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## DIPTERA OF THE PRIBILOF ISLANDS, ALASKA

#### (TIPULIDAE AND RHYPHIDAE)

By

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#### DIPTERA.

#### Suborder Orthorrhapha.

#### Division NEMATOCERA.

#### Families TIPULIDAE and RHYPHIDAE.

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#### (Plates X and XI.)

Our knowledge of the crane flies of the Pribilof Islands is due largely to the collections made by G. Dallas Hanna on the island of St. George and by Alvin G. and Elsie G. Whitney on the island of St. Paul, previous collections yielding very fragmentary data. In E. A. Schwarz's list<sup>1</sup> the following records for members of this family of flies occur:

Trichocera sp. A single specimen collected by Mr. Barrett-Hamilton. To this or an allied species I am inclined to refer the "gnat" mentioned by Mr. Elliott which "flits about in large swarms, but it is inoffensive and seeks shelter in the grass."

Tipulid. A single larva from Mr. Barrett-Hamilton's collection from St. Paul indicates a larger species than the *Trichocera* just mentioned.

The above material was determined by the late D. W. Coquillett; additional specimens that were collected by Mr. Elliott in 1895 were found among the undetermined material in the United States National Museum and will be found recorded under *Tipula whitneyi* on a later page.

The crane fly fauna of these islands is similar to that of many other wind-swept islands, in the large number of species with the wings so atrophied that the flies are incapable of flight. The relatively large number of species that seem to be confined to the Pribilofs is partly accounted for in this manner. The Alaskan Tipulidae named by Mr. Coquillett and now contained in the National Museum have been compared with the Pribilof material and were found to represent quite a different fauna, some comparisons to which are noted in later pages.

The notes of the collectors of the material are quoted under their original numbers.

<sup>1</sup>Schwarz, E. A., List of insects hitherto known from the Pribilof Islands: Report on Fur Seals and Fur-seal Islands, Part 3, pp. 550-552, 1899.

## Family RHYPHIDAE.

#### Genus Trichocera Meigen (1803).

Trichocera sp.

Numerous specimens of these crane-flies were included in the collection, but the systematic condition of the species of the genus is such that it is impossible to identify the insects at this time. St. George Island, June 14, 1914; St. Paul Island, Sept. 30, 1911. Mr. Whitney's note on his number 168 follows:

"Spring 1914. 12 gnats (?) flying in a swarm by the laboratory, St. Paul Island."

Family TIPULIDAE.

Subfamily LIMNOBIINAE.

#### Tribe Pediciini.

Genus Tricyphona Zetterstedt (1840).

### Tricyphona hannai, n. sp.

Male, length about 7.7 mm.; wing, 5.8 mm.

Rostrum and palpi very short, dark brown. Antennae short, dark brown, first segment about half again as long as the second; flagellum short, of an indeterminable number of segments, the basal segments greatly enlarged, thence tapering to the apex; the terminal segments very small, more or less fused, and provided with long verticils; eyes small, hairy; head with the front and vertex broad, dark brown, with a grayish yellow pollen.

Pronotum prominent; thorax dark brown with a grayish-yellow pollen; halteres long, more or less flattened and twisted, the knob not prominent; wings considerably atrophied both in length and width, the venation considerably degenerated (see pl. 10, fig. 1); the color is light brown, the disk darker anteriorly; the costa is incrassated and provided with several ranks of stout hairlike bristles; R's elongated, straight, in a line with  $R_{4+5}$ , which is forked at the apex,  $R_4$  and  $R_5$  being separate at the wing-margin;  $R_{2+3}$  indistinct on its terminal portion; cross-vein r-m elongate, prominent; media with only the upper branch clearly defined, this branch apparently unforked; cubitus well developed, dark brown, well defined; two anal veins, the second very long and straight; some of the veins with strong hairs or hairlike bristles on them, a group of about nive in the stigmal region, about six along  $R_{2+3}$ ; a considerable series on the apical portion of  $R_{4+5}$  and on  $R_4$  and  $R_5$ ; about twelve on the upper branch of M, others on the forks of Cu, and about nine, evenly spaced, on the second anal vein.

