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THE CRANE-FLIES OF PUERTO RICO

(Diptera)

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INTRODUCTION

At the suggestion of my friend, Dr. M. D. Leonard, I have prepared the following brief account of the Tipulidae of Puerto Rico. Although much has been done in the collection of specimens, still further work will unquestionably add materially to the subjoined record. The following is the plan of the present report:

I. Historical Account.
II. Distribution of Genera and Subgenera in the Greater Antilles.
III. Keys to the Subfamilies, Tribes, Subtribes, Genera and Subgenera of Tipulidae known from the Greater Antilles.
IV. A record of the Tipulidae known from Puerto Rico, with keys and brief diagnoses of the species.
V. A list of the Tipulidae known from the Greater Antilles.

A very few species and subspecies, not only from Puerto Rico, but from other islands, are described at this time in order to complete the data. All types of these novelties are preserved in my collection.

During the progress of this survey of Neotropical Tipulidae invaluable co-operation has been received from many persons and institutions. I here wish to acknowledge the kindly help of the following, who have been of especial service in adding to our fragmentary knowledge of the Tipulidae of the West Indian Islands. Cuba: Julián Acuña, Joseph Bequaert, S. C. Bruner, J. G. Myers, A. Otero, G. C. Rowe, P. D. Sanders. Hispaniola: H. L. Dozier, J. G. Myers. Jamaica: G. C. Crampton, C. C. Gowdey, J. G. Myers. Puerto Rico: Charles Bates, W. A. Hoffman, W. T. M. Forbes, M. D. Leonard.

In addition to the above, the collections of the American Museum, with additional material secured by Grossbeck in Jamaica, and by Lutz, H. E. Crampton, Mutchler and others in Jamaica and Puerto

Rico; the British Museum material, through the kindly interest of Dr. Fred W. Edwards; and the United States National Museum, with early specimens taken by Busck, Schwarz and Richmond, should be mentioned.

The rich Antillean collections in various American institutions are due almost entirely to the efforts of the above men, here gratefully acknowledged. From the following account, it will be seen that the collections made by Messrs. Acuña, Bruner, G. C. Crampton, Gowdey, Hoffman, Leonard and Myers are by far the largest and most important.

I wish to thank my old-time friend and co-worker on the Tipulidae, Dr. Mortimer D. Leonard, for much kindly help and advice at frequent periods in the past quarter century.

I. Historical Account

The first Tipulidae ever taken in Puerto Rico would appear to be those now preserved in the Berlin Museum, collected previously to 1850 by Moritz, and described by Loew in 1851 (*Limonia (Geranomyia) rufescens* and *Toxorhina fragilis*) and by Osten Sacken in 1887 (*Brachypremna unicolor* and *Helius albitarsis*). Still later, Dr. Juan Gundlach collected in various parts of the island, his material forming the basis for the important paper by von Röder in 1885 (*Hexatoma trifasciata* and *Megistocera longipennis* Macquart).

Subsequent to the Spanish-American war and the transference of Puerto Rico to the United States, various officials from the United States National Museum (August Busck in 1899, Charles W. Richmond in 1900) made collections of insects in Puerto Rico, these including a few species of Tipulidae (*Dolichopeza portoricensis, Trentepohlia niveitarsis*). During the period of the World War, an expedition under the joint auspices of the New York Academy of Sciences and the American Museum of Natural History made extensive collections in Puerto Rico and other islands of the Antilles, the insects being taken chiefly by Messrs. H. E. Crampton, Lutz and Mutchler, and being discussed in detail in the comprehensive report by Curran (Scientific survey of Puerto Rico and the Virgin Islands, vol. 11, part 1. Insects, Diptera or two-winged Flies, pp. 1–118, 39 figs.; 1928). This records a total of 11 species of Tipulidae. During this same general period, a few species of Tipulidae were collected by Mr. R. H. Van Zwaluwenburg and were sent by him to the United States National Museum (including *Hexatoma ocellifera*). Wolcott (Insectæ Portoricensis. Journ. Dept. Agr. Puerto Rico, vol.

7:1–313; 1923) recorded 9 species of Tipulidae from the island. In more recent years the present writer has described a number of additional species of Tipulidae, these being recorded in the present report. The total number of species of this family now known from Puerto Rico is 31, to which number many additions will surely be made as a result of future collecting. The mountainous region embraced in the Luquillo National Forest, culminating in El Yunque, will surely yield additional species, some of which will be endemic. This particular part of the island is of unusual interest, several species apparently being restricted to this region.

II. Distribution of Genera and Subgenera in the Greater Antilles

The accompanying table will show the present distribution of the genera and subgenera of crane-flies in the islands.

Genus and Subgenus	Cuba	Hispaniola	Jamaica	Puerto Rico
Tipulinae				
Nephrotoma	*	*	—	—
Tipula	*	—	*	—
Dolichopeza – Megistomastix	*	—	—	*
Brachypremna	*	*	—	*
Megistocera	*	*	—	*
Limoniinae				
Limonia–Limonia	*	—	*	*
— *Discobola*	*	—	*	—
— *Neolimnobia*	*	—	*	*
— *Dicranomyia*	*	*	*	*
— *Rhipidia*	*	*	*	*
— *Geranomyia*	*	*	*	*
Helius–Helius	*	—	*	*
Orimarga–Orimarga	*	—	—	—
— *Diotrepha*	*	—	*	—
Epiphragma–Epiphragma	*	*	—	—
Polymera–Polymera	*	—	—	*
Shannonomyia	*	—	*	*
Atarba–Atarba	*	—	—	—
Hexatoma–Eriocera	*	*	*	*
Elephantomyia–Elephantomyia	*	*	—	—
Gonomyia–Gonomyia	*	—	—	—
— *Progonomyia*	*	—	*	—
— *Ptilostena*	*	—	—	—
— *Lipophleps*	*	*	*	*
Teucholabis–Teucholabis	*	—	*	—
Trentepohlia–Paramongoma	—	—	*	*
Rhabdomastix–Sacandaga	—	*	*	—
Erioptera–Empeda	—	—	*	—
— *Mesocyphona*	*	—	—	*
Toxorhina–Toxorhina	*	*	—	*

From this list, it will be seen that of the 30 groups, Cuba has 27, Jamaica 17, Puerto Rico 16 and Hispaniola 12. The marked deficiency in the case of the last-named major island is surely a result of collecting rather than an actual condition. The non-occurrence

of such conspicuous elements as *Brachypremna* and *Megistocera* in Jamaica is noteworthy.

Of the above, the sole endemic group is the subgenus *Megistomastix,* known only from two species, one being confined to Puerto Rico, the other to western Cuba. This subgenus finds its near ally in the subgenus *Oropeza* Needham, widely distributed in eastern North America, and must surely have been derived from the north. The two species of *Nephrotoma* (*ferruginea* Fabr., var.) and *Tipula* (*ludoviciana* Alex.) in Cuba are forms that also occur in the southeastern United States, and have certainly invaded the island from the north. Of the Limoniinae in the islands, *Discobola, Sacandaga, Gonomyia* s.s. and *Ptilostena* are evidently derived from the north.

Megistocera, Brachypremna, Neolimnobia, Rhipidia, Geranomyia, Helius, Orimarga s.s., *Diotrepha, Polymera, Atarba, Progonomyia, Lipophleps, Teucholabis, Trentepohlia, Mesocyphona* and *Toxorhina,* on the other hand, all seem to be derivatives from the south, in all cases either having the greater part of their present distribution in Central or South America, or, in the case of larger groups, having the great majority of the known species, insofar as they exist in the New World, occurring in the Neotropics. The origin of some of the other groups, as *Limonia,* s.s., *Dicranomyia, Eriocera,* and possibly a few others, is uncertain, as the groups in question are virtually cosmopolitan. *Limonia* s.s., however, is evidently still another Neotropical element, insofar as it is represented in the Antilles by members of the *apicata* group (*basistylata* Alex., *hoffmani* Alex.), members of which have extended their range northward of the islands into Florida. Some of the species of *Dicranomyia* are northern forms that are isolated at higher altitudes on the mountains of Puerto Rico and Hispaniola (as *divisa* Alex.) or else are widespread coastal forms with a vast range in tropical and subtropical America (as *distans* O. S.). The Cuban *reticulata,* however, is a member of a group of characteristic Neotropical species of the subgenus. The 8 species of *Eriocera* in the Greater Antilles form a highly characteristic group that are more nearly related to species in Middle and South America than they are to the more sombre species of the North.

III. Keys to the Subfamilies, Tribes, Subtribes, Genera and Subgenera of Tipulidae Known From the Greater Antilles

1. Terminal segment of maxillary palpus elongate, whiplash-like; nasus usually distinct; antennae usually with 13 segments; wings with Sc_1 usually atrophied; vein Cu_1 constricted at *m-cu,* the latter usually at

or close to fork of $M_3 + _4$ (Figs. 1–3); body-size usually large. (TIPULINAE) ---------- 2

Terminal segment of maxillary palpus short; no distinct nasus; antennae usually with 14 or 16 segments; wings with Sc_1 present; vein Cu_1 straight, not constricted at *m-cu*, the latter placed far before the fork of $M_3 + _4$, usually at or close to fork of M (Figs. 4–5, 10–19), in *Orimarga* (Fig. 9) far before the fork of M; body-size small or medium ---------- (LIMONIINAE) ---------- 6

(TIPULINAE)

2. Legs unsually long and filiform; wings with vein $R_1 + _2$ atrophied and with Sc_2 close to origin of *Rs* (*Dolichopeza*, Fig. 3); when $R_1 + _2$ is preserved (*Brachypremna*, Fig. 2, *Megistocera*, Fig. 1), vein *Sc* is very long, Sc_1 reaching *C* as a distinct element some distance beyond the fork of *Rs* and cell *2nd A* is very narrow ---------- 3

Legs of normal stoutness for the family; wings with $R_1 + _2$ preserved and with *Sc* of moderate length, Sc_1 being atrophied before the fork of *Rs* and Sc_2 ending at or before midlength of *Rs*; cell *2nd A* of normal width ---------- 5

3. Antennae 8-segmented; wings with origin of vein M_4 usually opposite or even basad of that of $M_1 + _2$; $R_2 + _3$ angularly bent at near midlength (Fig. 1) ---------- MEGISTOCERA Wied.

Antennae with 11 or more segments; wings with origin of vein M_4 distad of that of vein $M_1 + _2$, usually far beyond; $R_2 + _3$ straight or nearly so, not angulated ---------- 4

4. Wings with vein $R_1 + _2$ pale, perpendicular to $R_2 + _3$; *Rs* elongate, strongly arcuated at origin; cells of wing glabrous (Fig. 2) BRACHYPREMNA O. S.

Wings with vein $R_1 + _2$ atrophied; *Rs* short, transverse, simulating a cross-vein; apical cells with macrotrichia (Fig. 3) ---------- DOLICHOPEZA: MEGISTOMASTIX Alex.

5. Wings with *Rs* short and oblique in position, shorter than *m-cu*; cell M_1 sessile or very short-petiolate; vein M_4 arising opposite or basad of orgin of $M_1 + _2$; body coloration highly polished, orange and yellow ---------- NEPHROTOMA Meig.

Wings with *Rs* elongate, exceeding *m-cu*; cell M_1 petiolate; vein M_4 arising distad of origin of $M_1 + _2$; body-coloration gray pruinose (in regional forms) ---------- TIPULA Linn.

