

NOTES ON NEARCTIC BIBIONID FLIES.

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INTRODUCTION.

Wishing to identify some Bibionidae and finding no keys available the writer decided to make some. The resulting keys and notes are based largely on the collections of the United States National Museum, and it is hoped that they will be useful to others desiring to study this neglected family. Among Nematocera in general the Bibionidae are distinguished by absence of transverse suture in mesonotum and of discal cell in wing, forking of the radial sector beyond the discal cross vein, and presence of three large ocelli on a well-developed ocellar prominence. Eliminating the flies properly separable as the family Scatopsidae, the Bibionidae may be separated from their nearer relatives with fair satisfaction. From all but the most primitive Mycetophilidae (*Paleoplasyra*, *Apemon*, etc.) they are distinguished by possession of two basal cells in the wing; most of them have short and compact (even if many-jointed) antennae, again in contrast to the majority of Mycetophilidae. The latter usually have all of the tibiae conspicuously spurred, while in the Bibionidae spurs of any magnitude are confined to the front tibiae. The Scatopsidae differ from the Bibionidae in much smaller average size, in possession of but one basal cell, and general reduction in venation. In these characters again they approach the Mycetophilidae, which differ, however, in the elongation of the coxae, and usually of the other leg joints and antennae.

In identifying various Bibionidae it is especially desirable, sometimes necessary, to have associated sexes of the species. By bearing this in mind collectors can greatly help the study of this family. Bibionidae exhibit what is apparently more than a fair share of injuries and malformations which may be connected with emergence from the soil. Distorted tarsal joints are not rare, and in the course of the present study the following more important abnormalities were observed: *Bibio femoratus* Wiedemann, a female from Plummers Island, Maryland, April 30, 1911 (W. L. McAtee), has the left front leg lacking a tarsus, the tibia being only about half the nor-

mal length and tapering off rather abruptly, ending in a short tubercle; *Bibio fraternus* Loew, a specimen collected at Castle Rock, Pennsylvania, May 3, 1908 (H. S. Harbeck), has the basal fourth of each hind tibia constricted, so as to form an extra joint in the leg, imperfect on one side, but apparently perfect on the other. In this connection it is worth recalling Dr. W. M. Wheeler's record¹ of an antenniform appendage branching from a fore coxa of *Dilophus tibialis* Loew.

The writer is indebted for loan of material used in the present study to Prof. J. M. Aldrich, curator of the Division of Insects, United States National Museum.

The location of types and other specimens is shown by names or initials in parentheses after citation of locality records. Type localities of described species are named in brackets following bibliographical citations.

KEY TO GENERA.

- A. Third longitudinal vein furcate (Pleciinae).
 B. Fourth and fifth veins forked.
 C. Distance between anterior cross vein and fork of fourth vein more than twice length of cross vein; antennae twelve-jointed.....*Hesperinus*
 CC. Distance between anterior cross vein and fork of fourth vein much less than twice length of cross vein; antennae 8- to 9-jointed.
 D. Fork of third vein very long, beginning near anterior cross vein; costal margin of wing sinuate.....*Crapitula*²
 DD. Fork of third vein much shorter, its origin remote from anterior cross vein; costal margin of wing not sinuate.....*Plecia*.
 BB. One or both of these veins not forked.
 E. Fifth vein not forked.....*Penthetria*.³
 EE. Neither the fourth nor fifth veins forked.....*Eupeitenus*.⁴
 AA. Third longitudinal vein not furcate (Bibioninae).
 F. Front tibia with two spurs at apex, the outer stronger.
 G. Third and fourth longitudinal veins coalescent for a short distance. *Bibiodes*.
 GG. Third and fourth veins not coalescent, joined by the anterior cross vein.....*Bibio*.
 FF. Front tibia with two or three series of spines; thoracic notum crossed by two pectinate ridges.....*Dilophus*.

¹ Arch. f. Entw. Mech. d. Org., vol. 3, 1896, pp. 26,108, pl. 16.

² Gimmerthal. An Asiatic genus; characters used in key derived from Loew's figure, Berl. Ent. Zeit., 1858, pl. 1, fig. 12.

³ Latreille. A European genus; characters used in key derived from Meigen's figure, Syst. Besch. Europ. zweifl. Ins., vol. 1, 1818, pl. 10, fig. 18. Loew (work cited, p. 105) states that the venation in the sexes is alike and that consequently Meigen's figure 17 of the male is incorrect.

⁴ Macquart, not Serville, as the former writes; he adopted a cabinet name of Serville, but published the original description himself (Dipt. Exot., vol. 1, 1838, pp. 84-5). Genotype *Penthetria atra* (Macquart, Hist. Nat. des. Insectes, vol. 1, 1834, p. 175) described from Philadelphia, but no specimens have been seen by the present writer. Characters used in the key derived from Macquart's figure (work first cited, pl. 12, fig. 3). Van Der Wulp identifies *P. atra* from Wisconsin (Tijds. v. Ent., vol. 5, 1869, p. 80). For description (as a new genus) of the fly identified as *Eupeitenus* by Coquillett see Proc. Ent. Soc. Wash., vol. 23, 1921, p. 49.

Genus *HESPERINUS* Walker.*HESPERINUS BREVIFRONS* Walker.

Hesperinus brevifrons WALKER (Francis), List of the Specimens of Dipterous Insects in the Collection of the British Museum,* pt. 1, 1848, p. 81 [St. Martin's Falls, Albany River, Hudson Bay].

More slender than the average Bibionid, antennae and legs elongate. Antennae twelve-jointed, second joint short, third about twice as long as fourth; general color of head and body black with grayish pruinose markings, the chief elements of which are a broad median and narrower lateral vittae on thorax, and a narrow median line on abdomen; head and thorax with short, abdomen, with longer pale hair; genital segment of male with a broad rounded cleft nearly half its length; anal plate rounded emarginate; legs copiously bristly-hairy, yellow brown, darker at end of joints especially on tarsi; halteres long, slender, stramineous; wings dusky hyaline, veins and stigma brown. Length of wings, 7 mm.

Specimens examined are from Currant Creek Valley, elevation 8,000 feet, Uinta National Forest, Utah, June 25, 1917, J. Silver (Biol. Survey). The species has been recorded also from New Hampshire, Rocky Mountains and Alaska.

This is one of the genera on the vague border line between the Mycetophilidae and Bibionidae; the long slender antennae and general appearance ally it to the former, but the lack of conspicuous spurs on posterior tibiae and presence of complete second basal cell in wing connect it perhaps more closely with the latter. Johannsen⁶ ranges this genus with the Bibionidae, but *Hesperodes*, which Coquillett compared⁷ with it, he assigns to the Mycetophilidae.

Genus *PLECIA* Wiedemann.

KEY TO SPECIES.

- A. Both sexes with the face produced in a beak as long as remainder of head; top of thorax reddish yellow; pleura and coxae brown to black-----bicolor.
 AA. Species without beak.
 B. Whole of thorax and coxae yellow-----confusa.
 BB. Body and legs wholly black-----heteroptera.

PLECIA BICOLOR Bellardi.

Plecia bicolor BELLARDI (Luigi), Saggio di Ditterologia Messicana, pt. 1, 1859, p. 16 [Cordova, Orizaba, Mexico].

Beak as long or longer than remainder of head, narrowed a little before apex where palpi are inserted; eyes large and contiguous in male, small and well separated in female. Top of thorax reddish

⁵ References are given in full the first time cited and abbreviated thereafter.

⁶ The Fungus Gnats of North America, pt. 1, Bull. 172, Maine Agr. Exp. Sta., Dec., 1909, p. 222.

⁷ Two New Genera of Diptera, Ent. News, vol. 11, No. 4, Apr., 1900, p. 429.

yellow, remainder of body and legs brown to black; hind femora but not the tibiae clavate, metatarsus about equal to next three joints; wings smoky brown. Length of wing, 5-8 mm.

A male and female labeled Tex. (U.S.N.M) and numerous specimens of both sexes from Orange, Texas, September 4, 1915, and Vinton Louisiana, September 5, 18, 1916, E. G. Holt, agree with others from Mexico and Central America.

Identification of this species as *P. bicolor* Bellardi is by no means certain. I have seen another species from Guatemala which fits the original description just as well. It has the hind metatarsus distinctly longer than the succeeding three joints of the tarsus, while the species here treated has these parts of about equal length. However, since specimens of the latter from Mexico are at hand and the known range is greater, indicating it may be the frequently recorded *bicolor*, that name is provisionally applied to it. Williston⁸ places *bicolor*, as a synonym of *collaris*, upon what grounds he does not say and I am unable to infer. The probabilities are against their being identical; we can be sure that they are at least varietally distinct.

