready to pupate, they come to sandy soil at the bank of the stream. The larvae of *Hexatoma* (*Eriocera*) *albitarsis* (O. S.) and *H. (E.) brevioricornis* Alex., formerly held to belong to a separate subgeneric group, *Penthoptera*, frequent rich organic mud in wooded swamps or along densely shaded streams.

### Hexatoma Latreille

1809. *Hexatoma* Latreille; Gen. Crust. et Ins., 4: 260.

1818. *Anisomera* Meigen; Syst. Besch. Zweifl. Ins., 1: 210.

#### Key to Subgenera

- |  |                 |
|--|-----------------|
| 1. Wings with cell <i>1st M</i> <sub>2</sub> open; two branches of <i>M</i> reach the margin (Fig. 44, J, K) .....             | <b>Hexatoma</b> |
| Wings with cell <i>1st M</i> <sub>2</sub> closed; three or four branches of <i>M</i> reach the margin (Fig. 44, L, M, N) ..... | <b>Eriocera</b> |

### Subgenus *Hexatoma* Latreille

The subgenus *Hexatoma*, in our fauna, includes but two species, one of which may prove not to be regional. The extreme reduction of the medial field is paralleled only by a subgenus of *Limonia* Meigen (*Alexandriaria* Garrett). The antennae are reduced to but six evident segments, with an additional minute "button", in the male, and with the sixth segment of the female sometimes vaguely divided by incomplete constrictions. The adult flies rest on vegetation along the banks of large creeks having sandy margins, wherein may be found the early stages.

#### Key to Species

- |   |                 |
|---|-----------------|
| 1. Cell $R_3$ of wings very small, subequal to or shorter than its petiole (Fig. 44, J); $R_5$ and its anterior branch without macrotrichia; antennae ( $\delta$ ) long, approximately one-half longer than the entire body ..... | <b>megacera</b> |
|---|-----------------|

Cell  $R_3$  of wings large, more than twice as long as its petiole (Fig. 44, K); abundant macrotrichia on  $R_3$  and its anterior branch ( $R_{2+3+4}$ ,  $R_{3+4}$ ,  $R_3$  and  $R_4$ ); antennae ( $\delta$ ) short, if bent backward scarcely attaining the wing-root .....microcera

**Hexatoma (*Hexatoma*) megacera** (O. S.) (Fig. 44, J).

1859. *Anisomera megacera* Osten Sacken: Proc. Acad. Nat. Sci. Philadelphia, 1859: 242.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 2, fig. 12 (wing); 1869. Williston, Man. N. Amer. Dipt., Ed. 3: 84, fig. 25, sub 13 (ven.); 1908, as *neglecta*. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 26, fig. 2 (ven.); 1908. Alexander, Cfs. N. Y., 1: 850, fig. 125, G (ant.  $\delta$ ), H (ant.  $\varphi$ ); pl. 37, fig. 112 (wing); 1919.

General coloration of thorax brownish gray, the praescutum with three darker brown stripes; pleura brown. Antennae of female short, not attaining the wing-root. Wings with a brownish tinge, caused especially by somewhat darker seams along veins. Abdomen dark brown.  $\delta$ . L. about 5-6 mm.; w. 5-6 mm.; antenna, about 7-9 mm.  $\varphi$ . L. 6-7 mm.; w. 6-7.5 mm.

(May, June) Que., N. H., Mass., N. Y., westw. to Ind., southw. to Md. and Va.

Connecticut.—Chapinville, May 26, 1904 (W. E. B.); Norfolk, May 31, 1931 (C. P. A.).

**H. (*Hexatoma*) microcera** Alex. (Fig. 44, K).

1926. *Hexatoma microcera* Alexander: Ent. News, 37: 49-50.

General coloration gray, the praescutum with three more blackish stripes. Legs short and stout. Wings faintly tinged with brown.  $\delta$ . L. 5.8-6.5 mm.; w. 7.1-8 mm.

Known only from three male specimens in the Vienna Museum, bearing the label "America borealis, 1867." The species has never been re-discovered and may not be regional to the present report.

Subgenus **Eriocera** Macquart

1838. *Eriocera* Macquart: Dipt. Exot., 1: 74.

1863. *Penthoptera* Schiner: Wien. Ent. Monatschr., 7: 220.

The subgenus *Eriocera* is a vast group, best represented in the tropics of both the Old and New Worlds. In the local fauna, it includes about fourteen species, some of which are rather difficult of separation. The character of very elongate antennae in the male sex is very striking, but, unfortunately, is not always correlated with other characters in the female. The various species with such lengthened antennae are often very close to others with the organ short in both sexes (*spinosa*, *brachycera*; *wilsonii*, *aurata*; *longicornis*, *gaspensis*). The adults of several of the species frequent the margins of major streams having sandy margins; *aurata* and *wilsonii* are found in southern swamps and bogs; *brachycera* and *spinosa* are most often to be found flying swiftly over the quiet pools of medium-sized mountain streams; *tristis* occurs in small dancing swarms in similar situations.

## Key to Species

1. Cell  $M_1$  of wings present (Fig. 44, L, N) ..... 2  
Cell  $M_1$  of wings lacking (Fig. 44, M) ..... 5
2. Tarsi snowy-white ..... 3  
Tarsi not white ..... 4
3. Wings strongly tinged with brown; antennae ( $\delta$ ) more than half the length of body; first flagellar segment more than three times the length of head. **albitarsis**  
Wings subhyaline or but weakly suffused with darker; antennae of both sexes less than one-half the length of body; first flagellar segment about twice the length of head ..... **brevioricornis**
4. Antennae ( $\delta$ ) elongate, approximately three times the body; wings grayish brown; vertical tubercle very prominent ..... **spinosa**  
Antennae short in both sexes, extending about to the wing-root or a little beyond; wings darker brown; vertical tubercle low ..... **brachycera**
5. General coloration of body yellow or yellowish red ..... 6  
General coloration of body gray, brown or black ..... 7
6. Wings with a weak yellowish tinge, the stigma pale brown; antennae ( $\delta$ ) elongate, about one-half longer than the body; dorso-pleural membrane and a spot on lateral margin of scutum velvety-black ..... **wilsonii**  
Wings with a strong brownish yellow suffusion, the stigma conspicuous, dark brown; antennae short in both sexes; in cases a small to nearly obsolete brownish spot on lateral margin of scutum ..... **aurata**
7. Wings with distal section of vein  $Cu_1$  unusually long, nearly twice *m-cu*. **albata**  
Wings with the distal section of  $Cu_1$  short, subequal to or shorter than *m-cu* ..... 8
8.  $R_2$  far before fork of  $R_{3+4}$ , the latter subequal to or longer than  $R_{1+2}$ , cell  $R_3$  correspondingly shortened ..... **fultonensis**  
 $R_2$  close to or beyond fork of  $R_{2+3+4}$ , vein  $R_{3+4}$  being obliterated or very short, cell  $R_3$  correspondingly lengthened ..... 9
9.  $R_2$  some distance beyond the fork of  $R_{2+3+4}$ ,  $R_{2+3}$  much longer than  $R_{1+2}$ ; vein  $R_4$  usually with abundant macrotrichia throughout its length; antennae ( $\delta$ ) elongated; ovipositor with elongate chitinized valves ..... **cinerea**  
 $R_2$  close to fork of  $R_{2+3+4}$ ,  $R_{2+3}$  very short or lacking; no macrotrichia on  $R_3$  or either of its anterior branches (excepting two or three in some specimens of *gibbosa*); antennae ( $\delta$ ) short, elongate only in  $\delta$  of *longicornis* which has ovipositor with short fleshy valves ..... 10
10. General coloration of thoracic dorsum dark brown or black, without pruinosity; vertical tubercle polished black; wings with a strong blackish suffusion ..... **tristis**  
General coloration of thoracic dorsum gray or brownish gray; vertical tubercle opaque, concolorous with remainder of vertex; wings not uniformly suffused with blackish ..... 11
11. Knobs of halteres whitish; wings, especially of males, widest opposite the level of vein *2nd A*; antennae ( $\delta$ ) very elongate (*longicornis*) or short (*gaspensis*); ovipositor with short fleshy valves ..... 12  
Knobs of halteres dark brown; wings widest along the central half of wings or opposite the distal half; antennae short in both sexes; ovipositor with long chitinized valves ..... 13
12. Antennae ( $\delta$ ) very long; wings with  $Sc$  long,  $Sc_1$  ending some distance beyond the fork of  $R_3$ ; size large (wing,  $\delta$ , over 10 mm.) ..... **longicornis**  
Antennae short in both sexes; wings with  $Sc$  short,  $Sc_1$  ending about opposite the fork of  $R_3$ ; size small (wing,  $\delta$ , under 8 mm.) ..... **gaspensis**
13. General coloration of mesonotum and pleura grayish brown, distinctly pruinose ..... **gibbosa**  
General coloration of mesonotum and pleura dull dark brown, with only a slight yellowish gray pruinosity ..... **fuliginosa**



**Hexatoma (*Eriocera*) alberta** (Alex.)

1930. *Eriocera alberta* Alexander; Bull. Brooklyn Ent. Soc., 25: 73-74.

General coloration black, light gray pruinose. Antennae (♀) seven-segmented, black. Halteres with whitish knobs. Wings whitish, with clearly delimited grayish brown seams along cord and other veins; *Rs* angulated and spurred at origin; cell  $R_3$  deep, parallel-sided for more than two-thirds the length; cell *1st M*<sub>2</sub> rectangular; *m-cu* at or close to fork of *M*. Ovipositor with fleshy valves. ♀. L. about 7 mm.; w. 9.2 mm.

(June) Alta.

**H. (*Eriocera*) albitarsis** (O. S.)

1869. *Penthoptera albitarsis* Osten Sacken; Mon. Dipt. N. Amer., 4: 257-258.

Figs.—All figures recorded under *albitarsis* pertain to the species described later as *brevioricornis*.

Mesonotum brownish black, with a sparse blue-gray pruinosity, to produce a plumbeous appearance, the praescutum sometimes with weakly indicated stripes; pleura abruptly pale yellow. Antennae (♂) six-segmented with an additional microscopic terminal "button". Head light gray. Wings with a brownish tinge, the small stigma very pale brown; *m-cu* beyond midlength of cell *1st M*<sub>2</sub>, exceeding the distal section of *Cu*<sub>1</sub>, the latter in alignment with its basal section. Abdominal tergites dark brown, the sternites and hypopygium yellowish. ♂. L. about 6-7 mm.; w. 7-8 mm.

(July) Pa., w. to Ia., southw. to S. C., Ga. and nw. Fla.

I am herewith restricting the name *albitarsis* to the male specimen described by Osten Sacken (l. c.), making this lectotype for the species. This species, together with *brevioricornis* is readily told from all other members of the genus by the snowy-white tarsi.

**H. (*Eriocera*) aurata** (Doane)

1900. *Eriocera aurata* Doane; Journ. N. Y. Ent. Soc., 8: 194.

Fig.—Doane, *Ibid.*, pl. 8, fig. 13 (wing); 1900.

General coloration reddish yellow, the thorax unmarked, or in rarer cases with a small darkened spot on margin of scutum above wing-root. Antennae pale, if bent backward extending about to wing-root. Head brown. Knobs of halteres dark brown. Legs yellowish to brownish yellow, in the latter case, femora with a vague, more yellowish subterminal ring. Wings with  $R_{2+3}$  about one-half  $R_3$  alone; inner end cell *1st M*<sub>2</sub> slightly arcuated. Abdomen brownish yellow; ovipositor with elongate chitinized valves. ♂. L. 9-13 mm.; w. 10-12 mm. ♀. L. 14-16 mm.; w. 11-13 mm.

(June-Aug.) N. C., S. C., Ga., Tenn., nw. Fla.

**H. (*Eriocera*) *brachycera* (O. S.)**

1877. *Eriocera brachycera* Osten Sacken; Bull. U. S. Geol. Surv., 3: 205.

Fig.—Alexander, Cfs. N. Y., 1, pl. 37, fig. 106 (wing); 1919.

Mesonotum praescutum obscure brownish yellow, with four clearly defined dark brown stripes, the lateral margin yellowish gray; ventral pleura clear gray. Antennae with basal segments obscure yellow, flagellum black. Knobs of halteres darkened. Femora yellow to brownish yellow, the tips narrowly blackened. Wings with a strong brown tinge, produced especially by broad seams to veins:  $R_{2+3}$  subequal to or a little shorter than  $R_3$ . Abdominal tergites dark brown, very narrowly yellowish laterally; sternites yellow; hypopygium dark; ovipositor with long chitinized valves. ♂. L. 13-17 mm.; w. 15-18 mm.; antenna, 4-5 mm. ♀. L. 25-27 mm.; w. 19-20 mm.

(Late June-early Aug.) Ont., Que., Me., N. H., Mass., N. Y., southw. to Tenn. and N. C.

**H. (*Eriocera*) *brevioricornis* Alex. (Fig. 44, L).**

1941. *Hexatoma (Eriocera) brevioricornis* Alexander; Amer. Midl. Nat., 26: 311.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 12, fig. 1 (wing); 1908 (as *albitarsis*). Alexander, Cfs. N. Y., 1, pl. 37, fig. 104 (wing); 1919 (as *albitarsis*).

Very similar to *albitarsis*, differing especially in the short antennae of the male sex, which are less than one-half the body. Wings more nearly hyaline. ♂. L. 6.5-7.5 mm.; w. 8-8.5 mm.; antennae, about 3.5 mm. ♀. L. 9-10 mm.; w. 9-10.5 mm.

(June-July) Que., southw. to Mass., Ct., N. Y., N. C., and Tenn., the latter in the mountains.

Connecticut.—Type-material of *albitarsis*; New London, on sea-beach. (Osten Sacken, Mon. Dipt. N. Amer., 4: 257-258; 1869).

**H. (*Eriocera*) *cinerea* (Alex.)**

1912. *Eriocera cinerea* Alexander; Psyche, 19: 169-170.

Figs.—Alexander, *Ibid.*, pl. 13, fig. 9 (wing); 1912. Alexander, Cfs. N. Y., 1, pl. 37, fig. 108 (wing); 1919.

Mesonotum yellowish gray, the praescutum with three conspicuous brown stripes, the median one broad and undivided; posterior sclerites and pleura clear gray. Antennae (♂) nearly three times body, basal flagellar segments microscopically spinose; antennae ♀ short. Vertical tubercle conspicuous, especially of ♂. Knobs of halteres weakly darkened. Femora yellow, tips narrowly blackened. Wings with a brownish tinge, produced by darkened seams to veins:  $R_{2+3}$  one-half or more of  $R_3$ ; cell  $1st\ M_2$  rectangular, with *m-cu* at near one-third to one-fourth its length. Abdomen dark brown, sparsely pruinose, extreme lateral margins of tergites pale. ♂. L. 9-10 mm.; w. 12-13 mm.; antenna, about 27 mm. ♀. L. 11-11.5 mm.; w. 11-11.5 mm.

(Late May-early July) Ont., Que., Me., N. H., Mass., N. Y., southw. to Va., S. C. and Tenn.

Connecticut.—Canaan, June 10, 1928 (R. B. F.); Storrs, 1929.

**H. (*Eriocera*) *fuliginosa* (O. S.)**

1859. *Eriocera fuliginosa* Osten Sacken: Proc. Acad. Nat. Sci. Philadelphia, 1859: 243.

Fig.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 4, fig. 28 (hyp.); 1869.

Praescutum with four slightly darker brown stripes. Antennae short in both sexes: basal segments pale. Femora rusty-yellow, tipped with dark brown. Wings brown, more suffused along veins, stigma darker. Abdomen brown. ♂. L. 10-12 mm.; w. 10-12 mm.

(July) N. H., westw. to Ind. and Mich., southw. to n. Fla.

I am still uncertain of the identity and limits of this fly and am inclined to consider it as being identical with *gibbosa*. The specimens mentioned by Osten Sacken from Va. and Ohio seem certainly to pertain to *gibbosa*. The species, *fuliginosa*, *gibbosa* and *tristis* are very closely related.

**H. (*Eriocera*) *fultonensis* (Alex.)**

1912. *Eriocera fultonensis* Alexander; Psyche, 19: 168-169.

Figs.—Alexander, *Ibid.*, 19, pl. 13, fig. 7 (wing); 1912. Alexander, Cfs. N. Y., 1, pl. 37, fig. 111 (wing); 1919.

Mesonotum yellowish gray, the praescutum with four narrow brownish black stripes; pleura more grayish pruinose. Antennae short in both sexes. Vertical tubercle weakly bifid. Knobs of halteres dark brown. Fore and middle femora brownish black, with about the basal half yellow, posterior femora brownish yellow, the tips narrowly blackened. Wings faintly tinged with brown, the veins broadly and conspicuously seamed with darker brown. Abdomen black, including the large hypopygium; ovipositor with long chitinized valves. ♂. L. 9.5-10 mm.; w. 9-10.5 mm. ♀. L. 11-11.5 mm.; w. 10.5-11.5 mm.

(June-Aug.) Mass., N. Y., southw. to Tenn.

**H. (*Eriocera*) *gaspensis* (Alex.)**

1931. *Eriocera gaspensis* Alexander; Can. Ent., 63: 143-144.

General coloration gray, the praescutum with three dark brown stripes; pleura black, heavily pruinose. Antenna seven- (♂) or eight- (♀) segmented. Femora obscure yellow, with more than distal half blackened. Wings pale brownish, the veins narrowly seamed with darker; *Rs* long, weakly angulated and spurred at origin; *R*<sub>2</sub> not far beyond fork of *R*<sub>2+3+4</sub>. Abdomen pruinose. ♂. L. about 5-6 mm.; w. 6-7.2 mm. ♀. L. about 7 mm.; w. 8 mm.

(June) E. Que.

**H. (*Eriocera*) *gibbosa* (Doane)**

1900. *Eriocera gibbosa* Doane; Journ. N. Y. Ent. Soc., 8: 193.

Fig.—Doane, *Ibid.*, 8, pl. 8, fig. 10 (wing); 1900.

General coloration brown, the mesonotum and pleura distinctly gray pruinose, the praescutum with four slightly darker brown stripes. Antennae with basal segments paler than the black flagellum. Vertical tubercle opaque. Femora obscure yellow, the tips narrowly blackened on all legs. Wings with a brown tinge, the veins a little seamed with brown; stigma darker. Abdomen dark brown, sparsely pruinose. ♂. L. about 10 mm.; w. about 11 mm. ♀. L. about 12 mm.; w. about 11 mm.

(Late May, June) Mass., Ct., westw. to Mich. and Ill., southw. to Va. and Tenn.

Connecticut.—Avon Old Farms, June 15, 1929 (C. H. C.); Salem, June 12, 1929 (W. E. B.).

I must regard this fly as being doubtfully distinct from *fuliginosa*.

**H. (*Eriocera*) *longicornis*** (Walk.) (Fig. 44. M).

1848. *Anisomera longicornis* Walker; List Dipt. Brit. Mus., 1: 82.

Figs.—Alexander, Psyche, 19, pl. 13, fig. 10 (wing); 1912. Alexander, Cfls. N. Y., 1, pl. 37, fig. 107 (wing); 1919.

General coloration of thorax gray, the praescutum with three conspicuous dark brown stripes, the median one sometimes vaguely split. Antennae (♂) more than three times the entire body, the proximal flagellar segments with microscopic spinulae; of ♀ short, 11-segmented. Vertical tubercle very large, especially in ♂. Fore femora short. Wings with  $R_{2+3}$  and  $R_2$  subequal. Abdomen brown, pruinose. Body (♂) with long pale setae. ♂. L. 10-11 mm.; w. 12-13 mm.; antenna, 35-40 mm. ♀. L. about 10 mm.; w. about 12 mm.

(May-early July) Ont., Que., Me., N. H., Mass., N. Y., westw. to Man., Ill. and Ia., southw. to Va. and N. C.

Connecticut.—Oxford, May 21, 1904 (W. E. B.).

**H. (*Eriocera*) *spinosa*** (O. S.) (Fig. 44. N).

1859. *Arrhenica spinosa* O. S.; Proc. Acad. Nat. Sci. Philadelphia, 1859: 244.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 4, fig. 29 (hyp.); 1869. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 26, fig. 3 (wing); 1908 (as *longicornis*). Alexander, Cfls. N. Y., 1: 850, fig. 125, F (ant. ♂), pl. 37, fig. 105 (wing); 1919.

Mesonotum and pleura light gray, the disk of praescutum more yellowish gray, with four distinct brown stripes. Antennae of male with flagellar segments having small cog-like spinulae almost to tip; antennae (♀) short. Vertical tubercle very large, especially in ♂. Knobs of halteres dark brown. Femora yellow, the tips narrowly infuscated to blackened. Wings with a grayish brown tinge, produced especially by broad dark seams to veins;  $R_{2+3}$  nearly as long as  $R_3$ . Abdominal tergites brownish black, narrowly yellowish laterally; hypopygium rusty brown; ovipositor with long sclerotized valves. Body (♂) clothed with long, erect pale setae. ♂. L. 15-18 mm.; w. 17-20 mm.; antenna, 35-50 mm. ♀. L. 25-28 mm.; w. 18-20 mm.

(May-Aug.) Que., Me., N. H., Vt., Mass., N. Y., westw. to Ill., southw. to Pa.

Connecticut.—Riverton, June 8, 1929 (C. P. A.).



**H. (*Eriocera*) *tristis* (Alex.)**

1914. *Eriocera tristis* Alexander: Proc. Acad. Nat. Sci. Philadelphia, 1914: 602.

Figs.—Alexander, Psyche, 19, pl. 13, fig. 8 (wing); 1912 (as *fuliginosa*). Alexander, Cfls. N. Y., 1, pl. 37, fig. 110 (wing); 1919.

Mesonotum dark brown, the praescutum with four slightly darker stripes, in cases with an additional capillary line on anterior half; pleura dark brown. Antennae brown, the basal two segments more reddish brown. Vertical tubercle entire. Knobs of halteres brownish black. Femora yellow, the tips narrowly but conspicuously blackened. Wings with stigma darker than the ground-color. Abdominal tergites black, sternites weakly bicolorous, obscure yellow, their apices broadly dark brown; ovipositor with sclerotized valves. ♂. L. 8-9 mm.; w. 8.5-9 mm. ♀. L. 11-12 mm.; w. 10-11 mm.

(July, Aug.) Mass., N. Y., westw. to Ind., southw. to Md. and Va.

**H. (*Eriocera*) *wilsonii* (O. S.)**

1869. *Eriocera wilsonii* Osten Sacken: Mon. Dipt. N. Amer., 4: 255.

1900. *E. antennaria* Doane: Journ. N. Y. Ent. Soc., 8: 194.

Figs.—Doane, *Ibid.*, pl. 8, fig. 12 (wing); 1900. Alexander, Cfls. N. Y., 1, pl. 37, fig. 109 (wing); 1919.

General coloration polished rusty-red, the praescutal stripes lacking or very faintly indicated. Antennae (♂) with basal segments yellow, the outer ones black; flagellar segments provided only with erect pale setae, no spinulae. Knobs of halteres weakly darkened. Legs yellow, the tips of femora, tibiae and basitarsi blackened. Wings with  $R_{2+3}$  subequal to or longer than  $R_{2+3+4}$ ; *m-cu* some distance beyond fork of *M*. Abdomen reddish yellow. ♂. L. 7.5-8 mm.; w. 9-10 mm.; antennae, 14-16 mm.

(May-July) Del., westw. to O., southw. to Va. and N. C.

## 7. Subtribe ATARBARIA

**Atarba** Osten Sacken

1869. *Atarba* Osten Sacken; Mon. Dipt. N. Amer., 4: 127-128.

In our region, *Atarba* includes only the genotype, *picticornis*. The genus is very isolated in its affinities and it is by no means certain that its present position in the Hexatomini is the correct one (*vide*. Alexander, Diptera of Patagonia and S. Chile, 1: 167; 1929; under *Ischnothrix*). The chief structural peculiarity lies in the very large meron which separates widely the middle and hind coxae. The tibial spurs in the local species are small but perfectly distinct. The venation shows few distinctive features other than the loss of  $R_2$  and the presence of but two branches of  $R_3$ , both characters being shared with *Elephantomyia* (Fig. 44, O, P). The antennae of *picticornis* are elongate and bicolorous in the male sex. The adult flies are not uncommon in shaded open woods. The early stages occur in saturated decaying wood (Rogers, Florida Ent., 10: 49-55, figs. 1-7; 1927).

**Atarba** (*Atarba*) **picticornis** O. S. (Fig. 44, O).

1869. *Atarba picticornis* Osten Sacken; Mon. Dipt. N. Amer., 4: 128-129.

Figs.—Osten Sacken, *Ibid.*, pl. 1, fig. 13 (wing); 1869. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 29, fig. 3 (ven.); 1908. Alexander, Cfs. N. Y., 1, pl. 33, fig. 47 (ven.); 1919.

General coloration polished yellow, the thoracic pleura weakly pruinose. Antennae ( $\delta$ ) elongate, if bent backward extending about to third abdominal segment, bicolorous, the basal half of individual segments yellow, the outer half black, the dark color increasing in amount on outer segments; antennae ( $\text{♀}$ ) shorter. Head slightly grayish brown. Legs yellow. Wings (Fig. 44, O) with a strong yellow to brownish yellow tinge, the stigma barely indicated;  $Sc_1$  ending opposite origin of  $Rs$ ;  $m-cu$  close to fork of  $M$ . Abdomen chiefly obscure yellow, with a blackened subterminal ring (in  $\delta$ ).  $\delta$ . L. 5.5-6 mm.; w. 6-7 mm.  $\text{♀}$ . L. 6.8-7 mm.; w. 7-7.5 mm.

(Late June, July) N. H., Mass., Ct., N. Y., westw. to Mich., Ill., Ind., Tenn. and Mo., southw. to S. C., Ga., n. Fla. and La. (Transition, Austral).

Connecticut.—Brooklyn, June 15, 1933 (C. P. A.); East River, July 13, 1910 (Ely).

## 8. Subtribe ELEPHANTOMYARIA

**Elephantomyia** Osten Sacken

1859. *Elephantomyia* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 220.

A very distinct genus which is well-characterized by the exceedingly elongate rostrum that is nearly as long as the entire body (Fig. 46, L). Other features of note lie in the antennae, which show the beginnings of a fusion-segment involving the basal flagellar segments, and with long conspicuous verticils on all segments. The venation (Fig. 44, P) shows  $R_2$  entirely lacking; two branches of  $Rs$ ;  $m-cu$  at near midlength of the large cell  $1st\ M_2$  and subequal to the distal section of  $Cu_1$ . The tibial spurs are short but perfectly distinct. The male hypopygium has the aedeagus developed into an elongate coiled penefilum. The adult flies are not uncommon in open mesophytic woods. The early stages occur in decaying wood. In our fauna there is a single species, with a local race described at this time.

**Elephantomyia** (*Elephantomyia*) **westwoodi** O. S. (Figs. 44, P; 46, L).

1869. *Elephantomyia westwoodi* Osten Sacken; Mon. Dipt. N. Amer., 4: 109.

Figs.—Osten Sacken, *Ibid.*, 4, pl. 1, fig. 5 (wing); pl. 3, fig. 8 (hyp.); 1869. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 29, fig. 1 (ven.); 1908. Alexander, Cfs. N. Y., 1: 846, fig. 124 (head); pl. 33, fig. 44 (wing); 1919.

General coloration of thorax obscure yellow, the posterior sclerites of mesonotum more infumed. Head yellowish gray; eyes very large, restricting the vertex. Legs yellow, the femoral tips narrowly black-

ened. Wings (Fig. 44, P) with a strong yellow tinge, the oval stigma dark brown, conspicuous; vague seams along cord and outer end of cell *1st M*<sub>2</sub>; wing-tip narrowly darkened; *R*<sub>5</sub> angulated and usually short-spurred at origin. Abdomen obscure yellow, the tergites with L-shaped darker markings; a subterminal blackened ring. ♂. L., excluding rostrum, 7.5-8 mm.; w. 8-8.5 mm.; rostrum, 7.5 mm. ♀. L., excluding rostrum, 10-11 mm.; w. 10 mm.; rostrum, 8-8.5 mm.

One small female measures only 8 mm. in body and wing length and, except in the abdominal pattern, approaches the race described below.

(June-Aug.) Ont., Que., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Wisc., Mich. and Ill., southw. to S. C., Ga. and Fla.

Connecticut.—Bloomfield, Aug. 6, 1929 (C. P. A.); East River, June 5, 1910 (Ely); Rowayton, June 16, 1909 (C. W. J.).

A very small race of this species has been taken in various parts of the Adirondack Mountains, N. Y.

### **Elephantomyia westwoodi adirondacensis** subsp. nov.

Similar to the typical form but much smaller. Abdominal segments with conspicuous black lateral areas but with the dorso-median portion clear yellow. The male sex is unknown. ♀. L., excluding rostrum, 7.5-8 mm.; w. 7.5-8 mm.; rostrum, 4.8-5 mm.