(LIMONIINAE)

6. Wings with the free tip of Sc_2 often present; veins R_4 and R_5 fused to margin, only two branches of *Rs* being present; antennae usually with 14 (Limoniaria) or 16 segments. (Limoniinini) ---------- 7

Wings with the free tip of Sc_2 atrophied; veins R_4 and R_5 separate, the former usually transferred to the upper branch, $R_2 + _3$, to form a distinct element $R_2 + _3 + _4$; usually with three branches of *Rs* present (Figs. 10–12, 14, 17–18); in local fauna, exceptions in *Atarba*, *Elephantomyia* (Fig. 13), *Teucholabis* (Fig. 16), some *Gonomyia* (Fig. 15) and *Toxorhina* (Fig. 19), where R_4 is captured by $R_2 + _3$, as above; antennae usually with 16 segments ---------- 15

7. Wings (Fig. 5) with vein R_2 lacking. (Heliaria)——HELIUS St. Farg.
Wings with vein R_2 present—— 8
8. Wings with *m-cu* three or more times its own length before the fork of M (Fig. 9); antennae 16- segmented. (Orimargaria)—— 9
Wings with *m-cu* close to or beyond the fork of M, if placed before, the distance not or scarcely exceeding the length of the vein itself (Fig. 4); antennae 14-segmented. (Limoniaria)—— 10
9. Wings with three branches of M reaching margin, cell M_3 being present; *m-cu* beneath *Rs*.——ORIMARGA: ORIMARGA O. S.
Wings (Fig. 9) with two branches of M reaching margin, cell M_3 being lacking; *m-cu* far before origin of *Rs*.——ORIMARGA: DIOTREPHA O. S.
10. Supernumerary crossveins present in either cell R_3 or *1st A* of wings—— 11
No supernumerary crossveins in either of the cells mentioned—— 12
11. Wings with *Sc* short, Sc_1 ending opposite or before origin of *Rs*; a supernumerary crossvein in cell R_3——LIMONIA: NEOLIMNOBIA Alex.
Wings with *Sc* long, ending about opposite the fork of *Rs*; a supernumerary crossvein in cell *1st A*, connecting the Anal veins near their outer ends——LIMONIA: DISCOBOLA O. S.
12. Mouthparts, and especially the labial palpi, lengthened, the rostrum thus formed much longer than the remainder of head and usually about as long as the combined head and thorax——LIMONIA: GERANOMYIA Hal.
Mouthparts, with the labial palpi, not notably lengthened, shorter than remainder of head—— 13
13. Antennae of male strongly subpectinate, of female less markedly so——
——LIMONIA RHIPIDIA Meig
Antennae simple in both sexes—— 14
14. Wings with *Sc* short, Sc_1 ending opposite or before origin of *Rs*.
——LIMONIA: DICRANOMYIA Steph.
Wings (Fig. 4) with *Sc* long, Sc_1 ending beyond midlength of *Rs*.——
——LIMONIA: LIMONIA Meig.
15. Tibial spurs present. (Hexatomini)—— 16
Tibial spurs lacking. (Eriopterini)—— 22
16. Antennae with not more than 12 segments (Hexatomaria)——
——HEXATOMA: ERIOCERA Macq.
Antennae with more than 14 segments—— 17
17. Wings (Fig. 13) with only two branches of *Rs* present; vein R_2 lacking— 18
Wings (Figs. 10–11, 14) with three branches of *Rs* present; vein R_2 preserved—— 19
18. Rostrum elongate, exceeding one-half the length of remainder of body; wing (Fig. 13). (Elephantomyaria)——ELEPHANTOMYIA O. S.
Rostrum short and inconspicuous, not exceeding the remainder of head. (Atarbaria)——ATARBA O. S.
19. Apical cells of wing with macrotrichia. (Limnophilaria)——
——SHANNONOMYIA Alex., part.
Cells of wing glabrous—— 20
20. A supernumerary crossvein in cell *C* of the handsomely patterned wings (Fig. 14). (Epiphragmaria)——EPIPHRAGMA O. S.

No supernumerary crossvein in cell *C*; wings plain or only sparsely spotted ---------- 21

21. Wings (Fig. 10) with cell *1st* M_2 open by atrophy of *m*; cell M_1 present; male with elongate nodulose antennae. (Polymeraria) ----------
---------- POLYMERA: POLYMERA Wied.

Wings (Fig. 11) with cell *1st* M_2 closed, in cases where open, cell M_1 lacking; antennae of both sexes short, not nodulose. (Limnophilaria)
---------- SHANNONOMYA Alex., part.

22. Rostrum very long and slender, approximately one-half the entire body or longer; setae of legs profoundly bifid; wings (Fig. 19) with a single branch of *Rs* reaching margin. (Toxorhinaria) ----------
---------- TOXORHINA: TOXORHINA Lw.

Rostrum short, not exceeding the remainder of head; setae of legs simple; wings with two or three branches of *Rs* reaching margin (Figs. 15–18) ---- 23

23. Two branches of *Rs* reach the wing-margin (Figs. 15–16). (Gonomyaria) 24

Three branches of *Rs* reach the wing-margin (Figs. 17–18) ---------- 25

24. Wings (Fig. 16) with R_2 present, close to fork of *Rs*; *Sc* usually long, Sc_1 ending beyond origin of *Rs*. ---------- TEUCHOLABIS: TEUCHOLABIS O. S.

Wings (Fig. 15) with R_2 lacking; *Sc* short, Sc_1 ending opposite or before origin of *Rs*. ---------- GONOMYIA: LIPOPHLEPS Bergr.

25. Wings (Fig. 17) with vein R_5 fused with M_{1+2} to form the entire cephalic face of cell *1st* M_2, *r-m* thus obliterated; only two branches of *M* reach the margin; vein *2nd A* very short. (Trentepohliaria) ----------
---------- TRENTEPOHLIA: PARAMONGOMA Brun.

Wings (Fig. 18) with vein R_6 entirely distinct from M_{1+2}, being separated by the *r-m* crossvein; three branches of *M* reach the margin; vein *2nd A* of normal length ---------- 26

26. Wings with cell R_3 short, vein R_3 being shorter than the petiole of cell R_3 ---- 27

Wings (Fig. 18) with cell R_3 deep, vein R_3 longer than the petiole of cell R_3, shortest in *Progonomyia* ---------- 30

27. Wings with vein R_2 lacking ---------- 28

Wings with vein R_2 present. (Eriopteraria) ---------- ERIOPTERA: EMPEDA O. S.

28. Wings with *Sc* long, Sc_1 extending to about opposite or beyond midlength of *Rs*; *m-cu* at or beyond the fork of *M*; trochanters elongate. (Eriopteraria) ---------- RHABDOMASTIX: SACANDAGA Alex.

Wings with *Sc* short, not extending to beyond midlength of *Rs*; if *Sc* is relatively long (*Ptilostena*), *m-cu* lies more than its own length before the fork of *M*; trochanters short. (Gonomyaria) ---------- 29

29. Wings with *m-cu* more than its own length before fork of *M*. ----------
---------- GONOMYIA: PTILOSTENA Bergr.

Wings with *m-cu* at or very close to fork of *M*. ---- GONOMYIA: GONOMYIA Meig.

30. Wings with veins R_3 and R_4 divergent, unequal in length, R_3 being about one-half of R_4; cell R_3 at margin some three or four times as wide as cell R_2. (Gonomyaria) ---------- GONOMYIA: PROGONOMYIA Alex.

Wings (Fig. 18) with veins R_3 and R_4 nearly equal in length, or with R_3 exceeding three-fourths the length of R_4, the veins extending generally parallel to one another to the wing-margin; cell R_2 at margin wider than cell R_3. (Eriopteraria) ---------- ERIOPTERA: MESOCYPHONA O. S.

IV. A Record of the Tipulidae Known From Puerto Rico, With Keys and Brief Diagnoses of the Species

Subfamily Tipulinae

Megistocera longipennis (Macq.) (Fig. 1)

1838. *Tipula longipennis* Macq.; Dipt. exot., 1, pt. 1: 57, pl. 5, fig. 1.
1885. *Tipula tenuis* van der Wulp; Notes Leyden Mus., 7: 7; Tijdsch. voor Ent., 23: 85, pl. 4, fig. 7.

Frontal prolongation of head brown, the nasus distinct; palpi black. Antennae 8-segmented, short in both sexes; scape and pedicel yellow, flagellum black; first flagellar segment shorter than the second, the remainder gradually decreasing in length outwardly. Head brownish gray, the anterior vertex and front more yellowish; eyes very large, on dorsum separated by the narrow anterior vertex that is only about one-third wider than the diameter of the scape; on ventral surface of head the eyes are broadly holoptic.

Mesonotal praescutum chiefly covered by four confluent light brown stripes, the lateral pair somewhat darker brown; lateral margins of praescutum broadly buffy. Pleura buffy-yellow, vaguely marked on anepisternum and coxae by grayish brown areas. Legs long and filiform, brown, the tarsi deepening to brownish black. Wings (Fig. 1) whitish subhyaline, highly iridescent; stigma dark brown. Venation: Vein M_4 usually arising opposite or basad of origin of M_{1+2}; R_{2+3} angularly bent at proximal end of stigma. Abdomen dark brown, the tergites variegated sublaterally with obscure yellow areas.

Male.—Length about 11–13 mm.; wing 15–17 mm.

Female.—Length about 14–17 mm.; wing 16–19 mm.

One of the two largest Tipulidae in the Greater Antilles, the other being *Brachypremna unicolor* O. S. The venation readily suffices to distinguish the present fly from all others. The head and thorax of the single American species are nearly glabrous whereas in the males of the two Old World forms, the body is provided with a dense pale vestiture. Furthermore, the antennae of both Old World species are enormously lengthened, whereas the organ is short in both sexes of the present fly.

Ranges from northern Florida, southward through the Antilles and on the mainland into Brazil and Paraguay.

Puerto Rico: Recorded by von Röder (Stett. Ent. Zeitg., 1885: 338, as *Tipula*).

Brachypremna unicolor O. S. (Fig. 2)

1887. *Brachypremna unicolor* O. S.; Berlin. Ent. Zeitschr., 31: 239–240.
1912. *Brachypremna unicolor* Alex.; Journ. N. Y. Ent. Soc., 20: 235–236, pl. 16, fig. c (wing).

Mesonotal praescutum light brown, with narrow, more or less interrupted

blackish stripes, the usual three stripes being represented only by marginal darkenings; each lateral stripe double, the median vitta triple by a dark capillary median line. Pleura pale. Legs with the femora yellow, the tips narrowly dark brown; remainder of legs brown, the tarsi brownish black. Wings (Fig. 2) unusually long and narrow, subhyaline, the small stigma dark brown; apex of wing and vague seams along certain of the longitudinal veins brown. Venation: The species differs from all other members of the genus in having both veins $R_2 + _3$ and $R_4 + _5$ arise directly from the end of *Rs*, obliterating the basal section of the latter; cell *1st* M_2 unusually short, roughly triangular in outline; *m-cu* in alignment with the basal section of $M_1 + _2$.

Abdominal tergites dark brown, the bases and lateral portions of the individual segments somewhat paler; sternites pale, with an almost continuous median line of black dashes.

Male.—Length about 12—17 mm.; wing 16—22.5 mm.

Female.—Length about 16—19 mm.; wing 18—21 mm.

This conspicuous crane-fly is widespread throughout the Greater Antilles, elsewhere being recorded only from the island of Grenada, Lesser Antilles.

Puerto Rico: Described from the island, based on three male specimens taken by Moritz. I have no other records from Puerto Rico, although the species is commonly taken in Cuba and Hispaniola.

It might be expected that *Brachypremna dispellens* (Walk.), the commonest and most widely distributed member of the genus, would occur in the Greater Antilles, since it ranges from the Carolinian zone of the eastern United States, southward on the continent to Argentina, occurring on the island of Trinidad but nowhere else in the West Indian islands.

The present fly may be readily told from all other North American members of the genus by the long, very narrow wings that have the peculiar venation above described, and by the unvariegated legs.

Dolichopeza (Megistomastix) portoricensis (Alex.) (Fig. 3)

1912. *Megistomastix portoricensis* Alex.; Psyche, 19: 63–66, pl. 5.
1931. *Dolichopeza (Megistomastix)*; Alexander, Philippine Journ. Sci., 46: 270.

Antennae (♂) very long, almost twice the length of the entire body. General coloration of body light brown, the thoracic pleura paler. Legs brown. Wings (Fig. 3) light grayish brown, with a darker stigmal area; conspicuous macrotrichia in cells of wing beyond level of cord (indicated in figure by dots).

Male.—Length about 5 mm.; wing 7.5 mm.; antenna about 9.5 mm.

The present fly is the smallest Tipuline species in the island. It is readily told by the apically hairy wings, with a peculiar venation, and by the greatly elongated antennae of the male sex.

Endemic in Puerto Rico. Known only from the mountainous country of the Luquillo National Forest. Type, a ♂, El Yunque, altitude 2800 ft., February 20, 1900 (C. W. Richmond). Type-locality, a ♂ November 18, 1925 (Am. Mus. Nat. Hist., No. F 5113 A).

(Besides the three Tipuline genera above recorded from Puerto Rico, two other genera, *Nephrotoma* and *Tipula,* have been taken elsewhere in the Greater Antilles.)

Subfamily Limoniinae

Tribe Limoniini

Subtribe Limoniaria

The only included genus in this subtribe is *Limonia* Meigen, which is now held to include approximately a score of subgeneric groups that until comparatively recently were considered to be valid genera (as, for example, *Limonia, Discobola, Dicranomyia, Rhipidia* and *Geranomyia,* in the local fauna). For a detailed discussion of the reasons for relegating these groups to a minor status, a paper by the present writer may be consulted (Alexander, Philippine Journ. Sci., 40: 239–248; 1929).

Subgenus **Limonia** Meig.

Limonia (Limonia) hoffmani Alex. (Figs. 4, 6)

1927. *Limonia hoffmani* Alex.; Journ. N. Y. Ent. Soc., 35: 265–266.

General coloration obscure brownish yellow, the praescutum with three dark brown stripes. Antennae black; flagellar segments oval, with short apical pedicels. Legs dark brown, the tips of the femora narrowly obscure yellow. Wings (Fig. 4) with a faint dusky tinge, the oval stigma darker brown. Male hypopygium (Fig. 6) with the single dististyle elongate, attached near midlength, its outer lobe obtuse, setiferous, the inner lobe a long slender point, gradually narrowed to the acute tip.

Male.—Length about 4.5—6 mm.; wing 4.5—5.5 mm.

Female.—Length about 5—6 mm.; wing 5—5.5 mm.

Endemic in Puerto Rico. Type, a ♂, Luquillo National Forest, May 10–13, 1927 (W. A. Hoffman). 1 ♂, El Yunque, 1800 feet, February 11, 1930 (M. D. Leonard). 1 ♂, Las Cruces, 1300 feet, March 28, 1930 (M. D. Leonard). 1 ♀, Yauco–Lares, in mountains, resting on coffee leaves (Seín and Wolcott).

