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CH. P. ALEXANDER

Records and descriptions of Mexican crane-flies
(*Dipt. Tipulidae*)

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PART I

by

CHARLES P. ALEXANDER

Massachusetts State College
Amherst, Mass., U. S. A.

During the past thirty years vast series of Mexican Tipulidae have been collected, chiefly through the efforts of Dr. Alfons Dampf as discussed below. As a result of the study of part of these materials many new species have been defined and very numerous records of distribution have been gathered. It is planned to continue the description of novelties in the present series of reports and at suitable times to present records adding to our knowledge of seasonal and geographical distribution of these flies. When sufficient knowledge has been derived to warrant the belief that keys to the various genera and species will have a lasting benefit, such keys and summaries will be provided. It may be affirmed that our knowledge of distribution of the Mexican Tipulidae is still only in its infancy and that many additions to the known list will be made. In the present part I have discussed chiefly materials taken on the Fourth Hoogstraal Mexican Biological Expedition of 1941, all from the State of Michoacan and taken by Mr. Harry Hoogstraal, leader and biogeographer of the expedition, and by the entomologist, Mr. Ralph Haag. A few of the specimens were from the Schultze collections, made in 1929, while still others are from the Dampf collections, the great majority of which have been discussed in other papers or will be reported in the future. I wish to express my very deep thanks to all the entomologists mentioned, who have done so much to make known the vastly rich crane-fly fauna of Mexico. The types are preserved in my collection of Tipulidae of the World.

DEVELOPMENT OF OUR KNOWLEDGE OF THE TIPULIDAE OF MEXICO

Nineteenth Century

What would appear to have been the first crane-fly to be collected in Mexico was taken by William Maclure, presumably in the Fall of 1827, and described as *Limnobia livida* by Thomas Say in 1829. Following the collapse of the Owen—Maclure socialistic experiment at New Harmony, Indiana, the latter visited Mexico on various occasions, dying at San Angel, near Mexico City, on March 23, 1840.

Various collections made in the first half of the century were assembled for study by Luigi Bellardi (1859-1862), the most important of these being those of Ettore Craveri, Henri Milne Edwards, Filippo de Filippi, Eugen Truqui, Henri de Saussure, and August Sallé (1831-1834). A few miscellaneous specimens in the British Museum, collectors unknown, were defined by Francis Walker.

Collections made in the second half of the century were assembled and studied by Osten Sacken and Williston, in the *Biologia Centrali-Americana* (1886-1900). The Osten Sacken materials (1886) were collected in Jalapa by Dominik Bilimek; Durango, at an altitude of more than 8,000 feet by A. Forrer; on Orizaba by Sumichrast; and in the extreme north of Sonora by Herbert K. Morrison¹. Williston's specimens (1900) were taken chiefly by Herbert H. Smith, in Guerrero, Morelos, Orizaba, Tabasco and Vera Cruz. A few additional specimens were taken in Morelos and on Orizaba by F. D. Godman.

Twentieth Century

In the course of his mosquito investigations at and near Cordoba in 1907 and 1908, Frederick Knab secured several specimens of Tipulidae, including one species, *Trentepohlia (Paramongoma) leucoxena* Alexander, that breeds in the detritus gathered in the leaf axils of various Bromeliads. Still later, routine collections made in Morelos by David L. Crawford included a few crane-flies.

More recent small series of these flies were taken in Guerrero by L. Schultze in 1929 and by Mr. A. E. Pritchard in June 1935, and in Colima by Mr. L. Conradt in 1917. The four expeditions of Harry Hoogstraal and colleagues (Hoogstraal Mexican Biological Expeditions, 1938-1941) yielded many new species and records of distribution, particularly in Nuevo Leon and Michoacan.

By far the richest of all collections of Mexican Tipulidae ever made, exceeding in numbers all others combined many times over, were those secured by Dr. Alfons Dampf and his field workers, assisted by a few interested friends and other workers. These series were taken from 1923 to date on the various field expeditions investigating the plagues of locusts, black flies and mosquitoes and involved not only many of the States of Mexico, but also the adjoining portions of British Honduras and Guatemala. The importance of the entomological work of Dr. Dampf to Mexico is so great that it can scarcely be over-exaggerated. Certainly no single individual has ever before made so many important additions to our knowledge of the insects of this vast area.

All of the collections made during the present century have been studied by Alexander and published in various papers, the first dating from 1913.

BELLARDI, LUIGI.

1859. Saggio di Ditterologia Messicana. *Mem. della reale A. delle scienze di Torino*, (2) XIX: 201-225, 2 pls. Appendix (1862). *Ibid.*, XI: 200-225 3 pls.

¹ In a recent paper by the late Eugene Murray-Aaron (*Ent. News*, LIII: 142-143, 1942), the route followed by Morrison in Mexico, is given in some detail. Aaron says: "From there we crossed into the state of Sonora, México, collecting somewhat around Nogales and finally going for a brief trip south to Hermosillo. Judging from correspondence of that far off day, now more than a half century past, Morrison later collected as far south as Guaymas, on the Gulf of California".

OSTEN SACKEN, C. R.

1886. *Biologia Centrali-Americana*. Insecta. Diptera, 1: 6-201, pl. 1, figs. 1-2 (Tipulidae).

WILLISTON, S. W.

1900. *Ibid.*, 1, Supplement: 225-229, pl. 4, figs. 4-5 (Tipulidae).

BASIC LIST OF TIPULIDAE OF MEXICO DESCRIBED BY ALEXANDER

Dr. Dampf has suggested that I provide at this time a list of papers that I have published on the crane-flies of Mexico, recording the new species described in each. I have done this, hoping that this assembling of the scattered records will be helpful to the future student of this rich area.

ALEXANDER, CHARLES P.

1913 a. New Neotropical Antochini. *Psyche*, XX: 40-54.

Toxorrbina centralis Alexander = *Toxorrbina (Toxorrbina) centralis* Alexander.

1913 b. A synopsis of part of the Neotropical crane-flies of the subfamily Limnobiae. *Proc. U. S. Nat. Mus.*, XLIV: 481-549.

Erioptera (Mesocyphona) knabi Alexander.

Erioptera (Mesocyphona) immaculata Alexander.

Gnophomyia magnifica Alexander = *Sigmatomera (Austrolimnobia) magnifica* (Alexander).

1914. New or little-known Neotropical Hexatomini (Tipulidae, Diptera). *Psyche*, XXI: 33-45.

Eriocera townsendi Alexander = *Hexatoma (Eriocera) townsendi* (Alexander).

1915. A second bromeliad-inhabiting crane-fly (Tipulidae, Diptera). *Ent. News*, XXVI: 29-30.

Mongoma leucoxena Alexander = *Trentepoblia (Paramongoma) leucoxena* (Alexander).

1916 a. New North American species of the genus *Gonomyia* Meigen (Tipulidae, Diptera). *Can. Ent.*, XLVIII: 316-325.

Gonomyia (Gonomyia) mexicana Alexander.

1916 b. New or little-known crane-flies from the United States and Canada: Tipulidae, Diptera. Part 3. *Proc. Acad. Nat. Sci. Philadelphia*, 1916: 486-549 (reference, pp. 527-528, figs. 90, 91).

Gonomyia (Gonomyia) mexicana Alexander; details of male hypopygium.

1925. Studies on the crane-flies of Mexico. Part I (Order Diptera, Superfamily Tipuloidea). *Ann. Ent. Soc. America*, XVIII: 341-362.

Dicranomyia praepostera Alexander = *Limonia (Dicranomyia) praepostera* (Alexander).

Dicranomyia ravidata Alexander = *L. (D.) ravidata* (Alexander).

Dicranomyia tricornis Alexander = *L. (D.) tricornis* (Alexander).

Dicranomyia filicauda Alexander = *L. (D.) filicauda* (Alexander).

Dicranomyia melanocera Alexander = *L. (D.) melanocera* (Alexander).

Dicranomyia dampfi Alexander = *L. (D.) dampfi* (Alexander).

Limonia obtusistylus Alexander = *Limonia (Limonia) obtusistyla* (Alexander).

Elephantomyia alticola Alexander.

Gonomyia (Gonomyia) tuberculata Alexander.

Molophilus severus Alexander.

Molophilus paucispinosus Alexander.
Erioptera (Mesocyphona) inornatipes Alexander.
Erioptera (Empeda) ochricauda Alexander.
Erioptera (Empeda) alticola Alexander.
Erioptera (Empeda) curta Alexander.
Erioptera (Empeda) tridentata Alexander.
Erioptera (Empeda) unidentata Alexander.
Tipula moctezumae Alexander.
Tipula azteca Alexander.
Nephrotoma dampfi Alexander.

1926. Studies on the crane-flies of Mexico. Part II (Order Diptera, Superfamily Tipuloidea). *Ibid.*, XIX: 158-179.

Limonia fissilis Alexander = *Limonia (Limonia) umbrata* (de Meijere).
Rhipidia multifida Alexander = *Limonia (Rhipidia) multifida* (Alexander).
Rhipidia agglomerata Alexander = *L. (R.) agglomerata* (Alexander).
Helius quadrifidus Alexander.
Orimarga dampfi Alexander.
Erioptera (Mesocyphona) venustipes Alexander.
Gonomyia (Gonomyia) remota Alexander.
Gonomyia (Lipophleps) strigilis Alexander.
Gonomyia (Lipophleps) latistyla Alexander.
Gonomyia (Lipophleps) spinistyla Alexander.
Gonomyia (Lipophleps) bifida Alexander.
Gonomyia (Lipophleps) haploa Alexander.
Teucholabis minuta Alexander.
Pilaria rubella Alexander.
Atarba mexicana Alexander.
Atarba aperta Alexander.
Eriocera pallidipes Alexander = *Hexatoma (Eriocera) pallidipes* (Alexander).
Rhaphidolabis (Plectromyia) tergata Alexander = *Dicranota (Plectromyia) tergata* (Alexander).
Tipula bellardiana Alexander.
Tipula oreomyzoides Alexander = *Tipula virgulata* Williston (Edwards, auct.).

1927 a. Studies on the crane-flies of Mexico. Part III (Order Diptera, Superfamily Tipuloidea). *Ibid.*, XX: 301-318.

Limonia infucata Alexander = *Limonia (Limonia) infucata* Alexander.
Limonia perflaveola Alexander = *L. (L.) perflaveola* Alexander.
Limonia ludibunda Alexander = *L. (L.) ludibunda* Alexander.
Dicranomyia exaeta Alexander = *L. (Dicranomyia) exaeta* Alexander.
Gonomyia (Gonomyia) chiapasensis Alexander.
Gonomyia (Lipophleps) maya Alexander.
Teucholabis dampfi Alexander.
Erioptera (Empeda) stygia Alexander.
Erioptera (Empeda) oresitropha Alexander.
Erioptera (Erioptera) quadricincta Alexander.
Erioptera (Erioptera) dampfi Alexander.
Erioptera (Mesocyphona) saturata Alexander.
Erioptera (Mesocyphona) apicinigra Alexander.
Erioptera (Mesocyphona) leucopasta Alexander.
Erioptera (Mesocyphona) modica Alexander.
Rhabdomastix (Rhabdomastix) isabella Alexander.
Cryptolabis (Cryptolabis) luteiceps Alexander.

Molophilus obediens Alexander.

Molophilus fuscopleuralis Alexander.

Molophilus pennatus Alexander.

1927 b. Records and descriptions of Neotropical crane-flies (Tipulidae, Diptera), III.
Journ. N. Y. Ent. Soc., XXXV: 265-278.

Geranomyia cerberus Alexander = *Limonia (Geranomyia) cerberus* (Alexander).

Geranomyia recisa Alexander = *L. (G.) recisa* (Alexander).

1928. Studies on the crane-flies of Mexico. Part IV (Order Diptera, Superfamily Tipuloidea). *Ann. Ent. Soc. America*, XXI: 101-119.

Tipula zeltale Alexander.

Tipula zotzil Alexander.

Dicranomyia onerosa Alexander = *Limonia (Dicranomyia) onerosa* (Alexander).

Dicranomyia ingrata Alexander = *L. (D.) ingrata* (Alexander).

Dicranomyia subruida Alexander = *L. (D.) subruida* (Alexander).

Geranomyia pentheres Alexander = *L. (Geranomyia) pentheres* (Alexander).

Geranomyia turbida Alexander = *L. (G.) turbida* (Alexander).

Geranomyia eurygramma Alexander = *L. (G.) eurygramma* (Alexander).

Geranomyia perfecta Alexander = *L. (G.) perfecta* (Alexander).

Epiphragma oreonympha Alexander.

Shannonomyia moctezuma Alexander.

Shannonomyia lentina Alexander.

Limnophila madida Alexander.

Atarba (Atarba) amabilis Alexander.

Elephantomyia fumipes Alexander.

Teucholabis (Teucholabis) cinereiceps Alexander.

Gonomyia (Gonomyia) debilis Alexander.

Gonomyia (Lipophleps) peracuta Alexander.

Erioptera (Mesocyphona) quadrifurcata Alexander.

Cryptolabis (Cryptolabis) fuscovenosa Alexander.

1930. Records and descriptions of Neotropical crane-flies (Tipulidae, Diptera), VIII.
Journ. N. Y. Ent. Soc., XXXVIII: 109-120.

Limonia (Geranomyia) neopentheres Alexander.

Limonia (Geranomyia) brevispinula Alexander.

Limonia (Geranomyia) viridula Alexander.

Teucholabis (Teucholabis) submolesta Alexander.

Gonomyia (Progonomyia) patruelis Alexander.

1938. Studies on the crane-flies of Mexico. Part V (Order Diptera, Superfamily Tipuloidea). *Ann. Ent. Soc. America*, XXXI: 393-412.

Gonomyia (Progonomyia) atroapicata Alexander.

Gonomyia (Euptilostena) dampfiana Alexander.

Gonomyia (Lipophleps) aequidens Alexander.

Gonomyia (Lipophleps) haploides Alexander.