PLECIA CONFUSA Loew.

Plecia confusa LOEW (Hermann), Ueber einige neue Fliegengattungen, Berliner Entomologische Zeitschrift, vol. 2, 1858, p. 109. [A new name for *Plecia ruficollis* FABRICIUS (J. C.), Systema Antiliatorum, 1805, p. 53, Middle America, as distinguished from *Plecia ruficollis* FABRICIUS, Species Insectorum, vol. 2, 1781, p. 410, Cape of Good Hope.]

Head without beak, eyes as in last species; whole thorax and coxae dull to bright orange or reddish yellow; remainder of body brown to black; wings smoky brown; hind femora but not the tibiae clavate; hind metatarsus about as long as succeeding three joints. Length of wing, 6-8 mm.

Specimens collected in Florida by Maynard and at Waco, Texas, by Belfrage are in the national collection. Loew's proposal of a new name for the American species resembling *Plecia ruficollis* Fabricius has been generally overlooked, but had Loew not taken such action it would have been done by some later student of the group, for there is very little probability that species from the Cape of Good Hope and from Middle America are identical. Further material and research may even show that Loew's name is too inclusive.

PLECIA HETEROPTERA Say.

B. [ibio] heteropterus SAY (Thomas), Descriptions of Dipterous Insects of the United States, Journ. Acad. Nat. Sci. Philadelphia, vol. 3, 1823, p. 78; Compl. Writings, vol. 2, 1859, p. 69 [Maryland].

Head without beak; eyes contiguous above in male, small and widely separated in female, ocellar tubercle prominent. A wholly

⁸ Biol. Centr. Amer., vol. 1, Suppl., p. 222, 1900.

black species (females sometimes brown), body opaque, occiput, and abdomen with rather long black hairs; long, slender, hind femora and tibiae clavate; hind metatarsus swollen (in male), about as long as next three joints together. Length of wing, 7–9 mm.

The known range of this species extends from Quebec and South Dakota to Georgia, Louisiana, and Colorado.

UNIDENTIFIED SPECIES.

PLECIA BIMACULATA Walker.

Plecia bimaculata WALKER (Francis), *Insecta Saundersiana*, vol. 1, Diptera, 1856, p. 422 [United States]. May be a *Dilophus*.

PLECIA LONGIPES Loew.

Plecia longipes LOEW (H.), *Neue Fliegengattungen*, Berl. Ent. Zeitsch., vol. 2, 1858, pp. 109–110 [New Orleans]. May be the same as *P. heteroptera* Say.

Genus BIBIODES Coquillett.

KEY TO SPECIES.

- A. Thickened portion of costal margin extending about halfway from stigma to apex of wing; femora conspicuously swollen, antennae shorter---femorata.
 AA. Thickened portion of costal margin extending much more than halfway from stigma to apex of wing; legs less robust; antennae longer.
 B. Halteres yellow; tarsal joints slender-----halteralis.
 BB. Halteres dark, at least apically; tarsal joints somewhat swollen--aestiva.

BIBIODES AESTIVA Melander.

Bibiodes aestiva MELANDER (A. L.), *The Dipterous Genus Bibiodes*. Bull. Amer. Mus. Nat. Hist., vol. 21, art. 27, Oct. 1, 1912, pp. 338–340 [Washington, Idaho, Montana, Wyoming].

Male.—Head and body shining black, with sparse, rather long, pale hairs; coxae and femora of same color and vestiture; anterior tibiae piceous, spurs rufous; anterior tarsi usually black, but tibiae and tarsi of posterior legs more or less yellowish or rufous, the joints darker apically, sometimes appearing banded; knobs of halteres dark, stalks pale; wings hyaline, stigma and veins near costa dark brown, remainder merely yellowish. Length of wing, 3.5–4 mm.

Specimens examined are four male paratypes from Lewiston and Craig's Mountain, Idaho (Aldrich).

BIBIODES FEMORATA Melander.

Bibiodes femorata MELANDER (A. L.), Bull. Amer. Mus. Nat. Hist., vol. 21, p. 340 [Austin, Texas].

Male.—Brownish black, shining, with plentiful, rather long, pale hair; spurs of front tibiae rufous; halteres pale fuscous; wings hyaline, stigma and veins near costa brown, remainder merely yellowish fumose. Length of wing, 3.5 mm.

Specimens examined are two male paratypes, Austin, Texas, December 13, 1899, A. L. Melander (Aldrich). On comparison with original description it would appear that these specimens have faded; that description alluding to jet-black general color and black halteres.

I have not described the genitalia of the species of this genus, as it is not necessary at present to base the classification upon them.

BIBIODES HALTERALIS Coquillett.

Bibiodes halteralis COQUILLET (D. W.), New North American Diptera, Proc. Ent. Soc. Wash., vol. 6, No. 3, July, 1904, p. 171 [California].

Male.—Black, shining, legs dark reddish brown; halteres yellow; head with short, body and legs with rather long yellowish white hairs; spurs of front tibiae rufous, the outer long and stout, the inner a mere pointed tubercle; wings nearly hyaline; the anterior veins and stigma brown, the posterior nearly colorless. Length of wing, 3.5 mm.

Specimens examined are from San Mateo County, California, C. F. Baker (type); Los Angeles, California, Coquillett (U.S.N.M.); Claremont, California, Baker (Aldrich).

Genus BIBIO Geoffroy.

A considerable number of the older names applied to American species of this genus remain unidentified. This is chiefly due to the fact that characters used in later diagnoses are not mentioned in earlier ones, and that elucidation of the obscure points has not been possible on account of lack of types or of opportunity of examining those in existence.

The male genitalia of *Bibio* undissected have not been found available for taxonomic use. They are not heavily chitinized, hence are not all constant in appearance in dried specimens of the same species; the superior plate is decidedly emarginate in all species examined, but the width of the emargination varies greatly, being strictly correlated with the degree to which the forceps are spread. Dissection of excised genitalia has not been attempted.

KEY TO THE SPECIES: MALES.

- A. Inner spur of front tibia long, sometimes nearly as long as outer.
 B. Legs almost entirely black.....**criorhinus**.
 BB. Legs with at least one joint yellow to rufous.
 C. Only the femora rufous.....**femoratus**.
 CC. More of legs yellow to rufous.
 D. Smaller species (wing, 4.5–6.5 mm.); body with rather short pale hair.
 E. Hind metatarsus distinctly shorter than succeeding three joints together.....**abbreviatus**.
 EE. Hind metatarsus about as long as succeeding three joints together.
fraternus.
 DD. Larger species (wing, 7.5–9.5 mm.); body with copious long gray to black hair.....**variabilis**.

- AA. Inner spur of front tibia much shorter than outer.
- F. Hind metatarsus distinctly enlarged, almost as thick as end of femur.
- G. Legs brown to black, not distinctly bicolored.
- H. Thorax and legs pale-haired.....longipes.
- HH. Thorax and legs dark-haired.....slossonae.
- GG. Legs distinctly bicolored.
- I. Tibiae, hind femora, and basal tarsal joints pale, dark-tipped.
inaequalis.
- II. All femora and succeeding joints yellow, dark-tipped.....fumipennis.
- FF. Hind metatarsus not distinctly enlarged, considerably less in diameter than end of femur.
- J. Legs almost entirely dark.
- K. Smaller species (wing, 4-5 mm.); first joint of hind tarsus but little longer than second.....tenuipes.
- KK. Larger species (wing, 5-9.5 mm.); first joint of hind tarsus twice as long as second.....albipennis.
- JJ. Legs distinctly bicolored.
- L. Only the femora (and front tibial spurs) yellow to rufous.....holtii.
- LL. More of legs yellow to rufous.
- M. Tibiae and tarsal joints rufous, dark-tipped, femora brown to black.....vestitus.
- MM. Femora and succeeding joints yellow to rufous, dark-tipped.
- N. Body usually pale-haired, leg joints pale, with dark tips.
- O. Wings hyaline to yellowish fumose; front tibiae narrower in proportion to length.....xanthopus.
- OO. Wings usually dusky hyaline; front tibiae broader in proportion to length.....nervosus.
- NN. Body dark-haired; leg joints often considerably dark-clouded.
tristis.