*Holotype*, ♀, Wilmington Notch, Essex Co., N. Y., June 13, 1927 (C. P. Alexander); in author's collection. Paratopotypes, 2♀♀.

I have also taken this form at Lake Pleasant, Hamilton Co., N. Y., June 22, 1926.

## ERIOPTERINI

One of the largest and best-known tribes of crane-flies. In our fauna, representatives of four subtribes occur. The tribe is very close to the Hexatomini, especially in the two subtribes Claduraria and Gonomyaria, where the chief character available for referring the groups to the present tribe is to be found in the absence of tibial spurs.

### *Key to Subtribes and Genera*

- |  |                      |   |
|--|----------------------|---|
| 1. Nearly apterous species, the wings reduced to microscopic structures that are smaller than the halteres. (Claduraria) .....   | <b>Chionea</b>       | 2 |
| Fully-winged species .....   |                      | 2 |
| 2. Wings with cell <i>M</i> <sub>1</sub> present. (Claduraria) .....   |                      | 3 |
| Wings with cell <i>M</i> <sub>1</sub> lacking .....  |                      | 4 |
| 3. Vein <i>R</i> <sub>2+3+4</sub> shorter than vein <i>R</i> <sub>3</sub> , cell <i>R</i> <sub>3</sub> being much longer than its petiole; <i>R</i> <sub>2</sub> far beyond fork of <i>R</i> <sub>2+3+4</sub> (Fig. 47, A) ..... | <b>Cladura</b>       |   |
| Vein <i>R</i> <sub>2+3+4</sub> longer than vein <i>R</i> <sub>3</sub> , cell <i>R</i> <sub>3</sub> being subequal to its petiole; vein <i>R</i> <sub>2</sub> at or before fork of <i>R</i> <sub>3+4</sub> (Fig. 47, B) .....     | <b>Neolimnophila</b> |   |
| 4. Rostrum very long and slender, about as long as the combined head and thorax; setae of legs profoundly bifid (Fig. 50, M) (Toxorhinaria) .....  | <b>Toxorhina</b>     |   |
| Rostrum short, not exceeding the remainder of head .....   |                      | 5 |
| 5. Two branches of <i>R</i> <sub>5</sub> reach the wing-margin (Fig. 47, E-G) (Gonomyaria) .....   |                      | 6 |
| Three branches of <i>R</i> <sub>5</sub> reach the wing-margin (Fig. 47, H-N; Fig. 50, A-L) .....   |                      | 7 |

6. Wings with  $Sc$  long,  $Sc_1$  ending beyond origin of  $Rs$ ;  $m-cu$  beyond fork of  $M$  (Fig. 47, E) ..... **Teucholabis**  
 Wings with  $Sc$  short,  $Sc_1$  ending before origin of  $Rs$ ;  $m-cu$  at or before fork of  $M$  (Fig. 47, F, G) ..... **Gonomyia** (part)
7. Wings with vein  $R_3$  shorter than the petiole of cell  $R_3$ , cell  $R_3$  short (Fig. 47, H-M; Fig. 50, B, C) ..... 8  
 Wings with vein  $R_3$  longer than the petiole of cell  $R_3$ , cell  $R_3$  long (Fig. 47, N; Fig. 50, A, D-L) ..... 11
8. Vein  $R_2$  present (Fig. 47, M; Fig. 50, B, C). (Eriopteraria) ..... 9  
 Vein  $R_2$  lacking (Fig. 47, H-L) ..... 10
9.  $Rs$  elongate, exceeding distal section of  $M_{1+2}$  (Fig. 47, M); tuberculate pits on cephalic portion of praescutum; trochanters elongate ..... **Rhabdomastix** (part)  
 $Rs$  shorter, less than the distal section of  $M_{1+2}$  (Fig. 50, B, C); tuberculate pits removed from cephalic margin of praescutum, nearly in transverse alignment with the pseudosutural foveae; trochanters short **Erioptera** (part)
10.  $Sc$  long,  $Sc_1$  extending from opposite midlength to just before the fork of  $Rs$ ;  $m-cu$  at or beyond the fork of  $M$  (Fig. 47, L) (Eriopteraria) ..... **Rhabdomastix** (part)  
 $Sc$  short, not extending beyond midlength of  $Rs$  (Fig. 47, H, J, K); if  $Sc$  is relatively long,  $m-cu$  lies more than its own length before fork of  $M$  (Fig. 47, I) (Gonomyaria) ..... **Gonomyia** (part)
11. Wings with distinct macrotrichia in outer cells (Fig. 50, I-K) ..... 12  
 Wings with the outer cells glabrous (Fig. 50, A-H) ..... 15
12.  $Rs$  shortened, its union with  $R_{2+3+4}$  forming an angle, so cell  $R_1$  is nearly equilateral in outline (Fig. 50, I) (Eriopteraria) ..... **Cryptolabis**  
 $Rs$  long, normal in position; cell  $R_1$  elongate (Fig. 50, J, K) ..... 13
13. Size very small (wing, 2.6 mm. or less);  $Rs$  ending in cell  $R_3$ , this cell being sessile, without element  $R_{2+3+4}$  (Fig. 50, K) (Eriopteraria) ..... **Tasiocera** (**Dasymolophilus**)  
 Size larger (wing 4 mm. or over);  $Rs$  ending in cell  $R_3$ , cell  $R_3$  being petiolate by the presence of a distinct element  $R_{2+3+4}$  (Fig. 50, J) ..... 14
14.  $Sc_2$  close to tip of  $Sc_1$ , the two veins thus subequal in length (Gonomyaria) ..... **Gnophomyia** (part)  
 $Sc_2$  far removed from tip of  $Sc_1$ , the latter vein long, subequal in length to  $Rs$  (Fig. 50, J) (Eriopteraria) ..... **Ormosia** 462
15.  $Rs$  ending in cell  $R_3$ , there being no element  $R_{2+3+4}$  (Fig. 50, L) (Eriopteraria) ..... **Molophilus** 476  
 $Rs$  ending in cell  $R_3$ , cell  $R_3$  being petiolate by a distinct element  $R_{2+3+4}$  (Fig. 47, C, D, N; Fig. 50, A, D-H) ..... 16
16. A supernumerary crossvein in cell  $R_3$ ; vein  $2nd A$  strongly sinuate (Fig. 47, N) (Eriopteraria) ..... **Symplecta**  
 No supernumerary crossvein in cell  $R_3$ ; vein  $2nd A$  straight or only weakly sinuate (Fig. 50, D-H) ..... 17
17. Coxae of middle and hind legs only slightly separated by the small meral region;  $Sc_1$  relatively short, not exceeding one-fourth the length of  $Rs$  (Fig. 47, C, D) (Gonomyaria) ..... 18  
 Coxae of middle and hind legs widely separated by a large "pot-bellied" meral region;  $Sc_1$  very long, exceeding one-half of  $Rs$  (Fig. 50, A, D-H) (Eriopteraria) ..... 19
18. Wings with  $m-cu$  some distance beyond the fork of  $M$ ;  $R_{1+2}$  long, more than three times  $R_3$  and exceeding  $R_{2+3+4}$  (Fig. 47, C) .. **Gnophomyia** (part)  
 Wings with  $m-cu$  at or close to fork of  $M$ ;  $R_{1+2}$  short, subequal to  $R_2$  and less than one-half  $R_{2+3+4}$  (Fig. 47, D) ..... **Lipsothrix**
19. Vein  $Cu_1$  nearly straight, the distal section not swinging cephalad toward wing-tip; cell  $1st M_2$  present, small, less than one-half the distal section of  $M_{1+2}$  (Fig. 50, A, E) ..... 20  
 Vein  $Cu_1$  with distal section slightly deflected at apex toward wing-tip; cell  $1st M_2$ , when present, elongate, subequal to or longer than the distal section of  $M_{1+2}$  (Fig. 50, G, H) ..... **Erioptera** (part)



20. Terminal three segments of antennae suddenly smaller than those preceding; body-coloration dull gray or buffy (Fig. 50, A) ..... **Trimicra**  
 Antennal segments gradually decreasing in size toward end; coloration of local species coal-black, variegated with yellow (Fig. 50, F) ..... **Erioptera** (part)

### 1. Subtribe CLADURARIA

#### Cladura Osten Sacken

1859. *Cladura* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 229.

A small genus of flies, most numerous in species in Japan. The adults are on the wing in late summer and autumn. The early stages occur in relatively dry soil in mesophytic woodlands.

#### Key to Species

1. Larger (w., 7 mm. or more); reddish yellow, the thoracic pleura sparsely variegated with brown spots; wings yellowish, the crossveins and deflections of veins clouded with brown; *Sc* long, *Sc*<sub>1</sub> ending beyond fork of *R*<sub>2+3+4</sub>, *Sc*<sub>2</sub> opposite this fork; *R*<sub>2</sub> much shorter than *R*<sub>2+3</sub>, usually one-fourth to one-fifth this length; petiole of cell *M*<sub>1</sub> short, not greatly exceeding *m* (Fig. 47, A); male hypopygium with a single dististyle. (Subgenus *Cladura*) ..... **flavoferruginea**  
 Smaller (w., 6 mm. or less); very pale yellow or whitish yellow, without spots on pleura; wings hyaline, without conspicuous darkened areas on the crossveins; *Sc* relatively short, *Sc*<sub>1</sub> ending opposite two-thirds the length of *R*<sub>2+3+4</sub>, *Sc*<sub>2</sub> nearly opposite or shortly beyond the fork of *Rs*; *R*<sub>2</sub> only a little shorter than *R*<sub>2+3</sub>; petiole of cell *M*<sub>1</sub> long, about two or three times *m*; male hypopygium with two dististyles. (Subgenus *Neocladura* Alexander) ..... **delicatula**

#### **Cladura** (*Neocladura*) **delicatula** Alex.

1914. *Cladura delicatula* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1914: 589-590.

Fig.—Alexander, *Ibid.*, pl. fig. 27 (wing); 1914.

General coloration pale yellow, the mesonotal praescutum darker medially. Abdomen narrowly margined laterally with dark brown.  
 ♂. L. 4.5-5 mm.; w. 5.6-6 mm. ♀. L. 4.5-4.8 mm.; w. 5.5-5.7 mm.

(Sept.) Me., N. H., Vt., Mass., N. Y., westw. to Ind. and Mich., southw. to S. C. and Tenn.

#### **C.** (*Cladura*) **flavoferruginea** O. S. (Fig. 47, A).

1859. *Cladura flavoferruginea* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 229.

1861. *C. indivisa* Osten Sacken; *Ibid.*, 1861: 291.

Figs.—Osten Sacken, Proc. Acad. Nat. Sci. Philadelphia, pl. 4, fig. 34; 1859. Osten Sacken, Mon. Dipt. N. Amer., 4: 34 (ven.), pl. 4, fig. 22 (hyp.); 1869. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 22, fig. 2 (ven.); 1908. Alexander and Leonard, Journ. N. Y. Ent. Soc., 20: 36-39, pl. 4 (abnormal ven.); 1912. Alexander, Cfs. N. Y., 1, pl. 37, fig. 102 (wing); 1919. Crampton, Insec. Inscit. Menst., 13, pl. 3, figs. 19, 22 (thorax); 1925. Dickinson, Cfs. Wisc., p. 198, fig. 87 (wing); 1932.

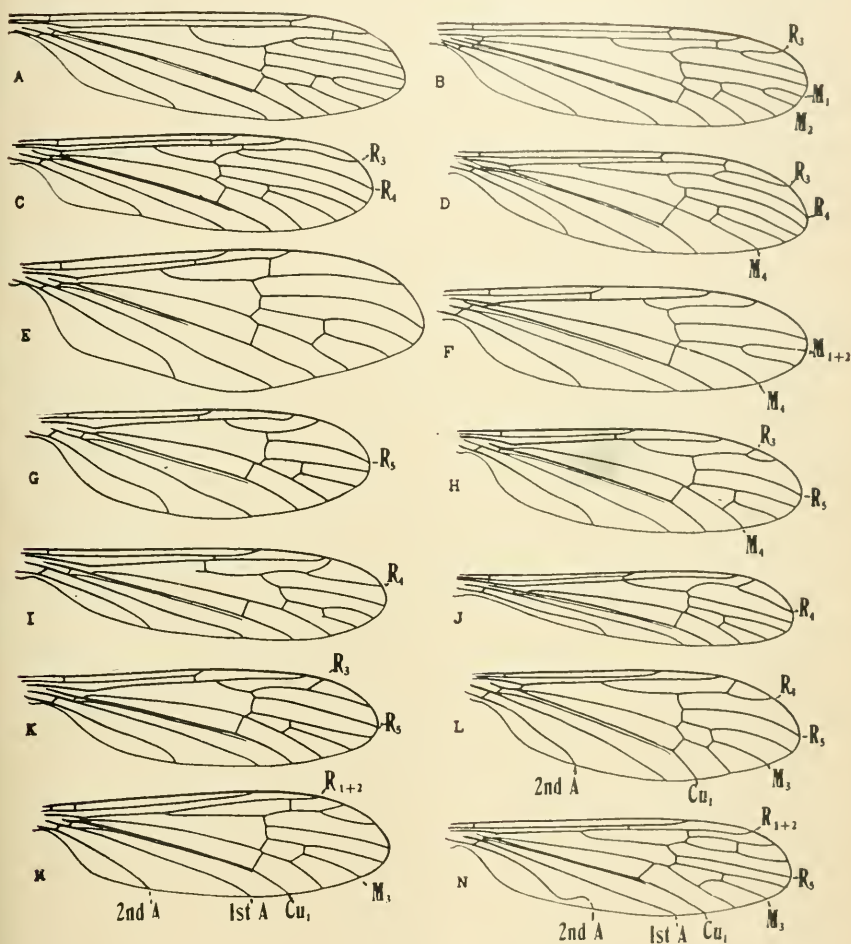


FIGURE 47. Eriopterini; venation.

- |  |  |
|--|--|
| A. <i>Cladura (Cladura) flavoferruginea</i><br>O. S.   | G. <i>G. (L.) puer</i> Alex.                         |
| B. <i>Neolimnophila ultima</i> (O. S.)                 | H. <i>G. (L.) sulphurella</i> O. S.                  |
| C. <i>Gnophomyia tristissima</i> O. S.                 | I. <i>G. (Idiocera) blanda</i> O. S.                 |
| D. <i>Lipsothrix sylvia</i> (Alex.)                    | J. <i>G. (Gonomyia) bidentata</i> Alex.              |
| E. <i>Teucholabis (Teucholabis) complexa</i><br>O. S.  | K. <i>G. (G.) noveboracensis</i> Alex.               |
| F. <i>Gonomyia (Lipophleps) alexanderi</i><br>(Johns.) | L. <i>Rhabdomastix (Socandaga) brittoni</i><br>Alex. |
|  | M. <i>R. (S.) subarctica</i> Alex.                   |
|  | N. <i>Symplecta cana</i> (Walker)                    |

Symbols: A, Anal; Cu, Cubitus; M, Media; R, Radius.

Pseudosutural foveae blackened. Wings (Fig. 47, A). Abdominal segments conspicuously cross-banded with brown, the incisures yellow; subterminal segments black; male hypopygium large, yellow.

Adventitious crossveins in the wing appear rather commonly in this species, the one most frequent being that in cell  $R_3$  (Alexander & Leonard, l. c.) ♂. L. 6-7 mm.; w. 7-8.5 mm. ♀. L. 7-8 mm.; w. 8-9.5 mm.

(Sept., Oct.) Que., Me., N. H., Vt., Mass., N. Y., westw. to Wisc., Ia. and Mo., southw. to N. C. and S. C.

### Chionea Dalman

1816. *Chionea* Dalman; K. Vetensk. Akad. Handl. 1: 102.

1912. *Sphaeconophilus* Becker; Ann. Soc. Ent. Belgique, 56: 142.

Species of *Chionea* are the only nearly apterous crane-flies in the local fauna. Members of the genus are widely distributed throughout the Holarctic Region. The adults are most in evidence during warm days in winter, when they are to be found walking slowly and awkwardly about over the snow, in company with spiders, which they much resemble. The early stages live in soil beneath leaf mold.

Besides the almost complete loss of wings, the most striking characters lie in the antennae. The elongate pedicel is almost unique in the family. A certain number of flagellar segments are involved in the composition of the conical basal or fusion-segment; the primitive number of antennal segments for the tribe is 16; the most generalized local species of *Chionea* (*primitiva*) shows nine segments beyond the fusion-segment, which is thus apparently comprised of five consolidated segments; the commonest local species (*valga*) has only four segments beyond the fusion-segment, which is thus evidently composed of ten such segments. The greatest reduction so far made known is in *Chionea alexandriana* Garrett, of northwestern North America, where there are only three free segments beyond the fusion. I have discussed elsewhere the relationships of *Chionea* and the manner in which the antennae have been reduced (Can. Ent., 49: 202-204; 1917).

#### Key to Species

- |   |                       |
|---|-----------------------|
| 1. Coloration of body dark brownish gray .....  | <i>noveboracensis</i> |
| Coloration of body reddish yellow, rusty brown to dark brown .....                                      | 2                     |
| 2. Body long and slender; male with all legs very long and slender, not incassated .....                | <i>gracilis</i>       |
| Body stouter; males with at least the posterior femora incassated .....                                 | 3                     |
| 3. Antennae with 12 segments, there being 9 flagellar segments beyond the first or fusion-segment ..... | <i>primitiva</i>      |
| Antennae with 7 segments, there being 4 beyond the fusion-segment .....                                 | 4                     |
| 4. Size very large (♂, L. 6-6.5 mm.) .....  | <i>waughii</i>        |
| Size smaller (♂, L. about 4-5 mm.) .....  | <i>valga</i>          |

### *Chionea gracilis* Alex.

1917. *Chionea gracilis* Alexander; Can. Ent., 49: 203.

Fig.—Alexander, *Ibid.*, 49, pl. 12, fig. 2 (ad. ♂); 1917.

General coloration brownish yellow. ♂. L. 3.9 mm.; diameter across pronotum, 0.6 mm.

(Dec.) N. Y.

**C. noveboracensis** Alex.

1917. *Chionea noveboracensis* Alexander; Can. Ent., 49:205.

Antennae black. Ovipositor long and conspicuous. ♀. L. about 3.5 mm.

(Feb.) N. Y.

**C. primitiva** Alex.

1917. *Chionea primitiva* Alexander; Can. Ent., 49:204.

Figs.—Alexander, *Ibid.*, 49:203, fig. 1 (ad. ♂), fig. 4 (ant.); 1917.

Readily told from the other species in our fauna by the number of antennal segments. ♂. L. 5.5-5.8 mm.; diameter across pronotum, 1.3-1.5 mm.

(Nov.) Mass., N. Y.

**C. valga** Harr.

1841. *Chionea valga* Harris; Insects Injur. to Vegetation, Ed. 3:601.

1848. *C. aspera* Walker; List Dipt. Brit. Mus., 1:82.

1848. *C. scita* Walker; *Ibid.*, 1:82.

Figs.—Harris, *Ibid.*, fig. 260; 1841. Johnson, Psyche, 14:43 (ad. ♂, ♀); 1907. Crampton, Insec. Inscit. Menst., 13, pl. 2, fig. 9; pl. 3, fig. 20 (thorax); 1925.

General coloration reddish brown. All femora more or less incrassated in males, especially the somewhat bowed posterior femora. ♂. L. 4-5.5 mm.; diameter across pronotum, 0.8-1.2 mm. ♀. L. about 5 mm.; diameter across pronotum, about 0.9 mm.

(Dec.-Feb.) Ont., Que., Me., N. H., Mass., N. Y., westw. to Minn. and Sask.

**C. waughi** Curr.

1925. *Chionea waughi* Curran; Can. Ent., 57:24.

Most readily told from *valga*, its nearest ally, by the average larger size. The posterior femora are more strongly incrassated than are the others. ♂. L. 6-6.5 mm.; diameter across pronotum, about 1.2 mm. ♀. L. 5.5 mm.; diameter across pronotum, about 0.8 mm.

(Sept.-Dec.) Lab.

**Neolimnophila** Alexander

1920. *Limnophila* (*Neolimnophila*) Alexander; Proc. California Acad. Sci., (4) 10:37-38.

A small genus of Holarctic crane-flies, most numerous in species in Eastern Asia. The adults are on the wing in Spring and again in Autumn, occurring in small dancing swarms. The early stages presumably live in garden soil and similar situations.



**Neolimnophila ultima** (O. S.) (Fig. 47, B).

1859. *Limnophila ultima* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 238.

Figs.—Osten Sacken, *Ibid.*, pl. 4, fig. 26; 1859. Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 4, fig. 24 (hyp.); 1869. Alexander, Cfs. N. Y., 1, pl. 38, fig. 127 (wing); 1919. Crampton, Insec. Inscit. Menst., 13, pl. 3, figs. 18, 23 (thorax); 1925. Dickinson, Cfs. Wisc., p. 198, fig. 86 (wing); 1932.

General coloration gray, the praescutum with four dark brown stripes. Halteres chiefly pale. Wings subhyaline, stigma faintly indicated (Fig. 47, B). The members of this genus, in common with all other Claduraria, have the basal flagellar segments united into a fusion-segment. ♂. L. about 5-6 mm.; w. 7-7.5 mm. ♀. L. 7-8 mm.; w. 8-9 mm.

(May; Sept., Oct.) Ont., Que., Me., N. H., Vt., Mass., N. Y., westw. and north-westw. to Mich., Iowa, Alta. and Alaska, southw. to Ga. and Miss. (Eastern Palearctic).

Connecticut.—W. Granby, Sept. 11, 1928 (C. P. A.).

## 2. Subtribe GONOMYARIA

**Gnophomyia** Osten Sacken

1859. *Gnophomyia* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 223.

An extensive genus of medium-sized flies, with two species within our faunal limits. The adult flies may be swept from rank vegetation in mesophytic woodlands. The immature stages occur beneath the bark of decaying deciduous trees.

*Key to Species*

1. Apical cells of wings with macrotrichia; halteres black throughout . . . **luctuosa**  
Cells of wings without macrotrichia; knobs of halteres light yellow **tristissima**

**Gnophomyia luctuosa** O. S.

1859. *Gnophomyia luctuosa* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 224.

1860. *Limnobia nigricola* Walker; Trans. Ent. Soc. London (n. s.), 5: 333.

Body, with antennae, legs, halteres and wings black. Wings with basal section of  $R_5$  perpendicular to end of  $R_s$ , subequal in length to  $r-m$ . ♂. L. 6-7 mm.; w. 7-8 mm. ♀. L. 7.5-8 mm.; w. 7-7.5 mm.

(May-Aug.) S. Ind., Ill., D. C., southw. and southwestw. to Fla. and Miss. (Austral).

**G. tristissima** O. S. (Fig. 47, C).

1859. *Gnophomyia tristissima* Osten Sacken; *Ibid.*, 1859: 224.

Figs.—Osten Sacken, *Ibid.*, pl. 4, fig. 18; 1859. Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 2, fig. 5 (wing), pl. 4, fig. 19 (hyp.); 1869. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 24, fig. 2 (ven.); 1908. Alexander, Cfs. N. Y., 1, pl. 37, fig. 100 (wing); 1919. Crampton, Ann. Ent. Soc. America, 18, pl. 3, fig. 8 (thorax); 1925. Dickinson, Cfs. Wisc., p. 190, fig. 71 (wing); 1932.

Black, with strongly darkened wings. Wings with basal section of  $R_5$  short to very short, in approximate alignment with  $R_s$ .  $\delta$ . L. 6-8 mm.; w. 5.5-8 mm.  $\text{♀}$ . L. 7.5-8 mm.; w. 6-7 mm.

(June-Aug.) Que., Ont., Me., N. H., Vt., Mass., R. I. and N. Y., westw. to Ia., Kan. and Tex., southw. to S. C., Ga., Fla. and Ala.

Connecticut.—New Haven, July 20, 1929 (W. E. B.); Riverton, June 8, 1929 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.).

### Lipsothrix Loew

1873. *Lipsothrix* Loew: Beschreib. Eur. Dipt., 3: 69.

A small genus, including twelve described recent species, widespread throughout the Holarctic Region. A single species in eastern North America. The adults frequent the vicinity of streams, often near small waterfalls. The immature stages are unknown.

**Lipsothrix sylvia** (Alex.) (Fig. 47, D; 51, A).

1916. *Limnophila sylvia* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1916: 534-535.

Figs.—Alexander, *ibid.*, pl. 27, fig. 46 (wing); 1916. Alexander, Cfs. N. Y., 1, pl. 40, fig. 157 (wing); 1919.

Mesonotum above dark brown, the sides of thorax paling to obscure yellow. Wings (Fig. 47, D) with a faint brownish tinge, the stigma poorly indicated;  $R_{1+2}$  and  $R_2$  subequal; basal section  $R_5$  strongly arcuated or angulated; *m-cu* not far from fork of  $M$ . Male hypopygium (Fig. 51, A) with the interbasal structures appearing as conspicuous blackened rods that narrow abruptly into a terminal spine.  $\delta$ . L. 5-6 mm.; w. 5.5-7 mm.  $\text{♀}$ . L. 6-7.5 mm.; w. 6.5-8 mm.

(June-Aug.) Me., N. H., Vt., Mass., N. Y., southw. to N. C., S. C. and Tenn.

Connecticut.—Hartland, June 9, 1929 (C. P. A.); Kent Falls, June 12-13, 1931 (C. P. A.); Natchaug State Forest, June 14, 1933 (C. P. A.); Union, June 14, 1933 (C. P. A.).

### Teucholabis Osten Sacken

1859. *Teucholabis* Osten Sacken: Proc. Acad. Nat. Sci. Philadelphia, 1859: 222.

An extensive, essentially tropical genus, with few species in the local fauna. The immature stages occur in decaying wood.

The various species have the notum highly polished, the pleura often with a silvery pruinosity. The general appearance is thus quite different from the allied genus *Gonomyia*. The males of most species of *Teucholabis* have a curious pocket of setae on the seventh abdominal sternite.

#### Key to Species

- |  |                 |
|--|-----------------|
| 1. $Sc$ long, $Sc_1$ ending far beyond midlength of $R_s$ (Fig. 47, E).....  | 2               |
| $Sc$ short, $Sc_1$ ending slightly beyond origin of $R_s$ .....  | 3               |
| 2. Mesonotal praescutum with three black stripes; male hypopygium with the spine of the basistyle very small; outer dististyle simple; aedeagus with terminal spine very short ..... | <b>complexa</b> |

Mesonotum reddish, unmarked with darker, in cases with black stripes; male hypopygium with the spine of basistyle large, apical in position; outer dististyle at midlength bearing a lateral branch; aedeagus terminating in a long straight apical spine . . . . . *immaculata*

3. Wings with cell  $R_2$  at margin more extensive than is cell  $R_1$ ; thoracic pleura chiefly pale brown, with an indistinct darker brown longitudinal stripe . . . . . *carolinensis*

Wings with cell  $R_4$  at margin more extensive than cell  $R_2$ ; thoracic pleura black, with a whitish longitudinal stripe passing beneath the halteres. *lucida*

**Teucholabis** (*Teucholabis*) **carolinensis** Alex.

1916. *Teucholabis carolinensis* Alexander; Can. Ent., 48: 44.

Lateral margins of praescutum and the thoracic pleura chiefly yellow, with a dorsal blackish pleural area that extends backward about to the level of the wing-root. Wings with branches of  $R_s$  extending generally parallel to one another. ♂. L. 4-4.2 mm.; w. 3.8-4 mm.

(Aug.) S. C. to Fla. (Austroriparian).

**T.** (*Teucholabis*) **complexa** O. S. (Fig. 47, E).

1859. *Teucholabis complexa* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 223.

Figs.—Osten Sacken, *Ibid.*, pl. 3, fig. 10; 1859. Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 1, fig. 12 (wing), pl. 3, fig. 9 (hyp.); 1869. Williston, Man. N. Amer. Dipt., Ed. 3, fig. 25, sub 30 (wing); 1908. Alexander, Proc. Acad. Nat. Sci. Philadelphia, pl. 25, fig. 15 (wing); 1916. Alexander, Cfs. N. Y., 1, pl. 33, fig. 52 (wing); 1919. Crampton, Insect. Inscit. Menst., 13, pl. 3, fig. 14 (thorax); 1925.

General coloration obscure yellow, the praescutum with three black to brownish black stripes; scutal lobes chiefly blackened. Pleura chiefly black, with obscure yellow areas on ventral portion. ♂. L. 6-7 mm.; w. 6.5-8 mm.

(July, Aug.) Ct., N. J., westw. to Mich., Ill. and Okla., southw. to Ga., Fla. and Ala. (Austral).

Osten Sacken's type record from northern New York is almost certainly in error.

Connecticut.—East River, July 9, 1910 (Ely).

**T.** (*Teucholabis*) **immaculata** Alex.

1922. *Teucholabis complexa immaculata* Alexander; Occas. Papers Mus. Zool., Univ. Michigan, 127: 5-6.

Quite as in the typical form but with the mesonotum shiny reddish, unmarked.

For a discussion of *complexa* and *immaculata*, see Alexander, Amer. Mid. Nat., 24: 636-638: 1940.