Abdomen dark brown, with sparse long, yellow appressed hairs; caudal and lateral margins of the segments paler; hypopygium (see Pl. X, fig. 6) with the ninth tergite rather broad, the caudal margin gently concave; pleurites very short and stout, the outer face with numerous pale hairs, the inner face with numerous black spicules; appendages two, the dorsal appendage a capitate lobe on a very short pedicel, the head with numerous black spicules and a few long yellow hairs; ventral appendage a flattened blade-like subchitinized arm; ninth sternite narrow, the caudal margin with the median portion straight but slightly denticulate at the ends.

Holotype, &, St. George Island, Bering Sea; June 10, 1914 (Hanna). "Lot-number 13. Found near a pool in Sphagnum bog, west of village."

There can be little doubt but that this insect is a degenerate species of *Tricyphona* with the fused portion of veins  $R_{4+5}$  of the wings very extensive, and many details of the venation considerably atrophied or hypertrophied. The insect is named in honor of the collector, G. Dallas Hanna.

#### Subfamily TIPULINAE.

#### Tribe Tipulini.

#### Genus Tipula Linnaeus (1758).

#### Tipula whitneyi, n. sp.

Male, length 13-14 mm.; wing, 2.8-5.5 mm.

Female, length 19-22 mm.; wing, 2.5-3 mm.

Frontal prolongation of the head moderate in length, gray, nasus indistinct; palpi dark brown. Antennae dark brownish-black, the segments of the flagellum very slightly constricted beyond the enlarged base; the segments covered with a short, dense, gray pubescence. Head clear whitish gray with a distinct impressed median line.

Pronotal scutum light gray with a narrow median brown vitta. Mesonotal praescutum and scutum clear light gray without apparent darker markings of any kind; scutellum and postnotum brownish gray with a narrow brown median vitta; pleura brownish gray; halteres short, yellowish brown, the knob darker brown; legs with the coxae prominent, light gray, with numerous long pale hairs; trochanters reddish brown; femora and tibiae reddish brown, tipped with dark brown; tarsi dark brown to black; wings extremely reduced in both sexes, in some specimens a little longer than in others, one male having the right wing twice as long as the left wing; in most specimens the wings extend about to the tip of the first abdominal segment; wings light brown, the costal margin very greatly incrassated, the region immediately behind the costa with an abundance of short bristles; venation (see Pl. X, fig. 2) indistinct, distorted, but traceable.

Abdomen varying from brown to reddish brown, with a broad, dark brown dorso-median stripe; first tergite largely dark brown;

lateral margins of the sclerites broadly, caudal margins very narrowly, pale; sternites gravish brown; hypopygium (see Pl. X, fig. 7) with the ninth tergite (see Pl. XI, fig. 13) prominent, the caudal margin with a broad U-shaped median notch which is notched again by a smaller W-shaped incision; the lateral lobes are broadly truncated, with the caudal margin shiny, tumid; ninth pleurite large, complete, situated on the dorso-caudal face of the ninth sternite, the ventral inner angle clothed with numerous long pale yellow hairs; pleural appendages two, the outer appendage a slender, cylindrical fleshy lobe that is clothed with comparatively short hairs; inner pleural appendage large, prominent, compressed, projecting cephalad as a narrowed lobe which occupies the notch of the tergite; near the apex it is split into a smaller lobe which is deflected laterad; ninth sternite with a broad U-shaped notch on the caudal half; on the cephalic half the margins of each side are approximated but not contiguous, the median area membranaceous; eighth sternite with the caudal margin simple, unarmed.

The female is similar to the male but the dorso-median abdominal vitta is often interrupted on the basal third of each segment; the wings are still shorter, extending to just beyond the base of the first abdominal segment; valves of the ovipositor (see pl. 11, fig. 21) very long and slender, the tergal valves slightly divergent, enlarged basally, thence gradually narrowed to the tip; sternal valves shorter, compressed, the apices rather blunt.

Holotype,  $\delta$ , St. George Island, Bering Sea; June 12, 1914 (Hanna); lot 16. Allotype,  $\mathfrak{P}$ , topotypic; lot 27, June 16, 1914. Paratypes, 35  $\delta$ 's,  $\mathfrak{P}$ 's, as follows: 18  $\delta$ 's,  $8 \mathfrak{P}$ 's, topotypic, June 12 to July 8, 1914 (Hanna); lots 16, 17, 27, 30, 41, 46, 49, 52, and 55. 1  $\delta$ , Otter Island, July 3, 1913 (Whitney); lot 60. 1  $\delta$ , 1  $\mathfrak{P}$ , St. Paul Island, June 10, 1913 (Whitney); lot 40. 2  $\mathfrak{P}$ 's with the last, June 1, 1914; lot 170. 1  $\delta$ , bred from pupa, with the last, June, 1914; lot 186. 1  $\delta$ , 1  $\mathfrak{P}$  (gravid), St. Paul Island, July 10, 1895 (H. W. Elliott). 1  $\delta$ , with the last, July 12, 1895; U. S. Nat. Mus. Acc. No. 30147.