KEY TO THE SPECIES: FEMALES.

- A. Inner spur of front tibia long, sometimes nearly as long as outer.
- B. Only the femora rufous; wings blackish.....femoratus.
- BB. More of legs yellow to rufous.
- C. Wings yellow brown, darker costally.
- D. Smaller species (wing, 4-5-6.5 mm.).
- E. Hind metatarsus distinctly shorter than succeeding three joints together; thorax dark.....abbreviatus.
- EE. Hind metatarsus about as long as succeeding three joints together; thorax chiefly yellow to rufous.....fraternus.
- DD. Larger species (wing, 7.5-9.5 mm.).....variabilis.
- CC. Wings smoky, blackish costally.....basalis.
- AA. Inner spur of front tibia much shorter than outer.
- F. Body and legs brown to black, with pale hair.
- G. Smaller species (wing, 4-5 mm.).....tenuipes.
- GG. Larger species (wing, 5.5-9.5 mm.).....albipennis.
- FF. Body or legs in part yellow to rufous.
- H. Abdomen black.
- I. Top of thorax chiefly or entirely black.
- J. Smaller species (wing, 5-6 mm.).....slossonae.
- JJ. Larger species (wing, 7.5-9 mm.).
- K. Entire anterior margin of mesonotum pale.....humeralis.
- KK. Humeral ridge only pale.

- L. Wings yellowish fumose; front tibiae narrower in proportion to length.....**xanthopus.**
 LL. Wings dusky hyaline, front tibiae broader in proportion to length.....**nervosus.**
 II. Top of thorax yellow to rufous.
 M. Top of thorax only rufous; legs black.....**rufithorax.**
 MM. Whole thorax and legs pale, joints of latter dark-tipped...**longipes.**
 HH. Abdomen, as well as thorax and legs, testaceous, with only minor dark markings; head black.....**inaequalis.**

BIBIO ABBREVIATUS Loew.

Bibio abbreviatus LOEW (H.), Diptera Americae septentrionalis indigena, Centuria, 5, No. 9, 1864, Compl. Work, p. 217 [District of Columbia].

Male.—Head, body, and coxae black, the head with dark, the other parts with pale hair; femora and succeeding joints of legs yellow to rufous, dark-tipped; the front tibiae almost wholly dark; spurs pale, subequal; wings chiefly hyaline, the anterior veins and stigma dark.

Female.—The female differs in having shorter hair of head pale, the coxae yellow to rufous and wings fumose.

The distinguishing character of the species is the short hind metatarsus, which in both sexes is distinctly shorter than the succeeding three joints of tarsus combined; the hind tibiae of males are somewhat enlarged.

Length of wing, 4–6 mm.

Van Der Wulp has repeated the combination *Bibio abbreviatus* in describing⁹ a new species from Argentina.

Specimens examined were collected in Maryland, near the District of Columbia, and in Pennsylvania, Indiana, Michigan, Iowa, and South Dakota (all from the latter State being very small).

BIBIO ALBIPENNIS Say.

B. [ibio] albipennis SAY (Thomas), Desc. Dipt. U. S., Journ. Acad. Nat. Sci. Phila., vol. 3, 1823, p. 78; Compl. Writings, vol. 2, 1859, p. 69 [Pennsylvania].

KEY TO SUBSPECIES OF ALBIPENNIS.

- A. Pile usually longer and more abundant, especially on males; western. **B. albipennis hirtus.**
 AA. Pile shorter and less abundant; eastern.....**B. albipennis albipennis.**

BIBIO ALBIPENNIS ALBIPENNIS Say.

Bibliographical reference same as for species.

Male.—Head, body, and legs black, humeral ridge more or less marked with yellowish, legs brownish black distally, the tarsal joints narrowly pale basally; eyes with copious long, dark hair, remainder of body, coxae and femora with the same, pale yellowish to gray, tibiae with shorter dark hair; spurs of front tibiae very unequal,

⁹ Tijds. v. Ent., vol. 24 (1880–81), 1881, p. 145.

often rufous-tipped, hind legs moderately elongate, the femora and tibiae clavate, the first tarsal joint more than twice as long as second; wings whitish hyaline, stigma and all veins dark, the latter pale toward base of wing.

Female.—The female frequently has the body color reddish brown to brownish black and differs otherwise by having shorter, all pale hair on head and body (vestiture of legs does not differ); hind tibiae not clavate; wings somewhat duskier.

Length of wing, 5–9.5 mm.

BIBIO ALBIPENNIS HIRTUS Loew.

Bibio hirtus LOEW (H.), Dipt. Amer. Sept. indig., Cent. 5, No. 2, 1864, Compl. Work, p. 213 [California].

Similar to *albipennis* in every way, the only distinction being the more copious and longer hair, especially prominent in the case of males.

Individual eastern specimens may be practically as hairy as even Pacific coast flies, and specimens approaching *hirtus* seem to prevail in intermediate localities as Colorado and New Mexico.

The range of the western moiety of the species (*hirtus*) includes, on the basis of specimens examined, Idaho and the Pacific States from Orcas, Washington, to Pasadena, California, and the eastern subspecies (*albipennis*) from the Dakotas and Quebec south to North Carolina and Oklahoma.

BIBIO BASALIS Loew.

Bibio basalis LOEW (H.), Dipt. Amer. sept. indig., Cent. 5, No. 11, 1864, Compl. Work, p. 217 [New Hampshire].

Female.—Head and body black with short pale reddish hairs, coxae rufous the posterior ones obscured by darker, femora rufous, dark-tipped, front tibiae shining black with rufous subequal apical spurs, other tibiae rufous, tipped and more or less overlaid by black; tarsi chiefly dark, each joint pale basally; wings and veins dusky fumose darker costally. Length of wing, 5.5 mm.

A female collected at Manning, South Carolina, March 28–29, 1919, by E. R. Kalmbach answers to the description of *B. basalis*, except in size, which is notoriously variable in the genus.

BIBIO CRIORHINUS Bellardi.

Bibio criorhinus BELLARDI (L.), Ditterologia Messicana, pt. 1, 1859, p. 17 [Mexico].

Black except the subequal spurs of front tibiae, and the hind tibiae and tarsi which are rufescent, and narrow bases of front tarsal joints which are yellowish; head, body, and coxae clothed with long dark hairs; those of the rather elongate legs shorter. Length of wing, 7 mm.

A male collected in the Graham Mountains, Arizona, June, 1914, E. G. Holt, is identified as this species; the size is rather larger than the type according to Bellardi's measurements, but size is very variable in *Bibio*; in other characters the specimen agrees well with the original description.

BIBIO FEMORATUS Wiedemann.

Bib[io] femorata WIEDEMANN (C. R. W.), *Auszereuropaische zweiflügelige Insekten*, vol. 1, 1828, p. 79 [North America].

Bibio fuscipennis MACQUART (J.), *Dipteres nouveau ou peu connus*, vol. 1, pt. 1, 1838, p. 87 [North America].

Male.—Head, body, and coxae black; legs black, the femora except their extremities, the anterior tibial spurs, bases of tarsal joints, especially the anterior ones, rufous (occasional specimens have a greater proportion of legs pale); long hairs of body and legs pale, those of head darker; wings chiefly hyaline.

Female.—The female differs in having the shorter hairs of head pale and the wings smoky to black.

Length of wing, 7-9 mm.

The inner spur of front tibia varies more in length than is usual in other species, sometimes being only about half the length and scarcely deserving to be called subequal to the outer.

The known range of the species extends from New Hampshire, Michigan, and Colorado to Missouri and Virginia. Specimens from most parts of this range have been examined in connection with the preparation of this paper.

BIBIO FRATERNUS Loew.

Bibio fraternus LOEW (H.), *Dipt. Amer. sept. indig.*, Cent. 5, No. 8, 1864. Compl. Work, p. 216 [District of Columbia].

Male.—Head, body, and coxae black, the eyes with dark and other parts with pale hair; femora and succeeding leg joints yellow to rufous, dark-tipped; wings chiefly hyaline, anterior veins and stigma dark.

Female.—The female differs in having shorter hairs generally, all of them pale; anterior parts of pronotum and mesonotum, except for three more or less distinct dark vittae, sometimes part of pleura and the coxae, yellow to rufous; wings fumose.

In both sexes, the front tibiae are almost wholly black, the rufous spurs subequal, and the hind metatarsi equal or exceed in length the succeeding 3 tarsal joints combined.

Length of wing, 5-6.5 mm.