The closest ally is another Antillean species, *L.* (*L.*) *basistylata* Alex., of Jamaica.

(The subgenus *Discobola* is not found in Puerto Rico. A new species, *Limonia* (*Discobola*) *gowdeyi*, from Cuba and Jamaica, is described later in the present report).

Subgenus **Neolimnobia** Alex.

Limonia (Neolimnobia) diva (Schin.)

1868. *Limnobia diva* Schin.; Novara Reise, Dipt., p. 46.

1928. *Dicranomyia* (*Neolimnobia*) *diva* Alex.; Dept. Sci. and Agr. Jamaica, Ent. Bull. 4. Catalogus Insectorum Jamaicensis, pt. 3: 20–21.

1929. *Limonia* (*Neolimnobia*) *diva* Alex.; Philippine Journ. Sci., 40: 239–244.

Rostrum and palpi black. Antennae chiefly dark brown; incisures of the flagellar segments restrictedly pale. Head velvety-black in front, paler on the posterior genae.

Mesonotal praescutum with the ground-color blackish, the three usual stripes more brownish yellow, the median one becoming blackish on its posterior half; scutellum and median region of scutum yellow pollinose; scutal lobes extensively brownish black on mesal portion; cephalic portion of postnotal mediotergite broadly blackened medially. Pleura chiefly yellow pollinose. Halteres yellow. Femora yellow, handsomely banded with brownish black; fore and middle femora with two brown rings, posterior femora with three such rings; remainder of legs obscure orange. Wings pale yellow, more saturated yellow on prearcular and costal regions, with an abundant reticulate or muscoid pale brown pattern, appearing as transversely parallel zigzag lines in most of the cells, more approximated and subconfluent to form broken bands before the level of origin of *Rs* and along the cord; veins yellow. Venation: A supernumerary crossvein in cell R_3.

Male.—Length about 6—8 mm.; wing 8—10 mm.

Widely distributed throughout the Greater Antilles, in the mountains. Elsewhere widespread in northern South America, in Central America and Mexico.

Puerto Rico: El Yunque, Luquillo National Forest, altitude 1800 feet, February 11, 1930 (M. D. Leonard).

The peculiar banding of the femora and the reticulate wings with a supernumerary crossvein in cell R_3, serve to define the present species. The fly bears a curious superficial resemblance to some species of the Hexatomine genus *Epiphragma*. The relationships existing between *diva* and some other allied Neotropical members of the subgenus have been discussed in the Alexander 1928 paper, above cited.

Subgenus **Dicranomyia** Steph.

Of this abundant and widespread group, only three species have been taken in Puerto Rico. Elsewhere in the Antilles a few additional species are found, but the subgenus is by no means as extensive and characteristic as is *Geranomyia*.

A KEY TO THE PUERTO RICAN SPECIES

1. Wings with cell M_2 open by the atrophy of *m*; *Rs* very short, less than *m-cu*; *Sc* short, Sc_1 ending before the origin of *Rs* a distance about equal to the entire length of the latter ..... *brevivena torrida* subsp. n.

   Wings with cell *1st* M_2 closed; *Rs* distinctly longer than *m-cu*; *Sc* longer, Sc_1 ending opposite or only a little before the origin of *Rs*. 2

2. General coloration of thorax brown, with a sparse pollinosity; praescutum with three darker stripes ..... *distans* O. S.

   General coloration of thorax yellow, the praescutum without distinct stripes ..... *divisa* Alex.

Limonia (Dicranomyia) brevivena torrida subsp. n.

Close to typical *brevivena* O. S. in venation and hypopygial characters, differing chiefly in the details of body-coloration.

Antennae with the scape light yellow. Head with the rostrum, from and anterior vertex yellow, the posterior vertex brownish gray.

Mesonotum yellow to brownish yellow, the praescutum with three clearly defined dark brown stripes, the median one not reaching the suture behind, the lateral stripes crossing the suture and extending to the abdomen, gradually converging behind to leave the central portions of the scutum, scutellum and postnotal mediotergite narrowly pale. Pleura pale yellow, the ventral sternopleurite restrictedly darkened.

Habitat.—Puerto Rico.

Holotype, alcoholic ♂, Puerto Real, Vieques Is., at light, September 25–27, 1931 (M. D. Leonard). Allotopotype, alcoholic ♀. Paratopotypes, a few alcoholic ♂ ♀.

The thoracic pattern is quite different from that of more northern specimens that seem to be typical of *brevivena*, s.s.

Limonia (Dicranomyia) distans (O. S.) (Fig. 7)

1859. *Dicranomyia distans* O. S.; Proc. Acad. Nat. Sci. Philadelphia, 1859: 211.

1869. *Dicranomyia distans* O. S.; Mon. Dipt. N. Amer., 4: 67–68.

General coloration brown, with a sparse golden-yellow pollen. Mesonotal praescutum with three darker stripes. Flagellar segments nearly globular. Halteres short. Wings with a faint brown tinge, the stigma scarcely indicated; veins brown. Venation: Sc_1 ending about opposite the origin of *Rs*, Sc_2 some

distance from its tip so that Sc_1 alone is nearly equal in length to *m-cu*; cell *1st* M_2 closed.

Male hypopygium (Fig. 7) readily distinguished from all similar forms by the presence of 3, or more rarely 4, straight spines on the rostral prolongation of the ventral dististyle.

Male.—Length about 4.5 mm; wing 4.5—5.5 mm.

Female.—Length about 5.5—6 mm.; wing 5.5—6 mm.

A common species in the southern United States, occurring much farther south on the mainland, reaching its southern limit in Paraguay; Puerto Rico.

Puerto Rico: Puerto Real, Vieques Is., at light, September 25–27, 1931 (M. D. Leonard). Río Piedras, February 1932 (M. D. Leonard).

Limonia (Dicranomyia) divisa Alex. (Fig. 8)

1859. *Dicranomyia diversa* O. S.; Proc. Acad. Nat. Sci. Philadelphia, 1859: 212, name preoccupied.

1929. *Limonia* (*Dicranomyia*) *divisa* Alex.; Philippine Journ. Sci., 40: 247.

General coloration of body yellow. Head darkened. Antennae pale brown, the basal segments paler. Halteres with the knobs darkened. Wings with a faint brownish tinge, the oval stigma slightly darker. Venation: Sc_1 ending shortly before the origin of *Rs*, Sc_2 some distance from its tip, Sc_1 alone subequal to or longer than *m-cu*; cell *1st* M_2 closed. Male hypopygium (Fig. 8) distinctive in structure, the rostral prolongation of the ventral dististyle being deeply and conspicuously bifid at apex, while the basistyle has the ventro-mesal lobe very large and complicated by lobules and groups of rows of setae of various shapes and sizes.

Male.—Length about 3.5—4 mm.; wing 4—4.5 mm.

Eastern North America, recurring in the mountains of Hispaniola and Puerto Rico.

Puerto Rico: El Yunque, 1800 feet, February 11, 1930 (M. D. Leonard). The same, altitude 2000-3500 feet, March 29, 1930 (M. D. Leonard).

Subgenus **Rhipidia** Meig.

Besides the common and widespread *domestica*, discussed below, two other species of *Rhipidia* occur in the Greater Antilles and may be found in Puerto Rico. *L.* (*R.*) *schwarzi* (Alex.) is widely distributed in the southeastern United States and West Indian islands. It is readily told from *domestica* by the numerous brown dots in all cells of wing and by the broad pale yellow border to the mesonotal praescutum. Both of these flies belong to the so-called *domestica*

group, having the antennae of the male merely subpectinate. A second regional species, *L.* (*R.*) *subcostalis* (Alex.) is known from Jamaica and Central America. This fly belongs to a very different group of *Rhipidia* and may readily be distinguished by the conspicuous pale yellow posterior tarsi. For a more detailed account, consult a paper by the writer (The Crane-flies of Jamaica. Dept. Sci. and Agr. Jamaica, Ent. Bull. 4:19–29; 1928).

Limonia (Rhipidia) domestica (O. S.)

1859. *Rhipidia domestica* O. S.; Proc. Acad. Nat. Sci. Philadelphia, 1859; 208.

1869. *Rhipidia domestica* O. S.; Mon. Dipt. N. Amer., 4, pl. 3, fig. 5 (male hypopygium).

1912. *Rhipidia domestica* Alex.; Bull. Brooklyn Ent. Soc., 8:15–16, pl. 1, fig. g (wing).

1919. *Rhipidia domestica* Alex.; Crane-flies of New York, part 1, pl. 32, fig. 40 (wing).

Antennae subpectinate, appearing moniliform; segments black, with the penultimate and antepenultimate (12th and 13th) segments abruptly pale yellow. Head dark gray.

Mesonotal praescutum with the stripes dark brown, the interspaces with a golden-yellow pollen. Legs obscure yellow, the tips of the femora and tibiae weakly darkened. Wings subhyaline, the centers of most of the cells streaked longitudinally with pale gray; a series of about five darker spots along the costal border of wing; stigmal area ring-like, with a pale center. Venation: Sc_1 ending just before midlength of *Rs*; *m-cu* some distance before the fork of *M*, in cases the distance exceeding *m-cu* itself.

Male.—Length about 4.5—6 mm.; wing 5.5.—7 mm.
Female.—Length about 6—6.5 mm.; wing 6—7 mm.

Widely distributed throughout the southern United States, from the Carolinian zone southward throughout the Antilles and on the continent to Argentina.

Puerto Rico: Manatí, June 27–29, 1915 (A.M.N.H.). Santurce, April 4, 1930 (M. D. Leonard). Río Piedras, March 12, 1930 (M. D. Leonard). Coamo Springs Hotel, at light, April 4, 1930 (M. D. Leonard). Puerto Real, Vieques Is., at light, September 25–27, 1931 (M. D. Leonard).

The fly is readily told by the coloration of the antennae, the two subterminal segments being pale yellow, contrasting abruptly with the blackened remainder of the organ. *L.* (*R.*) *schwarzi* has a somewhat similar antennal pattern, but is readily distinguished by the coloration of the wings and thorax, as described above.

Subgenus **Geranomyia** Hal.

Rather numerous species of *Geranomyia* occur in Puerto Rico. In addition to these forms, which are keyed and discussed below, a few other species are known from the other Antillean islands and may be found in Puerto Rico. Elsewere in the Neotropics, the subgenus is represented by a host of species.

The larvae of the known species are chiefly members of the hygropetric associations found on the wet faces of cliffs, at margins of streams and in similar places. The adults suck the nectar of various flowers by means of their long conspicuous beaks. The only other crane-flies in the fauna with elongate rostra are *Elephantomyia* and *Toxorhina,* in which the entire frontal region of the head is drawn out into a filiform structure, with the reduced mouthparts at the extreme tip. In *Geranomyia,* however, several structures take part in the formation of the rostrum, the longest and most conspicuous elements being the paired labial palpi.

A KEY TO THE PUERTO RICAN SPECIES

1. Wings unmarked, except for the stigmal spot when this is present 2
   Wings with a restricted dark pattern, in addition to the stigmal area 6
2. Sc_1 ending opposite the origin of *Rs* 3
   Sc_1 ending distinctly beyond the origin of *Rs*, about opposite one-fifth to one-third the length of the vein 5
3. Fore tibiae with the tips blackened and slightly enlarged 4
   Fore tibiae not blackened or enlarged at tips ..... *rufescens* (Lw.)
4. Male hypopygium with the spines of the rostral prolongation of the ventral dististyle exceeding twice the length of the prolongation alone; gonapophyses with the mesal-apical lobe distinctly bidentate at apex ..... *tibialis* (Lw.)
   Male hypopygium with the spines of the rostral prolongation of the ventral dististyle shorter, a little longer than the prolongation itself; gonapophyses with merely a lateral flange on the mesal-apical lobe ..... *myersiana* Alex.
5. General coloration gray, the praescutum with a median blackish stripe; rostrum short, approximately one-third the length of the body ..... *cinereinota* (Alex.)
   General coloration in life pale green, paling to yellow or greenish yellow in dead specimens; rostrum elongate, exceeding one-half the length of the body ..... *virescens* (Lw.)
6. Wings with a very restricted dark pattern; apex of wings beyond level of stigma and tips of the Anal veins without dark markings; fore tibiae not darkened at tips ..... *subrecisa* sp. n.
   Wings with the dark pattern more extensive, including clouds in the apical cells and at ends of both Anal veins; fore tibiae conspicuously blackened and enlarged at tips ..... *antillarum* Alex.

Limonia (Geranomyia) antillarum Alex.

1929. *Limonia (Geranomyia) antillarum* Alex.; Journ. N. Y. Ent. Soc., 37: 395–396.

Mesonotal praescutum with four brownish gray to gray stripes, the lateral pair usually clearer gray than the intermediates, the interspaces brown to black. Pleura buffy-gray, variegated with dark brown. Legs with the femora yellow, with a broad brown subterminal ring; tips of tibiae darkened, especially the fore tibiae which are slightly swollen and blackened. Wings with a restricted dark brown pattern; area over origin of *Rs* narrow, oblique, its proximal end lying over end of vein *Sc*; stigmal area shallow, its posterior edge not or but slightly passing caudad of vein R_2+_3. Abdomen brown, the caudal margins of the segments narrowly pale.