(June) Ind., Tenn. (Carolinian).

**T.** (*Teucholabis*) **lucida** Alex.

1916. *Teucholabis* (*Teucholabis*) *lucida* Alexander; Can. Ent., 48: 43.

Figs.—Alexander, Proc. Acad. Nat. Sci. Philadelphia, pl. 25, fig. 16 (wing); 1916. Alexander, Cfs. N. Y., 1, pl. 33, fig. 53 (wing); 1919.

Praescutum polished black, humeral region light yellow; pleura with a whitish longitudinal stripe. Knobs of halteres weakly darkened. Wings relatively narrow. ♂. L. 3.5-4.2 mm.; w. 4.2-4.5 mm.

(July, Aug.) Va., westw. to Ind. and Mo., southw. to Ga. and n. Fla. (Austral).

### Gonomyia Meigen

1818. *Gonomyia* Meigen; Syst. Besch. Eur. Dipt., 1: 146.

1869. *Gonomyia* Osten Sacken; Mon. Dipt. N. Amer., 4: 176.

One of the largest genera of eriopterine Tipulidae. The flies frequent shaded places in woods (as *florens*), open ravines (as *bidentata*), and similar situations. Others are very characteristic of the sandy margins of streams, where they may be swept from herbage, as *alexanderi*, *sacandaga*, *mathesoni*, *sulphurella*, *kansensis*, *noveboracensis*, etc.). The early stages occur in wet soil.

The chief venational peculiarities lie in the small cell  $R_3$ , which is lost in most species of the subgenus *Lipophleps*. The adults are most often colored yellow and dark brown, in contrasted patterns.

#### Key to Subgenera

1. Two branches of  $R_s$  reach the wing-margin (Fig. 47, F, G) .. **Lipophleps** (part)  
 Three branches of  $R_s$  reach the wing-margin (Fig. 47, H-K) .....

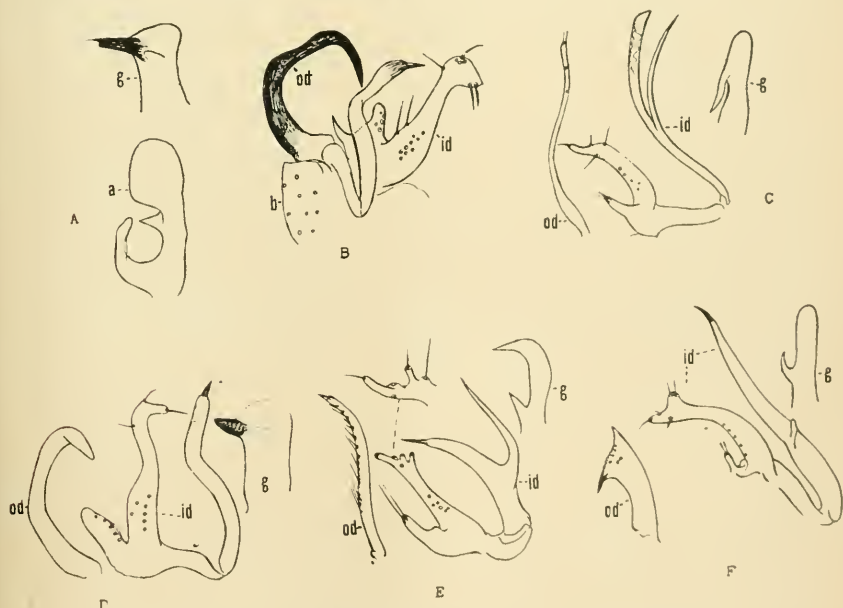


FIGURE 48. *Gonomyia, cognatella* group; male hypopygia.

A. *Gonomyia (Gonomyia) armigera* Alex.

B. *G. (G.) armigera* Alex.

C. *G. (G.) cognatella* O. S.

D. *G. (G.) florens* Alex.

E. *G. (G.) kansensis* Alex.

F. *G. (G.) reflexa* Alex.

Symbols: a, aedeagus; b, basistyle; g, gonapophysis; id, inner dististyle; od, outer dististyle.



- 2 Cell  $R_2$  very small, its extent along costal margin subequal to that of cell  $R_2$  (Fig. 47, H) ..... **Lipophleps** (part)  
 Cell  $R_3$  large, its extent along costal margin much greater than that of cell  $R_2$  (Fig. 47, I-K) ..... 3
3. Wings with *m-cu* about its own length before fork of  $M$  (Fig. 47, I) ..... **Idiocera**  
 Wings with *m-cu* at or close to fork of  $M$  (Fig. 47, J, K) ..... **Gonomyia**

### Subgenus **Lipophleps** Bergroth

1889. *Leiponeura* Skuse; Proc. Linn. Soc. New South Wales, (2) 4: 795 (preoccupied).

1915. *Lipophleps* Bergroth; Psyche, 22: 55.

I am following Edwards in including in this subgenus not only all regional species of *Gonomyia* having two branches of  $R_s$ , but also those forms having three such branches, in which cell  $R_3$  is very small and evidently tending to be lost by fusion of adjoining veins (Fig. 47, H). In our fauna, this latter group includes only *sulphurella*. The male antennae of members of this subgenus have exceedingly elongate verticils on the antennal flagellum.

#### Key to Species

(Based in part on male characters)

1. Wings with three branches of  $R_s$  reaching the margin, cell  $R_3$  being present (Fig. 47, H) ..... **sulphurella**  
 Wings with two branches of  $R_s$  reaching the margin, cell  $R_3$  being lost by fusion of enclosing veins (Fig. 47, F, G) ..... 2
2. Legs with tibiae snowy-white; wings with cell  $1st\ M_2$  open by atrophy of basal section of  $M_2$  (Fig. 47, F); costal margin china-white ..... **alexanderi**  
 Legs without white on tibiae; wings with cell  $1st\ M_2$  closed (Fig. 47, G); costal margin brown or yellow ..... 3
3. Wings grayish brown, the costal border broadly light sulphur-yellow; stigma pale brown, preceded and followed by yellowish areas; abdominal segments brown, narrowly ringed caudally with yellow ..... **sacandaga**  
 Wings with the costal border concolorous with remainder of wing or nearly so, where more brightened, the stigma conspicuously dark brown; abdominal segments uniformly darkened, or else pale with narrowly darkened incisures ..... 4
4. Stigma very conspicuous, dark brown; femora with a darkened nearly terminal ring (extra-limal) ..... **pleuralis**  
 Stigma lacking; femora uniformly brown ..... 5
5. Thoracic pleura pale, only slightly if at all striped with darker; male hypopygium with the dististyle entirely fleshy, terminating in a single fasciculate seta (Fig. 49, A) ..... **manca**  
 Thoracic pleura with the ground-color dark, striped longitudinally with pale yellow; male hypopygium with the dististyle a blackened curved hook, these of different sizes on the two sides of body (Fig. 49, B) ..... **puer**

**Gonomyia** (*Lipophleps*) **alexanderi** (Johns.) (Fig. 47, F).

1912. *Elliptera alexanderi* Johnson; Psyche, 19: 3.

1916. *Gonomyia* (*Leiponeura*) *alexanderi* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1916: 513-514.

Figs.—Johnson, *Ibid.*, 19: 3, fig. 6 (ven.); 1912. Alexander, *Ibid.*, pl. 26, fig. 17 (wing); pl. 29, figs. 59, 61 (hyp.); 1916. Alexander, Cfs. N. Y., 1, pl. 36, fig. 86 (wing); 1919.

Fore femora black; mid-femora yellow, the tips conspicuously blackened; hind femora yellow, with a narrow brown subterminal

ring; all tibiae white, the tips narrowly blackened. Thoracic pleura gray dorsally, dark brown ventrally, narrowly but conspicuously striped with pale yellow and black. ♂. L. about 3.5-3.8 mm.; w. 3.6-4.2 mm. ♀. L. about 5 mm.; w. about 5 mm.

(June-Aug.) Que., Vt. and N. Y., westw. to Ind., Ill., Mo. and Okla., southw. to N. C. and S. C.

**G. (*Lipophleps*) manca** (O. S.) (Fig. 49, A).

1869. *Gonomyia manca* Osten Sacken: Mon. Dipt. N. Amer., 4: 178-179.

Figs.—Alexander, Proc. Acad. Nat. Sci. Philadelphia, pl. 26, fig. 22 (wing); pl. 29, figs. 64, 65 (hyp.); 1916. Alexander, Cfs. N. Y., 1, pl. 36, fig. 88 (ven.); 1919.

General coloration of mesonotum light brown, scutellum broadly yellow. Male hypopygium (Fig. 49, A): gonapophyses appearing as simple blackened hooks. ♂. L. about 3.7-3.8 mm.; w. 3.5-3.6 mm. ♀. L. about 3.8-4 mm.; w. 3.8-4 mm.

(Apr. (Fla.); Aug.) Mass. and N. Y., westw. to Ind. and Tenn., southw. to S. C., Ga. and Fla.

**G. (*Lipophleps*) pleuralis** (Will.)

1896. *Atarba pleuralis* Williston; Trans. Ent. Soc. London, 1896: 289.

Figs.—Williston, *Ibid.*, pl. 10, fig. 61 (ant., wing); 1896. Alexander, Ent. News, 23: 418-420, figs. 3-4 (hyp.); 1912. Alexander, Proc. Acad. Nat. Sci. Philadelphia, pl. 26, fig. 20 (wing); 1916.

Ga. and Fla., southw. into Neotropics.

**G. (*Lipophleps*) puer** Alex. (Fig. 47, G; 49, B).

1913. *Gonomyia (Leiponeura) puer* Alexander: Proc. U. S. Nat. Mus., 44: 506.

Figs.—Alexander, *Ibid.*, pl. 66, fig. 14 (ven.); 1913. Alexander, Proc. Acad. Nat. Sci. Philadelphia, pl. 26, fig. 21 (ven.), pl. 29, fig. 63 (hyp.); 1916.

Generally similar to *manca*: mesonotum dark grayish brown. Antennae uniformly dark. Wings iridescent with light blue and coppery reflexions. Male hypopygium (Fig. 49, B). ♂. L. 3.2-3.5 mm.; w. 2.8-3 mm. ♀. L. 4-4.5 mm.; w. 4-4.5 mm.

D. C., southw. to Ga., Fla. and Gr. Antilles.

**G. (*Lipophleps*) sacandaga** Alex.

1914. *Gonomyia (Leiponeura) sacandaga* Alexander: Proc. Acad. Nat. Sci. Philadelphia, 1914: 587.

Figs.—Alexander, *Ibid.*, pl. 26, fig. 21 (hyp.), pl. 27, fig. 25 (wing); 1914. Alexander, *Ibid.*, pl. 26, fig. 19 (wing); 1916. Alexander, Cfs. N. Y., 1, pl. 36, fig. 87 (wing); 1919.

General coloration yellow, variegated with brown; pleura conspicuously striped brown and yellow. Antennae with two basal segments yellow, flagellum brown. Halteres yellow. Femora brown. ♂. L. 3.2-3.5 mm.; w. 3.3-3.5 mm. ♀. L. about 4.5 mm.; w. 4 mm.

(June-Aug.) Vt., N. Y., westw. to Ind., Mich. and Mo., southw. to N. C.

**G. (*Lipophleps*) *sulphurella* O. S.** (Fig. 47, H).

1859. *Gonomyia sulphurella* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 230.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 2, fig. 2 (wing); 1869. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 24, fig. 3 (wing); 1908. Alexander, Proc. Acad. Nat. Sci. Philadelphia, pl. 26, fig. 26 (wing), pl. 29, fig. 70 (hyp.); 1916. Alexander, Cfs. N. Y., 1, pl. 36, fig. 91 (wing); 1919. Dickinson, Cfs. Wisc., p. 196, fig. 83 (wing); 1932.

Rostrum black. Antennae with two basal segments light yellow, flagellum black. Head light yellow; center of vertex darkened. Mesonotum dark brown, scutellum yellow; pleura striped longitudinally with sulphur-yellow and dark pruinose. Halteres sulphur-yellow. Femora with dark brown subterminal ring. Abdominal tergites dark brown, the caudal margins of segments conspicuously yellow. ♂. L. 3.5-4 mm.; w. 4-4.5 mm. ♀. L. about 4-4.5 mm.; w. 5-5.2 mm.

(May-Sept.) Ont., Que., N. B., N. S., Me., N. H., Vt., Mass., R. I., N. Y., N. J., Pa., westw. to Wisc., Kan. and Tex., southw. to Ga., Fla., Ala. and La.

Connecticut.—East River, July 11, 1910 (Ely); Granby, June 8, 1929 (C. P. A.); Hamden, July 8-Sept. 5, 1932 (N. T.); Kent Falls, July 23-24, 1931 (C. P. A.); Manitic Lake, Aug. 6, 1929 (C. P. A.); Middletown, June 17, 1909 (C. W. J.); Saptree Run State Park, June 14, 1933 (C. P. A.).

**Subgenus *Idiocera* Dale**

1842. *Limnobia (Idiocera)* Dale; Ann. Mag. Nat. Hist., 8: 431, 433.

1913. *Ptilostena* Bergroth; Ann. Mag. Nat. Hist., (8) 11: 575-576.

*Key to Species*

(Based in part on male characters)

1. Wings heavily patterned with dark brown, especially in the outer radial field 2  
Wings immaculate, except for the feebly indicated stigmal area ..... 3
2. Male hypopygium with the outer lobe of basistyle short and stout, shorter than the outer dististyle; inner dististyle as shown (Fig. 49, D) ..... ***blanda***  
Male hypopygium with the outer lobe of basistyle long and slender, longer than the outer dististyle; inner dististyle as shown (Fig. 49, E) ..... ***gaigei***
3. Male hypopygium with the outer arm of middle dististyle less than twice the flattened, paddle-shaped inner arm; inner dististyle with the spine at extreme apex; aedeagus not blackened and spinous at tip, the apex curved into a weak beak-like crook (Fig. 49, C) ..... ***apicispina***  
Male hypopygium with the outer arm of middle dististyle a long slender spine, the inner arm correspondingly reduced in size; inner dististyle with an acute spine on lateral margin at near two-thirds the length; aedeagus conspicuously blackened at apex, bearing powerful paired spines before tip (Fig. 49, F) ..... ***mathesoni***

***Gonomyia (Idiocera) apicispina* Alex.** (Fig. 49, C).

1926. *Gonomyia (Ptilostena) apicispina* Alexander; Insec. Inscit. Menst. 14: 117-118.

Very similar to *mathesoni*, differing especially in the structure of the male hypopygium (Fig. 49, C). ♂. L. about 4 mm.; w. 5.2 mm. ♀. L. about 5.8 mm.; w. 6.3 mm.

(June) Ind.

FIGURE 49. *Gonomyia*; male hypopygia.

- |   |   |
|---|---|
| A. <i>Gonomyia</i> ( <i>Lipophleps</i> ) <i>manca</i> (O. S.) | F. <i>G.</i> ( <i>I.</i> ) <i>mathesoni</i> Alex.       |
| B. <i>G.</i> ( <i>L.</i> ) <i>puer</i> Alex.                  | G. <i>G.</i> ( <i>Gonomyia</i> ) <i>bidentata</i> Alex. |
| C. <i>G.</i> ( <i>Idiocera</i> ) <i>apicispina</i> Alex.      | H. <i>G.</i> ( <i>G.</i> ) <i>currani</i> Alex.         |
| D. <i>G.</i> ( <i>I.</i> ) <i>blanda</i> O. S.; <i>id.</i>    | I. <i>G.</i> ( <i>G.</i> ) <i>mainensis</i> Alex.       |
| E. <i>G.</i> ( <i>I.</i> ) <i>gaigei</i> Rog.; <i>id.</i>     | J. <i>G.</i> ( <i>G.</i> ) <i>subcinerea</i> O. S.      |

Symbols: *a*, aedeagus; *b*, basistyle; *d*, dististyle; *g*, gonapophysis; *id*, inner dististyle; *md*, intermediate dististyle; *od*, outer dististyle; *p*, phallosome.



**G. (*Idiocera*) *blanda* O. S.** (Figs. 47, I; 49, D).

1859. *Gonomyia blanda* Osten Sacken, Proc. Acad. Nat. Sci. Philadelphia, 1859: 231.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 4, fig. 17 (hyp.); 1869. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 24, fig. 5 (wing); 1908. Alexander, Proc. Acad. Nat. Sci. Philadelphia, pl. 26, fig. 24 (wing), pl. 29, figs. 68, 69 (hyp.); 1916. Alexander, Cfs. N. Y., 1, pl. 36, fig. 90 (wing); 1919. Dickinson, Cfs. Wisc., p. 196, fig. 82 (wing); 1932.

Mesonotum grayish brown, the pleura more yellowish. Femora conspicuously darkened at tips. Wings (Fig. 47, I). Male hypopygium (Fig. 49, D). ♂. L. 4.2-4.5 mm.; w. 5.5 mm. ♀. L. 5.5-6 mm.; w. 6-7 mm.

(June, July) Ont., Que., N. S., N. H., Vt., Mass., N. Y., westw. to Mich., Wisc. and Mo., southw. to S. C., Ga. and n. Fla.

Connecticut.—East River, July 16-20, 1910 (Ely).

**G. (*Idiocera*) *gaigei* Rog.** (Fig. 49, E).

1931. *Gonomyia (Ptilostena) gaigei* Rogers: Pub. Univ. Oklahoma Biol. Surv., 3: 333-335.

Very close to *blanda* but distinct in the details of structure of the male hypopygium (Fig. 49, E). Vein *Sc* short.

(June) Okla.

**G. (*Idiocera*) *mathesoni* Alex.** (Fig. 49, F).

1915. *Gonomyia (Gonomyia) mathesoni* Alexander: Ent. News, 26: 170-172.

Figs.—Alexander, *Ibid.*, 26: 171, fig. 1 (wing), 2, 3 (hyp.); 1915. Alexander, Proc. Acad. Nat. Sci. Philadelphia, 518, pl. 26, fig. 23 (wing); 1916. Alexander, Cfs. N. Y., 1, pl. 36, fig. 89 (wing); 1919. Dickinson, Cfs. Wisc., p. 196, fig. 81 (wing); 1932.

General coloration yellow, the praescutum indistinctly striped with reddish brown. Pleura white, striped longitudinally with reddish brown. Wings subhyaline, the stigma barely indicated, veins  $R_{1+2}$  and  $R_3$  approximated at margin. Abdominal tergites dark brown, the caudal margins narrowly yellow. Male hypopygium (Fig. 49, F). ♂. L. 5-5.4 mm.; w. 6-6.5 mm. ♀. L. 6.5-7 mm.; w. 6.2-7 mm.

(June-Aug.) N. S., N. H., Vt., Mass., Ct. and N. Y., westw. to Wisc., Mo. and Ia., southw. to N. C.

Connecticut.—Kent Falls, July 23-24, 1931 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.).

### Subgenus *Gonomyia* Meigen

#### Key to Species

(Based chiefly on male characters)

- |  |   |
|--|---|
| 1. Wings with cell <i>1st M</i> <sub>2</sub> open by atrophy of basal section of <i>M</i> <sub>3</sub> ( <i>coognatella</i> group) ..... | 2 |
| Wings with cell <i>1st M</i> <sub>2</sub> closed (Fig. 47, J, K) .....   | 6 |

2. Male hypopygium with the inner arm of inner dististyle bifid (Fig. 48, C, E) ..... 3  
 Male hypopygium with inner arm of inner dististyle simple (Fig. 48, B, D, F) ..... 4
3. Male hypopygium with outer dististyle a very long slender rod, with only three or four setae; inner arm of inner dististyle very long and slender, the stem longer than the arms (Fig. 48, C) ..... *cognatella*  
 Male hypopygium with the outer dististyle stouter, fringed along margin with several setae; inner arm of inner dististyle short, the stem stout, shorter than the arms (Fig. 48, E) ..... *kansensis*
4. Outer dististyle a short powerful arm, dilated at apex, provided with setae; gonapophyses with a marginal spine that is directed caudad (Fig. 48, F) ..... *reflexa*  
 Outer dististyle a long, sinuous, chitinized arm, without setae; gonapophyses produced into strong, erect, chitinized points (Fig. 48, A, B, D) ..... 5
5. Gonapophyses small, the beak-like points feebly sclerotized; outer dististyle only slightly prolonged into an apical spine (Fig. 48, D) ..... *florens*  
 Gonapophyses appearing as powerful, straight, heavily sclerotized spikes; outer dististyle produced into a powerful acute spine (Fig. 48, A, B) *armigera*
6. Wings with vein  $R_s$  shorter than  $R_{2+3+4}$ , the latter nearly straight;  $R_3$  short and straight (Fig. 47, K) (*noveboracensis* group) ..... *noveboracensis*  
 Wings with  $R_s$  subequal to or longer than the arcuated  $R_{2+3+4}$ ;  $R_3$  longer, gently sinuous (Fig. 47, J) (*subcinerea* group) ..... 7
7. Male hypopygium with the outer dististyle short and stout, at apex nearly truncate, sclerotized; outer arm of inner dististyle entirely pale (Fig. 49, I) ..... *mainensis*  
 Male hypopygium with the outer dististyle slender, the apex not sclerotized and only very obliquely truncated; outer arm of inner dististyle heavily blackened ..... 8
8. Outer arm of inner dististyle obtuse and weakly bidentate at apex; gonapophyses equal in size, pale throughout (Fig. 49, G) ..... *bidentata*  
 Outer arm of inner dististyle an acute spine; gonapophyses unequal in size, heavily blackened ..... 9
9. Inner dististyle bearing two, or, in cases, three, blackened spines of various sizes, the outermost largest (Fig. 49, H) ..... *currani*  
 Inner dististyle a single powerful black spine, basal in position, with a more slender outer pale spinous point (Fig. 49, J) ..... *subcinerea*

The male genitalia of the members of the *cognatella* group (Fig. 48) show several features in common. There are two dististyles, the outer one simple but showing a considerable diversity of structure in the different species. Inner style very complex, divided into two principal arms, the longest of which is sometimes deeply split (*cognatella*, *kansensis*), in the other local species simple. The longest arm is strongly bent upon itself close to base and here is broken or fractured. Gonapophyses paired, compressed, variously lobed on lower margin. Aedeagus likewise compressed and variously lobed and notched on margin.

**Gonomyia** (*Gonomyia*) *armigera* Alex. (Fig. 48, A, B).

1922. *Gonomyia* (*Gonomyia*) *armigera* Alexander: Occas. Papers Mus. Zool. Univ. Michigan, 127: 4-5.

*Cognatella* group; rostrum and palpi black. Antennae with basal segments yellow; flagellum black. General coloration of mesonotum light brown; pleura yellow, with a conspicuous dark brown longitudinal stripe. Legs yellow. Abdominal tergites dark brown, the segments narrowly ringed caudally with yellow. Male hypopygium (Fig. 48, A, B). ♂. L. 4.8-5 mm.; w. 4.5-5 mm.

(June) N. Y., s. Ind.

**G. (*Gonomyia*) *bidentata* Alex.** (Figs. 49, G; 47, J).

1922. *Gonomyia* (*Gonomyia*) *bidentata* Alexander; *Ibid.*, 127:3-4.

*Subcinerea* group; rostrum orange. A conspicuous brown spot on anepisternum. Male hypopygium (Fig. 49, G). ♂. L. 4.2-4.6 mm.; w. 5.5-5.8 mm. ♀. L. 4.8-5.4 mm.; w. 5.4-5.8 mm.

(July-Sept.) N. B., Me., N. H., Vt., Mass., N. Y., westw. and southwestw. to Ind. and Wisc.

Connecticut.—Kent Falls, July 23-24, Aug. 19, 1931 (C. P. A.); Norfolk, Sept. 6, 1928 (G. C. C.), Sept. 11, 1928 (C. P. A.); Sharon, Sept. 5, 1928 (G. C. C.).

**G. (*Gonomyia*) *cognatella* O. S.** (Fig. 48, C).

1859. *Gonomyia cognatella* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859:230.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 4, fig. 18 (hyp.); 1869. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 24, fig. 4 (wing); 1908. Alexander, Proc. Acad. Nat. Sci. Philadelphia, pl. 26, fig. 29 (wing), pl. 29, figs. 73-75 (hyp.); 1916. Alexander, Cfs. N. Y., 1, pl. 36, fig. 93 (ven.); 1919. Dickinson, Cfs. Wisc., p. 197, fig. 84 (wing); 1932.

Type of *cognatella* group; see general description under *armigera*. Male hypopygium (Fig. 48, C). ♂. L. about 4.5 mm.; w. 4.5-5 mm.

(June, July) Ct., N. Y., westw. to Wisc., Ia. and Mo., southw. to Va., S. C., Ind. and Ill.

Connecticut.—East River, July 5, 1910 (Ely).

**G. (*Gonomyia*) *currani* Alex.** (Fig. 49, H).

1926. *Gonomyia* (*Gonomyia*) *currani* Alexander; Can. Ent., 58:239.

*Subcinerea* group. Rostrum light yellow; head dark gray. Praescutum with three confluent grayish brown stripes; scutellum yellow. Wings with  $Sc_1$  ending some distance beyond origin of *Rs*. Male hypopygium (Fig. 49, H). ♂. L. 3.8-4 mm.; w. 4.5-4.8 mm. ♀. L. 5-5.4 mm.; w. 6.2-6.5 mm.

(Late May, June) Ont., Mass., Ct., N. Y., southw. to N. C.

Connecticut.—Middletown, May 31, 1929 (R. C. N.).

**G. (*Gonomyia*) *mainensis* Alex.** (Fig. 49, I).

1919. *Gonomyia* (*Gonomyia*) *mainensis* Alexander; Can. Ent., 51:163.

*Subcinerea* group. Thoracic pleura light yellow, distinctly striped with purplish brown. Male hypopygium (Fig. 49, I). ♂. L. about 5 mm.; w. 5.6 mm.

(Aug.) Me.

**G. (*Gonomyia*) *kansensis* Alex.** (Fig. 48, E).

1918. *Gonomyia* (*Gonomyia*) *kansensis* Alexander; *Ibid.*, 50:158-160.

*Cognatella* group. Male hypopygium (Fig. 48, E). ♂. L. about 4.5-4.6 mm.; w. 4.7-4.8 mm.

(May, June) Ind., Ill. and Mich., westw. to Kans., Mo. and Okla.

**G. (*Gonomyia*) *florens* Alex. (Fig. 48, D).**1916. *Gonomyia* (*Gonomyia*) *florens* Alexander; *Ibid.*, 48:316-317.

Figs.—Alexander, Proc. Acad. Nat. Sci. Philadelphia, pl. 26, fig. 28 (wing), pl. 29, fig. 71 (hyp.); 1916. Alexander, Cfs. N. Y., 1, pl. 36, fig. 92 (wing); 1919.

*Cognatella* group. Male hypopygium (Fig. 48, D). ♂. L. 4-4.2 mm.; w. 5.2-5.7 mm. ♀. L. about 5.6-5.8 mm.; w. 6.6-6.8 mm.

(June) Ont., Que., Vt., N. Y., westw. to Ind., Ill. and Mich., southw. to N. C. and Tenn.

**G. (*Gonomyia*) *noveboracensis* Alex. (Fig. 47, K).**1916. *Gonomyia* (*Gonomyia*) *noveboracensis* Alexander; *Ibid.*, 48:319-320.

Figs.—Alexander, Proc. Acad. Nat. Sci. Philadelphia, pl. 26, fig. 30 (wing), pl. 30, figs. 79-80 (hyp.); 1916. Alexander, Cfs. N. Y., 1, pl. 36, fig. 92 (wing); 1919.

Type of *noveboracensis* group. Antennae black throughout; head gray. Pleura yellowish white with two brown stripes. Wings with vein  $R_3$  short and oblique; cell 1st  $M_2$  closed (Fig. 47, K). Male hypopygium with a complicated development of structures surrounding the phallosome. ♂. L. about 3.8-4 mm.; w. 4.5-4.8 mm. ♀. L. about 5 mm.; w. about 4.5 mm.

(June) S. shore of Gaspé, Que., westw. to Mich. and Ind., southw. to Vt., Mass. and N. Y.

An isolated group, including also *aciculifera* Alex. (w. N. Amer.) and *edwardsi* Lacks. (n. c. Europe).**G. (*Gonomyia*) *reflexa* Alex. (Fig. 48, F).**1927. *Gonomyia* (*Gonomyia*) *reflexa* Alexander; Journ. N. Y. Ent. Soc., 35: 59-60.*Cognatella* group. Male hypopygium (Fig. 48, F). ♂. L. about 4 mm.; w. 4.6-5.2 mm. ♀. L. about 5 mm.; w. about 5 mm.

(July) Mich.

**G. (*Gonomyia*) *subcinerea* O. S. (Fig. 49, J).**1859. *Gonomyia subcinerea* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 231.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 2, fig. 4 (wing); 1869. Alexander, Proc. Acad. Nat. Sci. Philadelphia, pl. 26, fig. 33 (wing), pl. 26, figs. 83-85 (hyp.); 1916. Alexander, Cfs. N. Y., 1, pl. 36, fig. 95 (wing); 1919.