The accompanying collectors' notes with the above lot numbers are as follows:

Hanna: Lot 16. Found crawling over grass of high beach lands, not seen near bogs or on top of high hills; lot 30, toward East Rookery from village none seen with wings developed; lot 41, uplands toward Staraya Artel Rookery; lot 46, from toward East Rookery; lot 49, toward Zapadni—damaged by cyanide; lot 52, from toward Zapadni Rookery.

Whitney: Lot 40. In grass, one at Kitovi and the other on Reef Peninsula; lot 60, Otter Island (6 miles from St. Paul).

This fly is named in honor of the collector of certain of the paratypes, Mr. Alvin G. Whitney. The pupal skin from which one of the paratypes was bred was collected about June 1 and the adult fly emerged early in June. The following notes on the exuvium are included:

Length about 21.5 mm; diameter about 5 mm.; prothoracic breathing horns very short, finely crenulated; abdominal tergites with the caudal half of each segment bearing four blunt tubercles in alignment; the eighth segment with a fleshy tubercle on each side; ninth tergite (see Pl. XI, fig. 23) with the caudal margin deeply concave; the lateral angles wrinkled; tergal valves very elongated, blunt at their apices; sternal valves shorter; caudal half of sternite five (see Pl. XI, fig. 24) with four subacute fleshy tubercles on each side of the median line; sixth sternite with three similar tubercles; seventh sternite with two similar tubercles; eighth sternite with six large tubercles; leg pads ending about at the base of abdominal segment four; wing pads ending just beyond the base of segment three.

Tipula pribilofensis, n. sp. Pls. X and XI. Male.—Length 12.5-13.5 mm.; wing, 10.5-11.5 mm.; antennae about 5.5 mm.

Female.—Length, 15.5–19 mm.; wing, 10–11 mm.

Frontal prolongation of the head rather short, dark brown, with a dark gray bloom; nasus distinct; palpi short, dark brown; antennae rather elongated, black, the flagellar segments beyond the first deeply constricted at their middle; head dark with a dense, dark gray bloom.

Pronotal scutum gray, the scutellum yellowish on the lateral margins, this color becoming confluent with the same color of the dorsopleural membranes; mesonotum gray, stripes not indicated; sides of the scutellum and postnotum more yellowish; pleura brownish gray; halteres rather short, dull yellow, the knobs more brownish; legs with the coxae gray, trochanters, femora and tibiae brown, the two latter a little darkened at their apices; tarsi black; wings semiatrophied, the length little reduced but the width considerably restricted so that the venation is much distorted; color of the wings pale brownish, the stigma distinct, pale brown, not encroaching into the base of cell  $R_2$ ; veins brown; venation as in Plate 10, Figure 3.

Abdominal tergites reddish yellow with three indistinct interrupted brown lines, the lateral stripes becoming distinct only on the apical segments where they suffuse the entire bases of the sclerites; ninth tergite black; tergites with conspicuous transverse punctured areas on the basal half of each segment, these areas interrupted on the mid-dorsal line; hypopygium (see Pl. X, fig. 8) with the ninth tergite (see Pl. XI, fig. 14) extensive, the caudal margin with a very broad V-shaped notch, the lateral angles prolonged caudad as shiny impunctate horns; pleural appendages two; the outer appendage a conspicuous elongated fleshy lobe, narrowed at

the base, thence very slightly expanded and tapering gradually to the blunt apex; it is clothed with abundant hairs, on the caudal face very long, divergent, on the cephalic and lateral faces short, more appressed; inner pleural appendage a complex, flattened, chitinized lobe divided into two lobules, the ventral or caudal lobule projecting caudad as a compressed blade that is blunt at the apex, the outer face with about eight short bristles, the inner face with several long pale hairs; the inner or dorsal lobule jutting into the notch of the ninth tergite, flattened, compressed, with indistinct parallel grooves; the sterno-pleural suture is indistinct; at the point where it is usually located a short, slender, fleshy setigerous lobe; eighth sternite (see pl. 11, fig. 19) produced caudad as a very flattened, depressed, median arm that is shaped like a spade; the apex is gently notched medially by a broad U-shaped incision; the caudal margin of this tongue is fringed with delicate pale hairs.