Male.—Length, excluding rostrum, about 7—7.5 mm.; wing 7.5—8 mm.; rostrum about 3 mm.

Female.—Length, excluding rostrum, about 8—9 mm.; wing 7.3—8 mm.; rostrum about 3.2—4 mm.

Known from all four major islands of the Greater Antilles.

Puerto Rico: Coamo Springs Hotel, at light, April 4, 1930 (M. D. Leonard); the same, April 10, 1930 (W. T. M. Forbes).

This species is allied to and has been confused with the more northern *L.* (*G.*) *rostrata* (Say). From this latter species, it differs especially in its larger size, subterminal darkened rings on femora, narrower wings, with a slightly different pattern, and in the details of the male hypopygium.

Limonia (Geranomyia) cinereinota (Alex.)

1913. *Geranomyia cinereinota* Alex.; Ent. News, 24: 407–408, pl. 14, fig. 4 (wing).

1916. *Geranomyia domingensis* Alex.; Proc. Acad. Nat. Sci. Philadelphia, 1916: 490–491.

Rostrum short, as shown by the measurement. Head black, enclosing a silvery triangle. Mesonotal praescutum gray, with a broad blackish median line. Legs with the femora obscure yellow; tibiae and tarsi passing to brown. Wings nearly hyaline, the stigma small and relatively indistinct. Venation: Sc_1 ending about opposite one-fourth the length of *Rs*. Male hypopygium with the lateral lobes of the ninth tergite conspicuously setiferous. Rostral prolongation of the ventral dististyle elongate, the two rostral spines placed at and before midlength, separated from one another by a distance about equal to the basal tubercle of one; spines unequal, the outer about one-third to one-half longer than the inner spine.

Male.—Length, excluding rostrum, about 5—5.5 mm.; wing 6.5—7 mm.; rostrum about 1.8 mm.

Female.—Length, excluding rostrum, about 5.5—6 mm.; wing 5.5—7 mm.; rostrum about 1.6 mm.

Northern South America, northward in the Antilles to Puerto Rico and Hispaniola.

Puerto Rico: Mameyes, November 19, 1925 (A.M.N.H. No. F 5114 A). Río Piedras, March 12, 1930 (M. D. Leonard). Luquillo National Forest, May 10–13, 1927 (W. A. Hoffman). El Yunque, Luquillo, altitude 1800 feet, February 11, 1930 (M. D. Leonard).

Limonia (Geranomyia) myersiana Alex.

1929. *Limonia* (*Geranomyia*) *myersiana* Alex.; Journ. N. Y. Ent. Soc., 37: 397–398.

General coloration pale brown. Mesonotal praescutum with three narrow pale brown stripes. Tips of fore tibiae conspicuously blackened. Wings faintly tinged, unmarked except for the oval, pale brown stigma. Venation: *Sc* short, Sc_1 ending opposite or shortly before origin of *Rs*. Male hypopygium with the mesal-apical lobe of the gonapophyses slender, gently curved, the outer edge bearing a small flange. Dorsal dististyle considerably longer than in *tibialis*.

Male.—Length, excluding rostrum, about 4—4.5 mm.; wing 5.3—6 mm.; rostrum about 2.3—2.7 mm.

Known only from Cuba and Puerto Rico.

Puerto Rico: El Yunque, Luquillo National Forest, altitude 1800 feet, February 11, 1930 (M. D. Leonard).

Allied to *L.* (*G.*) *tibialis* (Lw.), yet well-distinguished by the structure of the male hypopygium.

Limonia (Geranomyia) rufescens (Lw.)

1851. *Aporosa rufescens* Lw.; Linn. Ent., 5: 396–397, figs. 9–12.

General coloration of body reddish yellow, more intense on the thoracic dorsum. Mesonotal praescutum with three brownish black longitudinal stripes, the median one broader. Knobs of halteres infuscated. Tips of femora and tibiae slightly darkened, but the fore tibiae not enlarged or blackened at tips. Wings with a grayish brown suffusion; stigma large, brown.

Female.—Length, excluding rostrum, about 5 mm.

Known only from Puerto Rico: Loew's original type, collected by Moritz.

There is great uncertainty as to the identity of this species. Lowe's description and figures indicate that the fore tibiae are not blackened at tips, otherwise the fly is almost exactly like what we have identified as *L.* (*G.*) *tibialis* (Lw.). The only fly that answers the description given by Loew that has been discovered in the Antilles is *tibialis* and it is possible that the two species are identical. However, since Loew distinctly figures *rufescens* as having the fore legs present in his type, it seems advisable for the present to retain *rufescens* as being distinct from *tibialis*.

Limonia (Geranomyia) subrecisa sp. n.

Allied to *recisa;* general coloration of mesonotum light brown, with a pale yellow central stripe that is further split on praescutum by a median brown vitta; femora with a narrow pale brown subterminal ring; wings with a very restricted dark pattern; Sc_1 ending opposite origin of *Rs;* a supernumerary crossvein in cell *Sc;* male hypopygium with the rostral spines arising from small to scarcely evident tubercles; gonapophyses with the mesal apical lobes wider than in *recisa.*

Male.—Length, excluding rostrum, about 5 mm.; wing 5.3 mm.; rostrum about 1.8 mm.

Female.—Length, excluding rostrum, about 6 mm.; wing 5.5 mm.; rostrum about 2 mm.

Described from alcoholic specimens.

Rostrum relatively short, dark brown, the extreme tips of the labial palpi pale. Antennae brown throughout; flagellar segments oval. Head dark gray, with a narrow silvery line.

Pronotum brown. Mesonotum light brown, traversed by a pale yellow central vitta extending the entire length of the notum, wider on the praescutum and here enclosing a darker brown median vitta; on posterior sclerites the pale central vitta is narrowly margined with darker. Pleura chiefly testaceous brown. Halteres pale, the knobs infuscated. Legs with the coxae and trochanters yellow; femora yellow, the tips somewhat clearer yellow, preceded by a narrow pale brown ring; tibiae and tarsi brownish yellow. Wings grayish subhyaline, with a very restricted brown pattern, the most evident areas being three in number, including the stigma and small clouds at the supernumerary crossvein in cell *Sc* and over the origin of *Rs* and tip of *Sc*; cord very vaguely seamed with brown; veins brown. Venation: Sc_1 ending opposite origin of *Rs*, Sc_2 at its tip; a supernumerary crossvein just beyond midlength of cell *Sc*; *m-cu* close to fork of *M*; cell *2nd A* narrow.

Abdomen brownish yellow, variegated by darker brown, the latter chiefly on the lateral and caudal portions. Male hypopygium with the caudal margin of tergite strongly emarginate, the lobes with strong setae. Basistyle relatively small, the ventro-mesal lobe large. Dorsal dististyle a gently curved rod, its apex suddenly narrowed to a point. Ventral dististyle large and fleshy; rostral prolongation slender, the two slender rostral spines placed close together near base of prolongation which they exceed in length; spines arising from very small, scarcely evident tubercles. Gonapophyses with the mesal apical lobe wider than in *recisa.*

Habitat.—Puerto Rico.

Holotype, alcoholic ♂, Puerto Real, Vieques Is., at light, September 25–27, 1931 (M. D. Leonard). Allotopotype, alcoholic ♀.

Limonia (Geranomyia) subrecisa is most nearly allied to *L. (G.) recisa* Alex. (Mexico–El Salvador) in the short *Sc*, in conjunction with the wing-pattern and general structure of the male hypopygium.

It differs most decisively in the narrow cell *2nd A* of the wings and in genitalic structures, as the reduced basal tubercles of the rostral spines of the ventral dististyle and in the broader apical lobes of the gonapophyses.

Limonia (Geranomyia) tibialis (Lw.)

1851. *Aporosa tibialis* Lw.; Linn. Ent., 5: 397–398.

Rostrum long, black. General coloration of mesonotum light brownish yellow, the praescutum with three narrow but distinct dark brown stripes, the median stripe longest, narrowed behind. Legs chiefly obscure yellow, the tips of the femora weakly infumed; tips of tibiae narrowly darkened, of the fore tibiae slightly swollen and intensely blackened. Wings with a sandy suffusion, the stigma a little darker. Venation: Sc_1 ending opposite origin of *Rs*, Sc_2 at its tip. Male hypopygium with the rostral spines of the ventral dististyle long and straight, divergent, each arising from a small basal tubercle. Gonapophyses bifid at apices.

Male.—Length, excluding rostrum, about 4.5—5 mm.; wing 5—5.5 mm.; rostrum about 2.8—3 mm.

Female.—Length, excluding rostrum, about 5.5—6 mm.; wing 5.5—6 mm.; rostrum about 3—3.5 mm.

Originally described from Brazil, now known to have a vast range in the Neotropics.

Puerto Rico: Puerto Real, Vieques Is., at light, September 25–27, 1931 (M. D. Leonard).

Limonia (Geranomyia) virescens (Lw.)

1851. *Aporosa virescens* Lw.; Linn. Ent., 5: 398.

General coloration of entire insect pale green, fading in death to yellow, but usually with persistent green tints on some parts of body. Antennae black; flagellar segments subglobular. Mesonotum without markings. Wings nearly hyaline, the stigma pale brown. Venation: Sc_1 ending some distance beyond origin of *Rs*.

Male.—Length, excluding rostrum, about 4 mm.; wing about 5 mm.; rostrum about 2.8 mm.

Described from the island of St. Thomas, Virgin Island, collected by Moritz. The reference of the Puerto Rican specimens to *virescens* is rendered somewhat doubtful because of inability to study the detail of structure of the male hypopygium of the type. A small number of allied species of small green *Geranomyia* are now known from Middle America.

Puerto Rico: Las Cruces, altitude 1300 feet, March 28, 1930 (M. D. Leonard).

Subtribe Heliaria

The only included genus in this subtribe is *Helius* St. Farg., rich in species and occurring in all regions of the World. In the Greater Antilles, two species occur, with one in Puerto Rico.

Helius (Helius) albitarsis (O. S.) (Fig. 5)

1887. *Rhamphidia albitarsis* O. S.; Berlin. Ent. Zeitschr., 31: 184.

General coloration rather dark brown, the pleura paler, more yellowish. Rostrum about one-third longer than the remainder of head, brownish. Antennnae black throughout; verticils considerably longer than the segments. Legs dark brown, the distal half of tarsi white or whitish. Wing (Fig. 5) with a strong blackish tinge, the elongate stigma even darker brown. Venation: Sc_1 ending before termination of *Rs*, Sc_2 *at* its tip; *r-m* very short or obliterated by the fusion of veins $R_4 + _5$ and $M_1 + _2$; cell *1st* M_2 large, roughly pentagonal or hexagonal in outline, the longest elements being the two sections of $M_1 + _2$; *m-cu* at near midlength of the cell. Abdomen, including the hypopygium, black.

Male.—Length about 6—7 mm.; wing 6.5—7.5 mm.

Female.—Length about 6.5—8 mm.; wing 6.5—8.5 mm.

The species is widely distributed in Central and northern South America.

Puerto Rico: The type, a ♂, was taken in Puerto Rico by Moritz. Luquillo National Forest, May 10–13, 1927 (W. A. Hoffman).

Helius albitarsis is readily told by the dark coloration of the body and wings, in conjunction with the white feet. In the present fauna, the only other crane-fly having this general size and appearance is *Trentepohlia* (*Paramongoma*) *niveitarsis* (Alex.), a very different fly. The Jamaican *Helius creper* Alex. is well-distinguished from *albitarsis* by the venation, notably the small cell *1st* M_2 and consequent full development of the *r-m* crossvein.

(No representatives of the genus *Orimarga O. S.*, sole American genus in the subtribe Orimargaria, have yet been taken in Puerto Rico. Both the typical subgenus and *Diotrepha* O. S. are found in Cuba and it seems highly probable that *Orimarga* (*Diotrepha*) *mirabilis* (O.S.) will be found to occur in Puerto Rico. It is readily told by the very remarkable venation (Fig. 9), notably the basal position of *m-cu*. The fly is an elongate insect, grayish, with long white legs, the femora with broadly blackened tips, the tibiae more narrowly so. A new Cuban member of the typical subgenus is described later in the present report.)

Tribe Hexatomini

The Hexatomine crane-flies are not strongly represented in the Greater Antilles. In Puerto Rico, three genera occur. Elsewhere

in the islands, a few additional groups are found (*Epiphragma, Atarba, Elephantomyia*). *Epiphragma* includes medium-sized to rather large crane-flies with the wings handsomely banded and variegated with brown and with the femora variously ringed with yellow and dark brown or black (Fig. 14). *Elephantomyia* is readily told by the greatly produced front, the only other local crane-fly with such a type of rostrum being the Eriopterine genus *Toxorhina* which is readily told from all other crane-flies by having a single branch of *Rs* reaching the wing margin (compare *Elephantomyia,* fig. 13 and *Toxorhina,* fig. 19). *Atarba* has many species in the Neotropics and representatives may well be expected to occur in Puerto Rico.