Type of *subcinerea* group. Brown to grayish brown, variegated with sulphur-yellow to pale yellow. Rostrum obscure yellow. Thoracic pleura pale yellow, with a small dark spot on laterocervix and propleura only. Abdominal tergites yellow, with large dark brown central areas. Male hypopygium (Fig. 49, J). ♂. L. 4.8-5.5 mm.; w. 5-6 mm. ♀. L. about 5.5-6 mm.; w. 5-6 mm.

(June-Sept.) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., westw. to Sask., Mont., Kan. and Mo., southw. to S. C., Ga. and n. Fla.



Connecticut.—East River, July 3, 1910 (Ely); Granby, June 8, 1929 (C. P. A.); Hartland, June 8, 1929 (C. P. A.); Kent Falls, June 12-13, 1931 (C. P. A.); Manitic Lake, Aug. 6, 1929 (C. P. A.); Middletown, June 16, 1909 (C. W. J.); Norfolk, June 9, 1929 (C. P. A.); Riverton, June 8, 1929 (C. P. A.); Tyler Lake, May 30, June 13, 1931 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.).

### 3. Subtribe ERIOPTERARIA

#### Rhabdomastix Skuse

1889. *Rhabdomastix* Skuse; Proc. Linn. Soc. New South Wales, (2) 4: 828-829.

#### Subgenus Sacandaga Alexander

1911. *Sacandaga* Alexander; Ent. News, 22: 351-352.

The subgenus *Sacandaga* is represented in our fauna by but few species. Adults may be swept from rank herbage along the margins of streams, where they appear in small swarms at dusk. Of these species, *flava* and *hudsonica* are found along larger streams or rivers; *brittoni* and *subarctica* along margins of brooks or minor streams. The immature stages occur in wet earth.

#### Key to Species

1. Vein  $R_2$  present as a weak element; *m-cu* at or close to fork of  $M$  (Fig. 47,  $M$ ); northern to Arctic ..... 2  
     Vein  $R_2$  lacking; *m-cu* from one-third to one-half its own length beyond the fork of  $M$  (Fig. 47,  $L$ ) ..... 3
2. Veins  $R_3$  and  $R_4$  strongly divergent, cell  $R_{3+4}$  at margin nearly twice as wide as cell  $R_2$ ; vein  $R_3$  short, about two-fifths  $R_4$ ; macrotrichia of veins scanty, there being none on  $R_3$ ,  $R_{3+4}$  or  $R_{2+3+4}$  ..... *caudata*  
     Veins  $R_3$  and  $R_4$  only slightly divergent, cell  $R_{3+4}$  at margin subequal in extent to cell  $R_2$ ; vein  $R_3$  long, oblique in position, nearly one-half as long as  $R_4$  (Fig. 47,  $M$ ); macrotrichia of veins abundant, occurring on  $R_3$ ,  $R_{3+4}$ ,  $R_{2+3+4}$  and on the distal third of  $R_5$  ..... *subarctica*
3. Size large (wing, ♂, 7.5-8.5 mm.); general coloration yellow, the head and thorax conspicuously patterned with grayish brown ..... *hudsonica*  
     Size smaller (wing, ♂, not exceeding 7 mm.); general coloration yellow, unmarked except for reddish brown thoracic areas, when these are present ..... 4
4. Size small (wing, ♂, about 5 mm.); coloration clear sulphur-yellow; vein  $R_4$  of wings gently curved, provided with scanty macrotrichia; wings hyaline, without stigma; veins pale and but little conspicuous (Fig. 47,  $L$ ) ..... *brittoni*  
     Size larger (wing, ♂, 6.5-7 mm.); coloration ochreous-yellow, the praescutum with reddish stripes; vein  $R_4$  of wings long and nearly straight, usually without macrotrichia (a very few scattered ones occurring in rare cases); wings hyaline, the stigma pale brown but usually evident; veins pale brown, distinct ..... *flava*

#### Rhabdomastix (*Sacandaga*) *brittoni* Alex. (Fig. 47, $L$ ).

1933. *Rhabdomastix* (*Sacandaga*) *brittoni* Alexander; Journ. N. Y. Ent. Soc., 41: 93.

Macrotrichia on distal half of the gently curved vein  $R_4$ . ♂.  $L$ . 4-4.2 mm.; w. 4.8-5 mm. ♀.  $L$ . 5.5 mm.; w. 5.5 mm.

(July) N. H., Mass., Ct. (Transition).

Connecticut.—Kent Falls, July 23-24, 1931 (C. P. A.); types.

**R. (*Sacandaga*) *caudata* (Lundb.)**

1898. *Goniomyia* (*Empeda*) *caudata* Lundbeck: Vidensk. Meddel. fra den naturh. Foren., Copenhagen, 1898: 267, pl. 6, fig. 15 (wing).

Fig.—Alexander, Cfls. N. Y., 1, pl. 36, fig. 96 (wing); 1919.

Greenland, Baffinland. (Arctic).

**R. (*Sacandaga*) *flava* (Alex.)**

1911. *Sacandaga flava* Alexander; Ent. News, 22: 351-352.

Figs.—Alexander, *Ibid.*, 22: 349, fig. 1 (head); 350, fig. 2 (tarsus); 352, fig. 3 (wing); 1911. Alexander, Cfls. N. Y., 1, pl. 36, fig. 97 (ven.); 1919.

Pleura variegated with reddish brown. Halteres and legs yellow. Wings iridescent. ♂. L. 5.5-6 mm.; w. 6.5-7 mm. ♀. L. 6-6.5 mm.; w. 6.5-7 mm.

(June, July) Que., N. S., N. H., Vt., Mass., Ct., N. Y., southw. to Tenn.

Connecticut.—W. Granby, June 8, 1929 (G. C. C.).

**R. (*Sacandaga*) *hudsonica* Alex.**

1933. *Rhabdomastix* (*Sacandaga*) *hudsonica* Alexander; Journ. N. Y. Ent. Soc., 41: 92-93.

Center of vertex, three praescutal stripes, centers of scutal lobes, posterior two-thirds of mediotergite and conspicuous areas on pleura grayish brown. Antennae black; scape yellow. Tips of femora and tibiae, and all tarsi, brownish black. Wings subhyaline; veins brown, conspicuous. ♂. L. 6-7 mm.; w. 7.5-8.5 mm. ♀. L. 7 mm.; w. 8.5 mm.

(June). Que.-N. Gaspé. (Hudsonian).

**R. (*Sacandaga*) *subarctica* Alex. (Fig. 47. M).**

1933. *Rhabdomastix* (*Sacandaga*) *subarctica* Alexander; Journ. N. Y. Ent. Soc., 41: 91-92.

♀. L. 4.5-5 mm.; w. 5-5.5 mm.

(June) Que.-N. Gaspé. (Hudsonian).

### Symplecta Meigen

1825. *Helobia* St. Fargeau; Encycl. Method., Ins., 10: 585 (procc.).

1830. *Symplecta* Meigen; Syst. Besch. Zweifl. Ins., 6: 282.

A small group containing only seven species, of which one, *hybrida* Meigen, has a vast range throughout Eurasia, while a second, *cana* Walker, is similarly very wide-spread throughout North America, as far south as the mountains of Central America. The adult flies appear very early in the Spring, frequenting vegetation near water. The immature stages are to be found in saturated earth. Edwards has recently placed the present group as a subgenus of *Erioptera* and this appears to be its proper arrangement. It may be noted that as far as known there is but a single species in North America and this should

be called *cana*; the very numerous American records of *hybrida* all pertain to the species considered below.

**Symplecta cana** (Walker). (Fig. 47, N).

1804. *Limonia hybrida* Meigen; Klass., 1: 57, pl. 3, fig. 17. (Erroneous for American records).  
 1818. *Limnobia punctipennis* Meigen; Syst. Besch. Zweifl. Ins., 1: 147. (Erroneous for American records).  
 1848. *L. cana* Walker; List Dipt. Brit. Mus., 1: 48.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 1, fig. 20 (wing); 1869. Snodgrass, Journ. N. Y. Ent. Soc., 11, pl. 11, fig. 15 (ovipos.); 1903. Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 8, figs. 10, 12 (hyp.); 1904. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 24, fig. 1 (ven.); 1908. Williston, Man. N. Amer. Dipt., Ed. 3, fig. 23 (entire insect), fig. 25, sub 21 (wing); 1908. Alexander, Cfs. N. Y., 1, pl. 37, fig. 98 (wing); 1919. Crampton, Insec. Inscit. Menst., 13, pl. 2, fig. 2; pl. 3, fig. 12 (thorax); 1925. Dickinson, Cfs. Wisc., p. 194, fig. 78 (wing); 1932.

General coloration gray, the praescutum with three brown stripes. Wings subhyaline, with a very restricted grayish brown pattern that is confined to the vicinity of the veins (Fig. 47, N). ♂. L. 4-5 mm.; w. 5-6 mm. ♀. L. 5-7 mm.; w. 5.5-8 mm.

(Late Feb. and Mar., into Spring; recurring in Fall) Almost universally distributed throughout the United States and Canada.

Connecticut.—East River, July 16, 1911 (Ely); Granby, Sept. 4, 1928 (G. C. C.); Hamden, Mar. 30, 1930 (R. B. F.); Middletown, Apr. 4-7, 1929 (R. C. N.); Norfolk, June 9, 1929 (C. P. A.); Riverton, June 8, 1929 (C. P. A.).

**Trimicra** Osten Sacken

1861. *Trimicra* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1861: 290.

A small genus, including a single wide-spread species, *pilipes* (Fabr.), with other closely allied species, or perhaps races, in many parts of the World. I am considering the local fly as being a subspecies of *pilipes*. Similar representatives of the genus occur virtually throughout the entire Globe, including many of the most remote oceanic islands. The early stages occur in wet earth, near water.

In many parts of the World, a surprising range in size and relative pilosity is to be found within members of this group. This has led to the belief that even in a restricted area two or more species occur, but all of these seem to refer to the single fly, *pilipes*.

Edwards now considers *Trimicra* as being a subgenus of *Erioptera*.

**Trimicra pilipes anomala** O. S. (Fig. 50, A).

1861. *Trimicra anomala* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1861: 290.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 2, fig. 1 (wing); 1869 (as *pilipes*). Snodgrass, Trans. Amer. Ent. Soc., 30, pl. 8, fig. 9 (hyp.); 1904. Alexander, Cfs. N. Y., 1, pl. 37, fig. 99 (ven.); 1919.

General coloration buffy, the praescutum almost covered by three confluent gray stripes, with an additional velvety-black capillary median vitta. Pleura with brown and yellowish longitudinal lines. Legs

chiefly yellow, conspicuously hairy; femora with brown subterminal ring. Wings (Fig. 50, A) subhyaline, the veins more or less seamed with darker. Abdomen dark brown, the lateral and caudal margins of the tergites obscure yellow; hypopygium large, yellow. ♂. L. 6-8 mm.; w. 8-11 mm. ♀. L. 6-7 mm.; w. 6-8 mm.

(June-Sept.) Mass., R. I., N. Y., N. J., Md., westw. to Cal., southw. to Fla., Tex. and Mex. (Cosmopolitan).

### Erioptera Meigen

1803. *Erioptera* Meigen; Illiger's Mag., 2:262.

A very extensive genus of small crane-flies, including many of our commonest and best-known species. Chiefly for the sake of convenience, the genus is divided into a number of subgenera, of which seven occur within our limits. These groups are based on usually slight venational features which are sometimes difficult to maintain. The adult flies occur on vegetation near water, the early stages living in moist earth in this same habitat. Besides the subgenera discussed below, Edwards has now placed the two preceding genera, *Symplecta* Meigen and *Trimicra* Osten Sacken, as subgenera in this major genus.

#### Key to Subgenera

1. Wings with cell  $R_3$  short, vein  $R_3$  shorter than the petiole of cell  $R_3$ ; vein  $R_2$  some distance before origin of vein  $R_3$  (Fig. 50, B, C); antennae ( $\delta$ ) with very long verticils ..... 2  
 Wings with cell  $R_3$  deep, vein  $R_3$  longer than the petiole of cell  $R_3$ ; vein  $R_2$  lying distad of origin of vein  $R_3$  (Fig. 50, D-H); antennal verticils not conspicuously lengthened ..... 3
2. Wings with cell  $1st\ M_2$  open by atrophy of  $m$  with  $m-cu$  at fork of  $M$ ; veins  $R_3$  and  $R_4$  generally parallel, cell  $R_3$  having a normal *Erioptera* shape but shorter; at margin, cells  $R_2$  and  $R_3$  subequal in extent or with  $R_3$  approximately twice  $R_2$ . (Fig. 50, B) ..... **Erioptera: Empeda**  
 Wings with cell  $1st\ M_2$  closed, with  $m-cu$  some distance beyond fork of  $M$ ; veins  $R_3$  and  $R_4$  strongly diverging, cell  $R_3$  having a *Gonomyia*-like shape; at margin, cell  $R_3$  nearly three times as extensive as cell  $R_2$  (Fig. 50, C) ..... **Erioptera: Gonempeda**
3. Wings with vein  $2nd\ A$  arcuated, the distal portion being deflected strongly cephalad so cell  $1st\ A$  at midlength is usually as broad as, or broader than, it is at margin; cell  $1st\ M_2$  opening into cell  $2nd\ M_2$  by atrophy of  $m$  (Fig. 50, D) ..... **Erioptera: Erioptera**  
 Wings with Anal veins divergent, cell  $1st\ A$  being widest at margin; vein  $2nd\ A$  straight or essentially so; cell  $1st\ M_2$  closed or open ..... 4
4. Wings with cell  $1st\ M_2$  open (Fig. 50, E) ..... 5  
 Wings with cell  $1st\ M_2$  closed, the basal section of  $M_3$  greatly exceeding  $m$  in length (Fig. 50, F-H) ..... 6
5. Wings with cell  $1st\ M_2$  opening into cell  $M_3$  by atrophy of basal section of  $M_3$  (Fig. 50, E) ..... **Erioptera: Mesocyphona**  
 Wings with cell  $1st\ M_2$  opening into cell  $2nd\ M_2$  by atrophy of  $m$  ..... **Erioptera: Psiloconopa (part)**
6. Wings with a more or less complete spur from the angulated basal section of vein  $M_3$  jutting basad, into cell  $1st\ M_2$ , sometimes completely dividing the cell (Fig. 50, G) ..... **Erioptera: Hoplolabis**  
 Wings without such a spur (Fig. 50, F, H) ..... 7
7. Wings with cell  $1st\ M_2$  small (Fig. 50, F); coloration of local species polished black and yellow ..... **Erioptera: Psiloconopa (part)**  
 Wings with cell  $1st\ M_2$  very elongate,  $m$  lying far distad, the distal section of vein  $M_{1+2}$  shorter than the cell (Fig. 50, H) ..... **Erioptera: Ilisia**



Subgenus **Empeda** O. S.

1869. *Empeda* Osten Sacken; Mon. Dipt. N. Amer., 4: 183-184.

A wide-spread group, with two species occurring in our limits. Very recently, Edwards has recognized the genus *Cheilotrichia* Rossi (Verz. Oesterreich. Dipt., 1848: 12) as valid and has placed the present subgenus, as well as the next, *Gonempeda* Alexander, as subgenera therein.

## Key to Species

1. Wings subhyaline, immaculate; vein  $R_3$  longer than  $R_{3+4}$  (Fig. 50, B) **stigmatica**  
 Wings dusky gray with the stigma and a narrow clouding along cord pale brown; vein  $R_3$  subequal to or shorter than  $R_{3+4}$  ..... **noctivagans**

**Erioptera** (*Empeda*) **noctivagans** Alex.

1917. *Erioptera* (*Empeda*) *noctivagans* Alexander; Can. Ent., 49: 200-201.

Fig.—Alexander, *Ibid.*, 49: 203, pl. 12, fig. 5 (wing); 1917.

General coloration grayish brown, the humeral region of praescutum yellow. Halteres yellow. Legs brown. ♂. L. 3-3.2 mm.; w. 4.6-4.8 mm. ♀. L. 3.8-4 mm.; w. 5.5-5.8 mm.

(Oct.) Va., Fla. (Austral).

**E.** (*Empeda*) **stigmatica** (O. S.) (Fig. 50, B).

1869. *Empeda stigmatica* Osten Sacken; Mon. Dipt. N. Amer., 4: 184-185.

Figs.—Alexander, Cfls. N. Y., 1, pl. 35, fig. 85 (ven.); 1919. Crampton, Insec. Inscit. Menst., 13, pl. 3, fig. 11 (thorax); 1925.

General coloration brownish gray; pleura more buffy. Halteres yellow. Legs chiefly obscure yellow, the outer segments darkened. Abdomen pale brown; hypopygium yellow. ♂. L. 4-4.5 mm.; w. 4-4.5 mm. ♀. L. 4.5-5 mm.; w. 4.5-5 mm.

(May-Aug.) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., westw. to Mich., southw. to N. C. and Tenn.

Connecticut.—Granby, June 8, 1929 (C. P. A.); Hartland, June 9, 1929 (C. P. A.); Norfolk, June 9, 1929 (C. P. A.); Riverton, June 8, 1929 (C. P. A.). Salisbury, Sept. 5, 1928 (G. C. C.); Tyler Lake, June 13, 1931 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.).

Subgenus **Gonempeda** Alex.

1924. *Gonempeda* Alexander; Proc. U. S. Nat. Mus., 64, art. 10: 8.

A single species in the local fauna. The adult flies occur in swarms beneath trees and shrubs growing along small streams. The early stages presumably live in the saturated earth at the water's margin.

Edwards now considers that this subgenus, as well as *Empeda* Osten Sacken, are more properly subgenera of the Palearctic group *Cheilotrichia* Rossi.

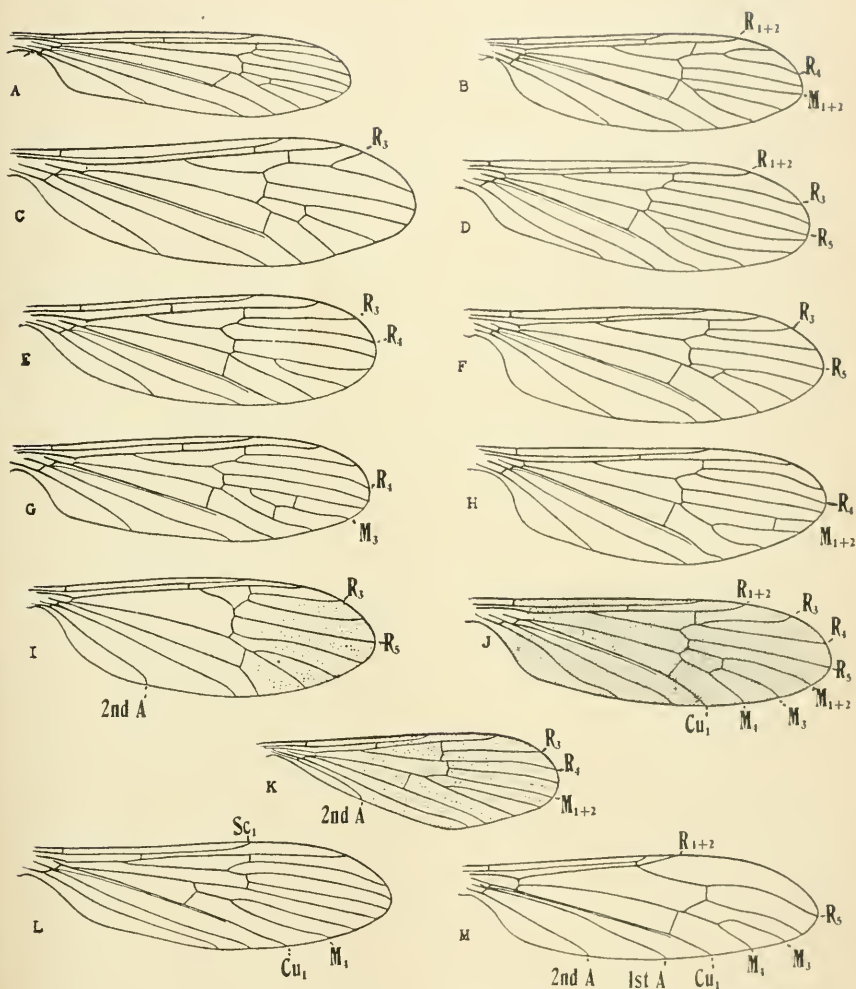


FIGURE 50. Eriopterini; venation.

- |   |  |
|---|--|
| A. <i>Trimicra pilipes anomala</i> O. S.        | H. <i>E. (Ilisia) laccis</i> Alex.                   |
| B. <i>Erioptera (Empeda) stigmatica</i> (O. S.) | I. <i>Cryptolabis (Cryptolabis) paradoxa</i> (O. S.) |
| C. <i>E. (Gonempeda) nyctops</i> Alex.          | J. <i>Osmosia nubila</i> (O. S.)                     |
| D. <i>E. (Erioptera) chrysocoma</i> (O. S.)     | K. <i>Tasiocera (Dasymolophilus) niphadias</i> Alex. |
| E. <i>E. (Mesocyphona) needhami</i> Alex.       | L. <i>Molophilus cramptoni</i> Alex.                 |
| F. <i>E. (Psiloconopa) cramptonella</i> (Alex.) | M. <i>Toxorhina (Toxorhina) muliebris</i> (O. S.)    |
| G. <i>E. (Hoplolabis) armata</i> O. S.          |  |

Symbols: A, Anal; Cu, Cubitus; M, Media; R, Radius; Sc, Subcosta.

**Erioptera** (*Gonempeda*) **nyctops** Alex. (Figs. 50, C; 51, B).

1916. *Erioptera* (*Empeda*) *nyctops* Alexander; Proc. Acad. Nat. Sci. Philadelphia, 1916: 503-505.

Figs.—Alexander, *Ibid.*, pl. 27, fig. 36 (wing), pl. 31, fig. 98 (hyp.); 1916. Alexander, Cfs. N. Y., 1, pl. 35, fig. 84 (wing); 1919.

General coloration pale yellow throughout, only the eyes conspicuously black. Wings (Fig. 50, C) with *Sc* very long. Male hypopygium (Fig. 51, B) with the basistyle produced far beyond the level of apices of either dististyle, gradually narrowed to an acute point. ♂. L. 3.8-4 mm.; w. 4.3-4.5 mm. ♀. L. 3.8-4 mm.; w. 4.5-4.8 mm.

(Late May, June) Que., Me., N. H., Vt., N. Y., Ct., westw. to Mich., southw. to N. C. and Tenn.

Connecticut.—Hartland, June 9, 1929 (C. P. A.); Riverton, May 30, June 12, 1931 (C. P. A.); Tyler Lake, May 30, 1931 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.).

**Subgenus Erioptera** Meig.*Key to Species*

(Based especially on male characters)

- |  |                         |
|--|-------------------------|
| 1. Knobs of halteres dark brown .....  | 2                       |
| Halteres pale throughout .....   | 4                       |
| 2. General coloration of body polished black; femora obscure yellow, the tips blackened; male hypopygium (Fig. 51, G) .....  | <b>ebenina</b>          |
| General coloration of body dull brown; legs brown or black .....   | 3                       |
| 3. General coloration of mesonotum dull brown, the humeral region of praescutum scarcely brightened; pleura uniformly gray to brownish gray; male hypopygium with the inner dististyle a small simple structure that narrows gradually to a point (Fig. 52, E) .....                             | <b>uliginosa</b>        |
| General coloration of mesonotum brown, the lateral and humeral portions of praescutum conspicuously brightened; pleura obscure yellow, striped longitudinally with dark brown; male hypopygium with a conspicuous spine on outer margin of outer dististyle at near midlength (Fig. 52, B) ..... | <b>septemtrionis</b>    |
| 4. Wings with small darkened spots on crossveins and deflections; outer costal field and cell $R_2$ suffused with darker; fore femora chiefly blackened, the coloration produced in large part by long black setae .....   | 5                       |
| Wings unmarked; legs pale (more darkened in <i>villosa</i> ) .....   | 6                       |
| 5. Male hypopygium with the outer lobe of outer dististyle relatively slender; basal gonapophyses appearing as long straight spines (Fig. 51, E) .....   | <b>chrysocoma</b>       |
| Male hypopygium with the outer lobe of outer dististyle dilated; basal gonapophyses stout, at apex suddenly narrowed to an acute black spine that is surrounded by a group of setae (Fig. 51, F) .....   | <b>chrysocomoides</b>   |
| 6. General coloration of body and appendages pale green ( <i>chlorophylla</i> group) .....   | 7                       |
| General coloration of body and appendages yellow or brown, without green tinges .....  | 13                      |
| 7. Male hypopygium with the gonapophyses appearing as smooth polished horns (Fig. 51, C, D, I) .....   | 8                       |
| Male hypopygium with the gonapophyses appearing as flattened blades, the outer margin more or less serrulate (Figs. 51, H; 52, C, D, H) .....  | 10                      |
| 8. Both dististyles slender, gradually narrowed to acute tips (Fig. 51, D) .....   | <b>chlorophylloides</b> |
| Outer dististyle expanded into a paddle-like blade; inner style bearing a subterminal spinous point (Fig. 51, C, I) .....  | 9                       |
| 9. Outer dististyle with the apex microscopically roughened; inner style with a small blackened spine on outer margin some distance from tip (Fig. 51, C) .....  | <b>chlorophylla</b>     |

- Outer dististyle a dusky paddle-like blade, with smooth margins; inner style short and stout, with a small recurved spinous point at extreme tip (Fig. 51, I) ..... *gaspeana*
10. Inner dististyle with a long spinous point placed far before apex, to give a forked appearance to style (Figs. 51, H; 52, D) ..... 11  
 Inner dististyle not appearing forked at apex (Fig. 52, C, H) ..... 12
11. Outer dististyle narrow, the extreme tip truncated and blackened; gonapophyses slender (Fig. 51, H) ..... *furcifer*  
 Outer dististyle widened apically; gonapophyses heavily blackened, unusually broad, terminating in a spike-like point (Fig. 52, D) ..... *subfurcifer*
12. Inner dististyle with a setiferous spine at right angles to extreme apex (Fig. 52, C) ..... *subchlorophylla*  
 Inner dististyle without evident spine, the style appearing more or less foot-shaped, with a group of setae at the "heel." (Fig. 52, H) ..... *viridula*
13. General coloration of body dark brown; wings strongly tinged with brown; male hypopygium (Fig. 52, G) ..... *villosa*  
 General coloration of body light brown to pale yellow; wings yellow or only slightly infumed ..... 14
14. Mesonotal praescutum with distinct reddish brown stripes; posterior sclerites of mesonotum and pleura pale yellow, variegated with brown or reddish brown; male hypopygium (Fig. 52, F) ..... *vespertina*  
 Mesonotum and pleura uniformly pale yellow or orange ..... 15
15. General coloration orange or orange-yellow; front and restricted posterior orbits silvery; male hypopygium (Fig. 52, A) with the outer dististyle an elongate paddle-like blade; gonapophyses appearing as long, straight, black spikes, lying generally parallel to one another, jutting caudad from the genital chamber ..... *megophthalma*  
 General coloration pale yellow or whitish yellow; male hypopygium with both dististyles long and slender, subequal in length and size, their tips acute; gonapophyses short, bent at about a right angle into a long blackened spine that is not directed caudad ..... *straminea*

The use of male genitalic characters is quite imperative in the case of many of the above species, notably those of the so-called *chlorophylla* group.

**Erioptera** (*Erioptera*) **chlorophylla** O. S. (Fig. 51, C).

1859. *Erioptera chlorophylla* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 226.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 1, fig. 16 (wing); 1869. Alexander, Cfs. N. Y., 1, pl. 35, fig. 75 (wing); 1919. Dickinson, Cfs. Wisc., p. 192, fig. 75 (wing); 1932.

Type of the *chlorophylla* group. General coloration pale green. Eyes ( $\delta$ ) holoptic beneath, separated above. Ovipositor with long smooth cerci. Male hypopygium (Fig. 51, C).  $\delta$ . L. 4-4.5 mm.; w. 5-5.5 mm.  $\varphi$ . L. 5-5.5 mm.; w. about 6 mm.

(July, Aug.) Ont., Que., N. S., Me., N. H., N. Y., westw. to Ind. and Wisc. southw. to N. C., Tenn. and Fla.

Connecticut.—East River, July 9, 1910 (Ely); Hamden, July 12, 1932 (P. G.), July 31, 1928 (R. B. F.); Manitic Lake, Aug. 6, 1929 (C. P. A.); New Haven, Aug. 20, 1928 (G. B.).

**E.** (*Erioptera*) **chlorophylloides** Alex. (Fig. 51, D).

1919. *Erioptera chlorophylloides* Alexander; Bull. Brooklyn Ent. Soc., 14: 106-107.

Belongs to the *chlorophylla* group. General coloration pale green.



Eyes ( $\delta$ ) unusually large, broadly holoptic beneath. Ovipositor with cerci dark-colored, upcurved, the ventral margin microscopically serrulate. Male hypopygium (Fig. 51, D).  $\delta$ . L. 4.5 mm.; w. 5.8-6 mm.  $\eta$ . L. 5 mm.; w. 6.8-7 mm.