The female is similar to the male; the antennal segments simple throughout; abdominal tergites dark gray, the caudal margins of the segments brighter, more yellowish; ovipositor (see Pl. XI, fig. 20) with the last tergite extremely elongated, smooth, shiny black, chitinized; tergal valves of the ovipositor triangular, lying both transversely and vertically, short, acutely pointed from very broad bases, the apices divergent; the dorsal face smooth, light chestnut brown; the outer face with a prominent median carina running from the base to the apex, the remaining surface of this face with a roughened irregular meshwork of raised lines; the ridges between the three faces of the valves with numerous fimbriate hairs; sternal valves reduced to tiny lobes.

Holotype, &, St. Paul Island, June 1, 1914 (Whitney); lot 170. "No 170. About June 1, 1914. Tolstoi sand dunes. Crane flies were crawling everywhere at this time and many were mating. Allotype, 9, topotypic. Paratypes, 20 &'s, 3 9's, topotypic.

#### Tipula aleutica, n. sp. Pls. X and XI.

# Male.—Length about 13-14 mm; wing, 13.5 mm. Discolored by

cvanide. Frontal prolongation of the head dark brown, short and stout; nasus indistinct; antennae dark brown, rather short, the segments not constricted; head dark grayish brown with abundant long pale hairs.

Pronotal scutum grayish brown with abundant long pale hairs; mesonotal praescutum gray with blue-gray stripes, these latter indistinctly margined with darker; the median stripe broadest at the cephalic end, narrowed at the suture, these stripes appearing to be discolored, probably by the action of cyanide; scutum gray, the lobes blue-gray; pleura dull gray; halteres short, pale yellowish throughout; legs with the coxae dull gray densely covered with long pale hairs; trochanters brown; femora and tibia light brownish yellow, the apices slightly darkened; tarsi dark brown; wings with a very faint brownish tinge, the stigma brown; veins dark brown; venation as in Plate 10, Figure 4.

Abdomen brownish gray, the caudal margins of the segments ringed with paler; hypopygium (see Pl. X, fig. 9) with the ninth tergite (see Pl. XI, fig. 15) moderately prominent, the caudal margin straight across, with two lobes, one on either side of the median line; these lobes pale yellow, conical, their apices rather acute, the notch between them narrowly V-shaped; ninth sterno-pleurite prominent, the pleural region partially separated from the sternite by a conspicuous arcuated suture beneath; pleural appendages two, situated far out near the apex of the sterno-pleurite, the outer ap pendage pale, prominent, flattened, a little narrowed toward the blunt apex; inner appendage of a very simple structure, a pale slightly chitinized lobe whose anterior angle is produced cephalad as a long subacute lobule, on the outer face near the caudal margin, a slender, acutely pointed horn directed cephalad; ninth sternite profoundly incised by a very narrow V-shaped notch, the adjacent margins pale-pubescent, not approximated; eighth sternite narrow, the caudal margin straight across, unarmed.

Holotype, &, St. George Island, June 27, 1914 (Hanna). "Lot 49. Toward Zapadni."

This crane fly belongs to the group of perlongipes Johnson, sulphurea Doane, tenebrosa Coquillett, and kennicotti Alexander. The only species with which it requires comparison are *cimmeria* Speiser, and tenebrosa Coquillett, and this comparison is given herewith, the notes and figures being based upon the types in the United States National Museum.

Tipula cimmeria Speiser (Dem Kilimandjaro, dem Meru Expedition, 10. Diptera. 4, Orthorhapha. Nematocera, p. 57, 1909) is the correct name for *Tipula strigata* Coquillett. Type number 5205, U. S. National Museum, from Yakutat, Alaska, June 21, 1899, collected by Kincaid.

The type of strigata is a male; antennae rather short, scape dull vellow, flagellum, dark brown, the segments a little constricted beyond the base: Frontal prolongation of the head short, nasus very prominent; Wing-venation with the basal deflection of  $R_{4+5}$ , r-m and the basal deflection of  $M_{1+2}$  almost in a line. Hypopygium with the tergite, pleurite and sternite fused in an almost continuous ring, the pleural suture well-indicated beneath; the tergo-pleural notch small, on the caudal margin only; ninth tergite (see Pl. XI, fig. 16) subquadrate, dark brown, with the caudal margin transversely truncated and bearing a pair of median lobes (as in the .....