Specimens examined come from a range with the following States at its extremes: Connecticut, Iowa, Tennessee, and Virginia.

BIBIO FUMIPENNIS Walker.

Bibio fumipennis WALKER (Francis), List of the Specimens of Dipterous Insects in the Collection of the British Museum, pt. 1, 1848, p. 122 [St. Martin Falls, Albany River, Hudson Bay].

Male.—Head, body, and coxae black, the head with copious, long, dark hair, the other parts with same, pale yellow to grayish; legs rufous, the femora dark-tipped, the tibiae hardly so, except front ones each of which have a brownish annulus at base of the very unequal rufous spurs, last two or three tarsal joints dark, hind femora and tibiae clavate, and hind tarsi somewhat enlarged; wings yellowish fumose, deeper costally where the veins and stigma are brown. Length of wing, 7.5–8 mm. Female not seen.

Two males from Mount Washington, New Hampshire, Slosson, and Banff, Alberta, Sanson, identified by Coquillett may be this species; the original description does not refer to the anterior tibial spurs, hence without access to the type specimen identification can not be positive.

BIBIO HOLTII, new species.

Male.—Spurs of front tibiae very unequal; hind legs elongate, their femora and tibiae clavate, and metatarsi slightly enlarged; eyes reddish with copious, rather long black hair, occiput with long dark hair; body and coxae black with rather sparse, long pale (reddish to grayish) hair; femora except their extreme ends bright rufous, remainder of legs dark reddish-brown to black, femora with rather long, pale, and tibiae and tarsi with shorter dark hair; wings dusky fumose, both veins and membrane distinctly darker on costal half of wing; stigma brown.

Length of wing, 7 mm.

Type.—Cat. No. 24700, U.S.N.M. A male from Graham Mountains, Arizona, July 25, 1914, E. G. Holt (U.S.N.M.).

A paratype male, Geneva Park, Grant, Colorado, altitude 10,000 feet, August 19, 1914, differs in having the femora yellow, and in being smaller, the wing measuring 5.5 mm., E. C. Jackson (Biological Survey). Another paratype male from Custer, South Dakota (Aldrich), agrees well with the type; length of wing, 7 mm. This species is named for the collector of the holotype, Mr. E. G. Holt, who has collected many interesting and novel insects in the western States, a particularly notable lot of which were obtained in the Graham Mountains.

BIBIO HUMERALIS Walker?

Bibio humeralis WALKER (Francis), List. Dipt. British Mus., pt. 1, 1848, pp. 121–2 [Nova Scotia].

Female.—Head and body black, complete transverse inverted V-shaped band along suture between pronotum and mesonotum,

pleura largely, and legs, pale rufous; tibiae faintly brown-tipped and terminal tarsal joints dusky; all hair pale; wing yellowish fumose deepest along costa where the veins are nearly black, remaining veins and stigma brown. Length of wing, 8.5 mm.

A single female from Las Vegas, New Mexico, 6,400 feet, Cockerell, identified as *humeralis* by Coquillett (U.S.N.M.).

Walker's description does not mention the front tibial spurs, hence, strictly speaking, *humeralis* is unidentifiable from the description alone. Moreover, the specimen recorded is from a region far distant from the type locality. However, considering the correlation between altitude and latitude, the distribution indicated is not impossible, and for the present it seems best to accept Coquillett's identification of the New Mexican specimen rather than to describe a new species on the basis of a single female.

BIBIO INAEQUALIS Loew.

Biblio inaequalis LOEW (H.), Dipt. Amer. sept. indig., Cent. 5, No. 3, 1864, Compl. Work, pp. 213-4 [Sitka].

Biblio fumidus COQUILLET (D. W.), Report on Diptera of the Commander Islands, 1899, p. 343 [Copper Island].

Male.—Head, body, and coxae black, head with copious, long, dark hair, and body and coxae with same, pale yellowish; femora swollen, dark reddish brown, the hind ones clavate, yellowish basally; front tibiae, reddish brown with base and very unequal spurs yellowish; others yellowish, dark apically, the hind ones clavate; tarsi with the last two or three joints dark, the hind ones noticeably thickened; wings yellowish fumose, deeper costally, anterior veins and stigma brown.

Female.—The female differs in having only the head black, the thorax reddish brown with indications of dark vittae, the abdomen yellow brown, all with pale yellowish hair, shorter than in male; pleura and coxae reddish brown with more or less black markings, femora and succeeding leg-joints reddish yellow, slightly darker at tips, last two or three tarsal joints dark; wings as in male.

Length of wing, 7-8.5 mm.

Specimens examined, including the type series of *B. fumidus* Coquillett, are from Unalaska, Iditarod, and Saldovia, Alaska, Copper Island and Karagi Island, Kamchatka.

BIBIO LONGIPES Loew.

Biblio longipes LOEW (H.), Dipt. Amer. sept. indig., Cent. 5, No. 12, 1864, Compl. Work, pp. 217-8 [District of Columbia].

Male.—Entirely black except for the outer (and much longer) spurs of anterior tibiae, head with long dark hairs, and body, coxae and femora with long gray to reddish hair; hind legs elongate,

femora and tibiae clavate, tarsal joints thickened; wing hyaline, anterior veins and stigma brown.

Female.—The female has entire thorax, coxae and succeeding leg joints rufous, dark-tipped (tarsi sometimes chiefly dark), and the hair much shorter and all pale; wing yellowish fumose, costal cell opaque yellowish, stigma and anterior veins brown.

Length of wing, 5–8 mm.

Specimens from New Hampshire, Massachusetts, New Jersey, Maryland, District of Columbia, and Virginia have been examined; the species has been recorded also from Quebec. Two males from near Flagstaff, Arizona, October 15, 1914, E. G. Holt, having the hair of head and thorax black and of pleura, legs, and abdomen pale, are intermediate between *longipes* and *slossonae*. A specimen from Yale, Idaho (Aldrich), seems to agree in every way with *longipes*, further indication of the close relationship of this form with *slossonae*, which has so extended a range in the north.

BIBIO NERVOSUS Loew.

Bibio nervosus LOEW (H.), Dipt. Amer. sept. indig., Cent. 5, No. 4, 1864, Compl. Work, p. 214 [California].

Male.—Black, shining, eyes with dark hair, body, coxae, fore and mid femora clothed with plentiful long gray hair; femora and succeeding leg joints rufous, tipped with black; wings smoky hyaline dusky near costa, the veins there and stigma being black.

Female.—Head and body black with short gray hair; coxae and succeeding leg joints rufous, those from femora on, dark-tipped; front tibia with basal and subapical black bands; wings dusky hyaline brown costally with black veins and stigma.

Length of wing, 6.5–8 mm.

Specimens examined are from Moscow, Idaho, and Sierra Morena Mountains, and Palo Alto, California (Aldrich); Wenatchee, Washington (U.S.N.M.).

Very similar to *B. xanthopus*, from which it differs in both sexes by the duskiest wings and the front tibiae being broader in proportion to their length.

BIBIO RUFITHORAX Wiedemann.

Bib. [io] rufithorax WIEDEMANN (C. R. W.), Ausz. zweif. Ins., vol. 1, 1828, p. 79 [Pennsylvania].

Humeral ridge, top of meso- and meta-notum rufous, head and body otherwise black, each with short concolorous hair; legs dark reddish-brown to black, pulvilli yellow, spurs of anterior tibiae very unequal; wings and veins blackish fumose darker costally, stigma almost wholly obscured. Length of wing, 8.5–9 mm.

Two females seen: Myrtle Beach, Horry County, South Carolina, April 22, 1919, E. R. Kalmbach (Biol. Survey); Paris, Texas, June

14, 1904, A. A. Girault (U.S.N.M.). The species has been recorded also from Florida.

BIBIO SLOSSONAE Cockerell.

Biblio slossonae COCKERELL (T. D. A.), Fossil Insects from Colorado, The Entomologist, vol. 42, p. 174, July, 1909. New name for *B. gracilis* Walker, 1848, not of Unger, 1841.

Biblio gracilis WALKER (Francis), List Dipt. Ins. Brit. Mus., vol. 1, 1848, p. 123 [Nova Scotia].

Male.—With head and body black, the head and thorax with copious long black hair, abdomen with the same, gray; legs brown to black, joints having a tendency to be pale basally and dark apically, the coxae and femora long haired, slender, the posterior elongate, hind femora and tibiae clavate, hind tarsi enlarged; spurs of front tibiae very unequal, rufous; wings hyaline with a slight yellowish cast.