(June-early Aug.) Ont., Que., Me., Ct., westw. to Ill., Mich. and Colo., southw. to N. J. and Tenn.

Connecticut.—Manitic Lake, Aug. 6, 1929 (C. P. A.); Natchaug State Forest, June 14, 1933 (C. P. A.); Putnam, June 15, 1933 (C. P. A.); Stafford Springs, June 14, 1933 (C. P. A.).

**E. (*Erioptera*) *chrysocoma*** O. S. (Figs. 50, D; 51, E).

1859. *Erioptera chrysocoma* Osten Sacken: Proc. Acad. Nat. Sci. Philadelphia, 1859: 226.

Fig.—Alexander, Cfs. N. Y., 1, pl. 35, fig. 74 (wing): 1919.

Mesonotum chiefly obscure yellow; pleura more infuscated. Legs chiefly darkened; middle and hind femora yellow, the tips narrowly darkened; tibiae and tarsi infuscated. Wings (Fig. 50, D) yellow, the costal border broadly more saturated, golden-yellow, this color produced by trichia; small but conspicuous brown dots at  $Sc_1$ ,  $Sc_2$ ,  $R_2$ , tip of  $R_{1+2}$  and along cord; vein *2nd A* only gently sinuate. Abdomen orange-yellow, with a narrow dark median line. Male hypopygium (Fig. 51, E).  $\delta$ . L. 4.5-5.5 mm.; w. 5-6 mm.  $\eta$ . L. 6 mm.; w. 6.5 mm.

(June-early Aug.) Que., N. B., Me., N. H., Vt., Mass., N. Y., N. J., southw. to Va. and N. C.

Connecticut.—Hamden, June 30, 1932 (N. T.); Natchaug State Forest, June 14, 1933 (C. P. A.); Riverton, June 12, 1931 (C. P. A.); Saptree Run State Park, June 14, 1933 (C. P. A.).

**E. (*Erioptera*) *chrysocomoides*** Alex. (Fig. 51, F).

1929. *Erioptera* (*Erioptera*) *chrysocomoides* Alexander: Journ. N. Y. Ent. Soc., 37: 50-51.

Very similar to *chrysocoma*, differing conspicuously in the structure of the male hypopygium (Fig. 51, F). Anal veins more divergent, *2nd A* shorter. Outer radial field of wing more extensively suffused with darker.  $\delta$ . L. 4-4.5 mm.; w. 4.5-5 mm.  $\eta$ . L. 4.5 mm.; w. 4.5-5 mm.

(June, July) Mass., southw. to Tenn.

**E. (*Erioptera*) *ebenina*** Alex. (Fig. 51, G).

1926. *Erioptera* (*Erioptera*) *ebenina* Alexander: Can. Ent., 58: 237-238.

A very distinct and isolated species. Lateral pretergites light yellow; ventral pleurites silvery pruinose. Head dark gray. Ninth abdominal segment ( $\delta$ ) pale; hypopygium with the inner dististyle a short massive club (Fig. 51, G).  $\delta$ . L. 4-4.2 mm.; w. 5-5.5 mm.  $\eta$ . L. 4.2-4.5 mm.; w. 5-5.5 mm.

(Late May, June) Ont., N. Y., Ct.

Connecticut.—Manitic Lake, June 8, 9, 1929 (C. P. A.).

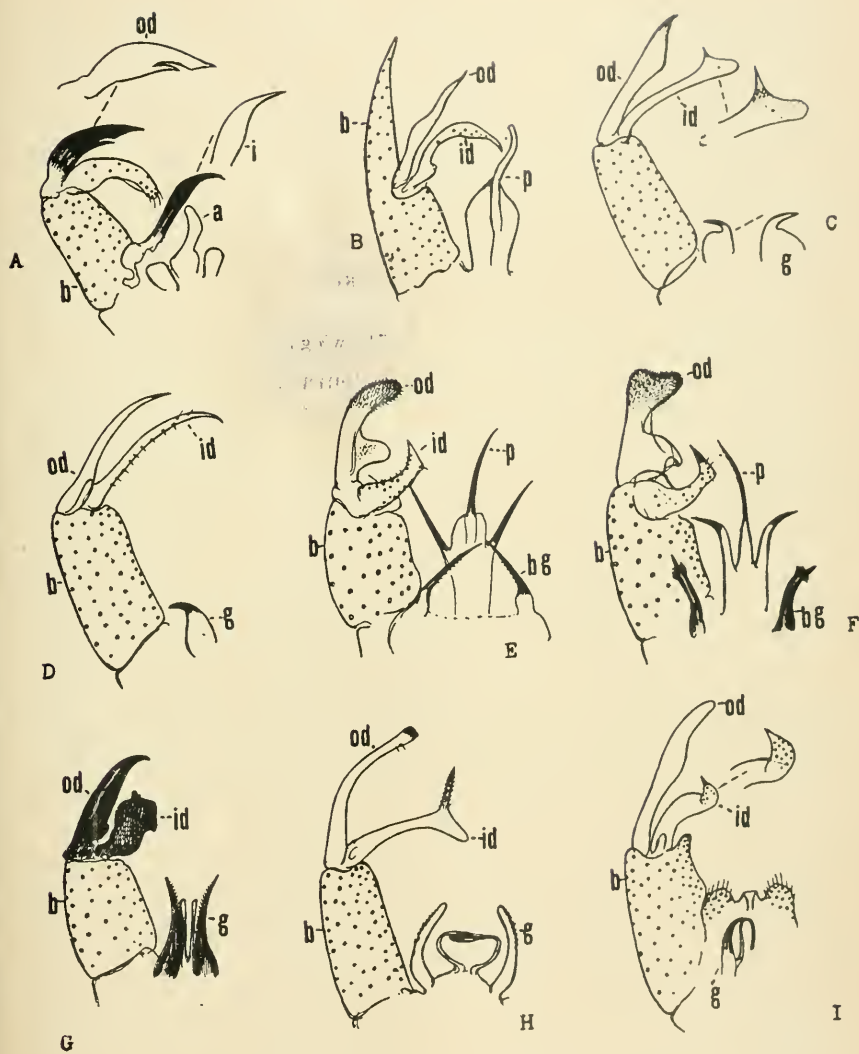


FIGURE 51. Eriopterini; male hypopygia.

A. *Lipsothrix sylvia* (Alex.)B. *Erioptera (Gonempeda) nyctops* Alex.C. *E. (Erioptera) chlorophylla* O. S.D. *E. (E.) chlorophylloides* Alex.E. *E. (E.) chrysocoma* O. S.F. *E. (E.) chrysocomoides* Alex.G. *E. (E.) ebena* Alex.H. *E. (E.) furcifer* Alex.I. *E. (E.) gaspeana* Alex.

Symbols: *a*, aedeagus; *b*, basistyle; *bg*, basal gonapophysis; *g*, gonapophysis; *i*, interbase; *id*, inner dististyle; *od*, outer dististyle; *p*, phallosome.

**E. (*Erioptera*) *furcifer* Alex. (Fig. 51, H).**

1919. *Erioptera furcifer* Alexander: Bull. Brooklyn Ent. Soc., 14: 108.

Belongs to the *chlorophylla* group. General coloration pale green. Ovipositor with the cerci long and slender, with smooth margins. Male hypopygium (Fig. 51, H). ♂. L. about 4.8-5 mm.; w. 5.2-5.5 mm. ♀. L. about 5 mm.; w. 5 mm.

(Late June, July) Ont., Mass., N. J., westw. to Mich., southw. to Md., S. C. and Tenn.

Connecticut.—Hamden, July 11-13, Aug. 1, 1932 (P. G.); Woodmont, July 9, 1904 (P. L. B.).

**E. (*Erioptera*) *gaspeana* Alex. (Fig. 51, I).**

1929. *Erioptera (Erioptera) gaspeana* Alexander; Can. Ent., 61: 250-251.

Belongs to the *chlorophylla* group. General coloration very pale green. Ovipositor with the cerci slender, with smooth margins. Male hypopygium (Fig. 51, I). ♂. L. about 5-5.5 mm.; w. 5-5.5 mm. ♀. L. about 6 mm.; w. 6.5 mm.

(Late June-Aug.) Que., westw. to Mich.

**E. (*Erioptera*) *megophthalma* Alex. (Fig. 52, A).**

1918. *Erioptera (Erioptera) megophthalma* Alexander; Can. Ent., 50: 60-61.

Eyes (♂) very large, black. Antennal scape and pedicel dark, flagellum pale basally, the outer segments darkened. Head yellow, the front and posterior orbits more silvery. Halteres and legs pale, the knobs of former a trifle darkened. Male hypopygium (Fig. 52, A). ♂. L. 4.5-5 mm.; w. 4.5-5.2 mm. ♀. L. 5.5 mm.; w. 5.5 mm.

(June) Ont., Que., Me., Vt., N. Y., Pa., westw. to Mich., southw. to N. C. and Tenn.

Connecticut.—Norfolk, June 9, 1929 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.).

**E. (*Erioptera*) *septemtrionis* O. S. (Fig. 52, B).**

1859. *Erioptera septemtrionis* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 226.

Figs.—Alexander, Cfs. N. Y., 1, pl. 35, fig. 72 (wing); 1919. Crampton, Insec. Inscit. Menst., 13, pl. 3, fig. 10 (thorax); 1925. Dickinson, Cfs. Wisc., p. 192, fig. 73 (wing); 1932.

Trichia of wing-veins unusually short; vein 2nd A strongly sinuous. Male hypopygium (Fig. 52, B). ♂. L. 4-4.5 mm.; w. 4.5-5.5 mm. ♀. L. 5-5.5 mm.; w. 5-5.5 mm.

(Apr.-Sept.) Ont., Que., N. B., N. S., Me., Vt., N. H., Mass., N. Y., westw. to Mich., Wisc., Ia. and Kan., southw. to Ga., n. Fla. and Ala.

Connecticut.—Hamden, July 8, Aug. 24, 1932 (N. T.), July 12, 1932 (P. G.); Kent Falls, Sept. 11, 1929 (A. J. W.); Middletown, May 26, 1929 (R. C. N.); Norfolk, May 31, 1916 (W. L. M.), June 9, 1929 (C. P. A.); Salisbury, Sept. 5, 1928 (G. C. C.); Stamford, May 16, 1929 (B. T. R. L.); Tyler Lake, May 17, 1931 (C. P. A.); Union, Aug. 17-18, 1928 (C. F. C.).

**E. (*Erioptera*) *straminea* O. S.**

1869. *Erioptera straminea* Osten Sacken; Mon. Dipt. N. Amer., 4: 157.

Fig.—Alexander, Cfs. N. Y., 1, pl. 35, fig. 76 (wing); 1919.

Eyes ( $\delta$ ) large, holoptic beneath. Ovipositor with cerci short, strongly upcurved, dark-colored, the ventral margins smooth. The male hypopygium is much as in *chlorophylloides*, but with slightly different gonapophyses.  $\delta$ . L. 4-4.5 mm.; w. 4.5-5 mm.  $\varphi$ . L. 5 mm.; w. 5.5 mm.

(Late May-July) Que., Me., Vt., Mass., N. Y., westw. to Mich., Ind. and Ill., southw. to S. C.

Johnson's record of this species is erroneous; see *vespertina*.

**E. (*Erioptera*) *subchlorophylla* Alex. (Fig. 52, C).**

1919. *Erioptera subchlorophylla* Alexander; Bull. Brooklyn Ent. Soc., 14: 107-108.

Belongs to the *chlorophylla* group. Wings yellowish, veins greenish yellow. Male hypopygium (Fig. 52, C).  $\delta$ . L. about 4 mm.; w. 4.5 mm.

(May-July) Mass. (Cape Cod), N. J., southw. to Fla. (Austral).

**E. (*Erioptera*) *subfurcifer* Alex. (Fig. 52, D).**

1929. *Erioptera* (*Erioptera*) *subfurcifer* Alexander; Journ. N. Y. Ent. Soc., 37: 51.

Belongs to the *chlorophylla* group. Thoracic stripes ferruginous; wings yellowish, the veins greenish-yellow. Male hypopygium (Fig. 52, D).  $\delta$ . L. about 5-5.5 mm.; w. 5.5 mm.  $\varphi$ . L. 6-7 mm.; w. 6.5-7 mm.

(June) Ct., westw. to Mich. (Canadian).

Connecticut.—State Line Pond, near Stafford Springs, June 14, 15, 1933 (C. P. A.); Putnam, June 15, 1933 (C. P. A.). In sphagnum bogs.

**E. (*Erioptera*) *uliginosa* Alex. (Fig. 52, E).**

1930. *Erioptera* (*Erioptera*) *uliginosa* Alexander; Occas. Papers Boston Soc. Nat. Hist., 5: 277-278.

Legs brown. Wings with a strong brown suffusion, more saturated in the costal and stigmal regions. Ovipositor with cerci long and slender, the margins smooth. Male hypopygium (Fig. 52, E).  $\delta$ . L. about 4.5-4.8 mm.; w. 4.5-5.3 mm.  $\varphi$ . L. about 5 mm.; w. 5.3-5.5 mm.

(June) Me., Ct., westw. to Mich. and Wisc., in sphagnum bogs. (Canadian).

Connecticut.—Manitic Lake, June 8, 9, 1929 (C. P. A.).

**E. (*Erioptera*) *vespertina* O. S. (Fig. 52, F).**

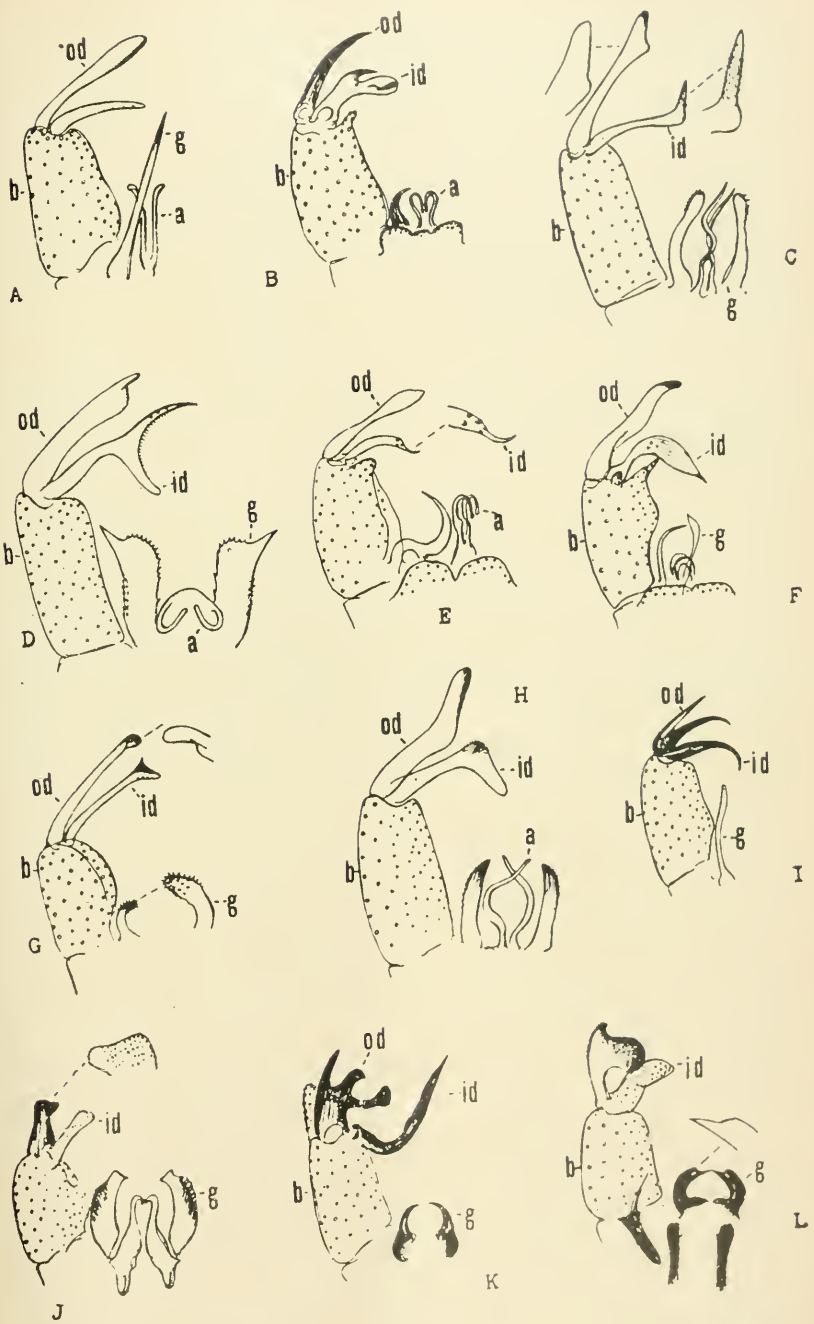
1859. *Erioptera vespertina* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 226.



FIGURE 52. Eriopterini: *Erioptera*; male hypopygia.

- A. *Erioptera (Erioptera) megophthalma* Alex.
- B. *E. (E.) septentrionis* O. S.
- C. *E. (E.) subchlorophylla* Alex.
- D. *E. (E.) subfurcifer* Alex.
- E. *E. (E.) uliginosa* Alex.
- F. *E. (E.) vespertina* O. S.
- G. *E. (E.) villosa* O. S.
- H. *E. (E.) viridula* Alex.
- I. *E. (Mesocypbona) caloptera* Say
- J. *E. (Psiloconopa) cramptonella* (Alex.)
- K. *E. (Hoptolabis) armata* O. S.
- L. *E. (Ilisia) armillaris* O. S.

Symbols: *a*, aedeagus; *b*, basistyle; *g*, gonapophysis; *id*, inner dististyle; *od*, outer dististyle.



1921. *Erioptera holoptica* Dietz; Trans. Amer. Ent. Soc., 47: 245-246.  
 1921. *Erioptera holoptica fuscoantennata* Dietz; *Ibid.*, 47: 246.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 4, fig. 20 (hyp.); 1869. Alexander, Cfs. N. Y., 1, pl. 35, fig. 73 (wing); 1919. Dickinson, Cfs. Wisc., p. 192, fig. 74 (wing); 1932.

Humeral and lateral regions of praescutum broadly yellow; median region of scutum with a capillary brown line; scutellum yellow, with a dark basal spot; postnotal mediotergite darkened; pleura yellow, variegated with reddish brown. Eyes ( $\delta$ ) very large. Legs yellow. Wings rather strongly suffused with brownish. Hypopygium brighter than remainder of abdomen (Fig. 52, F).  $\delta$ . L. 4.5-5 mm.; w. 4-5 mm.  $\text{♀}$ . L. 5-5.5 mm.; w. 5-5.5 mm.

(May, July) Ont., Que., Me., N. H., Vt., Mass., N. Y., Pa., westw. to Ill., Ia. and Wisc., southw. to S. C., Fla. and Ala.

Connecticut.—Kent Falls, July 23-24, 1931 (C. P. A.); Norfolk, June 9, 1929 (C. P. A.); Riverton, June 8, 1929 (C. P. A.); Woodmont, July 9, 1904 (P. L. B.) determined by Johnson as *straminea*.

**E. (*Erioptera*) villosa** O. S. (Fig. 52, G).

1859. *Erioptera villosa* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 226.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 23, fig. 1 (ven.); 1908. Alexander, Cfs. N. Y., 1, pl. 35, fig. 71 (wing); 1919.

General coloration dark brown, the humeral and lateral portions of praescutum restrictedly brightened. Legs brownish yellow. Wings with a strong brown suffusion, the costal and stigmal regions more saturated: vein *2nd A* strongly sinuous. Ovipositor with cerci slender, strongly upcurved, margins smooth. Male hypopygium (Fig. 52, G) scarcely brightened.  $\delta$ . L. about 5-5.5 mm.; w. 6-6.5 mm.  $\text{♀}$ . L. 5.5-6.5 mm.; w. 6-6.5 mm.

(June, early July) Que., Ont., N. B., N. Y., westw. to Sask., Alta., Wyo. and Utah. (Hudsonian, Canadian).

**E. (*Erioptera*) viridula** Alex. (Fig. 52, H).

1929. *Erioptera* (*Erioptera*) *viridula* Alexander; Can. Ent., 61: 20.

Belongs to the *chlorophylla* group. General coloration pale green throughout. Ovipositor with long slender cerci, their margins smooth. Male hypopygium (Fig. 52, H).  $\delta$ . L. 4.5-5 mm.; w. 5-6 mm.  $\text{♀}$ . L. 5-6 mm.; w. 6-7 mm.

(June, early July) Ont., Que., N. H., Vt., Ct., N. Y. (Canadian).

Connecticut.—Stafford Springs, June 14, 1933 (C. P. A.).

Subgenus **Mesocyphona** O. S.

1869. *Erioptera* (*Mesocyphona*) Osten Sacken; Mon. Dipt. N. Amer., 4: 161.

*Key to Species*

1. Wings with a faint brown tinge, the cord and veins at margin with small darker spots; size very small (w.,  $\delta$ , about 2.5 mm.) ..... **parva**

- Wings with a strong brown tinge, variegated with numerous white spots and dots; size larger (w., ♂, about 3.5 mm. or more) ..... 2
2. Femora with two brown rings; wings with about a score of large white spots, with additional smaller dots in all cells ..... *caloptera*
- Femora with a single brown subterminal ring; wings with about a score of large white spots but without additional pale dots in the cells ..... *needhami*

**Erioptera** (*Mesocyphona*) *caloptera* Say (Fig. 52, I).

1823. *Erioptera caliptera* Say; Journ. Acad. Nat. Sci. Philadelphia, 3: 17.

1828. *Erioptera caloptera* Wiedemann; Aussereur. Zweifl. Ins., 1: 23.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 4, fig. 15 (hyp.); 1869. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 23, fig. 3 (ven.); 1908. Alexander, Cfs. N. Y., 1, pl. 35, fig. 77 (wing); 1919. Dickinson, Cfs. Wisc., p. 192, fig. 72 (wing); 1932.

Mesonotal praescutum light buffy gray, with two narrow dark brown stripes; pleura conspicuously striped with silvery. Femoral dark rings subequal to or narrower than interspace. Male hypopygium (Fig. 52, I). ♂. L. 3.5-4 mm.; w. 3.5-4 mm. ♀. L. 4-4.5 mm.; w. 4-4.5 mm.

(May-Sept.) Ont., Que., N. B., N. S., Me., N. H., Vt., Mass., R. I., N. Y., westw. to Mo. and Colo., southw. to S. C., Fla. and Ala. (Tropical America, as races).

Connecticut.—Branford, June 23, Aug. 11, 1904 (H. L. V.); Granby, June 8, 1929 (C. P. A.); Hamden, July 8, Aug. 24, Sept. 2, 1932 (N. T.), Aug. 1, 1932 (P. G.); Kent Falls, June 12-13, July 23-24, 1931 (C. P. A.), Sept. 11, 1929 (A. J. W.); Meriden, July 30, 1929 (B. H. W.); New Haven, Aug. 20, 1928 (G. B.); Norfolk, June 9, 1929 (C. P. A.); Riverton, June 8, 1929 (C. P. A.); W. Hartford, June 23, Aug. 11, 1904 (H. L. V.); Winsted, Sept. 5, 1928 (G. C. C.), June 9, 1929 (C. P. A.).

**E.** (*Mesocyphona*) *needhami* Alex. (Fig. 50, E).

1918. *Erioptera (Mesocyphona) needhami* Alexander; Can. Ent., 50: 383-384.

Fig.—Alexander, Cfs. N. Y., 1, pl. 35, fig. 78 (wing); 1919.

Generally similar to *caloptera*. Wings with about twenty white spots, distributed along the cord and as marginal areas at ends of veins; venation (Fig. 50, E). ♂. L. 3-3.5 mm.; w. 3.5-4 mm.

(June, July) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., westw. to Mich., Ill. and Mo., southw. to S. C., Ga. and Fla.

Connecticut.—Hamden, July 12, 1932 (P. G.); Kent Falls, July 23-24, 1931 (C. P. A.); Saptree Run State Park, June 14, 1933 (C. P. A.).

**E.** (*Mesocyphona*) *parva* O. S.

1859. *Erioptera parva* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 227.

Fig.—Alexander, Cfs. N. Y., 1, pl. 35, fig. 79 (wing); 1919.

Legs yellow, the femora with a narrow brown subterminal ring. ♂. L. about 2.5 mm.; w. 2.5 mm. ♀. L. about 3 mm.; w. 3.5 mm.

(June, July) Ct., N. Y., westw. to Mich., Ia., Mo. and Kan., southw. to Ga., Ala. and Fla. (Neotropics).

Connecticut.—Hamden, June 30, 1932 (N. T.); recorded from Connecticut by C. W. Johnson.



Subgenus **Psiloconopa** Zetterstedt1838. *Psiloconopa* Zetterstedt; Ins. Lapponica, Dipt., p. 847.

A northern group, including several diverse types that do not fit well into any of the other subgeneric divisions of *Erioptera*.

## Key to Species

1. Wings with cell *1st M*<sub>2</sub> closed (Fig. 50, F); general coloration of body polished black, variegated with bright yellow ..... **cramptonella**
2. Wings with a brownish yellow tinge, but not otherwise patterned .... **gaspicola**
3. Wings with a restricted brown pattern ..... 3
3. Wings pale yellowish subhyaline, with two broad brown crossbands, one before, the other immediately beyond the cord; wings narrow, the forks of cells beyond cord deep; *m-cu* some distance before fork of *M* **manitobensis**
- Wings yellowish, the veins streaked longitudinally with brown; wings broad, the forks of the cells beyond cord shallow; *m-cu* at fork of *M*..... **painteri**

**Erioptera** (*Psiloconopa*) **cramptonella** (Alex.) (Figs. 50, F; 52, J).

1931. *Psiloconopa cramptonella* Alexander; Can. Ent., 63: 144-145.

Abdominal segments ringed caudally with sulphur-yellow. Halteres light yellow. Legs black. Wings (Fig. 50, F) strongly tinged with dusky; cell *1st M*<sub>2</sub> small. Male hypopygium (Fig. 52, J). ♂. L. 3.2-3.5 mm.; w. 3.8-4.4 mm. ♀. L. about 4 mm.; w. 4.5-4.6 mm.

(June) E. Que. (Gaspé), Prince Edward Island (Marion E. Smith).

**E.** (*Psiloconopa*) **gaspicola** (Alex.)

1929. *Psiloconopa gaspicola* Alexander; Journ. N. Y. Ent. Soc., 37: 54-55.

General coloration dull dark gray. Halteres pale yellow. Wings brownish yellow, the base and costal region clearer yellow; veins stout. ♂. L. about 5.5 mm.; w. 5.2 mm.

(June) E. Que. (Gaspé), westw. to Colo.

**E.** (*Psiloconopa*) **manitobensis** Alex.

1929. *Erioptera (Ilisia) manitobensis* Alexander; Journ. N. Y. Ent. Soc., 37: 51-52.

General coloration dull gray, the praescutum with four brown stripes. Antennae black throughout. Halteres yellow. Femora brown, their bases yellowish; tibiae pale brown; tarsi darker. Anal veins divergent. ♂. L. about 4 mm.; w. 5 mm.

(June) Man.

**E.** (*Psiloconopa*) **painteri** Alex.

1929. *Erioptera painteri* Alexander; Can. Ent., 61: 19-20.

General coloration brownish gray, the praescutum with three brown stripes, the median stripe more or less divided medially. Halteres yellow. Legs brownish black. Anal veins divergent. ♂. L. about 5.5 mm.; w. 5 mm.

(May) Ohio

Subgenus **Hoplolabis** O. S.

1869. *Erioptera* (*Hoplolabis*) Osten Sacken; Mon. Dipt. N. Amer., 4: 160.

The subgenus finds its near ally in *Ilisia*. A single local species, with a few others in western North America and in Japan.

***Erioptera* (*Hoplolabis*) *armata* O. S.** (Figs. 50, G; 52, K).

1859. *Erioptera armata* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 227.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 1, fig. 18 (wing), pl. 4, fig. 14 (hyp.); 1869. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 23, figs. 5, 6 (ven.); 1908. Alexander, Cfls. N. Y., 1, pl. 35, fig. 83 (wing); 1919. Crampton, Insec. Inscit. Menst., 13, pl. 2, fig. 5 (thorax); 1925. Dickinson, Cfls. Wisc., p. 193, fig. 76 (wing); 1932.

General coloration gray, the praescutum with black setigerous punctures on the interspaces. Knobs of halteres darkened. Legs obscure yellow. Wings with a heavy dark brown pattern, arranged chiefly as four or five major costal areas, with smaller spots at ends of other longitudinal veins and on crossveins and deflections; basal section of vein  $M_3$  angulated and spurred, the spur extending basad into cell *1st M*<sub>2</sub>, sometimes complete (Fig. 50, G). Abdomen dark brown, the segments ringed caudally with pale. Male hypopygium (Fig. 52, K). ♂. L. 4.5-5.5 mm.; w. 5-6 mm. ♀. L. 5-6 mm.; w. 5.5-6.5 mm.