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tephrocephala group); these lobes pale, darkened at their apices, very closely approximated on the basal three-quarters, the tips more separated, the apices of the lobes minutely spiculose; the length of these lobes is about the same as the length of the tergite; they are fringed on their outer lateral margin with long hairs; ninth pleurite with the suture conspicuous beneath, broadly U-shaped; the ventrocaudal angle with a tuft of long hairs which are decussate on the median line beneath; outer pleural appendage (see Pl. X, fig. 12) large, prominent, pale, fleshy, very flattened, elongate, slightly constricted beyond the base, then expanded, the apex a little pointed; the outer face with scanty strigose yellow hairs; inner pleural appendage very large, powerful, bilobed, the outer or caudal lobe short, subrotund, the apex a little truncated, densely and finely pale strigose on the inner face; inner lobe flattened, compressed; ninth sternite deeply divided, at the caudal angle just behind the suture with a sparse tuft of long pale hairs, decussate on the median line beneath; near the base of the split a dense tuft of golden yellow hair; eighth sternite prominent, straight across the caudal margin, unarmed with any brush or tuft.

Tipula tenebrosa Coquillett was described from Berg Bay, Alaska; collected June 10, 1899, by Kincaid; type number 5206, U. S. National Museum. The type is a male; the hypopygium has the ninth tergite (see Pl. XI, fig. 17) large, convex, the caudal margin with a prominent stout lobe on either side of the median line, these separated by a space equal to about one-half the diameter of the lobe; the apices of these lobes blackened, minutely spiculose; caudal margin of the tergite sloping obliquely backward from these lobes; notch between the ninth tergite and the ninth pleurite quite deep, but not running back to the eighth segment; ninth pleurite incomplete, the pleural suture well indicated beneath; the pleural region produced caudad as a blunt triangular arm bearing the appendages out near its apex; outer pleural appendage (see Pl. X, fig. 11) flattened, subquadrate or slightly elongated, bearing at the base on the inside the inner pleural appendage which is flattened, bilobed, the caudal lobe a short, blackened, chitinized point; the caudal face of the lobe on the basal half is downy pubescent; ninth sternite deeply cleft on the median line beneath but the adjoining sides contiguous; eighth sternite prominent, the caudal margin unarmed. Coquillett's description of the hypopygium does not agree at all with the type; the outer pleural appendages are described as being nearly twice as long as wide, the lower outer angle considerably prolonged beyond the upper one; this agrees much better with the somewhat similar Tipula cimmeria, discussed above.

Tipula alascaensis, n. sp. Pls. X and XI.

Male.—Length, 11-13.5 mm.; wing, 14.5-15 mm.

Female.—Length, 15-18 mm.; wing, 17.5 mm.

Frontal prolongation of the head bluish gray, very short, nasus indistinct; palpi gray, short; antennae very short, black, with a sparse grayish bloom; first segment elongated, longer than the secand and third together; the flagellar segments very short, slightly constricted beyond the basal swelling; head blue-gray with abundant long hairs, especially a tuft on the genae.

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Mesonotum dark gray with rather indistinct stripes, the median vitta very broad, rapidly narrowed behind; lateral stripes narrow, beginning behind the conspicuous pseudosutural foveae; thoracic interspaces with short pale, erect hair; scutum and lateral portions of the postnotum with abundant erect black hairs; pleura dark gray, smooth, a large setigerous area on the mesepisternum behind the fore coxae; halteres short, brown, the knobs a little brighter; legs with the coxae gray, clothed with abundant long yellow hairs; femora yellowish brown tipped with dark brown; tibiae brown tipped with darker brown; tarsi dark brown; wings fully developed in both sexes, strongly tinged with brownish yellow, the costal cell not different in color from the other cells of the wing; stigma conspicuous, oval, dark brown; small areas before the stigma in cell 1st  $R_1$  and beyond the stigma in cell 2d  $R_1$ , and the base of  $R_2$  slightly paler; veins dark brown; venation as in Plate X, Figure 5.