Female.—The female differs by all the hair being short and pale and the pleura, coxae, and succeeding leg joints (except for faint dark tips) yellowish rufous; wings a little more deeply suffused with yellowish brown; stigma and anterior veins in both sexes brown.

Length of wing, 5–6.5 mm.

Specimens examined are from Unalaska, Ontario, Maine, New Hampshire, Massachusetts, Maryland, and Arizona. Only males have been identified. Is this form merely a dimorphic male of *B. longipes* Loew?

BIBIO TENUIPES Coquillett.

Biblio tenuipes COQUILLET (D. W.), New Diptera from North America, Proc. U. S. Nat. Mus., vol. 25, p. 95, Sept. 12, 1902 [Williams, Arizona].

Head and body black, narrow, humeral ridge pale yellow; hair of eyes of male black, hair elsewhere in both sexes pale yellow to grayish, shorter on female; legs dark reddish brown, the front tibial spurs rufous, very unequal, hind legs but little longer than others, joints scarcely clavate, first joint of hind tarsus but little longer than second; wings sordid hyaline, all the veins brown. Length of wing, 4–7 mm.

Specimens examined include the type from Williams, Arizona, June 5, H. S. Barber, and numerous others from Las Vegas, New Mexico, May 4, 1904; Santa Fe, New Mexico, May 6, H. S. Barber; Boulder, Colorado, May 22, 1907, S. A. Rohwer (U.S.N.M.).

BIBIO TRISTIS Williston.

Biblio tristis WILLISTON (S. W.), in Kellogg, V. L., Insect Notes, Trans. Kansas Acad. Sci. (1891–2), 1893, pp. 113–14 [Western Kansas].

Male.—Head, body, and coxae black with moderately long black hair; femora and succeeding leg joints, rufous, tipped or more ex-

tensively obscured with darker; spurs of front tibiae rufous, very unequal; wing and veins dusky fumose, darker costally. Length of wing, 6 mm.

The female also, according to Williston, is chiefly black pilose, thus differing from most of the species of *Biblio*, and has the coxae, except front ones in part, black.

A male collected in the Graham Mountains, Arizona, at an altitude of over 9,000 feet, June 3-6, 1914, by E. G. Holt is assigned to this species.

BIBIO VARIABILIS Loew.

Biblio variabilis LOEW (H.), Dipt. Amer. sept. indig., Cent., 5, No. 7, 1864, Compl. Work, pp. 215-6 [Sitka; New Hampshire].

Male.—Head, body and coxae black, clothed with long hair varying from gray to black, chiefly the former on abdomen, pleura, and legs, and the latter on top of thorax and on occiput; sometimes wholly black pilose; femora black, the mid and hind pairs often rufous near bases (all of them sometimes almost entirely rufous); tibiae and tarsal joints rufous basally, dark apically, the subequal spurs of front tibiae rufous; wings hyaline, anterior veins and stigma brown.

Female.—The female differs in having much shorter wholly pale hair, all leg joints rufous with dark tips (coxae sometimes dark at base or even wholly black), and the wings fumose.

Length of wing, 6-10 mm.

Specimens examined were all collected along the northwest coast of North America from Corvallis, Oregon, to Yakutat, Alaska. The species has been recorded also from Quebec.

BIBIO VESTITUS Walker.

Biblio vestita WALKER (Francis), List. Dipt. British Mus., pt. 1, 1848, p. 122 [Nova Scotia].

Head, body, and legs black, clothed with black hairs, abundant and long over head, body, coxae and femora, shorter on remaining joints of legs; tibiae and tarsal joints rufous with dark tips, the last two joints of tarsi almost or wholly dark; front tibiae reddish-brown, the spurs very unequal; wings nearly hyaline, stigma and anterior veins brown, the cells bounded by latter more obscure than remainder of wing, posterior veins almost hyaline. Length of wing, 7 mm.

A male collected at St. John, New Brunswick, June 9, 1901, W. McIntosh, is identified by Coquillett as *vestitus* and probably is that species; the original description does not mention the front tibial spurs.

BIBIO XANTHOPUS Wiedemann.

Bib. [io] xanthopus WIEDEMANN (C. R. W.), Ausz., zweifl. Ins., vol. 1, 1828, p. 80 [New York].

KEY TO SUBSPECIES OF XANTHOPUS.

- A. Pleura of female wholly dark; male with the hair more copious and longer, usually darker, sometimes black.....**B. xanthopus palliatus.**
 AA. Pleura of female often in part yellow to rufous; male with less abundant and shorter hair usually pale on thorax and abdomen.....**B. xanthopus xanthopus.**

BIBIO XANTHOPUS XANTHOPUS Wiedemann.

Bibliographical reference as for species.

Male.—Head, body, and coxae black, head with black, body and coxae with usually pale yellow to grayish hair; femora and succeeding leg joints yellow to rufous, dark-tipped, the very unequal spurs of front tibiae rufous; humeral ridge, narrowly pale; wings slightly fumose, a little deeper costally, all of the veins dark, the anterior ones and stigma darkest.

Female.—The female differs by having shorter, pale hair on head, the coxae and pleura often in part yellow to rufous, pale humeral ridge more distinct, and wings more yellowish, sometimes dusky fumose.

Length of wing, 5.5–9.5 mm.

The range of this subspecies, on the basis of specimens examined, extends from Maine, Ontario, and Michigan to Pennsylvania, Tennessee, Colorado, and New Mexico. It has been reported also from Quebec.

BIBIO XANTHOPUS PALLIATUS new subspecies.

Differs from the typical subspecies in darker colors, more abundant pubescence, and somewhat greater average size. The pleura of female usually are wholly dark; the male has more abundant, longer, and darker hair, sometimes wholly black. This subspecies bears somewhat the same relation to the eastern race of *xanthopus* that *hirtus* does to *albipennis*. Length of wing, 7.5–9.5 mm.

Type.—A male, Moscow, Idaho, May 7, 1894; allotype, female mounted on same pin with type. Paratypes from Tacoma and Seattle, Washington, British Columbia and Vancouver Islands (Aldrich).

SPECIES NOT IDENTIFIED.

BIBIO ARTICULATUS Say.

Bibio articulatus SAY (Thomas), Journ. Acad. Nat. Sci. Philadelphia, vol. 3, 1823, p. 78; Compl. Writings, vol. 2, 1859, p. 69 [Pennsylvania].

Since there is no type specimen of Say's species and the original description does not refer to the length of tarsal joints, this species became unidentifiable when Lowe described *abbreviatus* with short hind metatarsi.

BIBIO BALTIMORICUS Macquart.

Biblio baltimoricus MACQUART (J.), Dipt. Exot. 5 Suppl. 1855, pp. 37-38 [Baltimore].

BIBIO BRUNNIPES (Fabricius).

Tipula brunripes FABRICIUS (J. C.), Ent. Syst., vol. 4, 1794, p. 250 [Newfoundland].

BIBIO CANADENSIS Macquart.

Biblio canadensis MACQUART (J.), Dipt. Exot., vol. 1, 1838, p. 179 [Canada].

BIBIO CASTANIPES Jaenicke.

Biblio castanipes JAENNICKE (F.), Neue exotische Dipteren, Ab. d. senckenb. naturf. Gesellsch., vol. 6, 1867, p. 317 [Illinois].

BIBIO LUGENS Loew.

Biblio lugens LOEW (H.), Dipt. Amer. sept. indig., Cent. 5, No. 6, 1864, Compl. Work, pp. 214-5 [Winnipeg].

BIBIO NIGRIPILUS Loew.

Biblio nigripilus LOEW (H.), Dipt. Amer. sept. indig., Cent. 5, No. 10, 1864; Compl. Work, p. 217 [Winnipeg].

BIBIO OBSCURUS Loew.

Biblio obscurus LOEW (H.), Dipt. Amer. sept. indig., Cent. 5, No. 5, 1864, Compl. Work p. 214 [Hudson Bay Territory]. Probably the same as *B. xanthopus* Wiedemann.

BIBIO ORBATUS Say.

Biblio orbatus SAY (Thomas), Journ. Acad. Nat. Sci. Phila., vol. 3, 1823, p. 78; Compl. Writings, vol. 2, 1859, pp. 69-70 [Pennsylvania]. See discussion under *Dilophus orbatus*.

BIBIO PALLIPES Say.