(May-Sept.) Ont., Que., N. B., N. S., Me., N. H., Vt., Mass., N. Y., westw. to Ia., Okla. and Colo., southw. to S. C., Ga. and Tenn.

Connecticut.—Hamden, Sept. 5, 1932 (N. T.); Hartland, June 9, 1929 (C. P. A.); Kent Falls, Sept. 11, 1929 (A. J. W.); Norfolk, May 31, 1931, June 9, 1929 (C. P. A.); Riverton, June 8, 1929 (C. P. A.); Twin Lakes, Sept. 12, 1928 (G. C. C.); Tyler Lake, May 30, 1931 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.); W. Hartford, Aug. 29, 1904 (H. L. V.).

Subgenus **Ilisia** Rond.

1856. *Ilisia Rondani*; Prodr. Dipterol. Italicæ, 1: 182.

1869. *Erioptera* (*Acyphona*) Osten Sacken; Mon. Dipt. N. Amer., 4: 151-152.

The various species have cell *1st M*<sub>2</sub> unusually long, with the basal section of  $M_3$  nearly straight, not angulated and spurred as in *Hoplolabis*.

## Key to Species

1. Wings with two broad brown crossbands, the first not attaining the costal border, the larger second band at the cord, these bands wider than the hourglass-shaped interspace ..... **venusta**
- Wings with the dark pattern broken into small spots or narrow broken bands that are narrower than the interspace ..... 2
2. All femora with a single narrow, dark brown, subterminal ring..... **indianensis**
- At least the fore femora with two broader rings ..... 3
3. Femora with the dark rings nearly black, so broad as to include almost the entire segment, the usual ground-color reduced to a narrow pale annulus; base of tibia narrowly blackened ..... **graphica**

At least the fore femora with two pale brown rings that do not exceed in extent the yellow annulus between ..... 4

4. General coloration of body dark, the thoracic notum grayish brown; male hypopygium with the outer margin of outer dististyle not emarginate; gonapophyses appearing as smooth, nearly straight, black horns ..... *laevis*

General coloration of thoracic notum yellowish brown; male hypopygium (Fig. 52, L) with the outer dististyle very large, the head with its outer margin conspicuously emarginate; gonapophyses microscopically spinulose before the abruptly narrowed acute spinous apex ..... *armillaris*

**Erioptera (*Ilisia*) *armillaris* O. S.** (Fig. 52, L).

1869. *Erioptera armillaris* Osten Sacken; Mon. Dipt. N. Amer., 4: 158-159.

Fig.—Alexander, Cfls. N. Y., 1, pl. 35, fig. 81 (wing); 1919.

Thoracic pleura and posterior sclerites of mesonotum dark liver-brown, the praescutum conspicuously yellowish brown. Fore femora with two pale brown annuli; remaining femora with a single subterminal ring; tibiae entirely yellow. Dark band at cord of wing narrow but nearly complete, being interrupted just behind vein  $Cu_1$ ; basal band variously broken. Male hypopygium (Fig. 52, L). ♂. L. 4.5-5 mm.; w. 5-5.5 mm. ♀. L. 5-5.5 mm.; w. 5.5-6 mm.

(June-Aug.) Ont., Que., N. S., Me., N. H., Vt., N. Y., westw. to Mich. and Kan., southw. to Md., Va. and N. C.

Connecticut.—Reported by C. W. Johnson, June 19 to Aug. 9, with no further data.

**E. (*Ilisia*) *graphica* O. S.**

1859. *Erioptera grafica* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 227.

Fig.—Alexander, Cfls. N. Y., 1, pl. 35, fig. 82 (wing); 1919.

Generally similar to *armillaris* but ground-color of body and wings darker. Legs, especially the femora, more extensively blackened. Wings with dark band at cord, narrow, incomplete, not including the distal section of vein  $Cu_1$ . ♂. L. 4.5-5 mm.; w. 4.5-5 mm.

(June-Sept.) Ont., Mass., N. Y., westw. to Ia. and Neb., southw. to S. C., Ga., n. Fla. and La.

**E. (*Ilisia*) *indianensis* Alex.**

1922. *Erioptera (Acyphona) indianensis* Alexander; Occas. Pap. Mus. Zool. Univ. Mich., 127: 1-2.

Mesonotal praescutum obscure yellow, with four brown stripes; pleura silvery gray, delimited by narrow, dark brown, longitudinal stripes. Gonapophyses appearing as strongly curved smooth hooks. ♂. L. 4-5 mm.; w. 4.5-5.5 mm.

(June) Ind., Ill., Ky., Mich., Ia. and Mo.

**E. (*Ilisia*) *laevis* Alex.** (Fig. 50, H).

1930. *Erioptera (Ilisia) laevis* Alexander; Bull. Brooklyn Ent. Soc., 25: 77.

♂. L. 4.2-4.5 mm.; w. 5-5.5 mm.

(July, Aug.) Mass., Pa.

**E. (*Ilisia*) *venusta* O. S.**

1859. *Erioptera venusta* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 227.

Figs.—Osten Sacken, *Ibid.*, pl. 4, fig. 23; 1859. Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 1, fig. 17 (wing), pl. 4, fig. 16 (hyp.); 1869. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 23, fig. 4 (ven.); 1908. Alexander, Cfls. N. Y., 1, pl. 35, fig. 80 (wing); 1919. Dickinson, Cfls. Wisc., p. 193, fig. 77 (wing); 1932.

General coloration of thorax dark brown, the praescutum conspicuously paler, brownish yellow. Fore femora with two narrow brown rings, the remaining femora with a single subterminal annulus; tibiae entirely yellow. ♂. L. 4.5-5 mm.; w. 5-5.5 mm. ♀. L. 5-6 mm.; w. 5.5-6.5 mm.

(June-Sept.) Ont., Que., Me., N. H., Vt., Mass., N. Y., westw. to Mich., Wisc., Ia. and Mo., southw. to Va. and Fla.

Connecticut.—Kent Falls, July 23-24, 1931 (C. P. A.); Riverton, July 23, 1931 (C. P. A.); Salisbury, July 16, 1926 (W. E. B.), Sept. 5, 1928 (G. C. C.); Sept. 12, 1928 (C. P. A.); Sharon, Sept. 5, 1928 (G. C. C.); Twin Lakes, Sept. 12, 1928 (G. C. C.).

***Cryptolabis* Osten Sacken**

1859. *Cryptolabis* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 224.

The members of this genus are chiefly Australian and Neotropical, a single species, the genotype, being found in northeastern North America. The adults are commonly swept from herbage on the banks of streams and it is strongly suspected that the immature stages are entirely aquatic.

***Cryptolabis paradoxa* O. S. (Fig. 50, I).**

1859. *Cryptolabis paradoxa* Osten Sacken; *Ibid.*, 1859: 225.

Figs.—Osten Sacken, *Ibid.*, pl. 4, figs. 14, 15, 15a (wing, hyp.); 1859. Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 2, fig. 11 (wing), pl. 3, fig. 13 (gen.); 1869. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 30, fig. 1 (ven.); 1908. Williston, Man. N. Amer. Dipt., Ed. 3, fig. 25, sub 6 (ven.); 1908. Alexander, Cfls. N. Y., 1, pl. 37, fig. 101 (ven.); 1919. Crampton, Insec. Inscit. Menst., 13, pl. 2, fig. 8 (thorax); 1925.

General coloration of thorax blackish, the dorsopleural membrane pale yellow. Halteres yellow, the apex of stem darkened. Wings grayish, the prearcular region abruptly whitened; faint dusky cloudings along cord, *Cu* and in axillary region; *Rs* weakly convex; numerous macrotrichia in cells beyond cord. Genitalia of both sexes small and inconspicuous, more or less retracted within abdomen. ♂ L. 3-4 mm.; w. 4.5-6.5 mm. ♀. L. 4-4.5 mm.; w. 5.5-6.5 mm.

(July, Aug.) Ont., Que., N. S., Me., N. H., Vt., Mass., N. Y., southw. to Va., Tenn., N. C., S. C. and Fla.

Connecticut.—Kent Falls, July 23-24, 1931 (C. P. A.)



### Ormosia Rondani

1856. *Ormosia Rondani*: Prodröm. Dipt. Italicæ, 1: 180.

1860. *Rhypholophus Kolenati*: Wien. Ent. Monatschr., 4: 393.

A very extensive group of essentially Holarctic crane-flies. European students tend to separate *Ormosia* from *Rhypholophus*, chiefly on the course of the 2nd Anal vein, but in the local fauna no such division seems feasible. The adult flies occur in small dancing swarms in shaded places, while the early stages live in saturated earth near water.

The chief characters available for separation of many closely allied forms are found in the structure of the male hypopygium (Figs. 53, 54). It should be emphasized that in this group, as well as many others, the entire ninth segment of the abdomen of the male has undergone a torsion of approximately 180° so the tergal plate lies on the sternal surface of the body. This plate, in many species, appears as a conspicuous spatula jutting caudad between and apparently beneath the basistyles. In *manicata* it is profoundly incised so as to appear as a sheath on either side. The true relative positions of the various parts can readily be ascertained after detecting the tergite. The outer dististyle is variously formed, and in slide mounts sometimes lies mesad of the true inner style. The outer style is destitute of setae or punctures, whereas the inner style has a number of small punctures and often possesses a pale membrane in the axil of curvature or on the concave face.

#### Key to Species

(Based in part on male characters)

- |   |              |
|---|--------------|
| 1. Wings with cell 1st $M_2$ closed (Fig. 50, J) .....  | 2            |
| Wings with cell 1st $M_2$ open .....  | 10           |
| 2. Wings spotted or clouded with darker .....   | 3            |
| Wings unicolorous or nearly so, only the stigmal area being darker .....  | 5            |
| 3. Anal veins divergent; wing-markings produced by dark brown spots and blotches on membrane .....  | 4            |
| Anal veins convergent, vein 2nd $A$ before tip bent strongly toward 1st $A$ ; dark markings produced by groups of dark-colored trichia or very pale gray clouds on membrane (Fig. 50, J) .....  | nubila       |
| 4. Wings with brown dots in all cells, additional to a series of larger costal areas, the latter beyond stigma alternating with pale spots .....  | innocens     |
| Wings with three brown costal spots, the cord narrowly seamed with brown; apex of wing in outer radial field solidly darkened .....   | apicalis     |
| 5. Anal veins more or less convergent, 2nd $A$ being deflected cephalad on its distal third or more .....   | 6            |
| Anal veins divergent ( <i>niaribila</i> group) .....  | 8            |
| 6. Wings broad (in ♀, 7.6x2.8 mm.); vein $R_2$ before origin of vein $R_3$ ; vague indications of darker seams along cord and vein $Cu$ .....   | cramptoniana |
| Wings relatively narrow (width not exceeding 2 mm.); vein $R_2$ distad of origin of $R_3$ ; no distinct seams on cord or vein $Cu$ . (Compare also abnormal specimens of <i>holotricha</i> , having cell 1st $M_2$ closed; see couplet 11) .....  | 7            |
| 7. Cell 1st $M_2$ relatively large, subequal in length to, or only a little shorter than, the distal section of vein $M_1$ ; $m-cu$ shortly beyond fork of $M$ ; wing-trichia relatively sparse; male hypopygium with the two dististyles unequal in size, the outer very small, subconical in outline (Fig. 53, B) ..... | arcuata      |
| Cell 1st $M_2$ small, about one-half the length of the distal section of vein $M_1$ ; $m-cu$ at fork of $M$ ; wing-trichia unusually abundant and well-dis-   |              |

- tributed over disk; male hypopygium with two well-developed, long and slender dististyles, the outer a little longer than the inner ..... **hubbelli**
8. Thorax and coxae reddish yellow ..... **luteola**  
Thorax reddish brown to gray, in the former case the praescutum with a median brown vitta ..... 9
9. Mesonotal praescutum reddish, with a median brown line that is sometimes indistinct; antennae either pale throughout or with only the outermost segments darkened; gonapophyses of hypopygium bifid near apex ..... **pygmaea**  
Mesonotal praescutum brownish gray; antennae dark brown to black, the basal four segments pale; gonapophyses of hypopygium slender, simple (Fig. 54, E) ..... **nigripila**
10. Wings with cell *1st M<sub>2</sub>* open by atrophy of *m*, the cell thus opening into cell *2nd M<sub>2</sub>* ..... 11  
Wings with cell *1st M<sub>2</sub>* open by atrophy of basal section of vein *M<sub>3</sub>*, the cell opening into cell *M<sub>3</sub>* ..... 13
11. Vein *2nd A* sinuous, at tip bent strongly toward *1st A*, narrowing the cell ..... **holotricha**  
Anal veins divergent (*nigripila* group) ..... 12
12. Antennae dark brown throughout; mesonotal praescutum yellowish brown, with three dark brown stripes; scutellum brownish yellow; wings strongly tinged with brown, the veins conspicuous; cell *M<sub>3</sub>* short, only a little longer than its petiole ..... **gaspensis**  
Antennae with the basal four or five segments pale, the remainder brown; mesonotal praescutum grayish brown, with a median, darker brown vitta; scutellum grayish brown; wings hyaline, the stigmal region slightly darker, the veins inconspicuous; cell *M<sub>3</sub>* elongate, approximately twice its petiole ..... **palpalis**
13. Antennae of both sexes relatively short, not exceeding the combined head and thorax (compare *dentifera*, *fernaldi*) ..... 14  
Antennae (♂) approximately as long as the entire body, or a little shorter (*mesocera*), extending at least to midlength of the abdomen; flagellar segments more or less narrowed apically, giving a bead-like appearance to the organ ..... 29
14. Vein *2nd A* arcuated, at its tip bent toward *1st A*; in a few species only the extreme tip of *2nd A* is so deflected ..... 15  
Anal veins gradually divergent ..... 24
15. Coloration of body gray; stigma conspicuously dark brown, preceded and followed by more whitish areas (*meigenii* group) ..... 16  
Coloration of body reddish or brown; if gray (*fernaldi*), the stigmal region is not conspicuously darkened ..... 20
16. Male hypopygium with both pairs of gonapophyses conspicuously serrate on outer and apical margins (Fig. 53, D; 54, I) ..... 17  
Male hypopygium with the gonapophyses only weakly if at all serrate, in the latter case only a single pair so toothed (Figs. 53, G, I; 54, B) ..... 18
17. Hypopygium with the outer dististyle bispinous (Fig. 53, D) ..... **carolinensis**  
Hypopygium with the outer dististyle bearing a single spine (Fig. 54, I) ..... **serridens**
18. Hypopygium with the gonapophyses notably unequal in length, the outer or longer pair not dilated at base (Fig. 54, B) ..... **meigenii**  
Hypopygium with the gonapophyses approximately equal in length, where more unequal (*ithacana*), the longest pair strongly dilated at base (Fig. 53, G, I) ..... 19
19. Gonapophyses appearing as relatively short blackened spikes (Fig. 53, G) ..... **frisoni**  
Gonapophyses more elongate, the basal pair weakly serrate before tips; outer apophyses strongly dilated at bases, pale except for the strongly divergent, blackened tips; outer dististyle usually bispinous, the spines directed in opposite directions toward one another (Fig. 53, I) ..... **ithacana**
20. Only a single dististyle is well-developed, the outer being reduced to a small or very small, obtusely rounded lobule (Fig. 53, F, H) ..... 21  
Both dististyles well-developed, subequal in length (Fig. 54, H, J) ..... 23
21. General coloration gray; antennae (♂) relatively long, extending about to

- base of abdomen; hypopygium with inner dististyle shaped more or less like a boomerang, about three times the length of the outer; gonapophyses hairy (Fig. 53, F) ..... **fernaldi**
- General coloration brown to reddish brown; antennae short in both sexes; hypopygium with inner dististyle a slender, sclerotized hook, the outer style so reduced in size as to be virtually lacking; gonapophyses glabrous (Figs. 53, H; 54, F) ..... 22
22. Inner dististyle narrowed to an acute black spinous point; aedeagus trifold at tip (Fig. 54, F) ..... **nimbipennis**
- Inner dististyle not narrowed into a spine, the obtuse apex bearing a long curved seta; aedeagus simple at tip (Fig. 53, H) ..... **ingloria**
23. Mesonotal praescutum reddish brown, with a capillary dark brown median line; male hypopygium with both dististyles and each gonapophysis bearing a small lateral spine, so as to appear bifid (Fig. 54, H) ..... **rubella**
- Mesonotal praescutum reddish brown, unmarked with darker; male hypopygium with both dististyles and the gonapophyses unbranched (Fig. 54, J) ..... **townesi**
24. Hypopygium with the tergal sheath profoundly divided by a median split; longest gonapophyses appearing as exceedingly lengthened, needle-like rods that jut from the genital chamber ..... **manicata**
- Hypopygium with the tergite a simple spatulate plate; gonapophyses not appearing as needle-like rods ..... 25
25. Inner dististyle on outer margin before apex with a small, erect, pale lobule; aedeagus elongate (Fig. 53, A) ..... 26
- Inner dististyle not so armed; aedeagus short ..... 27
26. Inner dististyle with the lateral lobe very small; aedeagus blackened, relatively short and stout, some distance before apex with two subtending black spines; apex of aedeagus microscopically roughened ..... **brevicalcarata**
- Inner dististyle with the lateral lobe elongate; aedeagus very long and slender, jutting some distance beyond the genital chamber, pale brown in color, not roughened near apex (Fig. 53, A) ..... **adirondacensis**
27. Outer dististyle a short, squat, blackened structure, bearing three or four acute, black spines; inner style bidentate at apex, its acute lateral spine with microscopic denticulations at base (Fig. 54, G) ..... **notmani**
- Outer dististyle not as above, either simple or at most bispinous; inner style simple ..... 28
28. Coloration of body brown, slightly overcast with gray; antennae short in both sexes; outer dististyle bispinous; gonapophyses appearing as slender erect rods (Fig. 53, C) ..... **bilineata**
- Coloration of body light gray; antennae ( $\delta$ ) relatively long, if bent backward extending to or shortly beyond root of halteres; both dististyles appearing as small, ear-like, simple lobes, the outer darkened, glabrous; gonapophyses appearing as powerful blackened horns, each bearing an acute tooth or spine on the inner or concave face (Fig. 53, E) ..... **dentifera**
29. Anal veins strongly divergent; outer dististyle of hypopygium a curved blackened hook (Fig. 54, A) ..... **megacera**
- Anal veins slightly convergent (Fig. 23, E); outer dististyle a small flattened lobe, clothed with transverse rows of blackened setae (Fig. 54, C, D) .... 30
30. Antennae ( $\delta$ ) about equal in length to entire body, the flagellar segments elongated, black, attenuated and pale at apices; gonapophyses heavily blackened, bifid (Fig. 54, D) ..... **monticola**
- Antennae ( $\delta$ ) shorter, if bent backward extending about to midlength of the abdomen, the flagellar segments shorter, without pale tips; gonapophyses pale, simple, terminating in an acute point that is directed laterad (Fig. 54, C) ..... **mesocera**

The groups in the above key that include more than a single species are as follows:

*adirondacensis* group.—*adirondacensis*, *brevicalcarata*.

*bilineata* group.—*bilineata*, *notmani*.

*mcigenii* group.—*carolinensis*, *frisoni*, *ithacana*, *mcigenii*, *scridens*.

*nigripila* group.—*gaspensis*, *luteola*, *nigripila*, *palpalis*, *pygmaea*.

*nimbipennis* group—*ingloria*, *nimbipennis*, *townesi*.  
*nubila* group.—*apicalis*, *cramptoniana*, *innocens*, *nubila*.

The following names are omitted from the key, either because they are synonyms, or else are doubtful forms unknown to the present writer.

*abnormis* Dietz=*Oxydiscus cayuga* (Alex.)

*atriceps* Dietz=*apicalis* Alex.

*divergens* Dietz=*megacera* Alex.

*parallela* Doane=Identity doubtful.

*perplexa* Dietz=Identity doubtful.

*pilosa* Dietz=*pygmaea* Alex.

*subcostata* Dietz=Identity doubtful.

Brief diagnoses of the doubtful species are included in order to complete the report.

*Ormosia aenigmatica* Dietz (Trans. Amer. Ent. Soc., 47:249; 1921), described as a variety of *rubella*. It was described as having a beak nearly as long as the thorax. An examination of the type specimen by Professor Rogers has disclosed the fact that the supposed "beak" is merely an artifact and the subspecies name should be placed in the synonymy of *rubella*.

*Ormosia parallela* (Doane) (Ent. News, 19:202; 1908, as *Rhypholophus*). Thorax reddish yellow, slightly darker above. Antennae entirely pale yellow. Halteres yellow, the knobs at tips slightly infuscated. Abdominal tergites brownish, sternites yellow. Wings rather narrow, brownish, without distinct stigma; cell *1st M*<sub>2</sub> open by atrophy of basal section of *M*<sub>3</sub>; Anal veins convergent. ♀. L. 5 mm.; w. 6 mm. Ithaca, N. Y.; known only from female specimens.

*Ormosia perplexa* Dietz (Trans. Amer. Ent. Soc., 42:141; 1916). Thorax fuscous, with a grayish bloom, the praescutum with a median darker brown stripe. Knob of haltere yellowish white. Wings brownish, without evident stigma; cell *1st M*<sub>2</sub> open by atrophy of basal section of *M*<sub>3</sub>; *m-cu* before fork of *M*; Anal veins convergent. ♀. L. 3.5 mm.; w. 3.75 mm. Waverly, N. Y.; a single female.

*Ormosia subcostata* Dietz (*Ibid.*, 47:249-250; 1921). Thorax grayish, with a more whitish pruinosity, the median area of praescutum with a sordid yellow median stripe that is bordered on either side by a narrow brown vitta. Antennae of moderate length, light brown. Pleura reddish brown. Halteres yellow. Wings yellowish gray, more yellowish at base; costal region appearing infuscated, due to an increased density of pubescence; stigmal region darker; cell *1st M*<sub>2</sub> open by atrophy of basal section of *M*<sub>3</sub>; Anal veins convergent. Male hypopygium with the dististyles small, blackish. ♂. L. 4 mm.; w. 5.5 mm. Hazleton, Pa.; Aug. 15, 1911.

All of these species, with cell *1st M*<sub>2</sub> open by atrophy of *M*<sub>3</sub> and the Anal veins convergent, are evidently allied, in the present key running to couplet twenty and beyond.

***Ormosia adirondacensis* Alex. (Fig. 53, A).**

1919. *Ormosia adirondacensis* Alexander; Insec. Inscit. Menst., 7: 145-146.

General coloration of mesonotum reddish brown, very sparsely pruinose, the postnotum and dorsal pleurites darker. Halteres pale throughout. Antennae (♂) moderately long, if bent backward extending to beyond the wing-root; flagellar segments with a dense white pubescence. Male hypopygium (Fig. 53, A). ♂. L. about 4.5 mm.; w. 4.5-5.8 mm. ♀. L. about 5-5.5 mm.; w. 5-5.5 mm.

(June) Me., N. H., Vt., Mass., N. Y., southw. to Tenn.

Connecticut.—Union, June 14, 1933 (C. P. A.); Westford, June 14, 1933 (C. P. A.).

I have interpreted the Anal veins as being divergent although vein *2nd A* on distal quarter is deflected slightly cephalad.



**O. apicalis** Alex.1911. *Ormosia apicalis* Alexander; Psyche, 18: 200-201.1916. *Ormosia atriceps* Dietz; Trans. Amer. Ent. Soc., 42: 136-137.Figs.—Alexander, *Ibid.*, pl. 16, fig. 6 (wing); 1911. Dietz, *Ibid.*, pl. 10, figs. 1-2 (hyp., diagramm.); 1916. Alexander, Cfls. N. Y., 1, pl. 34, fig. 55 (wing); 1919.

Mesonotum reddish brown, the pleura darker. Head obscure blackish. Antennae short. Knobs of halteres weakly infumed. Male hypopygium with a single dististyle, oval, on mesal face set with triangular blackened points to appear mace-like. ♂. L. 5-5.5 mm.; w. 5.5-7 mm. ♀. L. 6.5-7.5 mm.; w. 8-8.5 mm.

(June, July) N. Y., N. J., Pa., southw. to S. C. and Ga. (in mts.).

**O. arcuata** (Doane) (Fig. 53, B).1908. *Rhypholophus arcuatus* Doane; Ent. News, 19: 201.

Fig.—Dickinson, Cfls. Wisc., p. 189, fig. 69 (wing); 1932.

General coloration gray; pseudosutural foveae and tuberculate pits black. Antennae dark brown throughout. Knobs of halteres weakly infumed. Legs light brown. Wings with *m-cu* shortly beyond fork of *M*. Male hypopygium (Fig. 53, B). ♂. L. 4.5-5 mm.; w. 5-6 mm. ♀. L. 5-6 mm.; w. 6.5-7 mm.

(Apr.-June; Aug., Sept.) Ont., Que., N. B., Me., N. H., Mass., N. Y., Pa., westw. to Wisc. and Alta., southw. to Tenn.

**O. bilineata** Dietz (Fig. 53, C).1916. *Ormosia bilineata* Dietz; Trans. Amer. Ent. Soc., 42: 142-143.1929. *O. huronis* Alexander; Can. Ent., 61: 20-21.Figs.—Dietz, *Ibid.*, pl. 10, fig. 8 (hyp., diagramm.); 1916. Alexander, Can. Ent., 61: 21, fig. 2 (hyp.); 1929.

General coloration pale brownish gray. Antennae dark brown throughout, relatively long (♂), if bent backward extending nearly to wing-root. Halteres pale yellow. Male hypopygium (Fig. 53, C). The two blackish lines on praescutum indicated by the name are poorly defined or lacking. ♂. L. 4-5 mm.; w. 4-5.5 mm. ♀. L. 4.5-5.5 mm.; w. 5-5.5 mm.

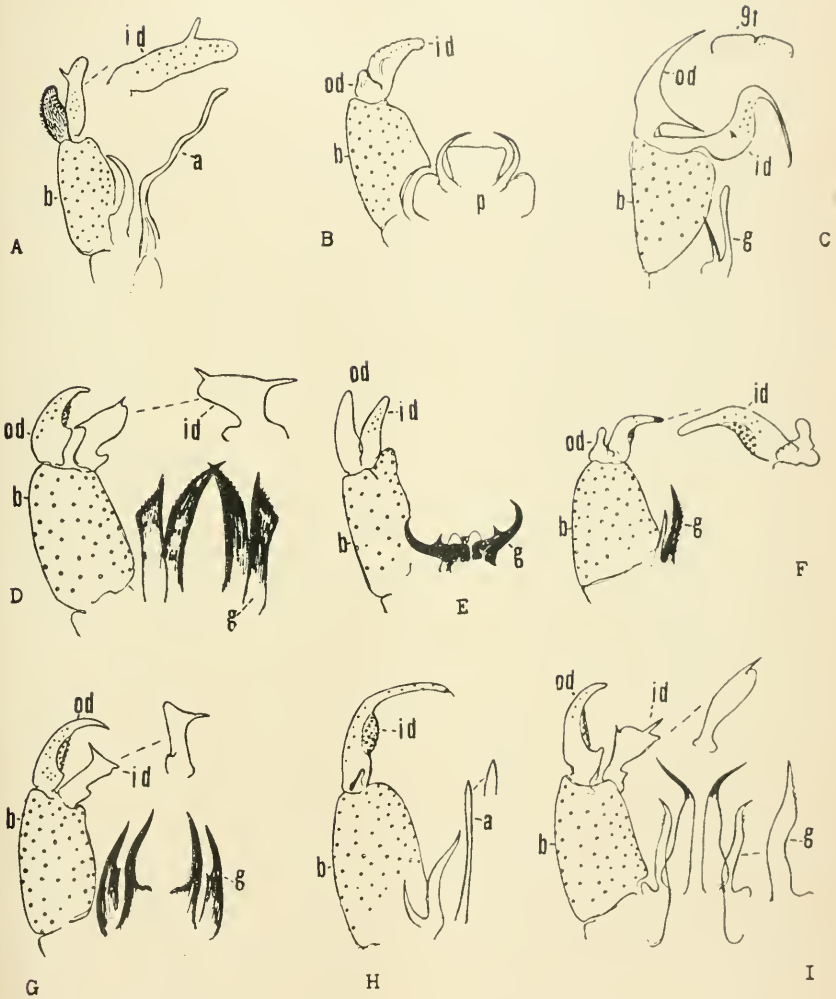
(Late Apr.-June) Que., N. B., N. H., Mass., N. Y., westw. to Mich. and S. D. (Black Hills), southw. to N. C. (Great Smokies).

Connecticut.—Riverton, May 16, 1931 (C. P. A.).

**O. brevicealcarata** Alex.1927. *Ormosia brevicealcarata* Alexander; Journ. N. Y. Ent. Soc., 35: 61-62.

Allied to *adivondacensis*. Mesonotum reddish brown, the praescutum with a darker median line. Wings subhyaline, the stigmal region darker; vein 2nd *A* very slightly sinuous, the distal third converging very slightly toward 1st *A*. ♂. L. about 3.5-4 mm.; w. 3.3-4.5 mm. ♀. L. 4-4.5 mm.; w. 4.3-4.8 mm.