Gonomyia (Gonomyia) triaculeata Alexander.

Gonomyia (Gonomyia) microserrata Alexander.

Gonomyia (Gonomyia) quaesita Alexander.

Gonomyia (Gonomyia) subremota Alexander.

Gonomyia (Gonomyia) multispicata Alexander.

Gonomyia (Gonomyia) expansa Alexander.

Rhabdomastix (Rhabdomastix) mexicana Alexander.
Rhabdomastix (Rhabdomastix) longiterebrata Alexander.
Erioptera (Erioptera) laetipleura Alexander.
Erioptera (Mesocyphona) fuscodiscalis Alexander.
Molophilus (Molophilus) miraculus Alexander.
Molophilus (Molophilus) ductilis Alexander.
Molophilus (Molophilus) sagax Alexander.
Molophilus (Molophilus) falx Alexander.
Toxorhina (Ceratocheilus) chiapasensis Alexander.
Toxorhina (Toxorhina) trilobata Alexander.

1939. Studies on the crane-flies of Mexico. Part VI (Order Diptera, Superfamily Tipuloidea). *Ibid.*, XXXII: 70-90.

Limonia (Geranomyia) civica Alexander.
Limonia (Geranomyia) uberis Alexander.
Limonia (Geranomyia) trichomera Alexander.
Limonia (Rhipidia) sejugata Alexander.
Limonia (Rhipidia) hirtilobata Alexander.
Shannonomyia dampfi Alexander.
Hexatoma (Eriocera) substolida Alexander.
Hexatoma (Eriocera) aurantionota Alexander.
Hexatoma (Eriocera) subgracilis Alexander.
Atarba (Atarba) scutata Alexander.
Elephantomyia (Elephantomyia) luteiannulata Alexander.
Teucholabis (Teucholabis) patens Alexander.
Teucholabis (Teucholabis) perangusta Alexander.
Gonomyia (Lipophleps) subinermis Alexander.
Gonomyia (Lipophleps) orthomeroides Alexander.
Erioptera (Empeda) divaricata Alexander.
Erioptera (Empeda) deludens Alexander.
Molophilus (Molophilus) subsagax Alexander.
Molophilus (Molophilus) retrorsus Alexander.
Cryptolabis (Cryptolabis) longiradialis Alexander.

1940. Studies on the crane-flies of Mexico. Part VII (Order Diptera, Superfamily Tipuloidea). *Ibid.*, XXXIII: 140-161.

Ozodicera (Ozodicera) septemtrionis Alexander.
Tipula (Bellardina) parrai Alexander.
Tipula (Bellardina) schizomera Alexander.
Tipula (Lunatipula) hoogstraali Alexander.
Tipula (Microtipula) obscuricincta Alexander.
Tipula temperata Alexander.
Tipula novaleonensis Alexander.
Tipula pritchardi Alexander.
Tipula guerreroensis Alexander.
Limonia (Rhipidia) gracilirama Alexander.
Limonia (Rhipidia) gracilirama lassula Alexander.
Limonia (Rhipidia) proliferata Alexander.
Limonia (Geranomyia) orthorhabda Alexander.
Orimarga (Orimarga) niveitarsis majuscula Alexander.
Orimarga (Diotrepha) subconcinna Alexander.
Polymera (Polymera) leucopeza Alexander.

Polymera (Polymera) honesta Alexander.
Polymera (Polymera) nodulifera Alexander.
Oxydiscus (Oxydiscus) mexicanus Alexander.
Oxydiscus (Oxydiscus) mexicanus acutissimus Alexander.
Hexatoma (Eriocera) plumbeinota Alexander.
Trentepohlia (Paramongoma) subleucoxena Alexander.
Gonomyia (Gonomyia) guerreroensis Alexander.

1941. Records and descriptions of Tipulidae from tropical America (Diptera). *Revista de Entomologia*, XII: 322-337.

Tipula orizabensis Alexander.

Tipula bilimeki Alexander.

I am including in this paper the single species of the family Trichoceridae, commonly called the "winter crane-flies". The various groups commonly referred to the superfamily Tipuloidea actually belong to three phylogenetic series, as follows: (1) Tanyderidae and Ptychopteridae-Psychodoid series; (2) Trichoceridae and Anisopodidae-Anisopodoid series; (3) Tipulidae, with the three subfamilies Tipulinae, Cylindrotominae and Limoniinae, Tipuloid series.

TRICHO CERIDAE

Gen. **Trichocera** Meigen

Trichocera mexicana sp. n.

Fig. 1.

General coloration gray; the praescutum with a more or less distinct, more blackened central stripe; antennae of moderate length, black throughout; halteres with stem white, knob blackened; legs black; wings subhyaline, unpatterned; R_{2+3+4} shorter than R_{2+3} ; abdomen, including hypopygium, uniformly brownish black; male hypopygium with the ventromesal lobes of basistyles contiguous and truncated at midline; dististyle without tubercles or other armature.

Male.—Length, about 5—5.5 mm.; wing, 6—6.5 mm.; antenna, about 2.8—3 mm.

Rostrum and palpi black. Antennae black throughout, of moderate length for a member of this genus; flagellar segments beyond the proximal five or six very long and filiform. Head gray.

Pronotum and mesonotum chiefly gray, the praescutum with a more or less distinct, more blackened, central stripe, the usual lateral pair of stripes lacking. Pleura light gray, the ventral sternopleurite and meron somewhat darker gray. Halteres with stem white, knob conspicuously blackened. Legs with coxae gray; remainder of legs black, without pattern. Wings (Fig. 1) subhyaline, the stigmal region vaguely tinted with very pale brown; veins brownish black. Venation: R_{2+3+4} shorter than R_{2+3} ; cell *Ist* M_2 somewhat variable in length and shape, in the holotype as figured with inner end slightly longer and more pointed than in the paratype; cell M_1 about parallel-sided, variable in length, in cases only.

about one-fourth longer than its petiole, in others (as figured) fully twice the length of petiole.

Abdomen, including hypopygium, uniform brownish black. Male hypopygium with the ventro-mesal lobes of basistyles contiguous at midline of body but not forming a complete bridge, the apex of each lobe truncated. Dististyle a terete lobe, without armature, gradually narrowed to the obtuse tip. Gonapophyses long and sword-like.

Habitat.—Mexico (Michoacan).

Holotype, ♂, Cerro Tancitaro, altitude 10,800 feet, swept from herbs in open pine forest, July 17, 1941 (Hoogstraal IV-29). *Paratopotype* ♂, altitude 10,500 feet, swept from herbs near water, July 18, 1941 (Hoogstraal IV-27).

The genus *Trichocera* as it occurs throughout the Holarctic region has always proved to be one of the most difficult taxonomic groups in the Diptera. It has been assumed that certain of the species, at least, range entirely around the earth in the Holarctic belt whereas others are very local in their known distribution. By means of Edwards's key to the British species (*Trans. Soc. British Ent.*, V: 153 1938), the present fly runs to *T. fuscata* Meigen or *T. major* Edwards, which have the male hypopygium entirely different in structure. In the western Nearctic fauna, the fly more closely resembles species such as *T. columbiana* Alexander, of the northwestern United States and western Canada, differing in the general coloration, details of venation, and structure of the male hypopygium. The still insufficiently known *T. brumalis* Fitch, described from the northeastern United States, differs from the present fly in the coloration, both the wings and legs being conspicuously pale at their bases, as in the western Palaearctic *T. hiemalis* (De Geer) and *T. parva* Meigen. The family Trichoceridae and the genus *Trichocera* had not previously been recorded from Mexico.

TIPULIDAE

Gen. **Tipula** Linnaeus

Tipula (Trichotipula) aplecta sp. n.

Figs. 2, 5.

Mesonotal praescutum with central portion reddish brown, the lateral regions conspicuously variegated with black and yellow in alternate areas; femora yellow, the tips narrowly but conspicuously blackened; wings with a yellow tinge, only sparsely patterned with darker; macrotrichia in outer ends of cells R_3 , R_5 and M_1 ; male hypopygium with both dististyles unusually simple in structure, the inner style long and slender.

Male.—Length, about 12 mm.; wing, 12.5 mm.; antenna, about 4.5 mm.

Female.—Length, about 14 mm.; wing, 14 mm.

Frontal prolongation of head relatively short, obscure yellow, narrowly but conspicuously dark brown above; nasus distinct, dark brown; palpi brown. Antennae (male) moderately long; basal three segments obscure yellow, succeeding segments passing into dark brown, the basal enlargements of the more proximal segments a trifle more yellowish; flagellar segments moderately incised; longest

verticils a little shorter than the segments; in the female, antennae a little shorter. Head in front obscure orange, the posterior portions brownish yellow, the center of vertex conspicuously more infuscated.

Pronotum obscure yellow above, more darkened laterally. Mesonotal praescutum handsomely patterned with reddish brown, yellow and black, the broad central disk reddish brown, including the median stripe that expands behind to include the usual lateral areas; two isolated black marks on praescutum, one at cephalic portion on either side of the median stripe, the second mark more posterior, at its cephalic end sending a narrow line laterad to the praescutal border where it is again expanded; these black marks isolate major clear yellow areas at the humeral region and laterally behind the pseudosutural foveae; scutal lobes reddish brown, the extreme cephalic-lateral portion blackened, this being a posterior extension of the praescutal darkening; median area of scutum more yellowish. Pleura yellow, indistinctly variegated with more reddish areas, especially on the ventral anepisternum, sternopleurite, meron and ventral pleurotergite. Halteres reddish brown, the knobs weakly darkened. Legs with the coxae reddish yellow; trochanters yellow; femora yellow, the tips narrowly but conspicuously blackened, the amount subequal on all legs or a little more extensive on the fore pair, involving about the distal eighth on the fore legs, about the distal fifteenth on the longer posterior femora; tibiae obscure yellow, the tips narrowly infuscated to blackened; basitarsi obscure yellow, passing into black at tips, the remainder of tarsi black; claws (male) with a single tooth. Wings (Fig. 2) with a strong yellow tinge, the prearcular and costal fields, together with the stigma, slightly more brownish yellow; cell *Sc* clearer yellow, especially on outer portion; veins brownish black, insensibly bordered by darker; veins of prearcular and costal fields more obscure yellow. Macrotrichia in outer portions of cells R_3 to M_1 , inclusive (their position indicated in figure by dots). Venation: Sc_2 ending about opposite one-fourth the length of R_s , the latter shorter and more arcuated than *m-cu*; petiole of cell M_1 shorter than *m*; *m-cu* at fork of M_{3+4} , the latter longer than *r-m*; cell 2nd *A* moderately wide.

Abdominal tergites reddish brown, narrowly bordered laterally by black; sternites obscure yellow; subterminal segments more darkened; hypopygium yellow. Ovipositor with cerci straight, their tips obtuse. Male hypopygium (Fig. 5) with the ninth tergite, *9t*, transverse, the caudal margin with a broad U-shaped notch, each lateral lobe obtuse with a triangular lobule on ventral face, this lobule and the margin of tergite set with abundant black spinous setae, those at exact midportion of notch longer and more setoid; spines of ventral lobules retrorse. Dististyles as figured, the inner style, *id*, unusually slender, a little more expanded and blackened on basal third, the apex truncated, blackened; outer margin of style with abundant long yellow setae that are longer than the diameter of style; outer dististyle, *od*, with abundant setae; between the two styles and apparently interconnected with both lies a pale yellow flattened blade. Eighth sternite, *8s*, relatively large and sheathing, the caudal border emarginate but filled with hyaline membrane; lateral lobes with abundant dense setae.

Habitat.—Mexico (Michoacan).

Holotype, ♂, Pedregal de Tancitaro, altitude 6,586 feet, on a forested flood plain, August 14, 1940 (Hoogstraal III-D 65). *Allotopotype*, ♀, August 15, 1940 (Hoogstraal III-D 66).

Tipula (Trichotipula) aplecta is the first member of the subgenus to be described from Mexico. It is entirely distinct from the various Nearctic species so far described, being closest perhaps to *T. (T.) cimarronensis* Rogers, of Oklahoma. The general coloration and certain of the details of the male hypopygium, as the ninth tergite, outer dististyle and eighth sternite suggest various species of *Nephrotoma* Meigen, but the species is evidently a true *Tipula*. It should be affirmed that the various subgeneric groups of *Tipula* that most nearly approach the virtually Cosmopolitan genus *Nephrotoma* are *Trichotipula* Alexander, *Nobilotipula* Alexander, and *Nephrotomodes*, subgen. n.

***Tipula (Bellardina) larga* sp. n.**

Fig. 4.

Size large (wing, male, over 25 mm.); general coloration dark brown, the praescutum with four stripes that are narrowly bordered by darker, the lateral pair more obscured; femora with distal half blackened, the extreme tip and a narrow subterminal ring yellowish white; wings pale brown, variegated with dark brown and cream-colored areas, the latter in a zigzag pattern; male hypopygium with the basistyle at apex produced into a small but conspicuous horn-like point; outer dististyle produced at apex into a long, unequally bilobed rod.

Male.—Length, about 25 mm.; wing, 27 mm.; antenna, about 4.1 mm.

Female.—Length, about 30 mm.; wing, 28 mm.; antenna, about 4 mm.

Frontal prolongation of head grayish brown above, including the long nasus, the sides dark brown; palpi brownish black. Antennae with the elongate scape brown, transversely corrugated; pedicel and first flagellar segment obscure yellow; succeeding flagellar segments weakly bicolored, their bases restrictedly darkened, the stems yellow; verticils long and conspicuous. Head grayish brown, conspicuously patterned with dark brown, including a median vitta from the vertical tubercle almost to the occiput, together with equally evident darkenings on posterior vertex behind eyes.

