

NOTES ON A SMALL COLLECTION OF CRANE-FLIES FROM  
OKLAHOMA, WITH DESCRIPTION OF NEW SPECIES:  
TIPULIDAE-DIPTERA

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Among the miscellaneous insects taken by the University of Oklahoma Museum of Zoology expedition in June and July, 1926, was a small collection of crane-flies. This group, the family Tipulidae of the Diptera, has been little studied or collected in the south central and southwestern parts of the United States and the twenty species represented in this collection include some very interesting extensions of known ranges, as well as three species believed to be hitherto undescribed.

I am indebted to my friend and colleague, Professor Hubbell, who was in charge of the invertebrate collecting for the expedition, for this material and for his field notes on the general type of locality from which each specimen was taken.

The bulk of the crane-flies collected were from Camp Boulder, Wichita National Forest, Comanche county. The following description I have abstracted from Professor Hubbell's manuscript field notes:

Camp Boulder is situated on Rattlesnake Island in West Cache creek, altho at this time (early June), only the larger, west channel contains flowing water. Above the camp the creek flows thru a shaded canyon with steep rock cliffs and talus slopes. Below the mouth of this canyon the stream is bordered by mesic woods, or, in some places, the woods are separated from the stream bed by areas of sedges and grasses. Outside of the valley bottom the mesic conditions give way to xeric woods on the slopes. Situations collected for crane-flies, or reached by the light trap were:

1.—Meadows in the valley bottom, areas of tall grasses and herbage, somewhat shaded by scattered hardwood trees; (2) Dry, willow-bordered, sandy stream bed, the sand moist beneath the surface; (3) Black-jack scrub forest of the lower slopes, forest floor grassy, transitional between mesic and xeric conditions; (4) Open mesic woods of valley bottom and lower talus slopes, in the canyon near its mouth. Here there is dense undergrowth except in rocky areas. (5) An old, horizontal mine shaft in granite rock, opening into the canyon. The walls of the shaft moist, covered with algal mats and mosses.

From about Camp Boulder were taken:

*Limonia fallax* Johnson. June 7, a single female. Previous records for this species are confined to the states of the Atlantic seaboard from New York to Florida, where the adults frequent open mesic woods near streams. The immature stages have been taken in moist, organic soil near streams and springs.

*Dicranomyia badia* (Walker). June 9, several males and females from the old mine shaft and from the canyon in its vicinity. This is another eastern species, characteristic of wet cliffs and ledges. The immature stages are spent in the wet moss and algal mats of wet rock walls.

*Dicranomyia liberta* Osten Sacken. June 11, a single male taken in the light trap. This species is widespread over the eastern half of the U. S. Usually found in comparatively dry, grassy situations.

*Gernaomyia canadensis* (Westwood). June 7, in light trap; June 9, from old mine shaft, and at night, resting on tree trunk, near creek. This is a widely distributed species. The larval life is spent in mosses, algae or slime of water seepage on rocks, earth banks or wood.

*Erioptera (Mesocyphona) parva* Osten Sacken. June 11, in light trap. The larval life is spent in wet organic earth, usually beneath wet leaf mould. In the eastern U. S. this species is usually found in the vicinity of running or stagnant water.

**ERIOPTERA (MESOCYPHONA) HUBELLI, sp. nov.**

Head variegated; thoracic notum with the stripes confluent, walnut brown margined with pale sulfur yellow; abdomen brown with yellow basal marks. Wings with the anterior margins brown, spotted with white; the posterior two-thirds hyaline with faint brown clouds and seams. Femora with two brown bands beyond midlength, separated by a yellow band; tibiae with a brown band just beyond the proximal ends. Basistyles of male, long cylindrical distyles with the bases not dilated; gonopophyses rod-like distally.

Length of body 3.5-5.3 mm.; length of wings, 3.6-4.2 mm.