Biblio pallipes SAY (Thomas), Journ. Acad. Nat. Sci. Phila., vol. 3, 1823, pp. 76-7; Compl. Writings, vol. 2, 1859, pp. 68-9 [Pennsylvania]. Remark in connection with *B. articulatus* applies here also.

BIBIO RUFIPES Fabricius.

Tipula rufipes FABRICIUS (J. C.), Species Insectorum, vol. 2, 1781, p. 410 [Newfoundland].

BIBIO SCITA Walker.

Biblio scita WALKER (Francis), List Dipt. British Mus., pt. 1, 1848, p. 122 [Nova Scotia].

BIBIO SENILIS Wulp.

Biblio senilis WULF (F. M. van der), Noglets over Noord-Americaansche Diptera, Tijdschrift voor Entomologie, vol. 12, 1869, pp. 81-2 [Wisconsin].

BIBIO STRIATIPES Walker.

Biblio striatipes WALKER (Francis), List Dipt. British Mus., pt. 1, 1848, pp. 122-3 [St. Martin Falls, Albany River, Hudson Bay].

DILOPHUS BREVICEPS Loew.

Dilophus breviceps LOEW (H.), Dipt. Amer. sept. indig., Cent. 9, No. 59, 1869, Compl. Works, vol. 2, p. 200 [New Hampshire].

Male.—Eyes with short dark hair, head and body shining black with longer pale hair; genital segment with a U-shaped cleft half its length, superior plate about as long as wide across hind margin which is very slightly convex; legs brownish black the fore femora darkest, hair of legs generally pale, tending to be darker on tarsi especially the front ones; wings nearly hyaline, veins near costa yellow-brown, stigma nearly obsolete.

Female.—Head black, basal joint of antenna in part or wholly pale; thorax yellow to rufous, sometimes touched with brown to black on pleura, front of prothorax, and scutellum; abdomen velvety brown to black above, sordid yellow to brown below; coxae and femora yellow, tibiae and tarsi pale fuscous the anterior darker, the front tarsi sometimes black; hair pale with the exception of that on front tarsi which is dark; halteres with the knob fuscous, the stalk pale; wings yellowish fumose, the veins nearly concolorous, those near costa sometimes darker; stigma large, light to dark brown.

Length of wing, 3.5–4.5 mm.

Three females from North Carolina examined and a male and female labeled Mannanattawa, June 25, 1903, W. J. Wilson.

DILOPHUS CAURINUS, new species.

Male.—Entirely shining or subshining black, eyes with copious long dark hair, hair of other parts of body and of coxae and femora long, pale; of tibiae and tarsi shorter, more bristly, tending to be darker especially on tarsi; genital segment cleft about half its length, the cleft often distinctly expanded at bottom, superior plate only about three times as long as wide along hind margin which is slightly concave; wing grayish hyaline, veins near costa and large stigma pale brown.

Female.—Head and thorax black, abdomen brown, with pale hairs; humeri, front (sometimes all) coxae, and femora yellow to rufous with pale hair, tibiae and tarsi brownish to black, color of hair corresponding to depth of coloring of joints; halteres with pale stalks and dark knobs; wings clear to yellowish hyaline, sometimes with transverse dusky clouding at level of stigma, veins near costa and stigma brownish, others nearly hyaline.

Length of wing, 4.5–6 mm.

Type.—Cat. No. 24701, U.S.N.M. A male, Popoff Island, Alaska, July 12, 1899, T. Kincaid (U.S.N.M.).

Paratypes of both sexes, Friday Harbor, Washington, July 17–23, 1905, May 29, June 1, 1906; San Juan Island, Washington, May 31, 1906, and Seattle, Washington (Aldrich).

DILOPHUS EMARGINATUS, new species.

Male.—Body shining black, legs more brownish, the front tibiæ darker; close-set hair of eyes dark, longer hair of underside of head, body and greater part of legs pale, of front tibiæ and tarsi dark; genital segment with a cleft half its length, rounded expanded at the bottom, superior plate decidedly not transverse, about as long as wide across hind margin which is distinctly angularly emarginate; wings hyaline, veins near costa brown, stigma nearly obsolete.

Female.—Humeri obscurely castaneous, thorax otherwise, and head shining black, abdomen velvety brownish black; legs rufous more or less suffused with brown, the front coxæ and femora palest; all hairs pale; wings hyaline, veins near costa and distinct stigma brown.

Length of wing, 4.5 mm.

Type.—Cat. No. 24702, U.S.N.M. Male and allotype collected at Samoa, California, May 23, H. S. Barber (U.S.N.M.).

DILOPHUS OBESULUS Loew.

Dilophus obesulus LOEW (H.), Dipt. Amer. sept. indig., Cent. 9, No. 60, 1869; Compl. Work, vol. 2, p. 200 [District of Columbia].

Male.—Lower surface of head black with long pale hair, eyes with shorter more abundant dark hair, thorax and abdomen shining black with long, sparse, pale hair; genital segment with a U-shaped cleft about half its length, superior plate transverse, about four times as broad as long, its hind margin slightly concave; legs reddish brown to black, in general pale haired but hairs on tibiæ and tarsi (especially the front ones) often in part or wholly dark; wings and veins nearly hyaline, slightly fumose costally, stigma almost obsolete.

Female.—Head black with short pale hair; humeri rufous, thorax elsewhere above shining black with sparse pale hair; pleura brownish-black more or less spotted with paler; abdomen velvety brownish black with abundant pale hair; coxæ and femora (and sometimes the front tibiæ) yellow to rufous, pale haired; trochanters, tibiæ (except front pair occasionally) and tarsi, fuscous to black chiefly darker haired; wings nearly hyaline, veins near costa brown, rather large stigma nearly black. Females from western localities usually have more or less dusky clouding transversely in the wing as the level of the stigma.

Length of wing, 4–5 mm.

Specimens examined are from Plummers Island, Maryland, Great Falls and Dead Run, Virginia; Cochetopa National Forest, Colorado, and Mott, North Dakota (Biological Survey); Pennsylvania, La Fayette, Indiana, and Moscow, Idaho (Aldrich). Two males from British Columbia (U.S.N.M.) are very similar, but I do not care to record them definitely as *D. obesulus*.

DILOPHUS ORBATUS Osten Sacken.

D. [ilophus] orbatus OSTEN SACKEN (C. R.), in LeConte's edition of The Complete Writings of Thomas Say on the Entomology of North America, vol. 2, 1859, p. 70 [Florida].

In the paper of 1823 in which Say's other species of *Dilophus* and *Biblio* were described (to which several references are made in the present article) he proposed a species *Biblio orbatus*.¹¹ Later authors (Wiedemann, 1828, Bellardi, 1859, and Osten Sacken, 1859) have used the name *orbatus* in the genus *Dilophus*, in each case probably for a different species.

Say was perfectly aware of the characters distinguishing *Biblio* from *Dilophus*, and it has not been found necessary to shift any other of his species as between these two genera. I fail, therefore, to see the point of rejecting Say's assignment of *orbatus* to the genus *Biblio* and accepting that to *Dilophus* by Wiedemann. While Osten Sacken says "Wiedemann . . . had specimens communicated by Say before him," there is no definite evidence that such was the case. Wiedemann did not have specimens of all of Say's species and his usual remark when he had seen specimens, "In meiner Sammlung," is lacking in this instance. Even had such specimens been available to Wiedemann, the chances of transposition or error in labels are such that we could by no means accept Wiedemann's reference of *orbatus* to *Dilophus* when Say certainly was just as well informed as he with respect to the generic characters. Wiedemann's action is best regarded as a misidentification and the name *Dilophus orbatus* Wiedemann as a synonym of *Biblio orbatus* Say.

Wiedemann's action therefore does not preoccupy the combination *Dilophus orbatus* and the next description under this combination, undoubtedly referring to a *Dilophus*, should be recognized. This combination is present in the contribution of Osten Sacken, cited at the beginning of this discussion, and in the first installment of Bellardi's "Saggio di Ditterologia Messicana," both published in 1859. So far I have found no means of deciding as to priority between these works, but since Osten Sacken's name undoubtedly refers to the Nearctic form it is selected for use in the present connection.

Male.—Head, body, and legs brownish to black, mostly shining, with black hairs; genital segment with a broad cleft about half its length, superior plate half as long as wide moderately convex posteriorly; wing sordid-hyaline, yellowish near costa where the veins and stigma are pale fuscous.

Female.—Same description applies except as to genitalia and wings; latter dusky to blackish, veins darker costally, stigma large, but little darker than surrounding membrane.