Subtribe Polymeraria

Includes in America only the genus *Polymera* Wied., a large and eminently characteristic genus in the Neotropics, with more than a score of described forms. Two species range northward into the southeastern United States, while two others occur in the Greater Antilles. Of these, only *geniculata* has been taken in Puerto Rico. *Polymera obscura* Macq. has been found in Cuba, thence ranging southward over most of South America.

Polymera (Polymera) geniculata Alex. (Fig. 10)

1915. *Polymera geniculata* Alex.; Insec. Inscit. Menst., 3: 106–107.

Flagellar segments of male binodose; brownish black, the second to sixth segments narrowly and indistinctly paler at incisures. Legs brown, the genua pale, the conspicuous pale femoral tip preceded by a darker brown ring; extreme base of tibia similarly pale; tarsi brown, the posterior tarsi of a slightly paler shade than the remaining tarsi. Wings (Fig. 10) with R_{1+2} about twice R_2 alone, basal section of R_5 slightly arcuated, a little longer than *r-m*; *m-cu* just beyond the fork of *M*; cell M_1 shallow.

Male.—Length about 4 mm.; wing 4.8 mm.; antenna about 7—8 mm.

Known only from Puerto Rico. Type, Carolina, altitude 100 feet, in crab-holes under rocks, September 11, 1914. A second specimen was reared by W. A. Hoffman from a pupa taken February 20, 1927, in an eddy of a rapidly flowing rocky stream at Barranquitas, where it was associated with larvae of a species of *Dixa;* the adult emerged February 21, 1927.

Subtribe Limnophilaria

The vast subtribe Limnophilaria is represented in the Greater Antilles only by several diverse species of *Shannonomyia* Alex.

Genus **Shannonomyia** Alex.

1929. *Shannonomyia* Alex.; Diptera Patagonia and South Chile, 1: 142–143.

The species of *Shannonomyia* are numerously represented in South America. In the Greater Antilles, 6 species have been discovered, there being two each in Cuba, Puerto Rico and Jamaica. No representatives of the genus have yet been taken in Hispaniola but must certainly occur. The Antillean species show some remarkable tendencies of venation, notably the shortening of vein *Sc* and the reduction in size of cell R_3 of the wings. In cases, cell *1st* M_2 is greatly lengthened (as in *leonardi*, fig. 11). In still other species, the cell is open by the atrophy of crossvein *m* (as *myersiana* Alex., *nacrea* Alex., *triangularis* Alex.). The Jamaican *S. myersiana* is very remarkable in the elongate antennae of the male sex and in the presence of macrotrichia in the apical cells of the wing.

A KEY TO THE PUERTO RICAN SPECIES

1. Cell *1st* M_2 of the wings elongate, closed, exceeding the veins beyond it (Fig. 11); wings with a restricted brown spotted pattern---*leonardi* sp. n.
   Cell *1st* M_2 open by the atrophy of *m*; wings unmarked, except for the small stigmal area----------*triangularis* Alex.

Shannonomyia leonardi sp. n. (Fig. 11)

General coloration pale yellow; wings yellow with a restricted dark brown spotted pattern that is confined to the veins and crossveins; *Sc* short, R_2 about one-half R_3+_4, cell R_3 being short; cell *1st* M_2 closed, long and narrow, exceeding any of the veins beyond it.

Male.—Length about 4 mm.; wing 3.8—4 mm.

Female.—Length about 5 mm.; wing 3.5.

Described from alcoholic specimens.

Rostrum yellow; palpi dark brown. Antennae short in both sexes; scape and pedicel yellow; the short, crowded flagellar segments dark brown. Head pale yellow.

Mesonotal praescutum and scutum bright yellow, the remainder of dorsum more whitish yellow; scutellum more or less darkened. Pleura whitish yellow. Halteres pale. Legs with the coxae and trochanters whitish; remainder of legs broken. Wings (Fig. 11) yellow, with a restricted dark brown spotted pattern, as follows: At arculus; origin of *Rs*; Sc_2, the last two elements sometimes confluent; stigma; cord and outer end of cell *1st* M_2; marginal seams on veins R_3, M_1+_2, M_3, M_4, Cu_1 and *2nd A*; veins yellow, brown in the darkened areas. Venation: Prearcular cells extensive; *Sc* unusually short, Sc_1 ending shortly beyond origin of *Rs*, Sc_2 a short distance from its tip; R_2 subequal to R_1+_2; *Rs* of moderate length, angulated and weakly spurred at origin; cell R_2 relatively short, R_2 being about three-fourths of R_3+_4; cell *1st* M_2 long and narrow, exceeding any of the veins beyond it; *m* and basal section of M_3 subequal; *m-cu* beyond fork of *M*; vein *2nd A* curved into *Anal* margin.

Abdomen brownish yellow, the lateral margins narrowly darker; hypopygium pale, only the tips of the outer dististyle blackened.

Habitat.—Puerto Rico.

Holotype, alcoholic ♂, El Yunque, Luquillo National Forest, altitude 1800 feet, February 11, 1930 (M. D. Leonard). Allotopotype, alcoholic ♀. Paratopotype, alcoholic ♂.

I take great pleasure in naming this distinct crane-fly in honor of the collector, Dr. Mortimer D. Leonard. The species is very different from all other described members of the genus, being readily told by the combination of spotted wings, unusually short *Sc* and elongate cell *1st* M_2. The medial field is about as in the Cuban *S. mesophragma* Alex., but the other details of venation are quite different.

Shannonomyia triangularis (Alex.)

1927. *Pilaria triangularis* Alex.; Journ. N. Y. Ent. Soc., 35: 270–271.

General coloration pale brown. Head brownish black, paler anteriorly. Antennae with scape and pedicel obscure yellow; flagellum dark brown. Femora and tibiae very pale brown. Wings grayish subhyaline, the small stigma pale brown. Venation: *Sc* of moderate length, Sc_1 ending between one-third and one-half the length of *Rs*; cell R_3 small and triangular in outline, somewhat as in species of the Eriopterine subgenus *Gonomyia*; cell *1st* M_2 open by the atrophy of *m*; *m-cu* at or only shortly beyond the fork of *M*. In some specimens, cell R_3 is a little deeper but in all cases originates beyond the level of vein Rs.

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

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

Known only from Puerto Rico and apparently restricted to the mountainous section of the Luquillo National Forest. Type, May 10–13, 1927 (W. A. Hoffman). Also at 1800 feet, February 11 and March 29, 1930 (M. D. Leonard).

Subtribe Hexatomaria

The subtribe includes the single genus *Hexatoma* Latr., now considered as having three subgenera, one of which, *Eriocera* Macq., is found in the Greater Antilles. *Eriocera* is one of the largest and most characteristic groups of crane-flies in the World, with approximately 200 described species of large and usually showy flies. These are most characteristic of the tropics of both hemispheres. In the Antilles, eight species have now been discovered, forming a somewhat peculiar group. These species are found in all four of the major islands but no one species occurs in more than a single island.

It is very probable that several additional species will be discovered as a result of future collecting.

The early stages of *Eriocera* are aquatic or nearly so, the large carnivorous larvae going to dryer land to pupate. The adults sometimes occur in large swarms, usually close to large streams or rivers.

A KEY TO THE PUERTO RICAN SPECIES

1. Wings with three darkened bands, the first at the wing-root, the second at origin of *Rs*, extending across the wing and being connected with the basal band in the Anal cells; wing-apex chiefly dark, with the centers of cells R_4, R_5, *2nd* M_2 and M_3 grayish-hyaline; thorax yellowish with a grayish blue pruinosity, especially on the pleura and coxae; abdomen with blackish bands on anterior margins of the segments, the incisures yellowish ..... *trifasciata* (Röder)

   Wings with an interrupted brown pattern that is ocelliform at the origin of *Rs*; thorax light orange, unmarked; abdomen without blackish bands on the segments, the terminal two segments uniformly blackened ..... *ocellifera* Alex.

Hexatoma (Eriocera) ocellifera (Alex.)

1915. *Eriocera ocellifera* Alex.; Insec. Inscit. Menst., 3: 104–105.

Antennae pale. Head dark. Thorax entirely clear light orange. Femora dull yellow, their apices narrowly dark brown; tibiae and tarsi black. Wings light yellow, with cell *C* dark brown; an interrupted narrow dark band along cord; an ocelliform darkening centering at origin of *Rs*; wing-tip narrowly margined with brown. Venation: Cell M_1 lacking; R_{2+3} about one-half longer than R_2. Abdomen orange, the terminal two segments blackened.

Male.—Length about 10.5 mm.; wing 9.8 mm.

Known only from the unique type, taken at Mayagüez, December 4, 1913, by R. H. Van Zwaluwenburg, now in the U. S. National Museum.

Hexatoma (Eriocera) trifasciata (Röder)

1885. *Eriocera trifasciata* Röder; Stett, Ent. Zeitig., 46 338.

The detailed diagnosis given in the above key includes about all that is known of this fly.

Like the last, is is known from the unique type only, this having been taken in Puerto Rico by Gundlach, who reports the species as being rare.

The venation of the closely allied *H.* (*E.*) *cubensis* (Alex.) is shown (Fig. 12).

Tribe ERIOPTERINI

Several genera and subgenera of this great tribe are found in the Greater Antilles, the most abundant and characteristic groups

being *Gonomyia, Teucholabis* and *Erioptera.* The small species of the subgenus *Lipophleps* (*Gonomyia*) are especially well-represented in Puerto Rico.

Subtribe Gonomyaria

This includes only *Gonomyia* and *Teucholabis* in the Antilles. Of these, only *Gonomyia,* with a single subgenus *Lipophleps* Bergr., is found in Puerto Rico. *Lipophleps* is a very extensive group, with approximately 100 described species, distributed in all regions of the World but especially characteristic of the American tropics. Members of this group are often swept from rank vegetation near water. The adults, especially the females, are commonly attracted to lights in the evening and may be found in houses the following day.

A KEY TO THE PUERTO RICAN SPECIES

(Based especially on male genitalic characters)

1. Wings with cell M_2 open by the atrophy of the basal section of M_3; costal border conspicuously whitened; tibiae china-white, tipped with dark brown (*cinerea* group)----------*helophila* Alex.
   Wings with cell *1st* M_2 closed; costal border yellow or brown, not whitened; legs without white coloration---------- 2
2. Wings with the stigmal spot dark brown, contrasting strongly with remainder of wing; male hypopygium with the apex of basistyle produced into a slender black spine. (*pleuralis* group)----------*pleuralis* (Will.)
   Wings with the stigma lacking or scarcely evident against the ground-color; male hypopygium with apex of basistyle without any spinous developments. (*manca* group) ---------- 3
3. Male hypopygium with a single, entirely fleshy dististyle that is terminal in position; elements of phallosome two in number very long and slender, jutting caudad beyond level of end of dististyle (Fig. 21)--*bifiligera* sp. n.
   Male hypopygium with the dististyle subterminal in position, the outer lobe of basistyle being more or less produced caudad into a pale fleshy lobe; elements of phallosome not conspicuously produced (Figs. 22–24)----- 4
4. Male hypopygium with the dististyle not blackened, fleshy, on outer margin near base bearing a small pale triangular point; outer lobe of basistyle subequal in length and general appearance to the dististyle (Fig. 24)----------*subterminalis* Alex.
   Male hypopygium with the outer dististyle a strongly curved hook or spine, entirely blackened and sclerotized, very dissimilar in appearance to the outer lobe of the basistyle (Figs. 22–23)---------- 5
5. Outer lobe of basistyle greatly produced, subequal in length to the very long, slender outer dististyle (Fig. 23)----------*producta* Alex.
   Outer lobe of basistyle relatively short and stout, much shorter than the powerfully constructed hook-like outer dististyle (Fig. 22)--*bicornuta* Alex.

Gonomyia (Lipophleps) bicornuta Alex. (Fig. 22)

1927. *Gonomyia* (*Lipophleps*) *bicornuta* Alex.; Journ. N. Y. Ent. Soc., 35: 276–277.

Belongs to the *manca* group. General coloration brown and sulphur-yellow. Rostrum and antennae black. Thoracic pleura with a broad whitish longitudinal stripe. Knobs of halteres yellow. Wings brownish gray, without stigma. Male hypopygium (Fig. 22) with the basistyle produced into a short fleshy lobe that is shorter than the outer dististyle. Outer dististyle a powerful blackened hook, symmetrical on the two sides; inner dististyle very small, with a few setae and a single powerful fasciculate bristle. Phallosome symmetrical, the aedeagus terminating in two pale rounded blades. Two entirely dusky blades, entirely glabrous, subtend the aedeagus; in addition to these there are two shorter lobes of nearly equal width, bearing several weak setae on their apical half.

Endemic in Puerto Rico. Known only from the Luquillo National Forest. Type, May 10–13, 1927 (W. A. Hoffman). An additional ♂, El Yunque, altitude 1800 feet, February 11, 1930 (M. D. Leonard).