Head variegated; vertex antique brown with the margins along the eyes a pale sulfur yellow; a transverse band of pale yellow across the occiput; rostrum and palpi, dull brownish. The vertex bears numerous (about 20) slender erect hairs. Scape of the antenna dull brown, the flagellum brownish yellow, becoming more brown on the apical joints.

Pronotal scutum sulfur yellow, the lateral and anterior margins brownish; with about a dozen long, pale, erect hairs. Pronotal scutellum short, sulfur yellow with the median depression and lateral margins brown. Mesonotal prescutum walnut brown, the anterior margin narrowly and the lateral margins and pseudosutural foveae broadly margined with sulfur yellow. The lines between the usual—but here fused—central and lateral stripes, faintly indicated and bearing narrow rows of long slender hairs. Scutum walnut brown on the lobes, yellowish brown medially, the extreme caudo-lateral angles with sulfur-yellow spots. Scutellum sulfur yellow save for a cephalo-median brown spot and a transverse row of small, faint brown spots before the caudal margin. Postnotum brownish yellow. Pleura whitish yellow with numerous faint brown blotches, the brown largely confined to the centers of the sclerites, most marked on the metasterna. Legs with the coxae brownish yellow; bases and proximal thirds of the femora yellowish. All of the femora have the apical one-half or two-thirds with two broad brown bands separated by a narrower yellow band. The brown rings most extensive and distinct on the prothoracic femora. Tibiae yellow with a broad yellowish brown ring just beyond their proximal ends. Metatarsi and the following two tarsal joints yellow, the apical tarsi brown. Halteres with the hairy stems and bases of knobs yellowish, apical parts of the knobs brown.

Wings (fig. 2-a) with the costal, subcostal and anterior radial cells chestnut brown with numerous hyaline spots; posterior to the medius the wing is nearly hyaline with numerous, faint brown clouds and seams along the veins. Along the costal margin the hyaline spots are located as follows: a linear spot in cell C, just distad to the humeral c-v; a large square spot at the origin of Rs, extending from C to M; a semicircular spot at Sc-2, extending from C to Rs; a small spot at Sc-1; a larger spot at Rc-v, including the bases of cells 2nd R-1 and R-2; rounded spots at ends of veins R-1, R-2, and R-3. The venation is like that of *E. (M) caloptera* O. S.

Abdomen yellowish brown, the dorsum basally with more yellowish areas to either side of the median line but the extreme lateral margins are brown. Distally the abdomen is dark brown, the genitalia more yellow.

Male genitalia (fig. 2-b) with the ninth tergite extensive, covering the bases of the basistyles, the caudal margin broadly convex. Basistyles cylindrical, elongate, length three times the diameter; the mesal surfaces slightly concave. Dististyles chitinized, circular in cross section and tapering evenly to long acute points. Dorsal dististyles forked near its base into two similar prongs, the caudo-dorsal the shorter

and less curved; ventral dististyle single, similar to the separate prongs of the dorsal but arcuate thru 90 degrees so that its apical half points directly cephalad and lies, when at rest, parallel to the basistyle. Gonopophyses widely divergent at their bases and forming a pair of rounded, rod-like chitinized arms that curve latero-caudad so that their distal halves are parallel to each other, and end at about midlength of the basistyles.

Female ovipositor with the valves slender, acicular; dorsal valves slightly and evenly arcuated, tergal valves straight, short.

Holotype, male, Wichita National Forest, Comanche Co., Oklahoma, June 11, 1926. (T. H. Hubbell.)

Allotopotype, female.

Paratopotypes, 36 males and females, June 7 and 11.

Paratypes, 20 males and females, Davis Mts., Jeff Davis Co., Texas, alt. 5000 ft.; Nov. 15, 1925. (O. C. Poling.)

*Erioptera hubbelli* is named for its collector, Professor T. H. Hubbell, to whom I am indebted for many crane-flies and notes, taken in the course of his own collecting of Orthoptera. Holotype, allotype, and a part of the paratypes in the collection of the Museum of Zoology of the University of Michigan, remaining paratypes in the collection of the Museum of Zoology of the University of Oklahoma and in the collection of Dr. C. P. Alexander of Amherst, Mass.