Pronotum buffy laterally, trivittate with dark brown, the median area broader. Mesonotal praescutum with the ground color dark, the disk with four stripes, the intermediate pair reddish brown with narrow dark borders, the lateral pair much darker and poorly differentiated from the ground; scutum dark brown, each lobe with two reddish areas that are bordered by brown; scutellum gray with a brown spot on either side of the midline, the parascutella dark; mediotergite gray, patterned with three blackened lines; pleurotergite brown, the elevated katapleurotergite silken yellow. In the female, the intermediate praescutal stripes are more grayish, the posterior interspaces reddened behind. Pleura light brown or testaceous brown, patterned with darker, including areas on the dorsal pleurites, ventral sternopleurite and the meron; dorsopleural region broadly buffy. Halteres

with stem obscure yellow, knob dark brown, its apex pale. Legs with the coxae more or less infuscated, their apices paler; trochanters obscure yellow; femora with basal half reddish brown, the apical portion black, enclosing a yellowish white ring, the extreme tip similarly pale; tibiae with extreme base whitened, the following portion pale brown, the distal half darker brown; tarsi dark brown, passing into black. Wings (Fig. 4) pale brown, variegated with dark brown and cream-yellow areas in the usual pattern of the subgenus, including a narrow zigzag pale band at midlength of wing and well before cord; distal half of cell R_5 pale; all cells at wing margin narrowly but more intensely darkened at the veins but interrupted by pale central spots; further irregular pale areas in vicinity of cell $1st M_2$ and in cells Cu , $1st A$ and $2nd A$; veins yellow. Venation: Cell R_3 slightly constricted before midlength; inner end of cell $1st M_2$ pointed; $m-cu$ on M_{3+4} shortly before fork.

Abdominal tergites reddish brown with a sublateral blackened stripe; caudal and postero-lateral borders of tergites narrowly pale; basal tergites more blackened; sternites more reddish brown; hypopygium somewhat darker brown. Ovipositor with cerci reddish brown, their tips obtuse. Male hypopygium (Fig. 4) with the tergite, $9t$, shield-shaped, the caudal border notched and toothed, about as shown; the central emargination at base bearing a small blackened flange on either side of the midline. Basistyle, b , at apex produced into a small but conspicuous horn-like point. Dististyles as figured, the outer, od , with the long slender rostral portion more or less bilobed, the enlarged basal portion with a fringe of powerful bristles; shorter lobe densely hairy, the longer one more glabrous. Ninth sternite with a conspicuous appendage, as common in the subgenus, appearing as two closely applied lobes with upturned margins.

Habitat.—Mexico (Michoacan).

Holotype, ♂, In pine forest just above Uruapan, on the Uruapan-Apatzingan road, altitude 6,000 feet, June 20, 1941 (Haag); Hoogstraal IV-O. *Allotype*, ♀, at light, in mountain meadow, Cerro Tancitaro, altitude 7,800 feet, July 3, 1941 (Hoogstraal IV-23).

Three species in the subgenus *Bellardina* Edwards, 1931, have been previously described from Mexico. These include *T. (B.) parrai* Alexander and *T. (B.) schizomera* Alexander, both from the mountains of Chiapas, and *T. (B.) craverii* Bellardi, the type of the subgenus. This latter was from an unspecified locality in Mexico, the type material having been collected by Ettore Craveri, of Bra, Cuneo province, in the Italian Piedmont. The identity of this last-named species has never been settled to my own satisfaction due to inability to study the type material. It is certain that there are several species of the subgenus in Mexico, together with at least ten to twelve further species in the Rocky Mountains and western United States to the north. The only course to follow seems to be to continue to treat *craverii* as an unrecognizable species until some date when a lectotype can be designated and further studied. From Bellardi's description, his species has the same body length as the present fly but with the expanse of wings considerably less (53 mm. instead of about 60 mm.) in male sex of the present fly. As regards the type material of *craverii*, that contained in the de Saussure col-

lection is preserved in the Natural History Museum at Geneva, Switzerland; the present location of the Craveri specimens is unknown. Walther Horn (Über Entomologische Sammlungen, 1935-1937) makes no mention of Craveri or of the fate of his collection, which, according to Bellardi, was particularly rich in Coleoptera. It may be presumed to be in the Natural History Museum at Turin, Italy.

Subgen. **Nephrotomodes** n.

Nasus usually distinct, rarely lacking (*auriga*). Antennae of male long to very long, in most cases one-third the length of body or more; scape unusually short; flagellar segments only slightly incised, their basal enlargements small; verticils much shorter than the segments. Vertical tubercle lacking. Vestiture of praescutum and scutum exceedingly sparse and reduced in size. Claws (male) toothed or simple. Wings with R_{1+2} preserved or atrophied; R_s short, subequal to or a little longer than $m-cu$; vein M_{3+4} short to very short; cell 2nd A of moderate width to very narrow. Cells of wings glabrous, rarely (*languidula*, *myriatricha*) with trichia in outer cells; squama usually naked, rarely provided with bristles (*epione* and allies).

Male hypopygium with the tergite distinct from the sternite, of various forms, usually with a median as well as lateral lobes on caudal border; in still other species, tergal margin merely bilobed; still more rarely the tergite produced into a long compressed median blade; from beneath the tergite at base, possibly a modification of the anal tube, projects a conspicuous median structure, in cases as long as the tergite itself or even longer; this structure usually fleshy, in cases (*smilodon*, *terribilis*) conspicuously toothed or spined at apex. Basistyle usually with a blackened squamose lobe on mesal face, this sometimes entirely pale or rarely lacking. Dististyle usually complex. Gonapophyses simple, usually appearing as small flattened spatulate blades subtending the aedeagus. Penis commonly very long and filiform. Ninth sternite usually with a fleshy simple to more or less deeply bilobed structure in the notch. Eighth sternite simple or bilobed; short to very long and strongly sheathing; in cases (*smilodon* and allies) bearing two conspicuous spines on caudal border. Ovipositor with valves usually fleshy, the outer faces of cerci with short setae to their tips; in cases (*didactyla*) the cerci more elongate and sclerotized but stout.

Type of subgenus: Tipula smilodon Alexander (Neotropical).

For some time it has appeared that a new subgeneric group would be necessary for those species centering around *parishi*, *smithi* and *smilodon*, evidently representing a vast host of species within the Neotropical fauna. Although the various species show certain features possessed by other groups of *Tipula* and by the genus *Nephrotoma*, nevertheless the sum-total of characters appears to define a relatively strong subgeneric group that will be helpful in delimiting the genus in Tropical America. At first sight it appears that more than a single subgenus might be involved in the group since various species superficially appear to be quite distinct from others included. However I feel that only a single subgeneric

group is involved. Certain of the hypopygial characters suggest the genus *Nephrotoma*, these including the blackened squamose lobe on mesal face of basistyle and the nature of the eighth sternite. The following species seem safely to be referred to this new group:

- amoenicornis* Alexander. Argentina, Brazil, Paraguay.
auriga Alexander. Ecuador.
aymara Alexander. Bolivia.
bilimeki Alexander. Mexico.
cerogama Alexander. Ecuador.
colombicola Alexander. Colombia.
ctenopyga Alexander. Panama.
decens Alexander. Peru.
detecta Alexander. Venezuela.
diacanthos Alexander. Peru.
didactyla Alexander. Peru.
effera Alexander. Peru.
effeta Alexander. Peru.
effulta Alexander. Ecuador.
epione Alexander. Bolivia.
ferocia Alexander. Brazil.
fiebrigi Alexander. Paraguay.
gladiator Alexander. Brazil.
guata Alexander. Brazil.
guerreroensis Alexander. Mexico.
gutticellula Alexander. Brazil.
icasta Alexander. Ecuador.
inaequilobata Alexander. Ecuador.
infida Alexander. Ecuador.
intemperata Alexander. Ecuador.
lagotis Alexander. Brazil.
languidula Alexander. Peru.
laticostata Alexander. Brazil.
lenta Alexander. Ecuador.
letalis Alexander. Brazil.
luctifica Alexander. Ecuador.
lyriiformis Alexander. Peru.
macrosterna Alexander. Guatemala, Honduras.
multimoda Alexander. Colombia.
myriatricha Alexander. Peru.
nigrovariegata Alexander. Ecuador.
pala Alexander. Brazil.
palaeogama Alexander. Ecuador.
paloides Alexander. Brazil.
parishi Alexander. Brazil.
perangustula Alexander. Costa Rica, Colombia.
perdelecta Alexander. Peru.
perlaticosta Alexander. Brazil.
plumbeithorax Alexander. Peru.
pritchardi Alexander. Mexico.
pritchardi glabristyla subsp. n. Mexico.
prolixisterna Alexander. Ecuador.
retrusa Alexander. Venezuela.

schwarzmaieri Alexander. Brazil.
sex-cincta Alexander. Brazil.
smilodon Alexander. Ecuador.
smithi Alexander. Brazil.
spinicauda Alexander. Panama.
sternohirsuta Alexander. Ecuador.
subinfuscata Williston. Lesser Antilles.
tancitaro sp. n. México.
temperata Alexander. México.
tenuilobata Alexander. Ecuador, Peru.
trinidadensis Alexander. Trinidad.
trinitatis Alexander. Trinidad.
urophora Alexander. Colombia, Ecuador.
zonalis Alexander. Venezuela.

***Tipula (Nephrotomodes) pritchardi glabristyla* subsp. n.**

Very similar to the typical form (Guerrero), differing especially in the wing pattern and in details of structure of the male hypopygium. Costal border and stigma of wing more distinctly darkened, brown, forming a conspicuous margin; in the typical form more yellowish brown. Male hypopygium with the outer dististyle strongly blackened. Inner dististyle with the broad apical blade glabrous or virtually so on distal half. In the typical form the outer dististyle is uniformly pale, while the apical blade of the inner style is differently shaped and is provided with abundant setae to the very apex.

Habitat.—Mexico (Michoacan).

Holotype, ♂, Pedregal de Tancitaro, on pine, altitude 6,000 feet, July 24, 1941 (Hoogstraal IV-2). *Allotopotype*, ♀, pinned with type. *Paratopotypes*, 2 ♂♂, 1 ♀, with type; 1 ♂, altitude 7,700 feet, in damp ravine, June 25, 1941 (Haag); Hoogstraal IV-15.

***Tipula (Nephrotomodes) tancitaro* sp. n.**

Figs. 3, 6.

General coloration of mesonotum yellow, the praescutum with three poorly indicated brownish gray stripes, the median one weakly divided by double capillary brown lines; pleura yellow; femora yellow, unmarked; wings with a brownish tinge, cell C darker brown, Sc more yellow; abdominal tergites yellow with conspicuous black lateral stripes, widened behind, forming a black subterminal ring on segments seven and eight; hypopygium yellow; male hypopygium with the tergal lobes low, set with short stout setae; dististyle complex, the apex of rostrum obtuse.

Male.—Length, about 13 mm.; wing, 13.5 mm.; antenna, about 4.8 mm.

Frontal prolongation of head brownish yellow; nasus conspicuous; palpi pale brownish yellow, the elongate terminal segment darkened basally, thence passing into light yellow. Antennae (male) relatively long; basal three segments yellow; succeeding segments bicolored, brownish black, the extreme apex of the more proximal segments pale; flagellar segments rather conspicuously incised,

with long verticils. Head buffy yellow, with vague indications of a darker median line; vertical tubercle lacking or virtually so.

Pronotum brownish gray. Mesonotal praescutum yellow with three very poorly indicated brownish gray stripes, the median one weakly divided by double capillary brown lines; scutal lobes and region of wing root weakly darkened; scutellum and postnotum clear light yellow. Pleura yellow. Halteres brownish yellow, knob darkened. Legs with the coxae and trochanters yellow; femora yellow throughout; tibiae obscure yellow, the tips very narrowly infuscated; tarsi black; claws with a single tooth. Wings (Fig. 3) with a brownish tinge; cell *C* somewhat darker brown, cell *Sc* clearer yellow; stigma short-oval, brownish yellow; veins brown. Venation: *Rs* a little longer than *m-cu*; petiole of cell *M*₁ slightly exceeding *m*.

Abdominal tergites yellow with a conspicuous black lateral stripe, more intense in color on the second segment, wider posteriorly; a black subterminal ring involving the seventh and eighth segments; hypopygium yellow. Male hypopygium (Fig. 6) with the tergite, *9t*, elongate, the caudal margin shallowly emarginate, each lateral lobe very low, the outer margin with elongate yellow setae, the caudal portions of the lobes with shorter and denser black setae. Basistyle before apex with a low lobe bearing four or five strong black setae and additional normal more slender setae. Dististyle, *d*, as figured; rostrum short and obtuse. Ninth sternite with paired pendant pale lobes, as common in the subgenus. Eighth sternite transverse, the posterior border slightly projecting unarmed with lobes or setal brushes.

Habitat.—Mexico (Michoacan).

Holotype, ♂, Pedregal de Tancitaro, on forested flood plain, altitude 6,586 feet, August 15, 1940 (Hoogstraal III-D 66).

Tipula (*Nephrotomodes*) *tancitaro* is readily distinguished from all other allied members of the subgenus by the structure of the male hypopygium, especially the dististyle.

***Tipula nimbinervis* sp. n.**

Fig. 11.

Belongs to the *glaphyroptera* group, allied to *moctezumae*; mesonotum buffy, the praescutum with four conspicuous dark brown stripes; antennae 13-segmented, relatively short in both sexes; scape and pedicel yellow, flagellum black; legs black, only the femoral bases restrictedly brightened; wings obscure yellow, the ground color much restricted by dark borders to virtually all the veins; anterior prearcular field and costal border heavily darkened; abdominal tergites yellow, trivittate with black; male hypopygium with the lobe on caudal margin of eighth sternite nearly three times as long as width across base.

Male.—Length, about 15 mm.; wing, 17 mm.; antenna, about 4 mm.

Female.—Length, about 18—19 mm.; wing, 16—16.5 mm.; antenna, about 2.5 mm.