(June, July) Pa., N. C., S. C., Tenn., southw. to nw. Fla.

FIGURE 53. Eriopterini: *Ormosia*; male hypopygia.

- |   |                              |
|---|------------------------------|
| A. <i>Ormosia adirondaccensis</i> Alex. | E. <i>O. dentifera</i> Alex. |
| B. <i>O. arcuata</i> (Doane)            | F. <i>O. fernaldi</i> Alex.  |
| C. <i>O. bilineata</i> Dtz.             | G. <i>O. frisoni</i> Alex.   |
| D. <i>O. carolinensis</i> Alex.         | H. <i>O. ingloria</i> Alex.  |
| I. <i>O. ithacana</i> Alex.             |                              |

Symbols: a, aedeagus; b, basistyle; g, gonapophysis; id, inner dististyle; od, outer dististyle; p, phallosome; t, tergite.

**O. carolinensis** Alex. (Fig. 53, D).1925. *Ormosia carolinensis* Alexander; Ent. News, 36:229.

Belongs to the *meigenii* group: most closely allied to *serridens*, differing chiefly in hypopygial characters (Fig. 53, D). ♂. L. about 2.6-2.8 mm.; w. 4.2-4.4 mm.

(March) N. C., S. C.

It is possible that this fly represents only a race of *serridens*.

**O. cramptoniana** Alex.1929. *Ormosia cramptoniana* Alexander; Can. Ent., 61:249.

Allied to *nubila*. General coloration dark gray. Antennae dark brown throughout. Wings with cell 1st  $M_2$  relatively small; *m-cu* shortly before fork of *M*. ♂. L. about 6 mm.; w. 6-6.5 mm. ♀. L. about 7.5 mm.; w. 7.6 x 2.8 mm.

(Late June, early July) Que. (Gaspé).

**O. dentifera** Alex. (Fig. 53, E).1919. *Ormosia dentifera* Alexander; Insec. Inscit. Menst., 7:144-145.

General coloration clear gray. Antennae (♂) black throughout; flagellar segments fusiform, with outspreading setae. Halteres pale. Wings with stigma not or but slightly indicated. Hypopygium bright yellow (Fig. 53, E). ♂. L. 3-3.8 mm.; w. 3.5-4.3 mm. ♀. L. 3.8-4 mm.; w. 4.5-4.6 mm.

(May-mid-June) Que., N. B., Me., N. H., Vt., Mass., Ct., N. Y.

Connecticut.—Riverton, May 16, 1931 (C. P. A.).

**O. fernaldi** Alex. (Fig. 53, F).1924. *Ormosia fernaldi* Alexander; Occas. Pap. Boston Soc. Nat. Hist., 5:116-117.

General coloration brownish gray, the pleura clear gray. Knobs of halteres yellowish. Wings tinged with gray, the stigma vaguely more infuscated; Anal veins converging at outer ends. Male hypopygium (Fig. 53, F). ♂. L. about 3.2 mm.; w. 4 mm. ♀. L. 3.5 mm.; w. 4-4.5 mm.

(May) Mass.

**O. frisoni** Alex. (Fig. 53, G).1920. *Ormosia frisoni* Alexander; Can. Ent., 52:224-225.

Belongs to the *meigenii* group; closest to *meigenii*, from which it is most readily told by the structure of the male hypopygium (Fig. 53, G). ♂. L. 3-3.5 mm.; w. 4-4.5 mm. ♀. L. 3.8-4 mm.; w. 4-4.8 mm.

(May) Ind., Ill., Mich., Ia.

**O. gaspensis** Alex.1929. *Ormosia gaspensis* Alexander; Can. Ent., 61:249-250.

Belongs to the *nigripila* group. Male hypopygium with the inner dististyle unusually short and stout, the expanded apex more or less bilobed. ♂. L. about 3-3.2 mm.; w. 4-4.2 mm. ♀. L. about 3.5 mm.; w. 4-4.4 mm.

(June) Que., N. B.

**O. holotricha** (O. S.)

1859. *Erioptera holotricha* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 226.

1869. *Rhypholophus holotrichus* Osten Sacken; Mon. Dipt. N. Amer., 4: 143-144.

General coloration pale gray to yellowish gray, the praescutum scarcely striped. Antennae entirely brownish black. Halteres yellow. Wings pale yellowish brown, the stigma barely darker. Male hypopygium with the outer dististyle a small acute black spine from a pale conical base; inner dististyle much longer, appearing as an angulated or sinuous rod, blackened and sparsely setiferous on outer half. ♂. L. about 4.5-5 mm.; w. 4-4.5 mm. ♀. L. about 5-5.5 mm.; w. about 5.5-5.8 mm.

(Late Apr., May) N. H., Vt., Mass., N. Y., southw. to N. C. and Tenn.

**O. hubbelli** Alex.

1926. *Ormosia hubbelli* Alexander; Insec. Inscit. Menst., 14: 20-21.

Belongs to the *bivittata* group. General coloration brown, the praescutum with two dark brown longitudinal stripes. Halteres with dark brown knobs. Wings strongly tinged with brown, the stigma scarcely darker. Male hypopygium with the outer dististyle a trifle longer than inner, blackened and microscopically serrulate along outer margin. ♂. L. about 5 mm.; w. 5 mm.

(Aug.) Man., Minn., N. Dak.

**O. ingloria** Alex. (Fig. 53, H).

1929. *Ormosia ingloria* Alexander; Can. Ent., 61: 21-22.

Fig.—Alexander, *Ibid.*, 61: 21, fig. 3 (hyp.); 1929.

Closely allied to *nimbipennis*, differing especially in the structure of the male hypopygium (Fig. 53, H). ♂. L. about 4 mm.; w. 4.8-5 mm. ♀. L. about 4.8 mm.; w. 5.2 mm.

(Aug.) Ont., Ind.

**O. innocens** (O. S.)

1869. *Rhypholophus innocens* Osten Sacken; Mon. Dipt. N. Amer., 4: 142.

Figs.—Alexander, *Cfs. N. Y.*, 1, pl. 34, fig. 56 (wing); 1919. Crampton, *Trans. Amer. Ent. Soc.*, 48, pl. 10, fig. 38 (hyp.); 1923.

General coloration gray. Antennae black throughout. Knobs of halteres weakly darkened. Male hypopygium with the mesal face of dististyle set with a few large marginal teeth. ♂. L. 4.5-5 mm.; w. 5-6 mm. ♀. L. 5-5.5 mm.; w. 5.5-6.5 mm.



(Apr.-mid-June) N. H., Vt., Mass., N. Y., N. J., westw. to Ohio, Ind. and Mich., southw. to Va., Tenn., N. C. and S. C.

Connecticut.—Norfolk, May 16, 1931 (C. P. A.).

**O. ithacana** Alex. (Fig. 53, I).

1929. *Ormosia ithacana* Alexander: Bull. Brooklyn Ent. Soc., 24: 29.

Belongs to the *meigenii* group; closest to *meigenii*, differing especially in the structure of the male hypopygium (Fig. 53, I). ♂. L. 3.8-4.2 mm.; w. 5-5.5 mm.

(Late Apr.-early May) N. Y.

**O. luteola** Dietz

1916. *Ormosia luteola* Dietz; Trans. Amer. Ent. Soc., 42: 138-139.

Fig.—Dietz, *Ibid.*, pl. 10, fig. 4 (hyp., diagramm.); 1916.

Belongs to the *nigripila* group. Thorax, including coxae, yellow to reddish yellow. Antennae generally pale, the outer segments darker. Wings broad, with a grayish brown tinge, the stigmal region darker. ♂. L. 4-5.5 mm.; w. 4.5-6 mm. ♀. L. 6-6.5 mm.; w. 6-7 mm.

(June-Sept.) Me., N. H., Vt., Mass., Ct., N. Y., Pa., westw. to Mich.

Connecticut.—East River, June 19, 1911 (Ely); Tunxis State Park, July 23-24, 1931 (C. P. A.).

**O. manicata** (Doane)

1930. *Rhypholophus manicatus* Doane; Journ. N. Y. Ent. Soc., 8: 187.

1916. *Ormosia deviata* Dietz; Trans. Amer. Ent. Soc., 42: 143-144.

Figs.—Dietz, *Ibid.*, pl. 10, figs. 9, 9A (hyp., diagramm.); 1916. Alexander, Cfls. N. Y., 1, pl. 34, fig. 60 (wing); 1919 (as *rubella*).

General coloration reddish brown, the praescutum more grayish brown medially. Antennae relatively short, with long conspicuous verticils. Halteres with weakly darkened knobs. Wings with a grayish tinge, the stigma pale brown.

Readily told from all other regional species by the profoundly divided ninth tergite and the needle-like gonapophyses. Allied species occur in western North America and in Japan. ♂. L. 4-4.5 mm.; w. 5-5.5 mm. ♀. L. 5 mm.; w. 5-5.5 mm.

(May, June; Aug.-Oct.) Ont., Que., N. B., N. S., Me., N. H., Vt., Mass., N. Y., Pa., westw. to the Pacific States.

Connecticut.—Granby, June 8, 1929 (C. P. A.); Kent Falls, May 30-31, June 12-13, 1931 (C. P. A.); Putnam, June 15, 1933 (C. P. A.) (in bog); Riverton, May 30, June 12, 1931 (C. P. A.); Twin Lakes, Sept. 12, 1928 (C. P. A.); Tyler Lake, June 13, 1931 (C. P. A.).

**O. megacera** Alex. (Fig. 54, A).

1916. *Ormosia divergens* Dietz; Trans. Amer. Ent. Soc., 42: 144-145 (nec *divergens* Coquillett, 1905).

1917. *Ormosia megacera* Alexander; Can. Ent., 49: 26.

Figs.—Dietz, *Ibid.*, pl. 10, fig. 10 (hyp., diagramm.); 1916. Alexander, *Cfls.* N. Y., 1, pl. 34, fig. 64 (wing); 1919.

General coloration dark brown, praescutum with three still darker brown stripes. Antennae dark brown, approximately as long as body ( $\delta$ ). Halteres dark brown, paler basally. Wings with a faint gray tinge; stigma ill-defined. Male hypopygium (Fig. 54, A).  $\delta$ . L. 3-4.5 mm.; w. 4.5-5.5 mm.

(June; Sept.) Que., N. B., Me., N. H., Vt., N. Y., Pa.

**O. meigenii** (O. S.) (Fig. 54, B).

1859. *Erioptera meigenii* Osten Sacken: Proc. Acad. Nat. Sci. Philadelphia, 1859:226.

1869. *Rhypholophus meigenii* Osten Sacken: Mon. Dipt. N. Amer., 4:144-145.

Figs.—Alexander, *Cfls.* N. Y., 1, pl. 34, fig. 61 (wing); 1919.

General coloration gray. Halteres light yellow. Wings with a gray tinge, the stigma brown, well-marked, preceded and followed by somewhat more whitish areas; cell *2nd M*<sub>2</sub> nearly truncate at base. Male hypopygium (Fig. 54, B).  $\delta$ . L. 3.6-4.5 mm.; w. 4.5-5.8 mm. ♀. L. 4.5-5 mm.; w. 5-5.5 mm.

(May, early June) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., N. J., Pa., westw. to Ohio and Ill., southw. to Va. and S. C.

Connecticut.—Kent Falls, May 17, 30, 31, 1931 (C. P. A.); Norfolk, May 16, 1931 (C. P. A.); Riverton, May 16, 30, 1931 (C. P. A.); Tyler Lake, June 13, 1931 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.); Winsted, May 16, 1931 (C. P. A.).

**O. mesocera** Alex. (Fig. 54, C).

1917. *Ormosia mesocera* Alexander: Can. Ent., 49:25.

Figs.—Alexander, *Cfls.* N. Y., 1, pl. 34, fig. 63 (wing); 1919.

General coloration light to dark brown, heavily gray pruinose; anterior lateral pretergites yellow. Antennae ( $\delta$ ) black throughout, if bent backward extending about to midlength of abdomen. Halteres pale. Wings with a strong grayish tinge, the stigmal region slightly darker. Male hypopygium (Fig. 54, C).  $\delta$ . L. 3.7-4.5 mm.; w. 3.8-5.5 mm. ♀. L. about 4-4.2 mm.; w. 4.5-5 mm.

(June, July) Ont., Que., N. B., Me., N. H., Vt., N. Y.

**O. monticola** (O. S.) (Figs. 23, E; 54, D).

1869. *Rhypholophus monticola* Osten Sacken: Mon. Dipt. N. Amer., 4:145-146.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 22, fig. 5 (ven.); 1908, (vein *2nd A* erroneous). Alexander, *Cfls.* N. Y., 1, pl. 34, fig. 62 (wing); 1919. Crampton, *Insec. Inscit. Menst.*, 13, pl. 2, fig. 7 (thorax); 1925.

General coloration pale brown, the praescutum with a somewhat darker median stripe and sometimes with a bluish gray pruinosity; pleura yellow. Knobs of halteres weakly darkened. Legs pale brown, the tarsi paling to light yellow or yellowish-white. Male hypopygium

(Fig. 54, D). ♂. L. 3.5-5 mm.; w. 4-6 mm. ♀. L. 5-5.5 mm.; w. 5.5-6 mm.

(Aug.-mid-Sept.) Que., Ont., N. B., Me., N. H., Vt., Mass., Ct., N. Y., Pa., westw. to Mich., southw. to N. C.

Connecticut.—Cornwall Bridge, Aug. 19, 1931 (C. P. A.); E. Hartland, Sept. 11, 1928 (C. P. A.); East River, Sept. 1910 (Ely); Kent Falls, Aug. 19, 1931 (C. P. A.); Norfolk, Sept. 6, 1928 (G. C. C.); Salisbury, Sept. 5, 1928 (G. C. C.), Sept. 12, 1928 (C. P. A.); Twin Lakes, Sept. 12, 1928 (C. P. A.); W. Granby, Sept. 11, 1928 (C. P. A.); Winsted, Sept. 5, 1928 (G. C. C.).

**O. nigripila** (O. S.) (Fig. 54, E).

1869. *Rhypholophus nigripilus* Osten Sacken; Mon. Dipt. N. Amer., 4: 142-143.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 22, fig. 4 (ven.); 1908. Alexander, Cfls. N. Y., 1, pl. 34, fig. 57 (wing); 1919.

General coloration dark brown, gray pruinose. Male hypopygium (Fig. 54, E) gonapophyses appearing as slender simple rods, curved to the acute tips. ♂. L. 3.5-4 mm.; w. 4-5 mm. ♀. L. about 4.5-5 mm.; w. 5 mm.

(May, June; Sept.) Ct., Pa., D. C., Va., westw. to Ind. and Mich., southw. to S. C. and Fla.

Connecticut.—Granby, June 8, 1929 (C. P. A.); Middletown, May 31, 1929 (R. C. N.) (at light); Riverton, May 30, 1931 (C. P. A.).

**O. nimbipennis** Alex. (Fig. 54, F).

1917. *Ormosia nimbipennis* Alexander; Can. Ent., 49: 24-25.

Figs.—Alexander, Cfls. N. Y., 1, pl. 34, fig. 59 (wing); 1919. Alexander, Can. Ent., 61: 21, fig. 4 (hyp.); 1929.

Mesonotal praescutum reddish brown to dark gray; remainder of thorax gray to dark grayish brown. Halteres pale yellow. Wings with a strong dusky tinge, the stigma still darker. Male hypopygium (Fig. 54, F) usually brighter than remainder of abdomen. ♂. L. 4-5 mm.; w. 4.5-6 mm. ♀. L. 5 mm.; w. 5-6 mm.

(July-Sept.) N. B., Me., N. H., Vt., Mass., Ct., N. Y., westw. to Mich.

Connecticut.—Cornwall Bridge, Aug. 19, 1931 (C. P. A.); W. Granby, Sept. 11, 1928 (C. P. A.).

**O. notmani** Alex. (Fig. 54, G).

1920. *Ormosia notmani* Alexander; Can. Ent., 52: 225.

General coloration gray. Antennae relatively short, black throughout. Knobs of halteres light yellow. Wings tinged with gray, the stigmal region more infumed; vein *2nd A* feebly sinuous near extreme tip but Anal veins decidedly divergent. Male hypopygium (Fig. 54, G). The peculiar structure of the outer dististyle is approached by *O. cornuta* (Doane) and *O. subcornuta* Alex., of western North America. ♂. L. 3.5-3.8 mm.; w. 4-4.5 mm. ♀. L. 4 mm.; w. 4 mm.

(May, June) Ont., Que., Mass., Ct., N. Y.

Connecticut.—Riverton, May 16, 1931 (C. P. A.).

**O. nubila** (O. S.) (Fig. 50, J).

1859. *Erioptera nubila* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 227.

1869. *Rhypholophus nubilus* Osten Sacken; Mon. Dipt. N. Amer., 4: 141-142.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 1, fig. 14 (wing); 1869. Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 22, fig. 3 (ven.); 1908. Alexander, Cfs. N. Y., 1, pl. 34, fig. 54 (wing); 1919. Crampton, Insec. Inscit. Menst., 13, pl. 3, fig. 13 (thorax); 1925.

General coloration gray, the praescutum with a single dark brown median stripe. Antennae brown, the basal segments paler. Halteres pale. Wings with cell *1st M*<sub>2</sub> frequently open by atrophy or partial atrophy of *m*; *R*<sub>2</sub> shortly before origin of vein *R*<sub>3</sub> (Fig. 50, J). Abdomen dark brown, the caudal margins of the segments restrictedly pale. ♂. L. 4.5-5 mm.; w. 5-5.8 mm. ♀. L. 5.5-6 mm.; w. 6.5-7 mm.

(Apr.-early June; Aug., Sept.) Me., N. H., Vt., Mass., N. Y., Pa., westw. to O. and Ill., southw. to Va., Tenn. and S. C.

Connecticut.—Granby, Sept. 4, 1928 (G. C. C.); Kent Falls, May 3, 1931 (C. P. A.); Riverton, May 16, 1931 (C. P. A.); Salisbury, May 16, 1931, Sept. 5, 1928 (C. P. A., G. C. C.); Tunxis State Forest, May 16, 1931 (C. P. A.); W. Granby, Sept. 11, 1928 (C. P. A.).

**O. palpalis** Dtz.

1916. *Ormosia palpalis* Dietz; Trans. Amer. Ent. Soc., 42: 140.

Fig.—Dietz, *Ibid.*, pl. 10, fig. 6 (hyp.).

Belongs to the *nigripila* group. General coloration grayish brown, the praescutum with a darker median line. Antennae brown, the basal four or five segments yellowish. Wings hyaline, the stigmal region slightly darker. ♂. L. 3.25 mm.; w. 4.25 mm.

(Sept., Oct.) Pa.

**O. pygmaea** (Alex.)

1912. *Trimicra pygmaea* Alexander; Psyche, 19: 166.

1916. *Ormosia pilosa* Dietz; Trans. Amer. Ent. Soc., 42: 139.

Figs.—Alexander, *Ibid.*, 19, pl. 13, fig. 3 (wing). Dietz, *Ibid.*, pl. 10, fig. 5 (hyp.). Alexander, Cfs. N. Y., 1, pl. 34, fig. 58 (wing); 1919.

Belongs to the *nigripila* group. Gonapophyses differing from those of *nigripila* by being relatively short and stout, broad, bearing an acute spine on outer margin just back of the similarly acute apex. ♂. L. 3.5-4 mm.; w. 4-5 mm. ♀. L. 4.5 mm.; w. 5 mm.

(May-early July; Aug., Sept.) Que., N. B., Me., N. H., Vt., Mass., Ct., N. Y., Pa., O., Mich.; southw. to N. C. (more northern than *nigripila*).

Connecticut.—E. Connecticut, May 24 (C. W. J.); Norfolk, June 9, 1929, Sept. 11, 1928 (C. P. A.); W. Granby, Sept. 11, 1928 (C. P. A.).



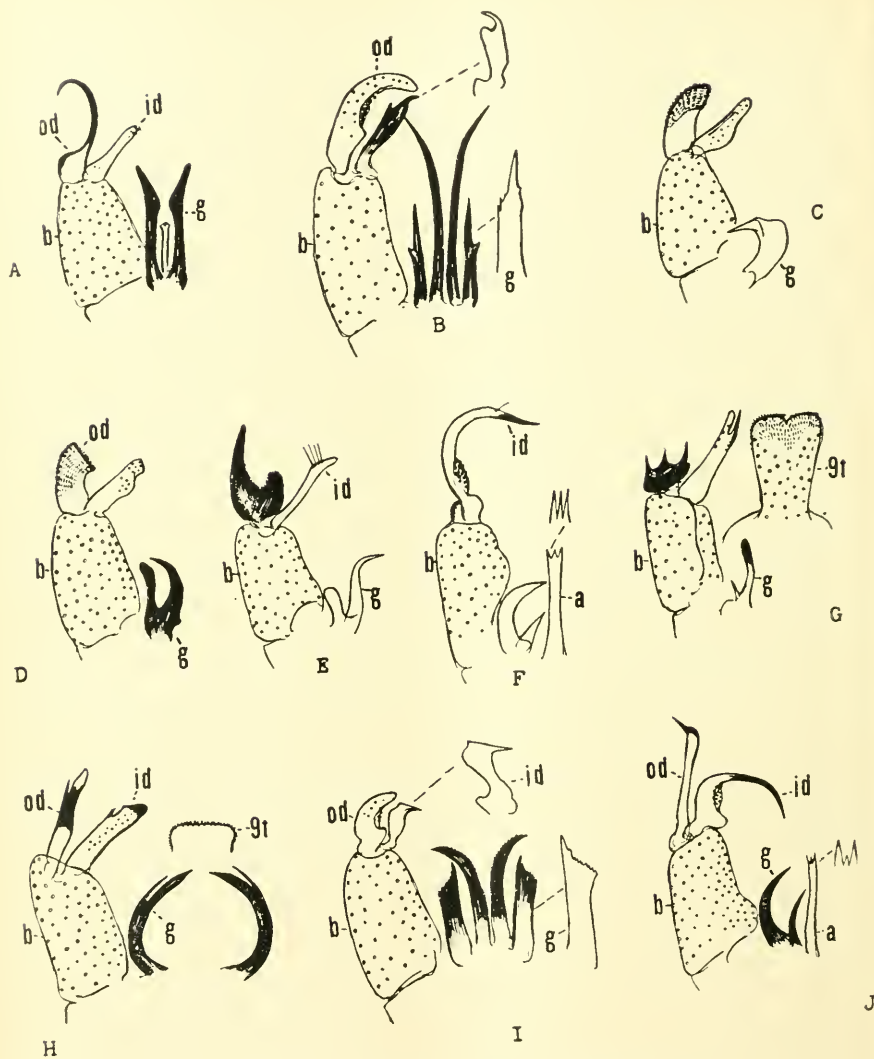


FIGURE 54. Eriopterini: *Ormosia*; male hypopygia.

- A. *Ormosia megacera* Alex.  
 B. *O. mcigenii* (O. S.)  
 C. *O. mesocera* Alex.  
 D. *O. monticola* (O. S.)  
 E. *O. nigripila* (O. S.)

- F. *O. nimbipectus* Alex.  
 G. *O. notmani* Alex.  
 H. *O. rubella* (O. S.)  
 I. *O. serridens* Alex.  
 J. *O. toxnesi* Alex.

Symbols: a, aedeagus; b, basistyle; g, gonapophysis; id, inner dististyle; od, outer dististyle; t, tergite.

**O. rubella** (O. S.) (Fig. 54, H).

1869. *Rhypholophus rubellus* Osten Sacken; Mon. Dipt. N. Amer., 4: 144.

1921. *Ormosia rubella aenigmatica* Dietz; Trans. Amer. Ent. Soc., 47: 249.

Figs.—Osten Sacken, *Ibid.*, pl. 1, fig. 15 (wing). Williston, Man. N. Amer. Dipt., Ed. 3: 84, fig. 25, sub 11 (wing); 1908. Dickinson, Cfs. Wisc., p. 190, fig. 70 (wing); 1932.

Mesonotum chiefly light reddish brown; pleura somewhat more darkened. Halteres yellow. Terminal tarsal segments dusky. Male hypopygium (Fig. 54, H). ♂. L. 3.7-4 mm.; w. 4.2-4.5 mm. ♀. L. 5 mm.; w. 5.5 mm.

(Late Aug.-Oct.) Ont., Me., N. H., Vt., Mass., Ct., N. Y., Pa., westw. to Ind., Mich. and Wisc., southw. to Ga.

Connecticut.—Norfolk, Sept. 5, 1928 (G. C. C.), Sept. 11, 1928 (C. P. A.); Salisbury, Sept. 5, 1928 (G. C. C.), Sept. 12, 1928 (C. P. A.); Twin Lakes, Sept. 12, 1928 (C. P. A.); W. Granby, Sept. 11, 1928 (C. P. A.).

**O. serridens** Alex. (Fig. 54, I).

1919. *Ormosia serridens* Alexander; Insec. Inscit. Menst., 7: 144.

Belongs to the *meigenii* group. Most readily told by the structure of the male hypopygium (Fig. 54, I). ♂. L. 3.8-4 mm.; w. 4.5-4.8 mm.

(Apr.) Md., Va.

**O. townesi** Alex. (Fig. 54, J).

1933. *Ormosia townesi* Alexander; Journ. N. Y. Ent. Soc., 41: 99-100.

Belongs to the *nimbipennis* group. Mesonotal praescutum reddish brown, contrasting conspicuously with the dark brown pleura and posterior sclerites of mesonotum. Halteres pale yellow. Male hypopygium (Fig. 54, J) with both dististyles elongate. ♂. L. 4.5 mm.; w. 5.8 mm. ♀. L. about 5 mm.; w. 6 mm.

(Late Aug.) N. C. (in mts.).

**Tasiocera** Skuse

1889. *Tasiocera* Skuse; Proc. Linn. Soc. N. S. W. (2) 4: 815.

Subgenus **Dasymolophilus** Goetghbuer

1920. *Molophilus (Dasymolophilus)* Goetghbuer; Bull. Soc. Ent. Belgique, 2: 132.

A small group of Holarctic crane-flies, now placed as a subgenus of the antipodal genus *Tasiocera* Skuse. The present group is well-distinguished from *Molophilus* by the presence of trichia in the cells of the wings; vein  $R_2$  in transverse alignment with  $R_{2+3}$ , and by the male hypopygium having a single dististyle of simple structure. These crane-flies are the smallest species in the local fauna, the adults occur-

ring in dancing swarms near small streams. The immature stages are unknown.

*Key to Species*

1. Mesonotum pale reddish yellow, contrasting with the dark brown abdomen and halteres; wings with anal angle lacking, vein *2nd A* short; wings dimidiate, the base paler than apex ..... **niphadias**  
 Body, including mesonotum, dark brown; wings with anal angle slightly indicated, vein *2nd A* longer; wings uniformly infumed, with a pale longitudinal streak above vein *M* ..... **ursina**

**T.** (*Dasymolophilus*) **niphadias** (Alex.) (Fig. 50, K).

1925. *Molophilus* (*Dasymolophilus*) *niphadias* Alexander: Ent. News, 36: 229-230.

Head brownish testaceous. Wings (Fig. 50, K) indistinctly dimidiate, the basal half whitish subhyaline, cells beyond cord distinctly infumed. ♂. L. 1.6 mm.; w. 2.2 mm.

(June) Ind., Mich., southw. to Tenn. and n. Fla.

**T.** (*Dasymolophilus*) **ursina** (O. S.) (Fig. 55, A).

1859. *Erioptera ursina* Osten Sacken: Proc. Acad. Nat. Sci. Philadelphia, 1859: 228.

Figs.—Alexander, Proc. Acad. Nat. Sci. Philadelphia, 1916, pl. 27, fig. 39 (ven.); 1916. Alexander, Cfls. N. Y., 1, pl. 34, fig. 70 (ven.); 1919.

General coloration dark brown to black; body conspicuously clothed with long black setae. Male hypopygium (Fig. 55, A). ♂. L. 1.8-2 mm.; w. 2.5-2.6 mm. ♀. L. 2 mm.; w. 2.5 mm.

(Late Apr.-July) Me., N. H., Vt., Mass., N. Y., Md., D. C., N. C. and Tenn. Connecticut.—Kent Falls, June 12-13, July 23-24, 1931 (C. P. A.).

### **Molophilus** Curtis

1833. *Molophilus* Curtis; Brit. Ent., p. 444.

A vast genus of small or medium-sized hairy flies. The adults may be swept from rank vegetation near water or be found in small dancing swarms in shaded spots. The immature stages occur in moist earth.

The local species fall in two groups, termed the *plagiatus* and *gracilis* groups, respectively, that are very numerous in species in Australia and New Zealand, with somewhat fewer members in South and Middle America. Their present distribution has evidently been attained by migrations across Antarctica and thence northward through the Americas.