Gonomyia (Lipophleps) bifiligera sp. n. (Figs. 15, 21)

Belongs to the *manca* group; general coloration of mesonotum dark brown, the scutellum yellow; antennal pedicel large, blackened; thoracic pleura yellow, striped with dark brown; legs brownish black; wings grayish, stigma lacking; male hypopygium with the basistyles very long and slender; a single, entirely fleshy dististyle; elements of phallosome two in number, very long and slender, extending caudad beyond the level of the distal ends of styli.

Male.—Length about 2.5 mm.; wing 2.8—3 mm.

Described from alcoholic specimens.

Rostrum obscure yellow; palpi dark brown. Antennae brownish black, the pedicel enlarged and more intensely blackened. Head obscure yellow in front, more grayish brown on posterior vertex and occiput, the posterior orbits broadly yellow.

Mesonotum chiefly dark brown, the scutellum and posterolateral portions of scutal lobes yellow. Pleura yellow, with two conspicuous, dark brown, longitudinal stripes, the more dorsal one widest on anepisternum, narrowed behind to a sutural marking along ventral edge of pteropleurite; ventral stripe more extensive, including the sternopleurite and meral region. Halteres dusky, the knobs pale yellow. Legs with the coxae yellow, the fore coxae darkened; trochanters chiefly dusky; remainder of legs brownish black. Wings (Fig. 15) with a strong grayish tinge; stigma lacking; veins pale brown. Venation: Sc_1 ending some distance before origin of *Rs*, the distance on costa being nearly equal to *Rs* alone; branches of *Rs* strongly divergent.

Abdominal tergites light brown, the sternites and hypopygium more yellowish. Male hypopygium (Fig. 21) with the basistyles very long and slender, the single dististyle entirely fleshy, terminating in two stout fasciculate setae. Phallosome

consisting of two very elongate, slender structures that extend caudad beyond the level of the tips of the styli; one rod at apex bears abundant short setae, the second structure more slender, glabrous, very gradually narrowed to an acute point.

Habitat.—Puerto Rico.

Holotype, alcoholic ♂, Las Cruces, altitude 1300 feet, March 28, 1930 (M. D. Leonard). Paratopotypes, 3 alcoholic ♂♂.

Gonomyia (*Lipophleps*) *bifiligera* is allied to species such as *G.* (*L.*) *cubana* Alex., yet is very distinct in the structure of the male hypopygium, notably the two filiform rods of the phallosome.

Gonomyia (Lipophleps) helophila Alex. (Fig. 20)

1916. *Gonomyia* (*Leiponeura*) *helophila* Alex.; Ent. News, 27: 343–346, fig. 1 (wing), 3 (male hypopygium).

1916. *Gonomyia* (*Leiponeura*) *helophila* Alex.; Proc. Acad. Nat. Sci. Philadelphia, 1916: 514, pl. 29, fig. 60 (male hypopygium).

Belongs to the *cinerea* group. Antennal scape brownish black beneath, remainder of organ yellowish brown. Head yellow, with a brownish mark on vertex. Mesonotal praescutum light gray, with four more brownish stripes. Pleura dark brown, with two whitish longitudinal stripes. Legs with the fore femora brownish black; middle femora yellow, tipped with dark brown; hind femora brownish yellow, the tips slightly more darkened; tibiae white, the extreme base and slightly broader apex dark brown. Wings with costal margin china-white; remainder of wing subhyaline; stigma oval, brown, preceded and followed by more whitish spots. Venation: Sc_1 ending some distance before origin of *Rs*. Abdominal tergites brown, their caudal margins light yellow. Male hypopygium (Fig. 20) with a slender outer spinous dististyle. Ventral dististyle with a blackened finger-like lobe on margin near base. Dorsal dististyle a small oval unarmed lobe.

Male.—Length about 4.5—5.2 mm.; wing 5—5.5 mm.

Female.—Length about 4.8—5.5 mm.; wing 5.2—5.8 mm.

Ranges from Texas, south on continent to Peru; in the Antilles, Puerto Rico and Dominica.

Puerto Rico: Santurce, March 1932 (M. D. Leonard). Coamo Springs, July 17–19, 1914 (A.M.N.H.). Puerto Real, Vieques Is., at light, September 25–27, 1931 (M. D. Leonard).

The only local representative of a very extensive group of chiefly Neotropical Gonomyiæ. It is readily told by the open cell M_2 of the wings, together with the white costal border, and the china-white tibiae.

Gonomyia (Lipophleps) pleuralis (Will.).

1896. *Atarba pleuralis* Will.; Trans. Ent. Soc. London 1896: 289, pl. 10, fig. 61 (wing).

1912. *Gonomyia (Leiponeura) pleuralis* Alex.; Ent. News, 23: 419–420, figs. 3, 4 (male hypopygium).

1916. *Gonomyia (Leiponeura) pleuralis* Alex.; Proc. Acad. Nat. Sci. Philadelphia, 1916: 516, pl. 26, fig. 20 (wing).

Mesonotum light brownish yellow, margined laterally with whitish, the latter color separated from the dorsum by a narrow darker line. Pleura almost white, striped longitudinally with dark brown. Legs with the trochanters and femora light yellow, the latter with a subterminal brown ring. Wings with a grayish tinge, the costal border narrowly more yellowish; a conspicuous dark brown stigmal area; region of cord variegated by small more hyaline areas. Abdomen yellow, the segments bordered by dark brown.

Male.—Length about 3—3.5 mm.; wing 3—3.3 mm.

A wide-ranging species, Georgia and Florida; Bermudas; southward through the Antilles to British Guiana and Brazil.

Puerto Rico: Aguadilla, January 1899 (A. Busck); U.S.N.M. Coamo Springs Hotel, at light, April 4, 1930 (M. D. Leonard). Santurce, March 26, 1930 (W. A. Hoffman); April 19, 1930 (M. D. Leonard).

Again the only local representative of a very large and widespread group of tropical American Gonomyiæ. It is readily told from the other local *Lipophleps* by the dark brown stigmal area.

Gonomyia (Lipophleps) producta Alex. (Fig. 23)

1919. *Gonomyia (Leiponeura) producta* Alex.; Journ. N. Y. Ent. Soc., 27: 139–140.

Belongs to the *manca* group. General appearance much as in *bicornuta* Alex., as described. Male hypopygium (Fig. 23) distinctive, notably the long slender apical lobe of the basistyle and the very long and slender, symmetrical outer dististyle. These latter are of a length and slenderness found otherwise only in *G. (L.) prolixistylus* Alex.

Male.—Length about 2.5—3 mm.; wing 2.5—3.2 mm.

Known only from Antigua, Lesser Antilles, and Puerto Rico.

Puerto Rico: Puerto Real, Vieques Is., at light, September 25–27, 1931 (M. D. Leonard).

Gonomyia (Lipophleps) subterminalis Alex. (Fig. 24)

1927. *Gonomyia (Lipophleps) subterminalis* Alex.; Journ. N. Y. Ent. Soc., 35: 275–276.

Belongs to the *manca* group. Antennae black throughout. Mesonotum brown, the postnotum variegated with yellow. Pleura striped with pale brown and

testaceous. Wings with an unusually strong dusky tinge. Abdomen dark brown, the hypopygium obscure yellow. Male hypopygium (Fig. 24) with a single, subterminal dististyle that bears a small pale basal triangular point on outer margin near base; outer portion of dististyle with a very powerful subterminal fasciculate seta. The outer lobe of basistyle and the dististyle are generally equal in form and size.

Male.—Length about 3—3.5 mm.; wing 3.6—3.8 mm.

Known only from the mountainous sections of the Luquillo National Forest, Puerto Rico; a very close ally in the Cuban mountains. Type, a male, Luquillo, May 10–13, 1927 (W. A. Hoffman), taken along the steep rocky sides and on the vegetation along a mountain stream. Other material, El Yunque, 1800 feet, February 11, 1930; 2000–3500 feet, March 29, 1930 (M. D. Leonard). Las Cruces, altitude 1300 feet, March 28, 1930 (M. D. Leonard).

The peculiar structure of the male hypopygium is very distinctive.

Although only representatives of the subgenus *Lipophleps* have yet been taken in Puerto Rico, three additional subgeneric groups, *Progonomyia* Alex., *Gonomyia* Meig. and *Ptilostena* Berg., have been taken in Cuba and are thus regional.

(The genus *Teucholabis* O. S. is one of the largest and most characteristic groups of Eriopterine Tipulidae, being especially rich in species in tropical America. Several species have been found in Cuba and Jamaica but none, as yet, has been taken in Puerto Rico. The venation of the Cuban *Teucholabis nigrosignata* Alex. is shown, Fig. 16.)

Subtribe Trentepohliaria

Trentepohlia (Paramongoma) niveitarsis (Alex.) (Fig. 17)

1913. *Mongoma niveitarsis* Alex.; Proc. U. S. Nat. Mus., 44: 501, pl. 65, fig. 13 (wing).

1928. *Trentepohlia* (*Paramongoma*) near *niveitarsis* Alex.; Dept. Sci. and Agr. Jamaica, Ent. Bull. 4: 25.

General coloration dark brown, including the head and appendages. Halteres elongate, brown. Legs dark brown, the terminal three tarsal segments white; in cases, the amount of white is more extensive, including all the tarsal segments, as well as the extreme tips of the tibiae. Wings (Fig. 17) subhyaline, the costal margin and stigma somewhat darker brown; veins dark brown.

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

Female.—Length about 6.5—7 mm.; wing 5.5—6.3 mm.

Known only from the mountains of Puerto Rico and Jamaica. El Yunque, Luquillo National Forest, altitude 2850 feet, February 25–27, 1900 (C. W. Richmond); types. One ♀, Luquillo Forest,

May 10–13, 1927 (W. A. Hoffman). El Yunque, altitude 1800 feet, February 11, 1930 (M. D. Leonard). Also what appears surely to represent this same species, Cinchona, Blue Mts., Jamaica, July 25, 1926 (G. C. Crampton); 1 broken ♂.

This very characteristic fly is the most northerly representative of the great genus *Trentepohlia* in the New World. It bears a superficial resemblance to *Helius* (*Helius*) *albitarsis* (O. S.), which is in reality a very different fly.

Subtribe Eriopteraria

The only representatives of the extensive genus *Erioptera* Meig. in Puerto Rico are members of the subgenus *Mesocyphona* O. S., which reaches its greatest development of species in the American Tropics and Subtropics. Two species of *Mesocyphona* have been taken in Puerto Rico, one of which is widespread throughout eastern North America, the other being endemic. In the high mountains of Jamaica occurs a second subgenus of *Erioptera, Empeda* O. S., with a single very distinct species.

A KEY TO THE PUERTO RICAN SPECIES

1. Wings dark brown, with abundant white spots and dots in all the cells---- ---------- *caloptera* Say
   Wings subhyaline, unspotted---------- *portoricensis* sp. n.

Erioptera (Mesocyphona) caloptera Say

1823. *Erioptera caliptera* Say; Journ. Acad. Nat. Sci. Philadelphia, 3:17.

1869. *Erioptera caloptera* O. S.; Mon. Dipt. N. Amer., 4:161–162, pl. 4, fig. 15 (male hypopygium).

1919. *Erioptera caloptera* Alex.; Crane-flies of New York, part 1: 908, pl. 35, fig. 77 (wing).

General coloration brownish yellow, the praescutum with two clearly defined dark brown stripes. Thoracic pleura striped longitudinally with dark brown and pale. Femora yellow, each with two brown annuli, one medial, the other subterminal. Wings brownish, more saturated near costal border, the entire disk variegated by white spots and dots, including somewhat larger areas beyond arculus, at origin of *Rs*, at Sc_2, along cord, and at tips of veins R_{1+2} and R_3.

Male.—Length about 3.5 mm.; wing about 3.5 mm.

Female.—Length about 4 mm.; wing about 3.5 mm.

The species *caloptera* (originally spelled *caliptera* by Say) is widely-distributed throughout the eastern United States. The Puerto Rican material here referred to *caloptera* has the white wing spots

somewhat more reduced in area than do specimens of the typical form from the northern United States.

Puerto Rico: El Yunque, Luquillo National Forest, altitude 1800 feet, February 11, 1930; March 29, 1930 (M. D. Leonard).

Erioptera (Mesocyphona) portoricensis sp. n. (Fig. 18)

Mesonotal praescutum dark brown, with three reddish brown stripes; pleura dark brown, striped longitudinally with whitish; wings immaculate, grayish, the costal border more yellowish; male hypopygium with the phallosome large, produced laterally into a conspicuous straight spine on either side.

Male.—Length about 2.8—3 mm.; wing 2.8—3 mm.

Described from alcoholic specimens.

Rostrum whitish; palpi black. Antennae black; pedicel enlarged, globular; flagellum short, the basal segments crowded. Head whitish, with a conspicuous dark brown area on vertex.