Frontal prolongation of head yellowish brown; nasus distinct; palpi black. Antennae relatively short in both sexes but longer in male; scape and pedicel

yellow, flagellum black; basal flagellar segment a little brightened at proximal end; flagellar segments moderately incised; verticils shorter than the segments; first flagellar segment (male) only moderately long, subequal to or shorter than the combined scape and pedicel. Head buffy gray behind, more yellow in front and on anterior vertex; a capillary dark brown median line; vertical tubercle low.

Pronotum dark gray, variegated with brown. Mesonotal praescutum buffy with four conspicuous entire dark brown stripes; scutum buffy, each lobe with two dark brown areas; scutellum and postnotum abruptly paler, buffy yellow, in cases more distinctly darkened medially. Pleura yellowish gray, variegated with darker gray, especially on the ventral sternopleurite. Halteres with stem obscure yellow, knob dark brown. Legs with coxae light yellowish gray; trochanters yellow; remainder of legs black, only the femoral bases narrowly yellow, not involving more than the proximal seventh or eighth of the segment; claws (male) simple. Wings with the restricted ground color obscure yellow, heavily patterned with brown, appearing especially as conspicuous seams to the veins and as a border around the entire wing, darker and broader in the anterior prearcular field and in costal field; stigma pale brown, poorly differentiated; obliterative areas before stigma and across base of cell *1st M*₂ even more whitened and conspicuous; posterior prearcular field yellow; veins brown, brighter in the last mentioned area. Squama naked. Venation: *Rs* approximately one-half longer than *m-cu*. In the allotype female, the right wing has cell *1st M*₂ abnormally open by the atrophy of *m*, the left wing normal.

Basal abdominal tergites in male bright yellow, trivittate with black, the outer stripes sublateral, the extreme borders gray; on the fourth and succeeding segments the stripes become more extensive, chiefly covering the segments; hypopygium extensively brownish yellow; sternites yellow, with a median black stripe. In the female, the entire abdomen is more extensively yellow, the median tergal stripe somewhat paler and more diffuse. Ovipositor with cerci very long and slender, nearly straight. Male hypopygium (Fig. 11) with the ninth tergite, *9t*, extensive, pale, the caudal margin with a deep U-shaped notch, the broad lateral lobes with their posterior borders sinuous, the lateral portion being slightly more produced than the mesal part, all angles broadly obtuse. Dististyle, *d*, as figured, the outer dististyle or posterior lobe of a single style flattened, its length a little more than three times its greatest width. Eighth sternite, *8s*, with a conspicuous median lobe, flattened-depressed, with long, conspicuous setae, the length a little less than three times the width across base.

Habitat.—Mexico (Michoacan).

Holotype, ♂, Cerro Tancitaro, flying against house, altitude 6,000 feet, July 1, 1941 (Haag); Hoogstraal IV-6. *Allotopotype*, ♀, on pine in pine-alder forest, altitude 7,000 feet, June 28, 1941 (Hoogstraal IV-12). *Paratopotype*, ♀, Pedregal de Tancitaro, on ravine vegetation, altitude 6,000 feet, June 24, 1941 (Haag); Hoogstraal IV-3.

Despite the very different wing pattern, I must refer this fly to the *moctezumae* subgroup of the genus, including among the described forms, *azteca* Alexander,

moctezumae Alexander, *virgulata* Williston (*oreomyzoides* Alexander) and *zeltale* Alexander. The present fly differs from the above most evidently in the pattern of the wings.

***Tipula ligulipenicillata* sp. n.**

Fig. 12

Belongs to the *monilifera* group; punctures of praescutal interspaces conspicuous; antennae (male) unusually short, the basal swellings subglobular, conspicuous; femora obscure brownish yellow, the tips rather narrowly blackened, the amount subequal on all legs; wings pale brown, extensively variegated with darker brown and whitish subhyaline, the latter including an incomplete post-stigmal band; male hypopygium with the eighth sternite provided with a flattened median lobe that is provided with conspicuous tufts or pencils of long reddish setae.

Male.—Length, about 15 mm.; wing, 16.3 mm.; antenna, about 6.5 mm.

Frontal prolongation of head yellow above, infuscated on sides and beneath; nasus long and conspicuous; palpi brownish black, the incisures of the segments restrictedly whitened. Antennae (male) of moderate length, unusually short for a member of this group being only a little more than one-third the length of the wing; basal three segments yellow; fourth flagellar segment yellow, the basal swelling brownish black; remaining flagellar segments almost uniform brownish black or with the basal knot a little deeper in color than the pedicel; basal swellings of the segments subglobular, as in the typical members of the group; longest verticils only a little shorter than the segments alone; segments provided with a short but dense white pubescence. Head yellowish brown, the center of vertex with a narrow but conspicuous dark brown median vitta; vertical tubercle undeveloped.

Pronotum buffy yellow. Mesonotal praescutum buffy yellow with three brownish gray stripes, the median one vaguely bordered by darker; praescutal interspaces with very conspicuous brown setigerous punctures; scutum with median portion buffy yellow, the lobes with conspicuous brownish gray areas that are narrowly separated by paler gray margins; scutellum obscure yellow, the parascutella darker; mediotergite with the broad central portion yellow, the lateral borders extensively infuscated. Pleura and pleurotergite yellow. Halteres relatively short, stem dusky, knob weakly infuscated. Legs with coxae and trochanters yellow; femora obscure brownish yellow, the tips rather narrowly but conspicuously blackened, the amount subequal on all legs; tibiae brown, the bases rather narrowly brightened; tarsi black. Wings pale brown, extensively variegated with darker brown and whitish subhyaline areas; prearcular field and cells *C* and *Sc* uniform yellowish brown, the latter cell unpatterned; stigma oval, dark brown; pale areas of disk distributed as follows: An incomplete post-stigmal band from costa through cell *1st M*₂ into extreme base of *M*₃; an extensive area across cells *R* and *M* before origin of *Rs*; other whitish markings in bases of cells *R*, *M*, *Cu* and *Anal* cells; outer fifth of cell *R*₅ whitened; the darker clouds include especially

the outer radial cells, origin of *Rs*, and seams along vein *Cu*, including midlength of the vein and again at and near *m-cu*; veins brown. Venation: Tip of R_{1+2} present but pale; petiole of cell M_1 shorter than *m*; cell *1st M*₂ relatively short.

Abdominal tergites yellow, the more basal ones conspicuously trivittate with darker, the lateral stripes narrow, blackened, the median one paler brown, continuous but ill-delimited; basal sternites yellow; outer segments, including hypopygium, chiefly brownish black; ninth tergite with apical and central portions conspicuously yellow. Abdomen provided with abundant long yellow setae. Male hypopygium (Fig. 12) with the caudal margin of tergite, *9t*, gently concave, the outer angles obtusely rounded; a median furrow down the dorsal surface, the adjoining ridges but little produced. Basistyle with a suboval, densely hairy lobe at base of dististyles. Outer dististyle relatively short and flattened, appressed to the inner style. Inner dististyle, *id*, as figured; setae of outer margin variously modified according to the region occupied but not forming a continuous comb as in certain allied forms; beak relatively slender. Gonapophyses, *g*, conspicuously bilobed, each lobe a flattened plate with obtusely rounded tips, the outer lobe broader. Eighth sternite, *8s*, with the median lobe a flattened long-oval plate, constricted at base, obtuse at apex; outer lateral portions bearing a very conspicuous tuft or broad pencil of long reddish setae; surface of lobe with a central series of stouter setae.

Habitat.—Mexico (Michoacan).

Holotype, ♂, Cerro Tancitaro, in damp ravine, altitude 7,700 feet, June 27, 1941 (Hoogstraal IV-16).

The present fly is readily distinguished from all known members of the *monilifera* group by the nature of the lobe of the eighth sternite of the male hypopygium, here provided with long and very conspicuous hair-brushes. There is no known close ally.

***Tipula michoacana* sp. n.**

Fig. 7, 8

Males fully-winged, females subapterous; antennae of male nearly as long as body, bicolored; mesothorax black, very conspicuously patterned with yellow on the pleurotergite and pteropleurite, the notum polished black; femora yellow, the tips abruptly blackened; wings (male) broad, pale brown, vaguely patterned; in female, wings greatly reduce to linear strap-like organs, the venation distorted; abdomen black, in male with a sublateral yellow stripe, in female with additional yellow brightenings on lateral portions of sternites; ovipositor with both cerci and hypovalvae long and narrow; male hypopygium with the inner dististyle bearing a long spinous arm on outer margin at base; eighth sternite near midline with three closely approximated brushes of long setae.

Male.—Length, about 12 — 13 mm.; wing, 15 — 16 mm.; antenna, 10 — 12 mm.

Female.—Length, about 15 — 17 mm.; wing, 5.5 × 0.5 mm; antenna, about 2.9 — 3 mm.

Male.—Frontal prolongation of head brownish yellow; nasus distinct; palpi black. Antennae elongate, almost as long as body; scape, pedicel and first segment of flagellum yellow; succeeding segments bicolored, black, the elongate pedicels yellow, the bicolored nature including all outer segments; basal enlargements of segments relatively small but conspicuous; longest verticils about one-third the length of segment; all segments with very conspicuous erect pale pubescence that is about one-fourth to one-fifth as long as the verticils. Head obscure brownish yellow, center of wide anterior vertex polished black; vertical tubercle lacking.

Pronotal scutum black, scutellum narrowly yellow. Mesonotal praescutum, scutum and scutellum uniform polished black, the parascutellâ, lateral margins of mediotergite and all of pleurotergite paling to obscure yellow; praescutal setae virtually lacking, reduced to a few tiny bristles near suture. Pleura with the propleura and mesepisternum, including all of the anepisternum and sternopleurite, polished black, the pteropleurite abruptly yellow, meron polished black. Halteres pale brown, the base of stem yellow. Legs with fore coxae brownish black, middle and hind coxae yellow, more or less darkened basally; trochanters yellow; femora yellow, the tips rather narrowly but abruptly and very conspicuously blackened, the amount subequal on all legs; tibiae obscure yellow, the tips more narrowly blackened; basitarsi pale, the outer tarsal segments blackened. Wings (Fig. 7) large and broad, with an almost uniform pale brown tinge; cell *C* pale brown, *Sc* light yellow; prearcular field brownish yellow; linear darker brown washes in cells *R*, *M* and distal end of *2nd A*; stigma virtually lacking, reduced to a narrow seam in radial field; veins brown, more brownish yellow in the brightened areas. Squama without trichia. Venation: *Rs* long, nearly straight, about twice the long *m-cu*; *R*₁ + ₂ entire; petiole of cell *M*₁ exceeding *m*; cell *1st M*₂ relatively small; cell *2nd A* wide.

Abdomen chiefly polished black, the tergites with most of first segment and conspicuous sublateral longitudinal stripes from midlength of segment two to base of five yellow; hypopygium black, the styli yellow. Male hypopygium with the ninth tergite transverse, the caudal margin truncate or virtually so, the whole median area yellow, the remainder black. Outer dististyle a small cylindrical lobe tipped with very long black setae that are only a little shorter than the lobe itself. Inner dististyle relatively broad, the beak blackened; from base of outer margin a long powerful spinous rod arises, this gradually narrowed into a long acute black spine, the surface of rod with numerous setae and microscopic setulae. Eighth sternite slightly narrowed outwardly, the median area with numerous elongate setae that are arranged in three more or less separate groups of about twelve to fifteen each.

Female.—Characters as in male but nearly flightless, the wings (Fig. 8) reduced to long narrow straplike organs; venation much distorted but clearly evident. Antennae short; flagellum almost uniform light brown to brownish black, varying in intensity in different specimens. Legs proportionately shorter and stouter than in the male. Abdomen with lateral portions of sternite brightened, additional to the longitudinal stripe on tergites. Ovipositor with all valves red-

dish brown, long and straight; hypovalvae of unusual length and slenderness, subequal in length to the cerci.

Habitat.—Mexico (Michoacan).

Holotype, ♂, Pedregal de Tancitaro, on forested flood plain, altitude 6,586 feet, August 14, 1940 (Hoogstraal III-D 65). *Allotopotype*, ♀, in copula with type and so pinned. *Paratopotypes*, 14 ♂ ♀, August 14-15, 1940 (Hoogstraal III-D 65, 66).

Tipula michoacana is very distinct from all other species of the genus known to me. The structure of the male antennae vaguely suggests the *monilifera* group of the genus but the structure of the male hypopygium seems to preclude such an assignment. In some regards the fly suggests the eastern and northern Nearctic *Tipula* (*Lunatipula*) *disjuncta* Walker which has fully developed wings in both sexes though exhibiting a marked sexual dichroism. The strict subgeneric assignment of the fly must be left in question until more is known of its relatives.

Gen. **Dicranoptycha** Osten Sacken

Dicranoptycha harpyia sp. n.

Fig. 9, 13

General coloration testaceous yellow, unpatterned; antennae with basal two segments obscure yellow, flagellum dark brown; legs yellow, the tips of the individual segments narrowly and inconspicuously darkened; wings brownish yellow, the prearcular and costal fields clearer yellow; *Rs* about one-third longer than cell *1st M₂*; abdomen of male with a subterminal dark brown ring; male hypopygium with the outer dististyle produced at apex into a high elevated crest, the beak relatively slender, terminating in an acute, slightly decurved point.

Male.—Length, about 8.5 mm.; wing, 7 mm.

Female.—Length, about 8—8.5 mm.; wing, 6.8—7 mm.

Rostrum buffy yellow; palpi black. Antennae relatively short; scape and pedicel obscure yellow, flagellum dark brown; flagellar segments generally oval to long-oval, with truncated ends; longest verticils subequal in length to the segments. Head medium brown, sparsely pruinose; anterior vertex (male) a little less than twice the diameter of scape.