Length of wing, 3.5–5.5 mm.

¹¹ Compl. Writings, vol. 2, 1859, pp. 69–70 [Pennsylvania].

Specimens examined are from Haulover, Capron, Biscayne Bay, Buena Vista, Palm Beach, and Miami, Florida, Baton Rouge, Louisiana, and from Texas (U.S.N.M.); Pass Christian, Mississippi (Aldrich).

The distribution of *Dilophus orbatus* Osten Sacken (the species not being known north of the Gulf Coast), casts additional doubt on the identification of it with *Bibio orbatus* Say, which was described from Pennsylvania.

DILOPHUS PROXIMUS, new species.

Male.—Head, body, and legs, piceous to black, shining, with pale hair, except on eyes, front tibiae and all tarsi; genital segment cleft, half its length, superior plate transverse, about four times as wide as long, straight or slightly concave posteriorly; wings hyaline, veins near costa and rather distinct stigma light brown.

Female.—Head and thorax except humeri shining black, and abdomen velvety brown, all with short pale hair; humeri and legs chiefly yellow to rufous, tibiae and tarsi, especially of the front legs deeper colored, sometimes black; in pale specimens the trochanters, distal tarsal joints and apices of other tarsal joints only are black, hair of legs except tarsi pale; wings hyaline, veins near costa and stigma brown.

Length of wing, 3–5 mm.

Type.—Cat. No. 24703, U.S.N.M. Male and allotype labeled "Colo." (U.S.N.M.); paratype, male and female, Hunters Creek, Wyoming, September 11, 1895 (Aldrich).

DILOPHUS SECTUS, new species.

Male.—Body shining black, legs brownish black; eyes with short, close-set, dark hair; body and legs with longer, sparse pale hair, except on tarsi where it is chiefly dark; genital segment cleft nearly to its base, superior plate about three times as wide as long, distinctly concave posteriorly; wings hyaline, veins near costa and nearly obsolete stigma yellowish brown.

Female.—Head shining black, with a few short pale hairs; thorax chiefly shining black with short sparse pale hairs, humeri yellowish-rufous and indistinct patches on pleura and scutellum yellowish brown; abdomen velvety brownish-black, with pale hairs; coxae and femora yellowish rufous; trochanters tibiae and tarsi fuscous to black, those of anterior legs darkest; hair of legs chiefly pale except on tarsi; wings as in male, stigma somewhat more distinct.

Length of wing, 4.5–5.5 mm.

Type.—Cat. No. 24704, U.S.N.M. A male, Franconia, New Hampshire, A. T. Slosson; allotype, same data; paratype, female, White Mountains, Morrison (U.S.N.M.).

DILOPHUS SEROTINUS Loew.

Dilophus serotinus LOEW (H.), Dipt. Amer. sept. indig., Cent. 1, No. 15, 1861; Compl. Work, pp. 9-10 [Illinois].

Male.—Entirely shining black, shorter hair of eyes and longer hair of hind part of abdomen, distal parts of tibiae and of the tarsi black, of remainder of body pale; halteres black and the stalk pale; wings and veins dusky to blackish, darkest costally; stigma large; genital segment cleft about half its length; superior plate half as long as wide, its hind margin somewhat rounded and shallowly but distinctly emarginate in middle.

Female.—Head black; thorax yellow to rufous, humeri, pleura, combs, and scutellum more or less touched with black; abdomen velvety brown to black; genitalia tipped with yellow; coxae (except hind ones sometimes in part) and femora except ends yellow to rufous; trochanters, tibiae and tarsi brown to black; hair of head, body and legs to and including femora pale, of tibiae and tarsi dark; halteres and wings as in male.

Length of wing, 4.5-8.5 mm.

Specimens examined are from Kansas, Missouri, Illinois, Maryland, Virginia, and Mississippi.

DILOPHUS SPINIPES Say.

D. [ilophus] spinipes SAY (Thomas), Des. Dipt. U. S., Journ. Acad. Nat. Sci. Phila., vol. 3, 1823, pp. 79-80; Compl. Writings, vol. 2, 1859, p. 71 [Missouri].

D. [ilophus] thoracicus SAY (Thomas), Des. Dipt. U. S., Journ. Acad. Nat. Sci. Phila., vol. 3, 1823, p. 80; Compl. Writings, vol. 2, 1859, pp. 71-72 [Pennsylvania, Maryland].

Dilophus dimidiatus LOEW (H.), Dipt. Amer. Sept. indig., Cent. 8, No. 3, 1860; Compl. Work, vol. 2, p. 118 [New York].

There is considerable variation in size and color in this species, sufficient in my opinion to cover the three described forms above cited. This is the only nearctic species having three series of spines on the front tibia.

Male.—Rostrum long, extended proboscis longer than antennae; lower part of compound eyes black, upper reddish, thorax in general rufous, but prothorax, the toothed ridges, middle of pleura and scutellum black; abdomen velvety black; genital segment cleft about half its length, superior plate about three times as wide as long, hind margin rounded angulate; front and mid coxae and femora chiefly rufous; remainder of legs black; hair of head, body and legs black; halteres dusky, wings and veins dusky, darker costally.

This, the only male at hand, is of the *thoracicus* type, but it is believed that variations in this sex parallels that of females, as

noted in the succeeding description, and is sufficient to cover the color differences attributed to Say's two species.

Female.—Rostrum long, extended proboscis longer than antenna; head black; thorax yellow to rufous more or less marked with black on humeri, pleura, combs and scutellum; abdomen velvety brown to black, genitalia chiefly yellow; front and mid coxae and corresponding, sometimes all, femora yellow to rufous; tibiae and tarsi brown to black; short sparse hair on head and thorax, more copious on abdomen and legs chiefly concolorous with the surface of origin; wings and veins dusky, darker costally.

Length of wing, 5–6 mm.

Specimens examined are from New England, Minnesota, Maryland, Virginia, North Carolina, and Florida.

DILOPHUS STIGMATERUS Say.

D. [ilophus] stigmaterus SAY (Thomas), Desc. Dipt. U. S., Journ. Acad. Nat. Sci. Phila., vol. 3, 1823, pp. 79–80; Compl. Writings, vol. 2, 1859, pp. 70–71 [Missouri].

Male.—Rostrum about as long as the short antenna; eyes reddish with short dark hair; remainder of head and body shining black with a moderate amount of longer pale hair; legs varying from yellowish rufous to brownish black with abundant pale hair; genital segment with only a shallow cleft, superior plate about three times as wide as long, the hind margin moderately convex; knob of halteres dark, stalks pale; wings nearly hyaline, veins of costal region and small rather indefinite stigma brown.

Female.—Rostrum about as long as the short antenna; extended mouth parts three times as long; head black the rostrum sometimes yellow to rufous; thorax yellow to rufous, combs, pleura and scutellum more or less touched with darker; abdomen velvety brown, genitalia more or less tipped with yellow; legs yellow to rufous, spines of front tibiae and tips of tarsal joints (apical joints of tarsi sometimes entirely) black; knob of halteres dark, stalk pale; wings and veins yellowish hyaline, veins of costal region and large distinct stigma brown.

Length of wing, 3.5–5 mm.

Specimens examined are from Wisconsin, Colorado, and New Mexico.

DILOPHUS STRIGILATUS, new species.

Male.—Shining black (legs sometimes brownish), with sparse pale hair; eyes reddish with short erect black hair; stalks of halteres pale; wings hyaline, veins near costa, and stigma dark brownish to black; genital segment cleft somewhat less than half its length, approaching in this respect *D. tibialis*, from which it differs in smaller size—wing 4 mm. or slightly less, as contrasted to 5–6 mm. in the former.

Female.—Similar to *D. breviceps* in coloration, but distinguished from this and other species by the conspicuous development of the prothoracic comb; head black; rostrum of ordinary length; thorax rufous, touched with black on pleura, and combs, the anterior of which is very strongly developed, with long stout teeth, height of comb nearly equal to length of eye; abdomen brown, darker basally; coxae and femora chiefly rufous, trochanters, ends of femora, tibiae and tarsi black; hairs pale except on tarsi and to some extent on tibiae; halteres with dark knob and pale stalk; wings yellowish to dusky fumose, veins near costa and large stigma dark brown. Length of wing, 5 mm. or slightly less.