Abdomen dark gray, the segments narrowly ringed with pale yellowish around the caudal margin; hypopygium (see Pl. X, fig. 10) very inconspicuous and somewhat concealed; ninth tergite (see Pl. XI, fig. 18) rather prominent, the caudal margin rounded, with a deep, narrow median notch; the lateral lobes are thus very broad and somewhat obliquely truncated; dorsal surface of the sclerite densely hairy; ninth pleurite small, complete, situated on the dorsocaudal face of the ninth sternite; outer pleural appendage short, clavate, slightly enlarged at the base, the head rounded, clothed with abundant golden hairs; inner pleural appendage compressed, flattened, on the outer face clothed with short, appressed golden hairs; ninth sternite prominent, with a very deep median notch whose margins are widely separated.

The female is generally similar to the male; the ovipositor has the last two segments exceedingly narrowed as in *besselsi* Osten Sacken and *pilicops* Alexander; the tergal valves (see Pl. XI, fig. 22) acute but small, tapering gradually from the broad base, the apices divergent.

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Holotype, male, St. George Island, June 14, 1914 (Hanna), Lot number 17. Allotype, female, topotypic. Paratypes, 2 males, 3 females, topotypic; 2 females, topotypic on June 16, 1914 (Lot 27). "Lot number 17. In wet places, mostly, but some seen crawling over grass far from water. None seen flying. Those with wings best developed (the present species) from Spring Creek, Garden Cove. One seen with the very fuzzy fly in No. 18 (*Scatophaga*) beneath it; apparently both were fighting." "Lot number 27. Garden Cove. Mrs. E. G. Whitney."

#### Tipula, sp.

Abundant larvae of an unknown species of *Tipula* taken on St. Paul island July 18–20, 1913. Mr. Whitney's notes on the species are very interesting:

No. 77. July 18, 1913. Reef Parade Ground. 12 larvae. Abundant everywhere there around the roots of grasses, herbs, and especially under beds of moss on the roots of which it feeds, killing the moss over considerable areas. Under such a moss bed I found as many as 20 to the square foot. This larva is found all over the island in grassy or mossy places and all through the summer season. It must be of considerable ecological importance because of its food value to the birds and foxes. The foxes will dig over large areas of moss beds to feed on these larvae. Was unable to find the species in adult form. Could not seem to raise adults in laboratory by keeping larvae with one of the food plants. It may possibly be the larval form of the crane fly, which is very abundant. Color not altered by pickling in alcohol.

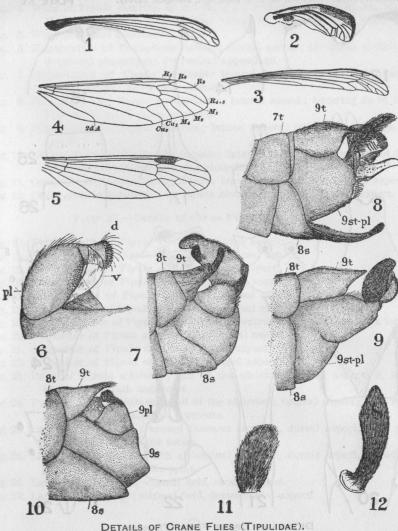
The identity of the form with any of the adult flies known from the Pribilofs is very doubtful. The large size of the larvae in mid-July would imply a species that emerges at or near the very end of the growing season, and it seems possible that they belong to such a species, as yet unknown.

The fully grown larva measures 29-30 mm. in length and about 5 mm. in diameter; the form is plump, color light brownish yellow without conspicuous darker markings; hairs and setae sparse; the dorsa of the thoracic segments with hairs as in Plate 11, Figure 25; the abdominal segments have six bristles in alignment, the intermediate four being almost evenly spaced, the outer one being much the strongest; the fifth and sixth again are weak and situated close to the strong bristles (see Pl. XI, fig. 26). The stigmal field is surrounded by six weak teeth, the dorsal pair closely approximated, the lateral pair being latero-dorsal in position; the ventral pair very broad, the inner face with a broad-triangular black chitinized area. Stigmata large, separated by a distance about equal to the diameter of one stigma, located ventrad of the four dorsal-lying teeth that surround the stigmal field; gills fleshy, not prominent. (See Pl. XI, figs. 27, 28.)