Pronotum and mesonotum chiefly testaceous yellow, unpatterned. Pleura a trifle more brownish yellow. Halteres pale yellow, the knobs a trifle darker. Legs yellow, the extreme tips of femora, tibiae, and three basal tarsal segments very narrowly and insensibly darkened; outer tarsal segments more uniformly darkened. Wings (Fig. 9) with a strong brownish yellow tinge, the prearcular and costal fields clearer yellow; veins yellow, the macrotrichia a trifle darker. Venation: *Sc₁* ending shortly beyond the fork of *Rs*, *Sc₂* at its tip; *Rs* about one-third longer than cell *1st M₂*; *m-cu* from about two-fifths to one-half the length of cell *1st M₂*.

Abdomen obscure yellow, in male with a subterminal dark brown ring involving segments six to eight, inclusive; abdomen of female unpatterned. Male

hypopygium (Fig. 13) with the outer dististyle, *od*, of unusual conformation, as figured; roughly suggesting the head of a harpy eagle, whence the specific name. Phallosome, *p*, broad and massive.

Habitat.—Mexico (Michoacan).

Holotype, ♂, La Majada, altitude 1,200 feet, swept from weeds in clearing around jungle pool, August 5, 1941 (Haag); Hoogstraal IV-34. *Allotopotype*, ♀. *Paratopotype*, 1 ♀.

Dicranoptycha harpyia is entirely different from the approximately fifteen species of the genus so far described from the Nearctic region, and likewise from the single species hitherto discovered in the Neotropics, *D. costaricensis* Alexander, from southern Costa Rica. Both of the Middle American species are among the most distinct forms of the genus in the entire world. The genus is new to the Mexican fauna.

Gen. **Limonia** Meigen

Limonia (Dicranomyia) rapida sp. n.

Fig. 10, 14

Allied to *knabi*, differing especially in the details of structure of the male hypopygium.

Male.—Length, about 7.5 mm.; wing, about 8 mm.

Rostrum and palpi black. Antennae black throughout; flagellar segments oval. Head dark gray; anterior vertex narrow, less than the diameter of scape.

Pronotum and mesonotum gray, the praescutum with ill-defined, more brownish stripes. Pleura light gray. Halteres with stem pale, knob darkened. Legs with coxae gray; trochanters obscure yellow; remainder of legs black, the femoral bases narrowly obscure yellow. Wings (Fig. 10) narrow, subhyaline, the very small stigma scarcely differentiated; veins dark brown. Venation: *Sc* short, *Sc*₁ ending a short distance before origin of *Rs*; *m-cu* at fork of *M*.

Abdomen brownish black, the basal sternites a trifle brightened; ventral dististyle of hypopygium more whitened. Male hypopygium (Fig. 14) with the rostral prolongation of ventral dististyle, *vd*, much stouter than in *knabi*, the length a little more than twice the width at the level of the spines; apex of prolongation irregularly truncate, with two more or less developed spinous points; both rostral spines from tubercles, that of the outer spine about one-third the length of the spine. Dorsal dististyle a simple, gently curved rod, narrowed outwardly, the tip produced into a long black spine. Gonapophyses, *g*, with mesal apical lobe much stouter than in *knabi*. In *knabi* (Fig. 15), the rostral prolongation of ventral dististyle much longer and narrower, its length some four or five times the width at level of the rostral spines; apex of prolongation with a single spine, placed near the lower angle; tubercles of rostral spines small, especially that of the outer spine. Dorsal dististyle a long powerful curved rod, more or less dilated at about two-thirds the length, thence constricted. Gonapophyses, *g*, with mesal apical lobe small and weak.

Habitat.—Mexico (Michoacan).

Holotype, ♂, El Soledad, altitude 6,000 feet, on pine, July 2, 1941 (Hoogstraal IV-1).

The differences from *Limonia (Dicranomyia) knabi* (Alexander) are listed above. Mexican records for *knabi* include the following:

Moshbiquil Range, Chiapas, altitude 2,500 meters, July 17, 1926 (Dampf; M. B. 193). San Cristobal, Chiapas, altitude 2,200 meters, June 11, 1926 (Dampf; M. B. 164). Cerro Tancitaro, Michoacan, altitude 6,500 feet, along shady path, July 9, 1941 (Hoogstraal IV-11); altitude 7,800 feet, June 30, 1941, edge of pine forest (Hoogstraal IV-18). altitude 7,800 feet, July 5, 1941, on grass in mountain meadow (Hoogstraal IV-17); July 8, 1941, on lupine in mountain meadow (Hoogstraal IV-21).

Descriptions of the Dampf Chiapas stations above mentioned are discussed in an earlier paper by the writer (*Ann. Ent. Soc. Amer.*, XX: 302, 1927).

***Limonia (Dicranomyia) insolabilis* sp. n.**

Fig. 16

General coloration brownish gray, the praescutum with three conspicuous dark brown stripes; antennae with scape and pedicel brownish black, the flagellum yellow throughout; knobs of halteres brownish black; femora yellow, the tips broadly and conspicuously black, the amount subequal on all legs; wings whitish subhyaline, very heavily patterned with brown; Sc_1 ending shortly beyond origin of R_s ; $m-cu$ before fork of M ; abdomen dark brown.

Female.—Length, about 6.5—7.5 mm.; wing, 7.5—8.5 mm.

Rostrum light brown, relatively long, exceeding the scape in length; palpi black. Antennae with scape and pedicel brownish black, flagellum abruptly light yellow; flagellar segments oval. Head silvery gray in front, darker gray on vertex, the latter more or less darkened on central portion; anterior vertex about one-third wider than the diameter of scape.

Pronotum dark brown, sparsely pruinose. Mesonotum brownish gray, the praescutum clearer gray on sides, the disk with three conspicuous, dark brown stripes; posterior sclerites of notum chiefly dark brown, more or less pruinose. Pleura gray pruinose, very restrictedly and vaguely patterned with darker. Halteres with stem yellow, knob brownish black. Legs with coxae pale brown, sparsely pruinose; trochanters obscure brownish yellow; femora yellow, the tips rather broadly and conspicuously black, the amount subequal on all legs, including approximately the distal seventh or eighth; tibiae obscure yellow, the bases and tips narrowly blackened; basal two tarsal segments yellow, the tips narrowly blackened; terminal tarsal segments uniformly black. Wings whitish subhyaline, heavily and handsomely patterned with brown, as follows: A series of four costal darkenings, the last at stigma, these areas much more extensive than the pale interspaces, the second and third slightly invading cell R behind; broad seams along cord and outer end of cell $1st M_2$; an extensive wash in outer radial field and very conspicuous seams along veins M , Cu , distal end of $1st A$, vein $2nd A$,

axillary border and on all outer medial veins back from the wing margin; veins yellow, darkened in the patterned areas. Venation: Sc_1 ending shortly beyond origin of Rs , in cases to about one-fourth the length, Sc_2 a short distance from its tip; $m-cu$ one-half or more of its own length before fork of M ; cell $1st M_2$ subequal to or shorter than the veins beyond it.

Abdomen dark brown; genitalia, especially the valves of the ovipositor, brightened; cerci long and very slender, gently upcurved.

Habitat.—Mexico (Michoacan).

Holotype, ♀, Cerro Tancitaro, altitude 8,500 feet, in cloud forest by sweeping shrubs, July 3, 1941 (Hoogstraal IV-25). *Paratopotype*, ♀, altitude 7,800 feet, on lupine in mountain meadow, July 8, 1941 (Hoogstraal IV-21).

Limonia (Dicranomyia) insolabilis is entirely different from all other regional species of the subgenus, being readily told by the coloration of the antennae and legs, and, especially, by the unusual pattern of the wings. In some respects it more suggests certain Palaearctic species, as *L. (D.) consimilis* (Zetterstedt), *L. (D.) mesosternata* (Alexander), and others.

***Limonia (Rhipidia) commelina* sp. n.**

Fig. 17, 22

Allied to *tripectinata*; general coloration gray, patterned with brown; antennae (male) elongate, the flagellum bicolored; flagellum with ten tripectinate segments, there being two elongate branches and a small basal spur; wings heavily patterned with brown on a whitish subhyaline ground; male hypopygium with the rostral prolongation of the ventral dististyle unusually long and slender, with two long rostral spines.

Male.—Length, about 6.5—7 mm.; wing, 7.5—8 mm.; antenna, about 3—3.2 mm.

Female.—Length, about 7.5—8 mm.; wing, 7.5—8 mm.

Rostrum and palpi black. Antennae (male) relatively elongate; scape and pedicel brownish black; flagellar segments bicolored, the basal swellings and branches black, the elongate pedicels abruptly white; terminal segment uniformly black; first flagellar segment with a single small lobule; flagellar segments two to eleven, inclusive, unequally tripectinate, there being two subequal elongate branches, with a rudimentary third spur immediately distad of their bases; longest branch at near midlength of organ, approximately twice the length of the segment, the spur about one-sixth the length of segment; spur of last branched segment (flagellar segment eleven) reduced; terminal segment slightly longer than the penultimate, simple, narrowed at distal end. In female, flagellar segments simply produced, the longest tubercle about as long as the segment alone and approximately three times the length of the shortened pale apical pedicel of the segment. Head gray, the vertex extensively patterned with black; anterior vertex (male) reduced to a narrow strip that is only about one-third the diameter of scape; anterior vertex of female very slightly wider than in male.

Pronotum dark brown, pruinose. Mesonotal praescutum chiefly gray pruinose, with three more or less distinct brown stripes, the anterior end of the broad median stripe in cases more or less obscured by pruinosity; posterior sclerites of notum gray pruinose, the scutal lobes more or less darkened. Pleura and pleurotergite gray pruinose, with a narrow blackened longitudinal stripe extending from the pronotum across the dorsal pleurites, becoming obsolete above the bases of the middle coxae. Halteres infuscated, the basal half of stem pale. Legs with coxae more or less darkened on basal portion, the tips conspicuously whitened; trochanters pale; fore femora chiefly blackened, only the basal fourth pale; middle femora extensively darkened, the extreme tips restrictedly pale; posterior femora chiefly yellow, the tips narrowly blackened, this color involving approximately the distal tenth; tibiae darkened, the tips narrowly black; tarsi passing into black. Wings (Fig. 17) variegated with whitish subhyaline and brown; usually the dark color much more extensive than the pale; dark areas of costal border deeper in color, four in number, the last at stigma, all much more extensive than the interspaces, sometimes confluent or virtually so to extensively pattern the whole costal border; clouds of remaining fields of wing very extensive but paler in color, greatly restricting the whitish, the most extensive areas of the latter being post-stigmal and axillary; in other specimens, especially females, the dark clouds are less extensive, in the cells beyond cord, especially, occupying the central portions; veins dark, paler in the costal interspaces. Venation: *Sc* relatively long, ending about opposite midlength of *Rs*, *Sc*₂ at its tip; *m-cu* shortly before fork of *M*, in cases to nearly one-half its own length.

Abdomen relatively short in both sexes, dark brown, including the male hypopygium, in cases the ventral dististyles paler; basal sternites a trifle brightened. Male hypopygium (Fig. 22) with the ninth tergite, *9t*, narrowly transverse, with numerous setae, two of the discal bristles being much longer and stronger. Basistyle, *b*, with the ventro-mesal lobe more or less pointed at apex, with about three setae near the apex longer and stronger than the others; near base of lobe with a close group of about five setae arising from conspicuous tubercles. Dorsal dististyle, *dd*, a moderately curved, stout, black rod, the tip suddenly narrowed, acute. Ventral dististyle, *vd*, relatively extensive, its total area subequal to that of basistyle; rostral prolongation very long and slender, considerably longer than the total length of the dorsal dististyle; rostral spines two, arising separately at near midlength of the style, each subequal to or a little shorter than the slender apex of the prolongation beyond. Gonapophyses, *g*, with mesal-apical lobe unusually stout, blackened, cultriform. At base of phallosome two blackened knobs of uncertain homologies, possibly developments of the anal tube.

Habitat.—Mexico (Michoacan).

Holotype, ♂, Cerro Tancitaro, altitude 7,800 feet, at light over a mountain meadow, July 3, 1941 (Hoogstraal IV-23). *Allotopotype*, ♀, pinned with type. *Paratopotypes*, 10 ♂ ♀, with types; 1 ♂, altitude 8,500 feet sweeping shrubs in cloud forest, July 3, 1941 (Hoogstraal IV-25).

From the few known Neotropical species of *Rhipidia* having the flagellar segments of the male antennae unequally tripectinate, the present fly is readily

distinguished by the structure of the male hypopygium. Among such species it is closest to *Limonia (Rhipidia) longurio* Alexander of southeastern Brazil, which differs further in the greatly elongated abdomen of the male sex, this being short and normal in the present fly. The specific name, *commelina*, is a somewhat far-fetched allusion, based on the antennal structure, to the early Dutch botanists, the Brothers Commelin, three of whom began the study of plants but only two, J. and G. Commelin, attained recognition in the science. The plant genus *Commelina* (Plum.) L., type of the spiderwort family, Commelinaceae, is said to have been based on the same circumstance.

***Limonia (Rhipidia) guerrerensis* sp. n.**

General coloration gray, the praescutum with a median brown stripe; femora yellow, the tips broadly blackened; wings yellowish subhyaline, with abundant pale brown spots and dots; *Sc* short, *Sc*₁ ending opposite origin of *Rs*.

Male.—Length, about 6.5 mm.; wing, 7.5 mm.

Antennae with scape and pedicel dark brown, the flagellum uniformly pale brown. Head dark gray; anterior vertex reduced to a linear strip, much narrower than in *multiguttata*.