*Key to Species*

(Based on male characters)

1. Male hypopygium with ventral lobe of basistyle produced near apex into a small sclerotized beak; both dististyles lying in notch of basistyle, widely separated by membrane; mesal lobe of basistyle not developed; outer dististyle deeply bifid (*plagiatus* group) (Fig. 55, C, F, I, M)..... 2

- Male hypopygium with ventral lobe of basistyle unarmed; both dististyles simple, placed close together near apex of basistyle; mesal lobe of basistyle conspicuously developed and provided (except in *auricomus*) with a dozen or more black spines or spinous setae (*gracilis* group) (Fig. 55, B, D, E, G, H, J, K, L) ..... 5
2. Antennae ( $\delta$ ) of moderate length, if bent backward extending about to root of halteres, the flagellar segments clothed with a long white pubescence. . . . . 3  
Antennae short in both sexes, ending opposite or before wing-root; male hypopygium (Fig. 55, F) with the basal dististyle bearing a simple acute spine on outer face at near one-third the length. . . . . *hirtipennis*
3. Male hypopygium with the basal dististyle a long straight unbranched rod (Fig. 55, I); size very small (wing, 3.5 mm. or less) . . . . . *nova-caesariensis*  
Male hypopygium with the basal dististyle variously branched; (Fig. 55, C, M); size larger (wing, 4.5 mm. or more) . . . . . 4
4. Male hypopygium with the basal dististyle terminating in four acute spines (Fig. 55, M) . . . . . *quadrispinosus*  
Male hypopygium with the axial stem of basal dististyle bearing a single long slender spine on inner face at near midlength (Fig. 55, C) . . . . . *cramptoni*
5. Wings with distinct brown seams along vein *Cu* and over *m-cu* . . . . . *soror*  
Wings immaculate . . . . . 6
6. Male hypopygium with mesal lobe of basistyle without blackened points, all setae being long and pale in color; dorsal lobe of basistyle very slender (Fig. 55, B); both dististyles appearing as long slender rods, acute at tips . . . . . *auricomus*  
Male hypopygium with mesal lobe of basistyle set with blackened spinous points or elongate spiniform setae; dorsal lobe of basistyle stout; both dististyles short and more or less curved (Fig. 55, D, E, G, H, J, K, L) . . . . . 7
7. Antennae ( $\delta$ ) short, if bent backward not attaining the wing-root; male hypopygium (Fig. 55, D) . . . . . *forcipulus*  
Antennae ( $\delta$ ) elongate, if bent backward extending to base of abdomen or beyond . . . . . 8
8. Antennae ( $\delta$ ) relatively short, approximately one-half the length of body, or extending about to base of abdomen . . . . . 9  
Antennae ( $\delta$ ) longer, if bent backward extending approximately to mid-length of abdomen . . . . . 10
9. Dorsal lobe of basistyle unusually long, extending caudad beyond level of apex of outer dististyle; vestiture of mesal lobe consisting of small black spines; outer dististyle conspicuously roughened, both on inner and outer margins; inner style with a few microscopic spinulae on concave margin before the long black apical point (Fig. 55, K); size small (w.  $\delta$ , about 3.5 mm.) . . . . . *pollex*  
Dorsal lobe of basistyle small, extending caudad only beyond bases of styli; festiture of mesal lobe consisting of elongate spines or long spinous setae; outer dististyle almost smooth, with relatively few microscopic points; inner style smooth (Fig. 55, H); size larger (w.  $\delta$ , about 5 mm.) . . . . . *laricicola*
10. Costal fringe ( $\text{♀}$ ) light golden-yellow, of  $\delta$  somewhat darker, light brown; male hypopygium with the outer dististyle glabrous, except for a few microscopic setulae on disk (Fig. 55, L) . . . . . *pupipennis*  
Costal fringe brown in both sexes; male hypopygium with the outer dististyle provided with abundant microscopic setulae on distal half or more (Fig. 55, E, G, J) . . . . . 11
11. Male hypopygium with the outer dististyle relatively slender, the apical point elongate; spines or spinous setae of mesal lobe of basistyle long and conspicuous (Fig. 55, E) . . . . . *fultonensis*  
Male hypopygium with the outer dististyle wider; spines of mesal lobe of basistyle unusually short and peg-like (Fig. 55, G, J) . . . . . 12
12. Size larger ( $\delta$ , w. 4.8-5 mm.); femora with the tips insensibly darkened; wings broad with vein *2nd A* long, extending to about opposite midlength of petiole of cell *M*; male hypopygium (Fig. 55, G) . . . . . *huron*  
Size smaller ( $\delta$ , w. 3.5-4.5 mm.); femora with the tips conspicuously black-



ened, broadest on fore legs; wings narrow, with vein *2nd A* short, extending to opposite *m-cu* or just beyond; male hypopygium (Fig. 55, J).....  
*paludicola*

The following doubtful forms, both members of the *gracilis* group, are not included in the above key because of insufficient data.

*Molophilus costopunctatus* Dietz (Trans. Amer. Ent. Soc., 47:248; 1921). Mesonotum light brown, the pronotum and lateral pretergites light yellow. Head reddish brown; antennae relatively short; basal segments pale yellow, the outer segments light brown. Knobs of halteres fuscous. Wings tinged with yellow; a small but conspicuous costal spot between *R*<sub>2</sub> and tip of *R*<sub>1+2</sub>. ♂. L. 2.3 mm.; w. 4 mm. Hazleton, Pa. (Sept.).

*Molophilus forcipulus heterocerus* Dietz. (*Ibid.*, 47:247-248; 1921). Differs from the typical form in the pale yellow antennal flagellum; scape brown; pedicel yellowish brown. The sulphur-yellow area on humeri scarcely evident. Hazleton, Pa. (Sept.).

**Molophilus auricomus** Alex. (Fig. 55, B).

1926. *Molophilus auricomus* Alexander; Insec. Inscit. Menst., 14:115-117.

Belongs to the *gracilis* group. General coloration reddish yellow. Antennae short in both sexes, the basal segments pale. Head yellow. Wings yellow, the costal region brighter, covered with yellow trichia. Male hypopygium (Fig. 55, B). ♂. L. about 3 mm.; w. 4 mm. ♀. L. about 3.5 mm.; w. 4.3 mm.

(June, July) N. C., S. C., Tenn.

**M. cramptoni** Alex. (Figs. 50, L; 55, C).

1924. *Molophilus cramptoni* Alexander; Bull. Brooklyn Ent. Soc., 19:61-62.

Belongs to the *plagiatus* group. General coloration dark brown; lateral pretergites restrictedly whitish. Antennae (♂) relatively long, if bent backward extending about to root of halteres; flagellar segments elongate-oval, clothed with long white setae. Halteres yellow. Wings (Fig. 50, L) strongly tinged with brown. Male hypopygium (Fig. 55, C). ♂. L. 4-4.2 mm.; w. 4.8 mm. ♀. L. 4.5-5 mm.; w. 4.8-5.4 mm.

(June) Me., N. H., Vt., Mass., N. Y., westw. to Ind. and Mich., southw. to S. C. and Tenn.

Connecticut.—Hartland, June 9, 1929 (C. P. A.).

**M. forcipulus** (O. S.) (Fig. 55, D).

1869. *Erioptera forcipula* Osten Sacken; Mon. Dipt. N. Amer., 4:163-164.

Fig.—Dickinson, Cfls. Wisc., p. 196, fig. 80 (wing); 1932.

Belongs to the *gracilis* group. Mesonotum reddish brown, with a line of darker setae on praescutal interspaces; humeri and lateral pretergites pale yellow. Antennae with basal segments pale, the outer segments dark brown. Halteres infuscated, the apices of knobs a trifle brightened. Male hypopygium (Fig. 55, D). ♂. L. about 3-4 mm.; w. 3.5-5 mm.

(June, July) Ont., Que., N. B., Me., N. H., Vt., Mass., N. Y., N. J., westw. to Wisc., southw. to S. C., Tenn. and Fla.; chiefly in bogs.

Connecticut.—Putnam, June 15, 1933 (C. P. A.).

**M. fultonensis** Alex. (Fig. 55, E).

1916. *Molophilus fultonensis* Alexander: Proc. Acad. Nat. Sci. Philadelphia, 1916: 505-506.

Figs.—Alexander, *Ibid.*, pl. 27, fig. 37 (wing), pl. 31, figs. 95, 96 (hyp.). Alexander, Cfs. N. Y., 1, pl. 34, fig. 67 (ven.); 1919.

Belongs to the *gracilis* group. Larger and darker colored than *pubipennis*. Antennae, especially of female, more elongate than in the corresponding sex of *pubipennis*. Thorax reddish brown, the pleura sometimes a little darker; abdomen dark brown, the hypopygium paler. Femora pale, the tips not or scarcely darker. Costal fringe of both sexes reddish brown to dark brown. Male hypopygium (Fig. 55, E). ♂. L. 4-4.5 mm.; w. 5-6.2 mm.; antenna about 3 mm. ♀. L. 4.5-5 mm.; w. 5.3-6 mm.

(June, July) Que., N. H., Mass., Ct., N. Y., westw. to Mich. and Wisc., southw. to S. C. and Tenn.

Connecticut.—Granby, June 8, 1929 (C. P. A.); Tunxis State Park, July 23, 1931 (C. P. A.).

**M. hirtipennis** (O. S.) (Fig. 55, F).

1859. *Erioptera hirtipennis* Osten Sacken: Proc. Acad. Nat. Sci. Philadelphia, 1859: 228.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 22, fig. 6 (ven.); 1908. Alexander, Cfs. N. Y., 1, pl. 34, fig. 65 (ven.); 1919.

Belongs to the *plagiatus* group. General coloration dark brown, very sparsely pruinose; lateral pretergites restrictedly brightened. Antennae dark brown. Wings tinged with dusky, the costal region brighter; trichia dark-colored. Abdomen dark brown. Male hypopygium (Fig. 55, F). ♂. L. 3.5-4 mm.; w. 4-4.5 mm.

(June, July) Ont., Que., N. S., Me., N. H., Vt., Mass., N. Y., N. J., Pa., westw. to Ind. and Ill., southw. to N. C. and Tenn.

Connecticut.—East River, July 1910 (Ely); Hartland, June 8, 1929 (C. P. A.); Kent Falls, June 12-13, 1931 (C. P. A.); Manitic Lake, June 8-9, 1929 (C. P. A.); Norfolk, June 9, 1929 (C. P. A.).

Rogers (1942) believes that this species as well as *M. pubipennis* O. S. and *M. soror* Alex. are chiefly or entirely parthenogenetic.

**M. huron** Alex. (Fig. 55, G).

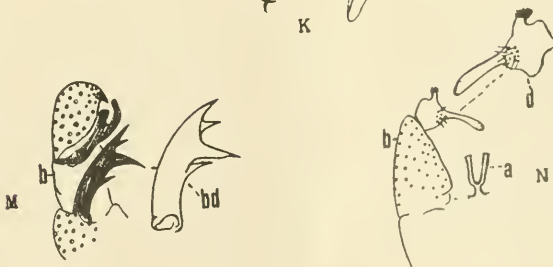
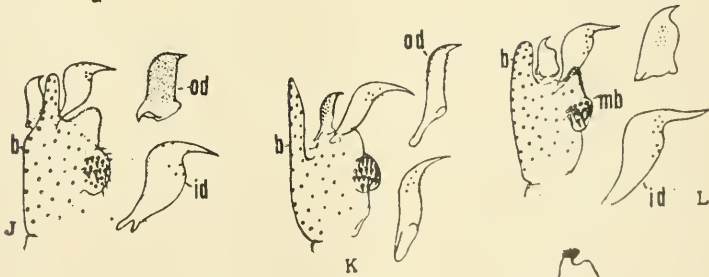
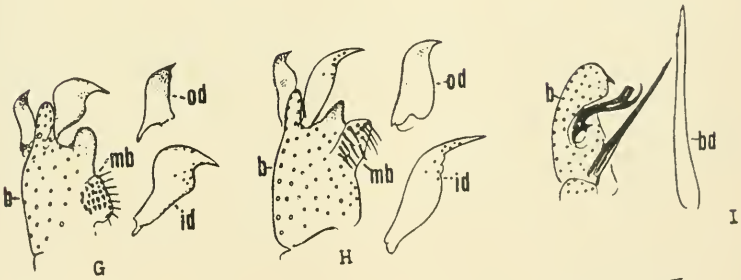
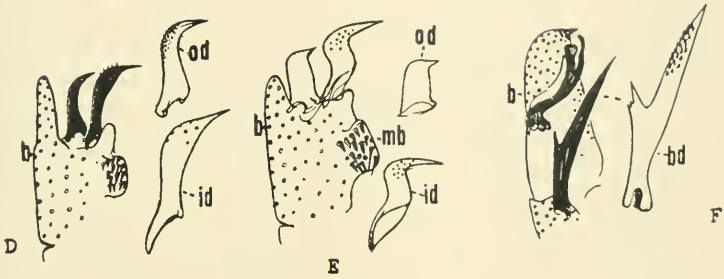
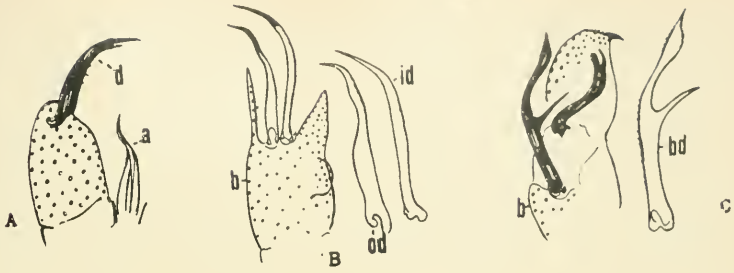
1929. *Molophilus huron* Alexander: Journ. N. Y. Ent. Soc., 37: 56-57.

Belongs to the *gracilis* group; most closely allied to *fultonensis* and *paludicola*. From *paludicola* it differs in the larger size, somewhat broader wings, with more elongate vein 2nd A, and in the indistinctly darkened tips of the femora. From *fultonensis* it differs especially in the structure of the male hypopygium (Fig. 55, G), notably the short peg-like spines of the mesal lobe of the basistyle and

FIGURE 55. Eriopterini; male hypopygia.

- A. *Tasiocera (Dasymolophilus) ursina* (O. S.)
- B. *Molophilus auricomus* Alex.
- C. *M. cramptoni* Alex.
- D. *M. forcipulus* (O. S.)
- E. *M. fultouensis* Alex.
- F. *M. hirtipennis* (O. S.)
- G. *M. huron* Alex.
- H. *M. laricicola* Alex.
- I. *M. nova-caesariensis* Alex.
- J. *M. paludicola* Alex.
- K. *M. pollex* Alex.
- L. *M. pubipennis* (O. S.)
- M. *M. quadrispinosus* Alex.
- N. *Toxorhina (Toxorhina) muliebris* (O. S.)

Symbols: *a*, aedeagus; *b*, basistyle; *bd*, basal dististyle; *d*, dististyle; *id*, inner dististyle; *mb*, median lobe of basistyle; *od*, outer dististyle.





the broader inner dististyle. ♂. L. about 4-4.2 mm.; w. 4.8-5 mm.; antenna, about 2.8-3 mm. ♀. L. about 5 mm.; w. 5.5 mm.

(July, Aug.) Mich.

**M. laricicola** Alex. (Fig. 55, H).

1929. *Molophilus laricicola* Alexander: Journ. N. Y. Ent. Soc., 37: 55-56.

Belongs to the *gracilis* group. General coloration reddish brown. Male hypopygium (Fig. 55, H) with the dorsal lobe shorter than in *pollex*. ♂. L. about 4 mm.; w. 5-5.2 mm.; antenna, about 2 mm. ♀. L. about 4.5-5 mm.; w. 5.5-6 mm.

(June) Me., N. H., Vt., N. Y.; in sphagnum bogs.

This species and *M. pollex* are readily told from all other members of the *gracilis* group by the intermediate length of the male antennae.

**M. nova-caesariensis** Alex. (Fig. 55, I).

1916. *Molophilus nova-caesariensis* Alexander: Proc. Acad. Nat. Sci. Philadelphia, 1916: 506-507.

Figs.—Alexander, *Ibid.*, pl. 27, fig. 38 (ven.). Alexander, Cfs. N. Y., 1, pl. 34, fig. 68 (ven.); 1919. Dickinson, Cfs. Wisc., p. 194, fig. 79 (wing); 1932.

Belongs to the *plagiatus* group. General coloration very dark brown or black, heavily gray pruinose; lateral pretergites restrictedly light yellow. Antennae of moderate length, somewhat shorter than in *cramptoni* but longer than in *hirtipennis*. Legs chiefly black, the femoral bases yellow. Wings with *m-cu* at or shortly beyond the fork of *M*. Male hypopygium (Fig. 55, I). ♂. L. 2.7-3 mm.; w. 2.8-3.5 mm. ♀. L. 3-3.5 mm.; w. 3-3.5 mm.

(Apr., May) N. J., Ind., Va., westw. to Wisc., southw. to Fla.

(Transition, Austral).

**M. paludicola** Alex. (Fig. 55, J).

1929. *Molophilus paludicola* Alexander: Journ. N. Y. Ent. Soc., 37: 57-58.

Belongs to the *gracilis* group, most nearly allied to *huron*. General coloration of mesonotum reddish gray to dark brown, the lateral pretergites pale yellow. Abdomen black, the hypopygium brightened. Male hypopygium (Fig. 55, J). ♂. L. 3-4 mm.; w. 3.5-4.5 mm. ♀. L. 4.5-5 mm.; w. 4.8-5 mm.

(June-Aug.) Me., Vt., Mass., Ct.; in boggy woods and meadows.

Connecticut.—Brooklyn, June 15, 1933 (C. P. A.); Hamden, June 30, 1932 (N. T.), July 8-13, 1932 (P. G.); Putnam, June 15, 1933 (C. P. A.); Stafford Springs, June 14, 1933 (C. P. A.).

**M. pollex** Alex. (Fig. 55, K).

1931. *Molophilus pollex* Alexander: Can. Ent., 63: 146-147.

Belongs to the *gracilis* group; most nearly allied to *laricicola*. General coloration light brown. Antennae (♂) black throughout.

Wings yellowish gray, the axillary region more infumed; vein *2nd A* ending some distance before *m-cu*. Male hypopygium (Fig. 55, K). ♂. L. about 3.8 mm.; w. 3.5 mm.; antenna, about 1.8 mm.

(June) Que., N. B.

**M. pubipennis** (O. S.) (Fig. 55, L).

1859. *Erioptera pubipennis* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 228.

Figs.—Alexander, Cfs. N. Y., 1, pl. 34, fig. 66 (ven.); 1919. Crampton, Insec. Inscit. Menst., 13, pl. 2, fig. 4; pl. 3, fig. 17 (thorax); 1925.

Belongs to the *gracilis* group. General coloration pale reddish yellow. Head yellow. Knobs of halteres weakly darkened (♂) or clear yellow (♀). In female, costal border of wings densely clothed with golden-yellow trichia; in male, these trichia more brownish yellow to pale brown. Male hypopygium (Fig. 55, L) with the outer dististyle almost glabrous.

The female is well-distinguished by the golden-yellow costal trichia but the males have not yet been satisfactorily separated. In what appears to represent a single species, a rather remarkable range in the amount and coarseness of the setae of the outer dististyle is found. ♂. L. about 3.5-4 mm.; w. 4-4.5 mm.; antennae, about 2.25 mm. ♀. L. 3.5-4 mm.; w. 4-4.5 mm.

It is doubtful that the male associated with this species belongs here. See note under *M. hirtipennis*.

(June-Aug.) Ont., Que., Me., N. H., Vt., Mass., N. Y., westw. to Ind. and Mich. southw. to S. C., Ga., Tenn. and Fla.

Connecticut.—Bloomfield, Aug. 6, 1929 (C. P. A.); Cornwall Bridge, June 12-13, 1931 (C. P. A.); Kent Falls, June 12-13, 1931, July 23-24, 1931, Aug. 19, 1931 (C. P. A.); Norfolk, May 31, 1931, June 12, 1931, July 24, 1931 (C. P. A.); Riverton, June 8, 1929 (C. P. A.); Saptree Run State Park, June 14, 1933 (C. P. A.); Twin Lakes, Sept. 12, 1928 (C. P. A.); Tyler Lake, June 13, 1931, July 23, 1931 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.).

**M. quadrispinosus** Alex. (Fig. 55, M).

1924. *Molophilus quadrispinosus* Alexander; Bull. Brooklyn Ent. Soc., 19: 62.

Belongs to the *plagiatus* group. General coloration dark grayish brown, the humeral region of praescutum more brownish yellow. Halteres light yellow. Male hypopygium (Fig. 55, M). ♂. L. about 3.5-4 mm.; w. 4.5-5 mm.

(Late May, June) Que., N. B., Vt., Mass., Ct., N. Y., westw. to Mich.

Connecticut.—Kent Falls, May 30-31, 1931 (C. P. A.); Riverton, May 30, 1931 (C. P. A.); W. Granby, June 8, 1929 (C. P. A.).

**M. soror** Alex.

1927. *Molophilus soror* Alexander; Occas. Pap. Boston Soc. Nat. Hist., 5: 230-231.

Fig.—Alexander, Cfs. N. Y., 1, pl. 34, fig. 69 (ven.); 1919 (as *comatus* Doane).

Belongs to the *gracilis* group. General coloration brownish gray. Antennae short, brownish black. Halteres pale. Wings whitish, the

base and costal border strongly yellowish; a narrow brown seam along veins *Cu*, *m-cu* and basal section of  $M_{3+4}$ . ♀. L. 4-5 mm.; w. 5-6 mm.

The male sex has not been discovered. See note under *M. hirtipennis*.

(Aug., Sept.) N. B., Me., westw. to Mich. and Alta.

#### 4. Subtribe TOXORHINARIA

##### Toxorhina Loew

1851. *Toxorhina* Loew; Linnaea Entomol., 5: 400.

1869. *Toxorhina* Osten Sacken; Mon. Dipt. N. Amer., 4: 109-114.

A moderate-sized group of very peculiar and isolated crane-flies, readily told by the reduced radial venation (Fig. 50, M), the elongate rostrum with mouth parts at extreme tip, and the profoundly bifid setae on legs. Other peculiar features lie in the uniting of certain of the basal flagellar segments into a conical "fusion-segment", the presence of very long setae on the outer flagellar segments, and the greatly lengthened cervical region, with the anterior portion of the praescutum produced cephalad over its base. The resemblance to *Elephantomyia* appears to be merely superficial. The adult flies of our northern species, *muliebris*, may be swept from vegetation in boggy areas. The early stages remain undiscovered.

##### Key to Species

1. Cell 1st  $M_2$  closed; body-coloration brownish yellow to brown; average size large (♂, L. 7 mm. or more) ..... **magna**
- Cell 1st  $M_2$  open by the atrophy of *m*, closed only in abnormal specimens (Fig. 50, M); body-coloration gray to brownish gray; average size smaller (♂, L. 6 mm. or less) ..... **muliebris**

##### **Toxorhina** (*Toxorhina*) **magna** (O. S.)

1865. *Toxorhina magna* Osten Sacken; Proc. Philadelphia Ent. Soc., 4: 232.

Figs.—Osten Sacken, Mon. Dipt. N. Amer., 4, pl. 1, fig. 6 (wing); 1869. Alexander, Cfs. N. Y., 1, pl. 33, fig. 45 (ven.); 1919.

Postnotum and pleura more pruinose than notum. Legs chiefly brown; tips of tibiae narrowly dark brown or black. Abdomen elongate, the segments pale brown, with darker brown incisures. ♂. L., excluding rostrum, 7-10 mm.; w. 5.5-7.5 mm.; rostrum, 3-3.5 mm. ♀. L., excluding rostrum, 9-12 mm.; w. 5.5-8 mm.; rostrum, 3.5-4.5 mm.

(Apr.-July; Sept.-Oct.) Mass. (Nantucket Is.); N. J., westw. to Mich.; southw. to S. C., Ga., Fla. and La. (Austral, Transition).

##### **T.** (*Toxorhina*) **muliebris** (O. S.) (Figs. 50, M; 55, N).

1865. *Toxorhina muliebris* Osten Sacken; Proc. Philadelphia Ent. Soc., 4: 233.

Figs.—Needham, 23rd Rept. N. Y. St. Ent. for 1907, pl. 29, fig. 5 (ven.); 1908.

Alexander, Cfs. N. Y., 1, pl. 33, fig. 46 (ven.); 1919. Dickinson, Cfs. Wis., p. 199, fig. 88 (wing); 1932.

Legs yellow to brownish yellow; terminal segments darker. Abdomen uniformly dark brown; hypopygium paler brown. Male hypopygium (Fig. 55, X). ♂. L., excluding rostrum, 5.5-6 mm.; w. 4.5-5 mm.; rostrum, 2-2.5 mm. ♀. L., excluding rostrum, 6-7 mm.; w. 5-5.5 mm.; rostrum, 2-2.5 mm.

(Mid-June-early Aug.) Que., Me., Vt., Mass., R. I., Ct., N. Y., Pa., westw. to Ind., Ill., Mich. and Wis., southw. to Md. and Va. (Canadian, Transition).

Connecticut.—East River, July 10, 1910 (Ely).

#### ADDENDA

The manuscript on the Tipulidae was completed some years ago but for various reasons the actual publication has been delayed to the present moment. In the intervening years an attempt has been made to keep up to date the general records of distribution of the various species discussed throughout the report. During this period a certain number of additional new species have been described from the region under consideration. It does not seem advisable to revise the keys to accommodate these forms but it is believed that a listing of the species will prove helpful to advanced students of the family. Three of these species (*Pedicia procteriana* Alexander, *Phyllolabis lagganensis* Alexander and *Dactylolabis pemetica* Alexander) are of such importance and interest that a brief statement concerning each has been interpolated in the text at the proper place. The further species described since the completion of the manuscript are as follows:

- Dolichozeza** (*Orozeza*) **pratti** Alexander: Ent. News, 52:192-193; 1941 (Minn.)
- Tipula** (*Yamatotipula*) **succincta** Alexander: Can. Ent., 72:151-152; 1940 (Ind.)
- Tipula** (*Oreomyza*) **broweri** Alexander: Ent. News, 51:83-85; 1940 (Me.)
- Limonia** (*Limonia*) **pemetica** Alexander: Bull. Brooklyn Ent. Soc., 34:95-97; 1939 (Me.)
- Limonia** (*Dicranomyia*) **broweriana** Alexander: Ent. News, 52:193-195; 1941 (Me.)
- Limonia** (*Dicranomyia*) **piscataquis** Alexander: Can. Ent., 73:86-87; 1941 (Me.)
- Limonia** (*Rhipidia*) **gaspicola** Alexander: *Ibid.*, 73:87-88; 1941 (Que.: Gaspé)
- Antocha** (*Antocha*) **biarmata** Alexander: Amer. Midl. Nat., 24:620-621; 1940 (N. Y.)
- Pedicia** (*Tricyphona*) **auripennis breviclava** Alexander: *Ibid.*, 26:299; 1941 (Que.: Gaspé)
- Dicranota** (*Dicranota*) **fumipennis** Alexander: Can. Ent., 73:89; 1941 (Minn.)
- Limnophila** (*Idioptera*) **mclureana** Alexander: Bull. Brooklyn Ent. Soc., 33:75-76; 1938 (Man.)



- Pilaria harrisoni** Alexander; Occas. Pap. Boston Soc. Nat. Hist., 8: 291-292; 1936 (N. H.)
- Chionea stoneana** Alexander; Ent. News, 51:100-102; 1940 (Ill.)
- Rhabdomastix** (*Sacandaga*) **hansonii** Alexander; Bull. Brooklyn Ent. Soc., 34: 99-100; 1939 (Mass.)
- Erioptera** (*Erioptera*) **chlorophylloides orthomera** Alexander; Can. Ent., 72:155; 1940 (Ct.)
- Erioptera** (*Erioptera*) **leptostyla** Alexander; *Ibid.*, 72:154-155; 1940 (Mich.)
- Erioptera** (*Mesocyphona*) **serpentina** Alexander; Amer. Midl. Nat., 26: 318; 1941 (Mass.)
- Erioptera** (*Psiloconopa*) **churchillensis** Alexander; Bull. Brooklyn Ent. Soc., 33: 77-78; 1938 (Man.)
- Erioptera** (*Psiloconopa*) **lacustris** Alexander; *Ibid.*, 33: 76-77; 1938 (Mich.)
- Ormosia** (*Ormosia*) **broweri** Alexander; *Ibid.*, 34:100; 1939 (Me.)

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PLATE I.

Diptera

1. *Nephrotoma ferruginca* Fabr. (Tipulidae). x 1
2. *Bibio albipennis* Say (Bibionidae), male, female,  
and larva. x 4
3. *Asilus sericeus* Say (Asilidae). x 2
4. Bulb fly, *Merodon equestris* Fabr. (Syrphidae).  
x 2
5. *Microdon tristis* Loew (Syrphidae). x 1
6. Apple maggot fly, *Rhagoletis pomonella* Walsh  
(Trupaneidae). x 2

PLATE I



1



2



3



4



5



6