Pronotum dark brown, paler laterally. Mesonotal praescutum dark brown the three usual stripes pale reddish brown; scutum dark brown, the centers of the lobes reddish brown; scutellum whitish; postnotum dark brown. Pleura dark brown with a conspicuous white longitudinal stripe in addition to the broad similarly-colored dorso-pleural region; ventral longitudinal pale line extending from behind the fore coxae to the abdomen, passing beneath the halteres, broadest on the pteropleurite. Halteres pale yellow. Legs with the fore and middle coxae dark brown, the posterior coxae somewhat paler; trochanters pale, especially the posterior ones; fore femora with a single subterminal brown ring; remaining femora with two such darkened rings (the posterior legs are all detached in vials, but the condition seems to be as described). Wings (Fig. 18) grayish, immaculate, more darkened basally, the costal region conspicuously light yellow; veins brownish yellow, clearer yellow in the flavous areas. Venation: Cell M_2 open by atrophy of the basal section of M_3.

Abdomen dark brown, the ninth segment obscure yellow, the styli again conspicuously blackened. Male hypopygium with the dististyles slender; outer style a nearly straight simple rod, the inner style bifid nearly to base, its outer arm longer, the inner arm shorter and very slender. Gonapophyses appearing as simple smooth arms that curve gently toward one another, the obtuse tips dusky. Phallosome large and conspicuous, the body large with a conspicuous lateral spine on either side, these directed laterad and slightly caudad.

Habitat.—Puerto Rico.

Holotype, alcoholic ♂, El Yunque, Luquillo National Forest, altitude 1800 feet, February 11, 1930 (M. D. Leonard).

Paratopotypes, several ♂ ♂, 1800–3500 feet, February 11—March 29, 1930 (M. D. Leonard); paratypes, a few broken specimens, Las Cruces, altitude 1300 feet, March 28, 1930 (M. D. Leonard).

Erioptera (*Mesocyphona*) *portoricensis* is very different from the other described species of the subgenus having unspotted wings.

(The genus *Rhabdomastix* Skuse, subgenus *Sacandaga* Alex., is found in Jamaica and Hispaniola, but to date not in Puerto Rico.

The sole Antillean species is *R.* (*S.*) *parva* (Alex.), a small brown fly with grayish wings. The characters given for the genus in the key will suffice for the separation of this insect. The only regional genus with which it might be confused is *Gonomyia* s.s., which is most readily told by the short to very short *Sc;* in *parva Sc* is long, Sc_1 extending to beyond midlength of *Rs.*)

Subtribe Toxorhinaria

The only genus in this very peculiar subtribe is *Toxorhina* Lw., with a small number of chiefly tropical species in both hemispheres.

Toxorhina (Toxorhina) fragilis Lw. (Fig. 19)

1851. *Toxorhina fragilis* Lw.; Linn. Ent., 5: 401–402, pl. 2, fig. 16 (antenna), 17 (entire insect), 18 (venation), 22 (head).

Thorax dark brown, somewhat pruinose; praescutum with a dark gray median stripe but with lateral stripes not clearly evident; extreme lateral margin of praescutum almost whitish. Antennae brownish black. Femora bright brown, darker toward tip; tibiae somewhat brighter, with darker tips. Wings with a faint grayish tinge; stigma lacking; veins of costal region brownish yellow, the others darker brown. Abdomen brown, the incisures darker.

Loew's type, a female, was taken by Moritz in Puerto Rico. Unfortunately no material agreeing entirely with the above diagnosis has ever been taken and it seems probable that the darkening of the tips of the femora and tibiae of *fragilis* is less evident than is implied by Loew's description. I have shown the venation of *Toxorhina* (*Toxorhina*) *centralis* Alex., (Fig. 19), the commonest species in the northern part of South America. The fly that seems closest to *fragilis*, specimens of which I have seen from Cuba and Hispaniola, but not from Puerto Rico, is relatively small.

Male.—Length, excluding rostrum, about 6.5 mm.; wing 6 mm.; rostrum about 5 mm.

V. A List of the Tipulidae Known from the Greater Antilles

TIPULINAE

Nephrotoma, sp. (*ferruginea* Fabr., var.); mss. record. Cuba, Hispaniola.

Tipula (*Tipula*) *jamaicensis* Alex.; Dept. Sci. & Agr. Jamaica, Ent. Bull. 4: 27–28; 1928. Jamaica.

Tipula (*Tipula*) *ludoviciana* Alex.; mss. record. Cuba.

Dolichopeza (*Megistomastix*) *cubensis* (Alex.); Journ. N. Y. Ent. Soc., 36: 47–48; 1928 (*Megistomastix*). Cuba.

Dolichopeza (*Megistomastix*) *portoricensis* (Alex.); Psyche, 19: 65–66; 1912 (*Megistomastix*). Puerto Rico.

Brachypremna unicolor O. S.; Berlin. Ent. Zeitschr., 31: 239; 1887. Cuba, Hispaniola, Puerto Rico.

Megistocera longipennis (Macq.); Dipt. exot., 1, pt. 1: 57; 1838 (*Tipula*). Cuba, Hispaniola, Puerto Rico.

LIMONIINAE

Limoniini

Limonia (*Limonia*) *basistylata* Alex.; Dept. Sci. & Agr. Jamaica, Ent. Bull. 4: 19–20; 1928. Jamaica.

Limonia (*Limonia*) *caribœa* sp. n.; this paper, conclusion. Cuba.

Limonia (*Limonia*) *hoffmani* Alex.; Journ. N. Y. Ent. Soc., 35: 265–266; 1927. Puerto Rico.

Limonia (*Limonia*) *jamaicensis* Alex.; *Ibid.*, 34: 223–224; 1926. Jamaica.

Limonia (*Discobola*) *gowdeyi* sp. n.; this paper, conclusion. Cuba, Jamaica.

Limonia (*Neolimnobia*) *diva* (Schin.); Novara Reise, Diptera, p. 46; 1868 (*Limnobia*). Cuba, Jamaica, Puerto Rico.

Limonia (*Dicranomyia*) *brevivena torrida* subsp. n.; this paper. Puerto Rico.

Limonia (*Dicranomyia*) *distans* (O. S.); Proc. Acad. Nat. Sci. Philadelphia, 1859: 211; Del., 1859. Puerto Rico.

Limonia (*Dicranomyia*) *divisa* Alex.; Philippine Journ. Sci., 40: 247; 1929. Hispaniola, Puerto Rico.

Limonia (*Dicranomyia*) *reticulata* (Alex.); Canad. Ent., 44: 334–335; 1912 (*Furcomyia*). Cuba.

Limonia (*Dicranomyia*) *trinitatis* Alex.; Journ. N. Y. Ent. Soc., 39: 110–111; 1931. Cuba.

Limonia (*Rhipidia*) *domestica* (O. S.); Proc. Acad. Nat. Sci. Philadelphia, 1859: 208; 1859 (*Rhipidia*). Cuba, Hispaniola, Jamaica, Puerto Rico.

Limonia (*Rhipidia*) *schwarzi* (Alex.); Bull. Brooklyn Ent. Soc., 8: 13–14; 1912 (*Rhipidia*). Cuba, Hispaniola, Jamaica.

Limonia (*Rhipidia*) *subcostalis* (Alex.); Proc. U. S. Nat. Mus., 60, art. 25: 3–4; 1922 (*Rhipidia*). Jamaica.

Limonia (*Geranomyia*) *antillarum* Alex.; Journ. N. Y. Ent. Soc., 37: 395–396; 1929. Cuba, Hispaniola, Jamaica, Puerto Rico.

Limonia (*Geranomyia*) *cinereinota* (Alex); Ent. News, 24: 407–408; 1913 (*Geranomyia*). Hispaniola, Puerto Rico.

Limonia (*Geranomyia*) *cubana* Alex.; Journ. N.Y. Ent. Soc., 37: 396–397; 1929. Cuba.

Limonia (*Geranomyia*) *domingensis* (Alex.); Proc. Acad. Nat. Sci. Philadelphia, 1916: 490–491; 1916 (*Geranomyia*). See *L.* (*G.*) *cinereinota* (Alex.).

Limonia (*Geranomyia*) *intermedia* (Walk.); List Diptera Brit. Mus., 1: 47; 1848. (*Limnobia*). Jamaica.

Limonia (*Geranomyia*) *myersiana* Alex.; Journ. N. Y. Ent. Soc., 37: 397–398; 1929. Cuba.

Limonia (*Geranomyia*) *rostrata* (Say), Antillean references erroneous, see *L.* (*G.*) *antillarum* Alex.

Limonia (*Geranomyia*) *rufescens* (Lw.); Linnaea Ent., 5: 396; 1851 (*Aporosa*). Puerto Rico.

Limonia (*Geranomyia*) *subrecisa* sp. n.; this paper. Puerto Rico.

Limonia (*Geranomyia*) *subvirescens* Alex.; Journ. N. Y. Ent. Soc., 38: 112; 1930. Cuba.

Limonia (*Geranomyia*) *tibialis* (Lw.); Linnaea Ent., 5: 397; 1851 (*Aporosa*). Cuba, Jamaica, Puerto Rico.

Limonia (*Geranomyia*) *virescens* (Lw.); Ibid., 5: 398; 1851 (*Aporosa*). Puerto Rico.

Helius (*Helius*) *albitarsis* (O. S.); Berlin. Ent. Zeitschr., 31: 184; 1887 (*Rhamphidia*). Cuba, Puerto Rico.

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A few new species and subspecies of extra-Puerto Rican Tipulidae are described herewith in order to complete the record for the Greater Antilles.

Limonia (Limonia) caribaea sp. n. (Fig. 25)

General coloration yellow; mesonotal praescutum with three brownish black stripes; thoracic pleura with a broad dorsal black stripe, together with a reduced ventral area on the sternopleurite; legs chiefly black; wings faintly tinged with brownish, with a restricted darker brown pattern; *Rs* square and short-spurred at origin; *m-cu* longer than distal section of Cu_1; male hypopygium with the ventral dististyle bearing a single pale rostral spine; gonapophyses unusually powerful, blackened, the mesal apical lobe bidentate.

Male.—Length about 5.5 mm.; wing 6.2 mm.

Rostrum and palpi black. Antennae black throughout; flagellar segments elongate-oval, with long, unilaterally arranged verticils. Head with the frons and anterior vertex silvery gray, the posterior vertex darker.

Pronotum obscure yellow, with a narrow, dark, longitudinal line on either side. Mesonotal praescutum yellow, with three brownish black stripes that are all more or less confluent near their anterior ends; median stripe not reaching the anterior margin of sclerite and more or less split by a capillary pale vitta; posterior sclerites of mesonotum chiefly pale brown, the posterior border of the postnotal mediotergite darker, this being the end of a conspicuous black pleural stripe. Pleura yellow, with the stripe just described, together with a similar intense blackened area on the ventral sternopleurite. Halteres dark brown. Legs with the coxae and trochanters light yellow; femora dark brown, their bases restrictedly paler, the tips narrowly still darker brown; tibiae and tarsi black. Wings with a faint brownish tinge, the prearcular and costal regions more yellowish; a restricted dark brown pattern, as follows: Origin of *Rs*; fork of *Sc*; along cord and outer end of cell *1st* M_2; stigma; pale brown streaks in centers of cells R_1, R_2, R_3 and R_5; veins brown. Venation: Sc_1 long, ending just beyond midlength of *Rs*, Sc_2 at its tip; *Rs* nearly square and weakly spurred at origin; free tip of Sc_2 and R_2 in transverse aligment; *m-cu* at fork of *M*, about one-half longer than the distal section of Cu_1.

Abdominal segments dimidiate, pale yellow basally, the apical half and narrower lateral margins dark brown, the amount of dark increasing on the outer segments. Male hypopygium (Fig. 25) of somewhat remarkable structure. Ninth tergite transverse, the caudal margin with two rounded lobes. Ventro-mesal lobe of basistyle very large. Dorsal dististyle a slender, nearly straight rod, before the apex a little widened and gently curved, the tip acute. Ventral dististyle smaller than the basistyle, white, deeply divided by a dorsal notch in which the dorsal dististyle rests; rostral prolongation a pale, compressed blade, at its base with a setiferous area that includes a single pale rostral spine. Gonapophyses very large and powerfully constructed, the mesal apical lobe stout, bidentate. Aedeagus broad, each outer apical angle bearing a small lobe.

Habitat.—Cuba.

Holotype, ♂, San Blás, Santa Clara, Trinidad Mts., altitude about 700 feet, May 5, 1932 (Bruner and Otero).

This very distinct *Limonia* requires no comparison with any described members of the subgenus. The peculiar structure of the hypopygium is quite different from any of the described Neotropical species.

Limonia (Discobola) gowdeyi sp. n. (Fig. 26)

General coloration yellow and black; antennal flagellum black; apices of knobs of halteres blackened; tibiae narrowly blackened at bases; wings the usual ocellate pattern arranged in five more or less complete fasciae.

Male.—Length about 10 mm.; wing 13 mm.

Female.—Length about 9 mm.; wing 9.5 mm.

Rostrum and palpi black. Antennae black throughout; flagellar segments (female) narrowly subcordate, with short apical pedicels; terminal segment more slender, about one-third longer than the penultimate. Head behind light brown, more grayish in front.