Mesonotal praescutum gray, with a very broad, median, brown stripe that becomes still darker brown before the suture; lateral stripes scarcely evident gray, shortly bordered on mesal edge near suture by dark brown. Pleura gray, lined longitudinally with narrow brown stripes on ventral anepisternum, more broadly and conspicuously so on the ventral sternopleurite, meron, and across bases of the middle and hind coxae. Halteres pale. Legs with femora yellow, rather broadly and conspicuously tipped with black or brownish black; tibiae yellow, very narrowly tipped with darker; tarsi yellow. Wings yellowish subhyaline, with abundant pale brown dots and scattered, somewhat larger and darker brown spots, the latter including four costal areas, arranged as follows: Above arculus; at supernumerary crossvein in cell *Sc*; a common area at tip of *Sc* and origin of *Rs*, and the small stigmal area; scarcely larger seams along cord and outer end of cell 1st *M*₂, and as small marginal clouds at ends of longitudinal veins; the smaller dots include all cells and are in part confluent; veins pale, darker in the clouded portions. Venation: *Sc* short, *Sc*₁ ending above the origin of *Rs*; *m-cu* just before fork of *M*. In the paratype, *Sc*₁ extends to opposite one-fifth the length of *Rs* but the darkened spot at its tip likewise covers the origin of *Rs* and it is considered as being conspecific.

Abdominal tergites pale, lined longitudinally with darker. Male hypopygium almost exactly as in *multiguttata*; rostral prolongation slender and nearly straight, with two long spines that are slightly unequal; spines subequal in length to the prolongation, placed close together at near two-thirds the length.

Habitat.—Mexico (Guerrero, Chiapas).

Holotype, ♂, Chilapa, Guerrero, October 1929 (*L. Schultze*). *Paratype*, ♂, Moshbiquil Range, Chiapas, altitude 2,500 meters, July 17, 1926 (Dampf; M. B. 193); Alexander Collection.

Closely allied to *multiguttata* (Alexander), of southern Mexico to Panama, differing especially in the short vein *Sc*, conspicuously blackened tips of the femora, and the dark ventral pleural stripe that involves the middle and hind coxae.

Gen. **Epiphragma** Osten Sacken

Epiphragma (Epiphragma) celator sp. n.

General coloration of mesonotal praescutum gray, the humeral portions reddened, narrowly bordered laterally with blackish; antennae long for the female sex, the second and succeeding flagellar segments conspicuously bicolored, brownish black, the apices yellow, the amount of the latter decreasing on the outer segments; pleura conspicuously dark brown on dorsal and ventral portions, the intermediate section yellowish gray; halteres dark brown; legs yellow, the apices of the femora weakly infuscated; wings grayish yellow, with a heavy pale brown pattern that is narrowly bordered by darker brown and is in part ocelliform; *Rs* angulated and spurred at origin; abdominal tergites gray, patterned with dark brown, the apices of the tergites very narrowly yellow; sternites obscure brownish yellow.

Female.—Length, about 12.5 mm.; wing, 11.5×3.4 mm.; antenna, about 4 mm.

Rostrum brown, yellow pollinose; palpi black. Antennae relatively long for the female sex, indicating an even more elongate male organ; scape and pedicel dark brown; first flagellar segment yellow; succeeding segments bicolored, brownish black basally, the tips yellow, more extensively so on the proximal segments, the color becoming obsolete at near midlength of the organ; flagellar segments cylindrical or subcylindrical, the longest verticils subequal in length to the segments; all fourteen flagellar segments distinct, none fused. Head gray, the anterior vertex variegated with dark brown.

Pronotum with anterior and posterior borders of the scutum buffy, the broad central portion dark brown, the scutellum more uniform yellow. Mesonotal praescutum with the humeral portions reddish, narrowly bordered laterally with blackish; disk of praescutum chiefly covered by more or less confluent gray stripes, near the suture showing indications of four short brown stripes, the intermediate pair narrow; anterior portion of praescutum slightly infuscated; scutal lobes gray on anterior portion, more infuscated behind; scutellum obscure brownish yellow, the parascutella dark brown; postnotum yellowish gray, bordered laterally and posteriorly with darker; pleurotergite yellowish gray, the ventral portion darkened. Pleura with the dorsal pleurites, including the dorsopleural membrane, extensively and almost uniformly dark brown; ventral sternopleurite and meron likewise extensively darkened, the broad intermediate portion much paler, yellowish gray. Halteres dark brown, the base of stem restrictedly pale. Legs with the coxae yellowish gray; trochanters yellow; femora yellow, the tips weakly infuscated; tibiae and tarsi yellow, the terminal segments darkened. Wings with the ground color extensively grayish yellow; a heavy pale brown pattern

that is in part ocelliform, with complete ocelli centering at origin of *Rs* and fork of M_{1+2} ; a further circular area centering at anterior cord, this with only a partial hyaline area; all brown bands very narrowly bordered by dark brown; stigma darker brown; dark markings of basal third of wing slightly disconnected from the pattern of outer half of wing, the latter very irregular but the various areas interconnected to a greater or less degree; cell *2nd A* with only two darkened marginal areas, excluding the one at end of vein; veins yellowish brown, darker along *Cu*, cord and outer end of cell *1st M*₂. Venation: *Rs* angulated and spurred at origin; R_{2+3+4} from about one-half to two-thirds longer than *m-cu*.

Abdominal tergites gray, patterned with dark brown, the latter much broken into spots; posterior borders of tergites very narrowly yellow; sternites obscure brownish yellow; subterminal sternites more blackened. Ovipositor with cerci strongly upcurved, reddish horn-color.

Habitat.—Mexico (Michoacan).

Holotype, ♀, Cerro Tancitaro, altitude 7,700 feet, in damp ravine, June 27, 1941 (Hoogstraal IV-16).

The nearest relatives are *Epiphragma (Epiphragma) nebulosa* (Bellardi) and *E. (E.) oreonympha* Alexander, both of which differ conspicuously in the pattern of the body, legs and wings. The former fly is still unknown to me except from Bellardi's description and figure but evidently represents a species not re-discovered since its original capture by August Sallé between 1831 and 1834; type in the Bellardi collection in Turin, Italy.

Gen. **Shannonomyia** Alexander

Shannonomyia adumbrata sp. n.

Fig. 18, 25

General coloration black, heavily pruinose with light gray; antennae (male) elongate, if bent backward extending about to the base of abdomen; knobs of halteres weakly darkened; legs brownish black to black, the femoral bases restrictedly brightened; wings with a weak brown tinge; *m-cu* beyond fork of *M*; male hypopygium with outer dististyle blackened and unequally bidentate at apex.

Male.—Length, about 5 — 5.2 mm.; wing, 5.3.—5.5 mm.; antenna, about 2.1 — 2.2 mm.

Female.—Length, about 6.5 mm.; wing, 5 mm.

Rostrum black, sparsely pruinose; palpi black. Antennae black throughout, relatively elongate in male (Fig. 25), if bent backward extending about to base of abdomen; flagellar segments elongate, more or less fusiform, with truncated ends; verticils shorter than the segments. Head light gray; anterior vertex wide.

Thorax almost uniform light gray over a blackened ground, the praescutal stripes poorly indicated to lacking. Halteres pale, the knobs weakly darkened. Legs with the coxae gray pruinose; trochanters obscure yellow; remainder of legs brownish black to black, the femoral bases restrictedly brightened. Wings (Fig. 18) with a weak brownish tinge, the oval stigma very faintly darker; prearcular and

costal fields vaguely more yellowish brown; veins brown. No macrotrichia in cells of wing. Venation: Sc_1 ending about opposite three-fourths the length of R_s , Sc_2 at its tip; R_2 very faint, a trifle longer than R_{2+3} , shorter than or subequal to R_{1+2} ; R_{2+3+4} in virtual longitudinal alignment with R_{2+3} and R_s ; cell *1st* M_2 relatively long and narrow, shorter than vein M_{1+2} beyond it; in some specimens this is longer than in the case of the holotype figured; *m-cu* varying from about two-thirds to virtually its full length beyond the fork of M .

Abdomen black in both sexes, sparsely pruinose, in cases the more basal sternites slightly reddish brown with their posterior borders darkened. Ovipositor with the genital shield blackened; cerci long and slender, gently upcurved. Male hypopygium with the outer dististyle blackened, especially at apex, the latter conspicuously bispinous, the spines slightly unequal in size. Inner dististyle dusky, shorter than the outer style, narrowed outwardly. Gonapophyses with apical portion curved, the base more expanded, the outer margin with a conspicuous tooth at near midlength.

Habitat.—Mexico (Michoacan).

Holotype, ♂, Cerro Tancitaro, altitude 10,500 feet, swept from herbs near water, July 18, 1941 (Hoogstraal IV-27). *Allotopotype*, ♀, altitude 11,500 feet, swept from herbs in open pine forest, July 18, 1941 (Hoogstraal IV-30). *Paratopotypes*, 1 ♂, same as allotype, summit of mountain, altitude 11,800 feet, July 17, 1941 (Hoogstraal IV-32); 1 ♀, swept from grass near stream, altitude 10,600 feet, July 17, 1941 (Hoogstraal IV-28). *Paratypes*, 1 ♂, 2 ♀♀, Tancitaro, altitude 6,580 feet, July 20, 1940 (Hoogstraal III-D 44).

The nearest relatives are *Shannonomyia dampfi* Alexander and *S. ovaliformis*, sp. n. The former species, one of the numerous new forms discovered by Dampf in Chiapas, likewise has elongate antennae in the male sex but is an altogether distinct fly; it has even longer antennae, sparse but evident macrotrichia in the outer cells of wing, and the hypopygial structure, especially the outer dististyle and gonapophysis, entirely different. The latter fly is described herewith, differing from the present species especially in the much shorter antennae.

Shannonomyia ovaliformis sp. n.

Fig. 19, 26

General coloration light gray, the praescutum with a median brown stripe; antennae short, the flagellar segments suboval, their verticils exceeding the segments; knobs of halteres darkened; wings with a strong brown tinge, the oval stigma darker brown; Sc_2 at extreme tip of Sc_1 ; *m-cu* before midlength of cell *1st* M_2 ; male hypopygium with the setae of outer dististyle of unusual length.

Male.—Length; about 6 mm.; wing, 6.5 mm.; antenna, about 1.5 mm.

Rostrum gray; palpi black. Antennae (Fig. 26) relatively short, black throughout; flagellar segments suboval, with the lower face slightly more bulging than the outer one; verticils exceeding the segments in length; compare antennae of *adumbrata* male (Fig. 25). Head light gray.

Pronotum and mesonotum light gray, the praescutum with a median brown stripe, the lateral stripes not or scarcely evident; centers of scutal lobes weakly darkened; praescutal interspaces and posterior border of scutellum with unusually long and conspicuous yellow setae. Pleura gray. Halteres with stem whitened, knob dark brown. Legs with coxae gray; trochanters brownish yellow; femora brownish black, the bases somewhat brightened, in cases more extensively so; tibiae and tarsi black. Wings (Fig. 19) with a strong brown tinge, the oval stigma darker brown; veins dark brown. Venation: Sc_1 ending shortly before level of fork of R_s , Sc_2 longer, at its extreme tip; R_2 subequal to $R_2 + 3$; $m-cu$ before midlength of cell 1st M_2 .

Abdomen, including hypopygium, black. Male hypopygium with the outer dististyle more strongly narrowed and heavily blackened on distal half, the apical points short. Setae of basal portion of style of unusual length, some extending to beyond the apex of the style itself.

Habitat.—Mexico (Michoacan).

Holotype, ♂, Cerro Tancitaro, altitude 8,500 feet, sweeping in a weedy clearing, August 2, 1940 (Hoogstraal III-D 55).

Shannonomyia ovaliformis is very similar in its general appearance to *S. adumbrata*, sp. n., which differs most conspicuously in the more elongate antennae of the male, this being from one-third to one-half longer than in the present fly, with the individual flagellar segments correspondingly lengthened (compare figures 25 and 26).

Gen. **Gonomyia** Meigen

Gonomyia (Idiocera) hoogstraali sp. n.

Fig. 20, 23

General coloration gray, the praescutum with four brown stripes, the intermediate pair elongate; femora obscure yellow, the tips dark brown; wings whitish subhyaline, restrictedly patterned with brown, including a darkened cloud in outer end of cell R_3 ; veins R_{1+2} and R_3 confluent at wing margin or virtually so; male hypopygium with the outer dististyle simple, terminating in a powerful black spine; inner dististyle blackened, deeply but unequally bifid; aedeagus very slender, provided with scattered setae over most of the length.

Male.—Length, about 5.5 mm.; wing, 5 mm.

Rostrum and palpi black. Antennae with the scape darkened beneath, obscure yellow above; pedicel and flagellum brownish black to black; flagellar segments long-oval to subcylindrical, the longest verticils subequal in length to the segments; terminal segment longer than the penultimate. Head dark gray, the front more infuscated.

Pronotum elongate, dark brownish gray, conspicuously bordered laterally by pale yellow; anterior lateral pretergites very obscure testaceous yellow. Mé-

sonotal praescutum gray, with four conspicuous brown stripes, the intermediate pair extending for virtually the whole length of the sclerite, wider than the median interspace; lateral stripes about one-half as wide; posterior sclerites of notum gray, the scutal lobes and a capillary median line on scutum dark brown; posterior sclerites more or less infuscated. Pleura gray, with a more or less distinct obscure yellow longitudinal stripe extending from the fore coxae across the sternopleurite and meron to the base of abdomen; dorsopleural region obscure yellow. Halteres relatively elongate, stem yellow, knob dark brown. Legs with the fore and middle coxae yellow, more or less darkened basally, the posterior pair more uniformly pale; trochanters pale yellow; femora obscure yellow, the tips passing into dark brown; tibiae and basitarsi yellow, the tips more narrowly infuscated; remainder of tarsi brownish black. Wings (Fig. 20) relatively narrow, whitish subhyaline, the prearcular field more milky white; stigma oval, dark brown; a more or less distinct brown cloud in outer end of cell R_3 ; cord vaguely darkened, indicated almost entirely by a deepening in color of the veins; veins brown, pale in the brightened basal portions. Venation: Sc relatively short, Sc_1 extending to just beyond origin of Rs , Sc_2 a little removed from its tip, lying just basad of origin of Rs ; veins R_{1+2} and R_3 confluent or virtually so at tips, closing cell R_1 at margin; R_{2+3+4} shorter than vein R_4 ; $m-cu$ nearly twice its own length before fork of M .