This species is close to *Erioptera (M) caloptera* O. S. but can be readily separated by the markings of the wings and the differences in the male genitalia.

At Camp Boulder this species appears to be common. It came freely to the light trap and was also taken in the shaded mesic conditions near the mouth of the old mine shaft. The Davis Mts. records would indicate that the species is a member of the southwest fauna.

*Gnophomyia luctuosa* Osten Sacken. June 10, taken from a tree trunk in a small glen that opens into the valley of West Cache creek. This species is known from the southeastern U. S. and Central America. It is characteristic of deciduous mesic woods. The immature stages are unknown, but are almost certainly spent beneath or in the bark of living trees. (In eastern and southern U. S. in beech, magnolia, red bay, and several species of oaks.)

*Gonomyia (Liophleps) helophila* Alexander. June 6 and 11, in light trap; June 10, swept from vegetation about the mouth of the old mine shaft, Cache Canyon. Apparently common. Another species from the southwest. Originally described from Peru and British Guiana, this species has been taken in Mexico and in the Davis Mts., Jeff Davis Co., Texas.

*Gonomyia (Liophleps) alexanderi* (Johnson). June 10, swept from vegetation in Cache Canyon. Except for one questioned record from Texas, this represents a great western extension of the range of this eastern species. The adults frequent shaded stream courses. Dr. Alexander has taken the immature stages from wet sand, bordering a stream.

*GONOMYIA (PTILOSTENA) GAIGEI*, sp. nov.

Head chestnut brown with sulfur yellow markings. Mesonotum chestnut brown. Margined anteriorly with sulfur yellow; the stripes fused. Pleura brown with two distinct yellow stripes. Abdomen brown, the caudal margins of the segments narrowly and incompletely bordered with grayish yellow. Basistyles of the male geni-

talia with the caudolateral angles prolonged into cylindrical lobes, that are slightly curved and project caudad of the tips of the dististyles. Venation and wing pattern like that of *G. blanda* O. S.

Length of body, 5-6.5 mm.; length of wings, 6-7mm.

Rostrum chestnut brown; palpi and mouth parts dark brown. Vertex, chestnut brown medially and caudally, the lateral and cephalic margins broadly sulfur yellow. Occiput chestnut brown. Ventral surface of head yellow. The occiput and vertex with numerous long slender hairs. Antenna with the first joint long, cylindrical, sulfur yellow—in some specimens its base and ventral surface infuscated; bearing a scanty pubescence and, at about midlength, a circle of a few long hairs. Second joint obovate, the base yellowish, the expanded apex brown; bearing numerous long hairs. Joints of the flagellum sub-cylindrical; the base of the first flagellar joint is yellow, its apical two-thirds and the remaining joints brownish, somewhat lighter below; all the joints with a thin pubescence, and with a circle of from 4 to 8 stout hairs a little before midlength.

Pronotum comparatively elongate, triangular in outline, chestnut brown; its caudolateral areas with long slender hairs. Mesonotal prescutum chestnut brown, a pair of wedge-shaped sulfur yellow spots at the cephalo-lateral margins that include the pseudo-sutural foveae. Scutum, scutellum and postnotum dark brown, the scutum a little lighter in the median line. Pleura dark chestnut brown with two prominent sulfur stripes: the dorsal stripe begins as a narrow line on the prothorax but widens on the mesopleura and ends at the wing root; the ventral stripe includes the bases of all the coxae; posteriorly it widens to reach the base of the halteres. Mesosternum with a large brown blotch that extends onto the base of the middle coxa. Legs with the coxae and trochanters pale yellow, save for slight brown markings at the bases of the fore and middle coxae; femora, tibiae and metatarsi light brownish yellow; tarsi brown; all with a thick growth of short brown hairs. Halteres elongate, the stems yellow, the knobs abruptly dark brown.