Type, a female from Catalina Island, California, Baker (U.S. N.M.). Paratypes include a female, with same data, and numerous specimens of both sexes from Mount Lowe, July 3, 1917, and Mount Wilson, California (Aldrich). A female from Palo Alto, California, May 1, 1906, also is included here, but is not made a paratype; it is somewhat intermediate in characters between *strigilatus* and *occipitalis*.

Type.—Cat. No. 24705, U.S.N.M.

DILOPHUS TIBIALIS Loew.

Dilophus tibialis LOEW (H.), Dipt. Amer. sept. indig., Cent. 9, No. 61, 1869; Compl. Work, vol. 2, p. 200 [Sitka].

Male.—Head, body, and legs brownish to black, chiefly shining, with copious, rather long pale hair; genital segment cleft only about one-fourth its length, superior plate almost straight across hind margin; wings and veins nearly hyaline, membrane somewhat fumose costally, veins brown; stigma nearly obsolete, the vein running through it distinct.

Female.—Head, body and legs with copious, rather long pale hair, as in male; head, top of thorax chiefly, pleura in part, and scutellum brownish black or black, shining; abdomen pale brown to brownish black: humeri, pleura in part, coxae (at least the front ones) and femora yellow to rufous; mid and hind coxae sometimes, trochanters, tibiae and tarsi brownish to black; wings as in male, the stigma a little more distinct.

Length of wing, 5–6.5 mm.

Specimens examined are from Berg Bay, Yakutat, Sitka, and Juneau, Alaska.

SPECIES NOT IDENTIFIED.

DILOPHUS FULVICOXA Walker.

Dilophus fulvicoxa WALKER (Francis), List Dipt. British Mus., pt. 1, 1848, p. 117 [St. Martin Falls, Albany River, Hudson Bay].

DILOPHUS LONGICEPS Loew.

Dilophus longiceps LOEW (H.), Dipt. Amer. Sept. indig., Cent. 1, No. 14, 1861, Compl. Work, p. 9 [Illinois].

DILOPHUS OCCIPITALIS Coquillett.

Dilophus occipitalis COQUILLET (D. W.), in Baker, C. F., Reports on Californian and Nevadan Diptera, I, Invertebrata Pacifica, vol. 1, p. 20, February 10, 1904 [Claremont, Calif., type No. 7669, U.S.N.M.].

This probably is a synonym of *D. breviceps* Loew. The female type supports this belief, but associated sexes from the type locality should be examined before a definite statement is made on this synonymy.

DILOPHUS PUSILLUS Wiedemann.

Dilophus pusillus WIEDEMANN (C. R. W.), Ausz. zweifl. Ins., vol. 1, 1828, p. 77. [United States?].

DILOPHUS SERRATICOLLIS Walker.

Dilophus serraticollis WALKER (Francis), List Dipt. British Mus., pt. 1, 1848, p. 117 [St. Martin Falls, Albany River, Hudson Bay].

This species has been identified by subsequent authors from New York, Colorado, and Alaska, but on color characters only.

INDEX.

This index includes all the generic and specific names treated in this paper. Generic names are in bold face type, valid specific names in roman and synonyms in italics.

	Page.		Page.
abbreviatus Loew (<i>Bibio</i>)-----	8	<i>longipes</i> Loew (<i>Plecia</i>)-----	5
<i>aestiva</i> Melander (<i>Bibiodes</i>)---	5	<i>lugens</i> Loew (<i>Bibio</i>)-----	17
<i>albipennis</i> Say (<i>Bibio</i>)-----	8	<i>nervosus</i> Loew (<i>Bibio</i>)-----	13
<i>articulatus</i> Say (<i>Bibio</i>)-----	16	<i>nigripilus</i> Loew (<i>Bibio</i>)-----	17
<i>baltimoricus</i> Macquart (<i>Bibio</i>)--	17	<i>obesulus</i> Loew (<i>Dilophus</i>)-----	20
<i>basalis</i> Loew (<i>Bibio</i>)-----	9	<i>obscurus</i> Loew (<i>Bibio</i>)-----	17
Bibio Geoffroy-----	6	<i>occipitalis</i> Coquillett (<i>Dilo-</i>	
Bibiodes Coquillett-----	5	phus)-----	26
<i>bicolor</i> Bellardi (<i>Plecia</i>)-----	3	<i>orbatus</i> Osten Sacken (<i>Dilo-</i>	
<i>bimaculata</i> Walker (<i>Plecia</i>)---	5	phus)-----	21
<i>breviceps</i> Loew (<i>Dilophus</i>)---	19	<i>orbatus</i> Say (<i>Bibio</i>)-----	17
<i>brevicornis</i> Walker (<i>Hes-</i>		<i>palliatus</i> , new subspecies	
<i>perinus</i>)-----	3	(<i>Bibio</i>)-----	16
<i>brunnipes</i> Fabricius (<i>Bibio</i>)---	17	<i>pallipes</i> Say (<i>Bibio</i>)---	17
<i>canadensis</i> Macquart (<i>Bibio</i>)--	17	Plecia Wiedemann-----	3
<i>castanipes</i> Jaenicke (<i>Bibio</i>)--	17	<i>proximus</i> , new species (<i>Dilo-</i>	
<i>caurinus</i> , new species (<i>Dilo-</i>		phus)-----	22
phus)-----	19	<i>pusillus</i> Wiedemann (<i>Dilo-</i>	
<i>confusa</i> Loew (<i>Plecia</i>)-----	4	phus)-----	26
<i>erlorhinus</i> Bellardi (<i>Bibio</i>)---	9	<i>ruficollis</i> Fabricius (<i>Plecia</i>)---	4
Dilophus Meigen-----	18	<i>rufipes</i> Fabricius (<i>Bibio</i>)-----	17
<i>dimidiatus</i> Loew (<i>Dilophus</i>)---	23	<i>rufithorax</i> Wiedemann (<i>Bibio</i>)--	13
<i>emarginatus</i> , new species (<i>Dilo-</i>		<i>scita</i> Walker (<i>Bibio</i>)-----	17
phus)-----	20	<i>sectus</i> , new species (<i>Dilophus</i>)--	22
<i>femorata</i> Melander (<i>Bibiodes</i>)--	5	<i>senilis</i> Wulp (<i>Bibio</i>)-----	17
<i>femoratus</i> Wiedemann (<i>Bibio</i>)--	10	<i>serotinus</i> Loew (<i>Dilophus</i>)---	23
<i>fraternus</i> Loew (<i>Bibio</i>)-----	10	<i>serraticollis</i> Walker (<i>Dilophus</i>)--	26
<i>fulvicoxa</i> Walker (<i>Dilophus</i>)---	25	<i>slossonae</i> Cockerell (<i>Bibio</i>)---	14
<i>funidus</i> Coquillett (<i>Bibio</i>)---	12	<i>spinipes</i> Say (<i>Dilophus</i>)-----	23
<i>fumipennis</i> Walker (<i>Bibio</i>)---	11	<i>stigmaterus</i> Say (<i>Dilophus</i>)---	24
<i>fuscipennis</i> Macquart (<i>Bibio</i>)--	10	<i>striatipes</i> Walker (<i>Bibio</i>)-----	17
<i>gracilis</i> Walker (<i>Bibio</i>)-----	14	<i>strigilatus</i> , new species (<i>Dilo-</i>	
<i>halteralis</i> Coquillett (<i>Bibiodes</i>)--	6	phus)-----	24
Hesperinus Walker-----	3	<i>tenuipes</i> Coquillett (<i>Bibio</i>)---	14
<i>heteroptera</i> Say (<i>Plecia</i>)-----	4	<i>thoracica</i> Say (<i>Bibio</i>)-----	18
<i>hirtus</i> Loew (<i>Bibio</i>)-----	9	<i>thoracicus</i> Say (<i>Dilophus</i>)-----	23
<i>holtii</i> , new species (<i>Bibio</i>)---	11	<i>tibialis</i> Loew (<i>Dilophus</i>)-----	25
<i>humeralis</i> Walker (<i>Bibio</i>)-----	11	<i>tristis</i> Williston (<i>Bibio</i>)-----	14
<i>inaequalis</i> Loew (<i>Bibio</i>)-----	12	<i>variabilis</i> Loew (<i>Bibio</i>)-----	15
<i>longiceps</i> Loew (<i>Dilophus</i>)---	25	<i>vestitus</i> Walker (<i>Bibio</i>)-----	15
<i>longipes</i> Loew (<i>Bibio</i>)-----	12	<i>xanthopus</i> Wiedemann (<i>Bibio</i>)--	16