Abdomen dark brown, the sternites a trifle brighter; hypopygium brownish black. Male hypopygium (Fig. 23) with the basistyle, b , produced far beyond the point of insertion of the dististyles as an unusually long and slender lobe, the apex slightly more flattened. Outer dististyle, od , simple, appearing as a flattened blade, expanded outwardly, the outer angle produced laterad into a powerful, gently curved, black spine. Inner dististyle, id , longer than the outer, heavily blackened, unequally bifid, the outer arm a long, nearly straight black spine that is nearly twice as long as the stouter inner arm. Aedeagus, a , long and unusually slender, the tip simple, the basal portion more or less dilated, beyond the expanded portion with a few scattered setae over the entire length.

Habitat.—Mexico (Michoacan).

Holotype, ♂, La Majada, altitude 1,200 feet, August 16, 1941 (Robert Traub); Hoogstraal IV-35.

Gonomyia (Idiocera) hoogstraali is named in honor of the leader of the various Hoogstraal Expeditions to Mexico. The species is very different from the Cuban *G. (I.) angustissima* Alexander and likewise from the rather numerous species of the subgenus occurring in the Rocky Mountain region of the United States. As usual in the Tipulidae, the structure of the male hypopygium is distinctive of the species. The subgenus *Idiocera* Dale is new to the Mexican fauna.

***Gonomyia (Gonomyia) connivens* sp. n.**

Allied to *remota*; antennae relatively elongate, scape and pedicel yellow, the flagellum black; mesonotum chiefly dark brown; pleura yellow with a conspicuous

brownish black longitudinal stripe; legs brownish black; wings subhyaline, the stigma faintly darkened; Sc_1 ending some distance before origin of Rs , cell $1st M_2$ closed; male hypopygium with the apical lobe of basistyle and the outer dististyle both of unusual length, approximately twice as long as the remainder of basistyle; inner dististyle bearing a long slender spine on outer face near base.

Male.—Length, about 4.5 mm.; wing, 4.3 mm.

Rostrum and palpi black. Antennae with scape and pedicel yellow, flagellum black; flagellum relatively elongate, the segments long and narrow. Head dark.

Pronotum yellow, narrowly darkened laterally. Mesonotum almost uniform dark brown. Pleura yellow, with a conspicuous dorsal brownish black stripe extending from above the fore coxae to the posterior portion of mediotergite. Halteres relatively long and slender, brownish black throughout. Legs with the coxae and trochanters obscure yellow; remainder of legs brownish black. Wings subhyaline, the stigma faintly darkened; veins brown. Venation: Sc relatively short, Sc_1 ending a distance before origin of Rs about equal to two-thirds the length of $m-cu$, Sc_2 some distance from its tip; R_{2+3+4} rather strongly arcuated, subequal in length to Rs ; R_3 moderately oblique; cell $1st M_2$ closed; $m-cu$ just beyond the fork of M .

Abdomen dark brown, the hypopygium somewhat brighter. Male hypopygium with the apical lobe of basistyle unusually long and slender, nearly twice as long as the main body of the style. Outer dististyle a trifle longer than the lobe of basistyle and very slender, appearing as a uniformly pale rod. Inner dististyle complex, bearing an elongate spine on outer face near base, the remainder of style shorter, terminating in a powerful black spine, bearing a smaller pale spine on outer margin at near midlength. Phallosome complex.

Habitat.—Mexico (Chiapas).

Holotype, ♂, Finca Victoria, altitude 900 meters, at trap lamp from 9 P. M. until morning, May 29, 1935 (Dampf); M. F. 4342. Dampf writes "This region is much more virgin than Finca Vergel, full of brooks, rivulets, barrancas, and the like,—a paradise for an entomologist".

Gonomyia (Gonomyia) connivens resembles *G. (G.) remota* Alexander and allied forms but is entirely distinct from all known Neotropical species in the structure of the male hypopygium, notably of the basistyle and dististyles.

Gen. **Erioptera** Meigen

Erioptera (Empeda) mayanymphica sp. n.

Fig. 24

Allied to *nymphica*; general coloration blue-gray, the postnotum and ventral pleurites variegated with blackish; legs black, the tibiae and basitarsi ringed with snowy white; wings with a weak gray tinge, the stigmal darkening scarcely indicated; male hypopygium with the outer dististyle conspicuously blackened, terminating in two major spinous points, with a small peg-like spine in the axil.

Male.—Length, about 3.5 mm.; wing, 4—4.3 mm.

Female.—Length, about 4 mm.; wing, 4.8—5 mm.

Rostrum and palpi black. Antennae black throughout; flagellar segments long-oval, the longest verticils a trifle exceeding the segments; terminal segment about two-thirds the length of the penultimate. Head blue-gray.

Pronotum blue-gray, the posterior portions and very restricted pretergites more yellow. Mesonotum almost uniform blue-gray, the praescutum not or scarcely patterned with darker; lateral portions of postnotum blackened. Pleura blue-gray, the dorsopleural membrane yellow; ventral sternopleurite and meron broadly blackened. Halteres pale yellow. Legs with the coxae and trochanters brownish black; femora black; tibiae black with a narrow snowy white ring at near midlength; basitarsi with approximately the proximal three-fourths similarly snowy white, the remainder of tarsi black; legs without flattened scales as found in many members of the subgenus, the segments covered with long coarse setae, dark-colored on the blackened portions, whitish on the pale annuli. Wings with a weak gray tinge, the prearcular and costal fields more whitened; stigmal darkening very weakly developed to virtually lacking, chiefly limited to a seam along vein R_{1+2} ; veins dark brown, pale in the brightened basal portions. Venation: Sc_1 ending about opposite one-third the length of R_s , Sc_2 some distance from its tip, Sc_1 alone subequal to or exceeding vein R_2 , the latter oblique in position; $m-cu$ very close to the fork of M .

Abdomen black, the surface sparsely pruinose, the extreme lateral borders restrictedly pale; hypopygium chestnut brown; genital segment of female blackened. Male hypopygium (Fig. 24) with the outer dististyle, *od*, conspicuously blackened, the stem narrow, the blade expanded outwardly into two major spinous points, with a smaller peg-like spine in the axil of the two latter; outer spine more slender, strongly curved. Inner dististyle, *id*, a flattened, paddle-like blade.

Habitat.—Mexico (Chiapas).

Holotype, ♂, Finca Germania, altitude 1,190 meters, June 20, 1935, at trap lamp on veranda, overlooking valleys and rocks, with many brooks (Dampf); M. F. 4571. *Allotopotype*, ♀. *Paratopotypes*, several ♂ ♀.

It is now evident that there are several species in the subgenus *Empeda* Osten Sacken with the general coloration of *Erioptera* (*Empeda*) *nymphica* Alexander, that is, having the legs black, banded with snowy white. Members of this group are now known to occur as far to the south as the Peruvian Andes. The present fly is most similar to *nymphica*, still known only from the Blue Mountains, Jamaica. The male sex of *nymphica* is still unknown but the species differs from the present fly in the details of coloration, as the much larger and darker stigma of the wing. Edwards (1939) indicates that *Platyotoma* Lioy (1863) should replace *Empeda* Osten Sacken (1869). There is an earlier use of the name *Platyotoma* (Coleoptera, Dejean 1833) but this is apparently a *nomen nudum* as there employed. Until any uncertainty in the matter is definitely cleared it seems best to adhere to the old established name of *Empeda*.

Gen. **Molophilus** Curtis**Molophilus (Molophilus) haagi** sp. n.

Fig. 21, 27

Belongs to the *plagiatus* group; general coloration dark brown, sparsely pruinose; antennae (male) relatively long, slightly exceeding one-half the length of body; legs brownish black; halteres uniformly pale yellow; wings with a brownish tinge; male hypopygium with the basal dististyle a strong, gently curved, blackened rod, terminating in two strong points, the apical spine slightly curved, the subapical one more nearly straight; outer margin of style weakly serrulate and roughened.

Male.—Length, about 4.5—5 mm.; wing, 5—5.5 mm.; antenna, about 2.6—2.9 mm.

Female.—Length, about 5—5.5 mm.; wing, 5—5.7 mm.

Rostrum and palpi black. Antennae (male) black throughout, elongate, exceeding one-half the length of body; flagellar segments elongate-subcylindrical, narrower at the ends, provided with abundant erect pale setae additional to the even longer, unilaterally arranged verticils; longest vestiture subequal to or exceeding the segments in length. Head dark brown, sparsely pruinose.

Thorax uniformly dark brown, sparsely pruinose to produce a more or less leaden appearance. Halteres uniformly pale yellow. Legs brownish black. Wings (Fig. 21) with a brownish tinge, the veins and trichia still darker. Venation: R_2 variable in position, in cases before, in other specimens beyond the level of $r-m$; $m-cu$ likewise variable, in some cases straight, in others angulated and spurred.

Abdomen, including hypopygium, brownish black. Male hypopygium (Fig. 27) with the beak of ventral lobe of basistyle, b , relatively slender. Outer dististyle, od , with the arms, especially the slender outer one, unusually long. Basal dististyle, bd , a strong, gently curved, blackened rod, terminating in a powerful curved apical spine, before apex on outer face with a strong straight spine; outer margin with abundant microscopic serrulations almost to the base, the inner or ventral margin with fewer, more obtuse roughenings on outer half. Aedeagus long and slender. Phallosomic plate, p , glabrous, its apex obtuse.

Habitat.—Mexico (Michoacan).

Holotype, ♂, Cerro Tancitaro, in damp ravine, swept from vegetation, altitude 7,700 feet, July 4, 1941 (Hoogstraal IV-16 a). *Allotopotype*, ♀, pinned with type. *Paratopotypes*, 20 ♂ ♀, on pine, in pine-alder forest, altitude 7,000 feet, June 28, 1941 (Hoogstraal IV-12); in mountain meadow, at light, altitude 7,800 feet, July 3, 1941 (Hoogstraal IV-23); sweeping shrubs in pine-oak-fir forest, altitude 8,500 feet, July 8, 1941 (Hoogstraal IV-26).

The present fly is named in honor of the entomologist of the Fourth Hoogstraal Mexican Expedition, Mr. Ralph Haag. Among the numerous regional species it is closest to *Molophilus (Molophilus) falx* Alexander, of Chiapas, differing conspicuously in the structure of the male hypopygium, notably of the basal dististyle.

Molophilus (Molophilus) schultzei sp. n.

Fig. 28

Belongs to the *plagiatus* group; general coloration of body blue-black; antennae and legs black throughout; knobs of halteres white; wings with a strong dusky tinge, veins and macrotrichia darker brown; male hypopygium with the basal dististyle a gently curved chitinized rod that terminates in a long straight apical spine and a few microscopic denticles.

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

Rostrum blue-black; palpi black. Antennae short, black throughout; flagellar segments oval, with verticils that much exceed the segments. Head dark, with a blue pruinosity.

Mesonotum and pleura dark, heavily covered with a blue pruinosity; pseudosutural foveae black, relatively conspicuous. Halteres with stem obscure whitish, the knobs clear white. Legs with the coxae bluish; remainder of legs black. Wings with a strong dusky suffusion; veins and macrotrichia dark brown. Venation: R_2 lying opposite or just beyond $r-m$; cell M_3 relatively short, vein M_4 shorter than M_{3+4} in paratype, longer in the type; vein *2nd A* ending before *m-cu*.

Abdomen, including the hypopygium, black. Male hypopygium (Fig. 28) with the apical beak of ventral lobe of basistyle, *b*, compressed-flattened, yellow. Outer dististyle, *od*, unequally bifid at apex, the shorter arm exceeding two-thirds the length of the longer one. Basal dististyle, *bd*, a gently curved chitinized rod that terminates in a long straight axial spine, before tip with smaller lateral spines and a few additional microscopic denticles.

Habitat.—Mexico (Guerrero).

Holotype, ♂, Chilapa, October 1929 (L. Schultze). *Paratopotype*, 1 ♂, in alcohol.

The species is named in honor of the collector, Mr. L. Schultze. *Molophilus (Molophilus) schultzei* is most closely allied to *M. (M.) severus* Alexander, differing especially in the structure of the male hypopygium.

SUMARIO

En esta nueva aportación al estudio de los Tipulidae de México, hecha principalmente sobre materiales provenientes de la Cuarta Expedición Biológica Hoogstraal, comienza por dar el autor un detenido estado del desarrollo del conocimiento de los Tipulidae mexicanos, enumerando los datos que se obtuvieron durante el siglo XIX, y seguidamente los conseguidos en el XX, con las citas bibliográficas a ellos relativas.

Se incluye, a continuación, una lista básica de los Tipulidae de México descritos por el autor, y formada por éste a sugerencia del Dr. A. Dampf, a quién se debe la recolección de una parte muy considerable de los materiales de esta familia conocidos de la República. En esta lista aparecen enumerados los trabajos todos

del autor en que figuran datos mexicanos, a partir de 1913 y que llegan hasta 1941.

Se describe la Trichocera mexicana, primer representante de este grupo en México, siete especies de Tipula, en cuyo género se crea el nuevo subgénero Nephrotomodes, y se da una larga lista de las especies americanas que a él corresponden; una especie de Dicranoptycha, cuatro de Limonia, una de Epiphragma, dos de Shannonomyia, dos de Gonomyia, una de Erioptera y dos de Molophilus.

La mayoría de las especies fueron obtenidas en la región de Tancítaro (Michoacán) por la Expedición Biológica Hoogstral como queda dicho; dos especies proceden de la colección Dampf y otra de la del autor.