Pronotum yellowish. Mesonotal praescutum obscure yellow, with five brown lines on posterior half, these including the posterior ends of three more or less confluent discal stripes, together with the darker lateral margins of the sclerite; scutum yellow, each lobe with a ring-like brown area; scutellum black, obscure yellow medially at base; postnotal mediotergite chiefly blackened. Pleura greenish yellow, handsomely variegated with black, including the middle coxae, sternopleurite and ventral half of anepisternum, from which last-named a black band extends caudad across the pteropleurite and pleurotergite to the postnotal mediotergite; a narrower incomplete stripe extends caudad and dorsad across the meral region, nearly if not quite attaining the haltere; a linear black dash on margin of dorso-pleural membrane. Halteres chiefly black, the base of stem and base of knob pale. Legs with the coxae yellow, the mid-coxae black, as described; trochanters yellow; femora yellow, slightly darkened outwardly, the broad apex abruptly clear light yellow, enclosing a narrow subterminal black ring that is a little wider than the terminal yellow annulus and subequal to the basal pale annulus; tibiae obscure yellow, the proximal end just beyond base and the apex narrowly and subequally blackened; terminal tarsal segments passing into dark brown. Wings cream-yellow, more saturated at base and in costal region; extreme base of wing darkened; the usual ocellate pattern is arranged as five crossbands, complete or nearly so, the first at base and before the supernumerary crossvein, the latter lying in the first pale interspace; second dark fascia broad, with the origin of *Rs* as a center; third fascia along cord; fourth composed of two contiguous ocelli, with R_2 and outer end of cell *1st* M_2 as centers; outermost fascia at wing-apex, broken; the three outer interspaces are occupied by dark posterior marginal spots at ends of veins *1st A*, Cu_1 and M_4, respectively; veins yellow, brown in the clouded areas. Venation: Cell *1st* M_2 long-rectangular, the second and third sections of M_{1+2} subequal; *m-cu* just beyond fork of *M*.

Abdominal tergites dimidiate, the bases blackened, the apices yellow; on proximal segments, the black areas are more restricted to the lateral portions, on the third to seventh segments the black bands are continuous and gradually increasing in area on the outer sclerites; genital segments obscure yellow.

The allotype male is much larger than the type female but seems unquestionably to belong here. The dark band-like fasciae of the wings are more broken, with more extensive pale centers, yet retain the five-banded appearance of the type. Male hypopygium (Fig. 26) agreeing in its general features with *L.* (*D.*) *argus* (Say) but differing in several regards. The ventral dististyle is much longer, with the outer lobe produced; rostral spines at the base of the prolongation but not arising in hyaline membrane, as in *argus*; apex of the prolon-

gation extended into a small sclerotized point. Lobe on mesal face of basistyle very extensive.

Habitat.—Cuba, Jamaica.

Holotype, ♀, Cinchona, Blue Mts., Jamaica, June 1889 (W. Fawcett); Brit. Mus. Access. No. 89–80. Allotype, ♂, San Blás, Santa Clara, Trinidad Mts., Cuba, altitude 700 feet, December 4, 1931 (G. C. Rowe). Paratopotype, one specimen of doubtful sex, from the type-locality, August 2, 1923 (C. C. Gowdey).

The type and paratype are in the British Museum of Natural History, the allotype in the writer's collection.

Limonia (*Discobola*) *gowdeyi* is named in honor of the late Mr. C. C. Gowdey, former Entomologist for Jamaica. The species is quite distinct from all other described members of *Discobola,* being closest to *argus,* yet differing in numerous features of coloration, wing-pattern and structure of the male hypopygium. The discovery of this subgenus in the Antilles far to the south of its known range was a highly significant one.

Orimarga (Orimarga) cubensis sp. n.

General coloration black; lateral margin of praescutum and a slightly wider stripe on ventral pleura silvery; legs black; wings long-petiolate basally, nearly hyaline; R_1 meeting R_2 at an obtuse angle, with a short spur of $R_1 + _2$ at the point of angulation; *m-cu* lying far distad, shortly before the level of the outer end of *Rs*; vein *2nd A* short.

Male.—Length about 8 mm.; wing 5 mm.

Rostrum and palpi black. Antennae broken. Head black, with a light gray pruinosity.

Pronotum and mesonotum black, the praescutum narrowly lined laterally with silvery. Pleura brown, with a ventral silvery stripe that is a little wider than the praescutal vitta. Halteres broken. Legs with the coxae and trochanters horn-colored; remainder of legs black, the extreme femoral bases paler. Wings with a long basal petiole, nearly hyaline; veins dark brown. Costal fringe (male) relatively long and dense; macrotrichia of veins beyond cord long and abundant. Venation: Sc_1 ending opposite origin of *Rs*; free tip of Sc_2 preserved; R_1 meeting R_2 at an obtuse angle, $R_1 + _2$ being represented at this point of angulation by a tiny spur; vein M_3 a little less than three times $M_3 + _4$; *m-cu* lying far distad, about opposite the outer end of *Rs* and about one-third that section beyond it; vein *2nd A* unusually short.

Abdominal tergites brownish black, narrowly bordered laterally by yellowish; tip of abdomen broken.

Habitat.—Cuba.

Holotype, ♂, Sierra Rangel, Pinar del Río, August 28, 1929 (Acuña and Bruner).

The long-petiolate wings readily separate this fly from all allies,

except *O.* (*O.*) *niveitarsis* Alex. (Panama), which is readily told by the white tarsi and position of *m-cu* opposite the origin of *Rs.* The general features of venation are somewhat as in *O.* (*O.*) *wetmorei* Alex. (southern Florida) but the details are quite distinct, especially the narrow cell *2nd A* and the distal position of *m-cu.*

Elephantomyia westwoodi antillarum subsp. n. (Fig. 13)

Male.—Length, excluding rostrum, about 8.5—9.5 mm.; wing 7—8.5 mm.; rostrum about 8—8.5 mm.

Similar to typical *westwoodi* O. S., differing as follows: Antennae more uniformly infuscated. Mesonotum not or scarcely darkened medially; ventral sternopleurite restrictedly blackened. Wing-apex distinctly infumed. Abdomen almost entirely yellow, the lateral portion of tergites darkened; subterminal segment infuscated but less so than in *westwoodi*; sternites three and four with a median brown spot before caudal margin. Male hypopygium with the outer dististyle conspicuously bidentate at apex, the outer spine straighter and more slender than the curved axial or inner spine.

Habitat.—Cuba, Hispaniola.

Holotype, ♂, Buenos Aires, Trinidad Mts., Cuba, altitude 2350–2800 feet, May 3–4, 1931 (Bruner, Acuña and Otero). Paratopotypes, 2 ♂ ♂. I have also seen this from Hispaniola (Haití), taken by Dr. John G. Myers.

The relationship of the present fly to *westwoodi* seems best expressed by a trinomial.

Teucholabis (Teucholabis) gowdeyi nigroterminalis subsp. n.

Male.—Length 10—11 mm.; wing 8–85 mm.

Close to typical *gowdeyi* Alex., (Jamaica), differing most evidently in the broad black apices of all the femora. In the typical form, the corresponding markings are much narrower, dark brown, and are subterminal in position.

Habitat.—Cuba.

Holotype, ♂, Sierra Rangel, Pinar del Rio, January 27–30, 1931 (Acuña and Otero). Paratypes, 1 ♂, Buenos Aires, Trinidad Mts., altitude 2350–2800 feet, May 3, 1932 (Bruner and Otero); 1 badly damaged ♂, San Blás, Trinidad Mts. (G. C. Rowe).

Explanation of Plates

PLATE XLIII

Fig. 1. *Megistocera longipennis* (Macq.); venation.
Fig. 2. *Brachypremna unicolor* O. S.; venation.
Fig. 3. *Dolichopeza* (*Megistomastix*) *portoricensis* (Alex.); venation.
Fig. 4. *Limonia* (*Limonia*) *hoffmani* Alex.; venation.
Fig. 5. *Helius* (*Helius*) *albitarsis* (O. S.); venation.

PLATE XLIV

Fig. 6. *Limonia* (*Limonia*) *hoffmani* Alex.; male hypopygium.
Fig. 7. *Limonia* (*Dicranomyia*) *distans* (O.S.); male hypopygium.
Fig. 8. *Limonia* (*Dicranomyia*) *divisa* Alex.; male hypopygium.

Symbols: a = ædeagus; b = basistyle; d = dististyle; dd = dorsal dististyle; g = gonapophysis; t = tergite; vd = ventral dististyle.

PLATE XLV

Fig. 9. *Orimarga* (*Diotrepha*) *mirabilis* (O. S.); venation.
Fig. 10. *Polymera* (*Polymera*) *geniculata* Alex.; venation.
Fig. 11. *Shannonomyia leonardi* sp. n.; venation.
Fig. 12. *Hexatoma* (*Eriocera*) *cubensis* (Alex.); venation.
Fig. 13. *Elephantomyia westwoodi antillarum* subsp. n.; venation.

PLATE XLVI

Fig. 14. *Epiphragma cubensis* Alex.; venation.

Symbols: A = Anal veins; C = Costa; Cu = Cubitus; M = Media; R = Radius; Rs = Radial sector.

PLATE XLVII

Fig. 15. *Gonomyia* (*Lipophleps*) *bifiligera* sp. n.; venation.
Fig. 16 *Teucholabis* (*Teucholabis*) *nigrosignata* Alex.; venation.
Fig. 17. *Trentepohlia* (*Paramongoma*) *niveitarsis* (Alex.); venation.
Fig. 18. *Erioptera* (*Mesocyphona*) *portoricensis* sp. n.; venation.
Fig. 19. *Toxorhina* (*Toxorhina*) *centralis* Alex.; venation.

PLATE XLVIII

Fig. 20. *Gonomyia* (*Lipophleps*) *helophila* Alex.; male hypopygium.
Fig. 21. *Gonomyia* (*Lipophleps*) *bifiligera* sp. n.; male hypopygium.
Fig. 22. *Gonomyia* (*Lipophleps*) *bicornuta* Alex.; male hypopygium.
Fig. 23. *Gonomyia* (*Lipophleps*) *producta* Alex.; male hypopygium.
Fig. 24. *Gonomyia* (*Lipophleps*) *subterminalis* Alex.; male hypopygium.

Symbols: b = basistyle; d = dististyle; p = phallosome.

Fig. 25. *Limonia* (*Limonia*) *caribæa* sp. n.; male hypopygium.
Fig. 26. *Limonia* (*Discobola*) *gowdeyi* sp. n.; male hypopygium.

Symbols: a = ædeagus; b = basistyle; dd = dorsal dististyle; g = gonapophysis; t = tergite; vd = ventral dististyle.

PLATE XLIII

PLATE XLIV

PLATE XLV

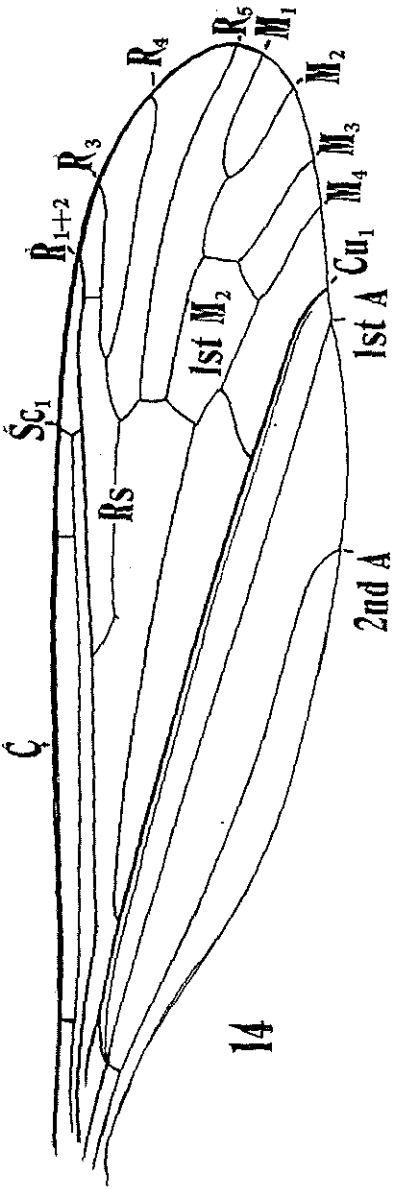

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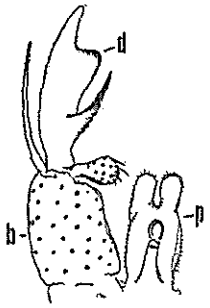
PLATE XLVII



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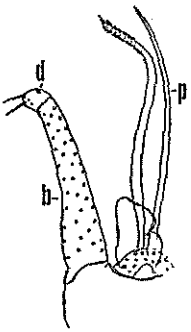

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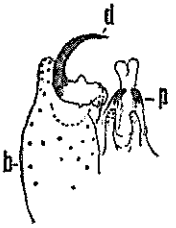

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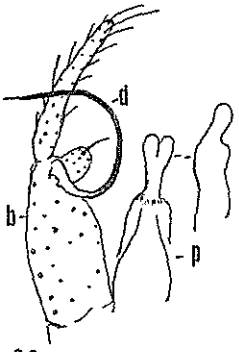

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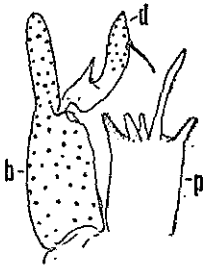

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