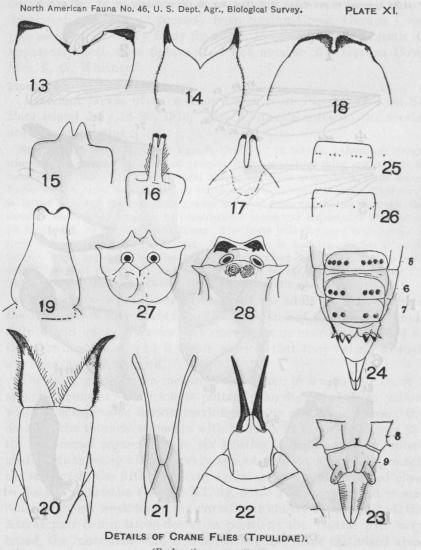
Tricyphona glacialis Alexander, and Tipula pribilovia Alexander have previously been recorded by this author. (Proc. Calif. Acad. Sci., Fourth Ser. 11, pp. 183-184, Nov., 1921.)-W. L. M.

North American Fauna No. 46, U. S. Dept. Agr., Biological Survey.

PLATE X.



(Explanation on page 169.)



#### (Explanation on page 169.)

#### EXPLANATION OF PLATES X AND XI.

#### Plate X.-Details of Crane Flies (Tipulidae).

- Fig. 1. Wing of Tricyphona hannai, sp. n.
- Fig. 2. Wing of Tipula whitneyi, sp. n.

Fig. 3. Wing of Tipula pribilofensis, sp. n.

- Fig. 4. Wing of *Tipula aleutica*, sp. n.; R<sub>1</sub>, <sub>2</sub>, <sub>3</sub>, <sub>4</sub>, <sub>5</sub>=Radial veins; M<sub>1</sub>, M<sub>2</sub>, M<sub>4</sub>= Medial veins; Cu<sub>1</sub>, Cu<sub>2</sub>=Cubital veins; 2d A=second anal vein.
- Fig. 5. Wing of Tipula alascaensis, sp. n.
- Fig. 6. Hypopygium of *Tricyphona hannai*; dorsal aspect; pl=ninth pleurite; d=dorsal appendage; v=ventral appendage.
- Fig. 7. Hypopygium of *Tipula whitneyi*; lateral aspect; 8t, 9t=eighth and ninth tergites; 8s=eighth sternite.
- Fig. 8. Hypopygium of *Tipula pribilofensis*; lateral aspect; lettering as in fig. 7; 9 st-pl=ninth sterno-pleurite.
- Fig. 9. Hypopygium of *Tipula alcutica*; lateral aspect; lettering as in figs. 7 and 8.
- Fig. 10. Hypopygium of *Tipula alascaensis*; lateral aspect; lettering as in fig. 7; 9s, 9pl=ninth sternite and pleurite.

Fig. 11. Outer pleural appendage of *Tipula tenebrosa Coquillett*, lateral aspect. Fig. 12. Outer pleural appendage of *Tipula cimmeria* Speiser; lateral aspect.

#### Plate XI.-Details of Crane Flies (Tipulidae).

Fig. 13. Ninth tergite of Tipula whitneyi; dorsal aspect.

Fig. 14. Ninth tergite of Tipula pribilofensis; dorsal aspect.

- Fig. 15. Ninth tergite of Tipula aleutica; dorsal aspect.
- Fig. 16. Ninth tergite of Tipula cimmeria; dorsal aspect.
- Fig. 17. Ninth tergite of Tipula tenebrosa; dorsal aspect.
- Fig. 18. Ninth tergite of Tipula alascaensis; dorsal aspect.
- Fig. 19. Eighth sternite of *Tipula pribilofensis*; ventral aspect of the median lobe.
- Fig. 20. Ovipositor of Tipula pribilofensis; dorsal aspect.
- Fig. 21. Ovipositor of Tipula whitneyi; dorsal aspect.
- Fig. 22. Ovipositor of Tipula alascaensis; dorsal aspect.
- Fig. 23. Pupa of *Tipula whitneyi*; end of the abdomen, dorsal aspect; 8, 9= eighth and ninth segments.
- Fig. 24. Pupa of *Tipula whitneyi*; end of the abdomen, ventral aspect; 5, 6, 7= fifth, sixth, and seventh segments.
- Fig. 25. Larva of *Tipula* sp.; second thoracic segment, dorsal aspect, showing the distribution of the setae.
- Fig. 26. Larva of *Tipula* sp.; fifth abdominal segment, dorsal aspect, showing the distribution of the setae.

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- Fig. 27. Larva of Tipula sp.; stigmal field, caudal aspect.
- Fig. 28. Larva of Tipula sp.; stigmal field, dorso-caudal aspect.