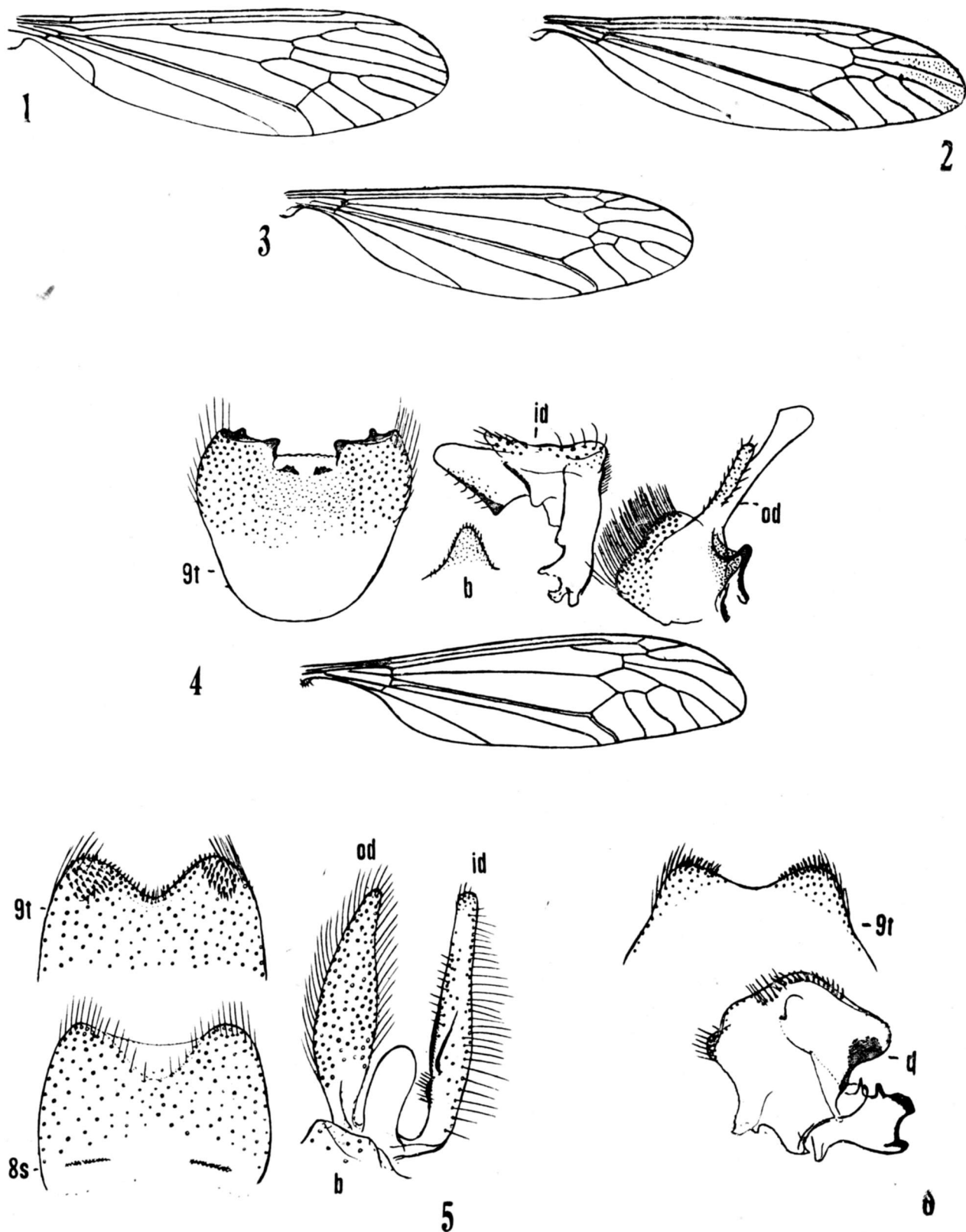


Fig. 1. *Trichocera mexicana* sp. n.; venation.—Fig. 2. *Tipula (Trichotipula) aplecta* sp. n., venation.—Fig. 3. *Tipula (Nephrotomodes) tancitaro* sp. n.; venation.—Fig. 4. *Tipula (Bellardina) larga* sp. n.; venation and details of male hypopygium.—Fig. 5. *Tipula (Trichotipula) aplecta* sp. n.; male hypopygium.—Fig. 6. *Tipula (Nephrotomodes) tancitaro* sp. n.; male hypopygium.

Symbols: *a*, aedeagus; *b*, basistyle; *d*, dististyle; *dd*, dorsal dististyle; *g*, gonapophysis.

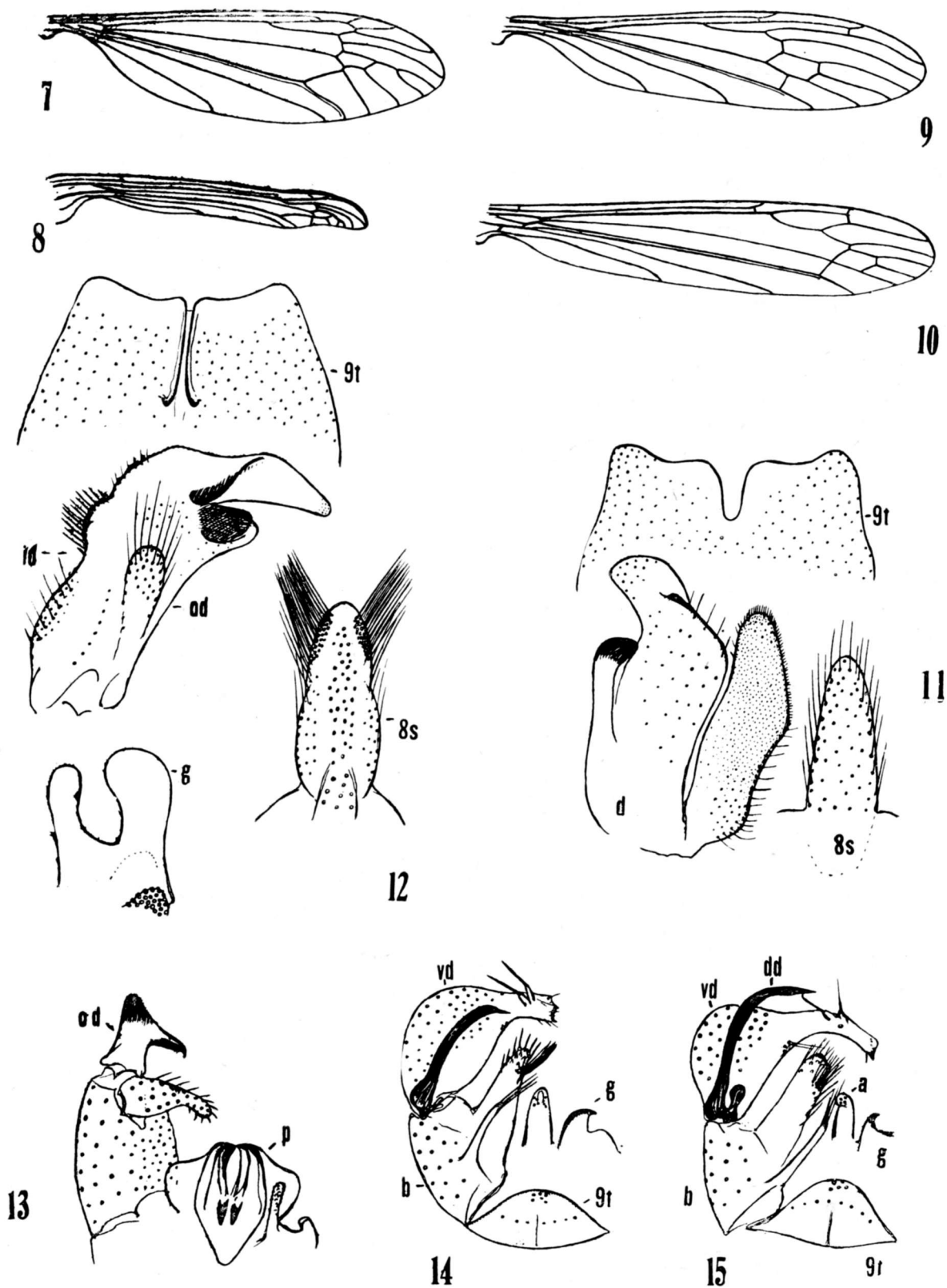


Fig. 7. *Tipula michoacana* sp. n.; venation, male.—Fig. 8. *Tipula michoacana* sp. n.; venation, female.—Fig. 9. *Dicranoptycha harpyia* sp. n.; venation.—Fig. 10. *Limonia (Dicranomyia) rapida* sp. n.; venation.—Fig. 11. *Tipula nimbinervis* sp. n.; male hypopygium.—Fig. 12. *Tipula ligulipenicillata* sp. n.; male hypopygium.—Fig. 13. *Dicranoptycha harpyia* sp. n.; male hypopygium.—Fig. 14. *Limonia (Dicranomyia) rapida* sp. n.; male hypopygium.—Fig. 15. *Limonia (Dicranoptycha) knabi* (Alexander), male hypopygium.

(Symbols: a, aedeagus; b, basistyle; d, dististyle; dd, dorsal dististyle; g, gonapophysis; p, phallosome; vd, ventral dististyle.)

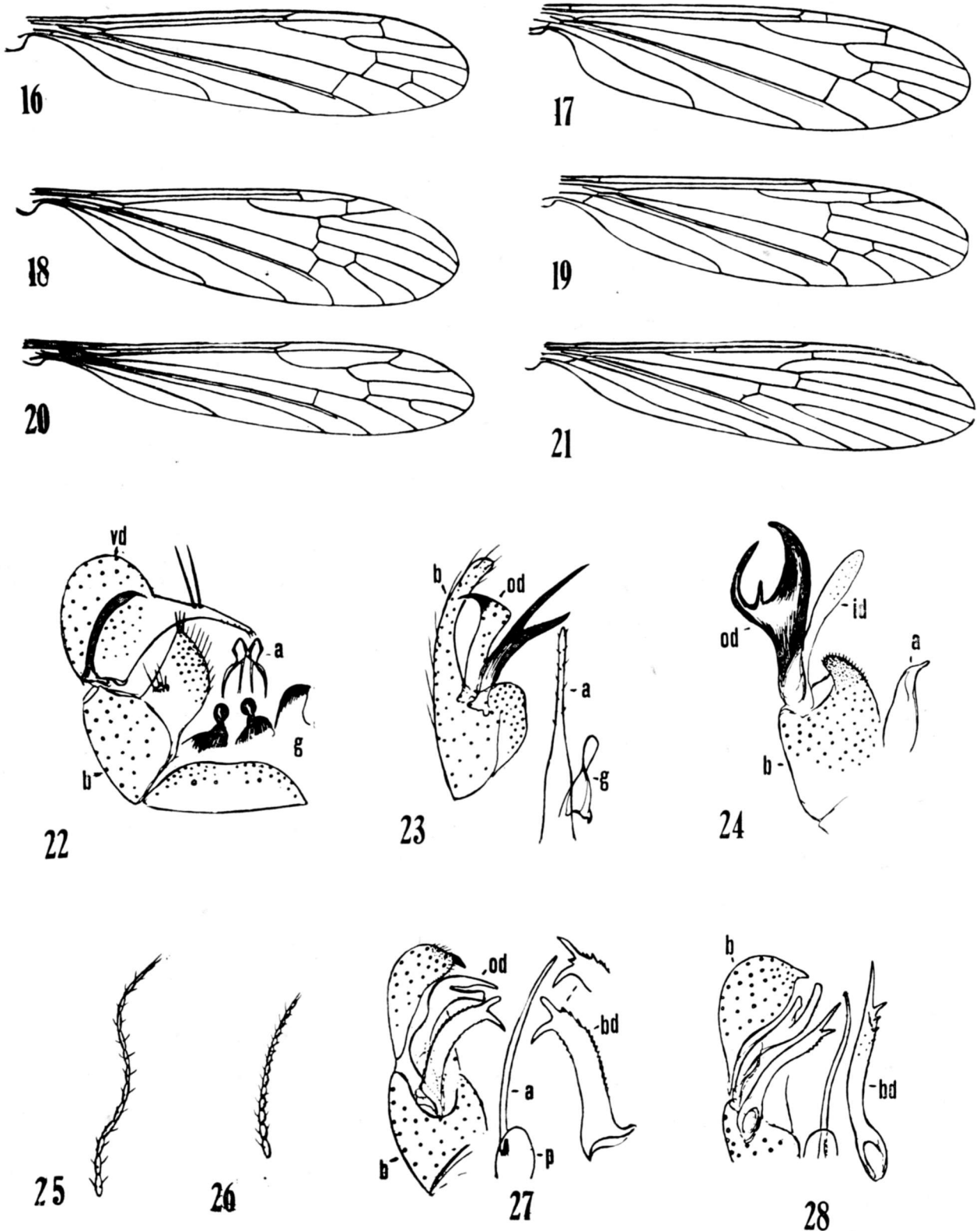


Fig. 16. *Limonia (Dicranomyia) insolabilis* sp. n.; venation.—Fig. 17. *Limonia (Rhipidia) commelina* sp. n.; venation.—Fig. 18. *Shannonomyia adumbrata* sp. n.; venation.—Fig. 19. *Shannonomyia ovaliformis* sp. n.; venation.—Fig. 20. *Gonomyia (Idiocera) hoogstraali* sp. n.; venation.—Fig. 21. *Molophilus (Molophilus) baagi* sp. n.; venation.—Fig. 22. *Limonia (Rhipidia) commelina* sp. n.; male hypopygium.—Fig. 23. *Gonomyia (Idiocera) hoogstraali* sp. n.; male hypopygium.—Fig. 24. *Erioptera (Empeda) mayanymphica* sp. n.; male hypopygium.—Fig. 25. *Shannonomyia adumbrata* sp. n.; antenna, male.—Fig. 26. *Shannonomyia ovaliformis* sp. n.; antenna, male.—Fig. 27. *Molophilus (Molophilus) baagi* sp. n.; male hypopygium.—Fig. 28. *Molophilus (Molophilus) schultzei* sp. n.; male hypopygium.

(Symbols: a, aedeagus; b, basistyle; bd, basal dististyle; g, gonapophysis; id, inner dististyle; od, outer dististyle; p, phallosomic plate; t, tergite; vd, ventral dististyle.)