Wings (fig. 1-a) with venation as in the sub-genus: Sc-1 extending beyond the origin of Rs; Sc-2 about midway between origin of Rs and tip of Sc-1; R-2 short, upcurved, its tip fusing with the tip of R-1 just before the wing margin; Cell 1st M-2 open by atrophy of basal deflection of M-3, a short stump of this vein persisting; basal deflection of Cu-1 well before the fork of M. The wing clear grayish hyaline with small brown spots at humeral c-v, and in the bases of cells R, M, and Cu; and at the tips of Sc-1 and Sc-2; larger brown spots at origin of Rs and at base of R-4-5; still larger brown spots at the apices of cells R-1-2 and R-3. The basal deflection of Cu-1 and the median c-v are margined with brown.

The abdomen is slender, moderately elongate, dark brown above, somewhat lighter below. The tergites and sternites with narrow, incomplete, yellowish bands at their caudal margins, the bands most evident toward the lateral margins.

The male genitalia (fig. 1-f) with the ninth tergite deeply and narrowly emarginate medially, the caudo-lateral margins prolonged into pointed, divergent lobes that are slightly concave along their mesal edges. The ninth sternite rounded, complete, its caudo-lateral areas broadly sulfur yellow. Basistyles large and stout, their caudo-lateral angles prolonged into long, slightly arcuated, finger-shaped lobes that extend caudad past the tips of the dististyles. Dististyles borne in the angle of the basistyle and its caudo-lateral lobe. Dorsal dististyle flattened, blade-like, the distal end broader, its caudo-lateral angle prolonged into a curved hook or beak; the surface with hairs and setigerous punctures. Ventral dististyle longer, its base chitinized; cylindrical, at about midlength forked into two rod-like arms; the mesal arm short, flattened, sub-conical, the lateral arm long, slender, curved, sub-acicular. Aedeagus slender cylindrical, the base slightly dilated, extending to beyond dorsal dististyle.

Ovipositor with the tergal valves slender, gently arcuated, elongate; sternal valves acutely pointed, heavily chitinized, almost straight.

Holotype, male, Wichita National Forest, Comanche Co., Oklahoma June 11, 1926 (T. H. Hubbell.).

Allotopotype, female.

Paratopotypes, 2 males and 18 females, June 6 to 11.

Paratype, 1 male, Davis Mts. Jeff Davis Co., Texas; Nov 15, 1925.  
Alt. 5000 ft. (O. C. Poling.)

*Gonomyia gaigei* is respectfully dedicated to Mr. F. M. Gaige, Curator of Insects of the Museum of Zoology of the University of Michigan. The holotype, allotype, part of the paratopotypes and the Texas paratype in the collection of the Museum of Zoology of the University of Michigan, remaining paratopotypes in the collection of the Museum of Zoology of the University of Oklahoma and in the collection of Dr. C. P. Alexander.

This species came rather freely to the light trap and specimens were swept from the vegetation along West Cache creek. It is of interest that this species as well as *F. hutbelli* was included in a collection from the Davis Mts. as well as from Camp Boulder.

*Gonomyia (Gonomyia) sulphurella* Osten Sacken. June 6, from light trap; June 10, swept from along the borders of the creek. The male genitalia are not entirely typical of *G. sulphurella*, but the difference is too slight to warrant regarding the two male specimens that were taken as showing other than individual variations. *G. sulphurella* is a widespread eastern species. The adults are often common in wet grassy situations, the immature stages are found in muddy, organic soils near streams or at marsh borders.

*Gonomyia (Gonomyia) kansensis* Alexander. June 10, swept from along the borders of West Cache Creek, June 11, in light trap. Apparently common. Known from Kansas and southern Indiana. Apparently occurs in open grassy areas on sand. Dr. Alexander records the occurrence of the pupae in wet sand near a stream.

*Teucholabis complexa* Osten Sacken. June 6, a single male in the light trap. An eastern species, known from New York to Florida and west to Indiana and Tennessee. The adults are often common in mesic woods, the immature stages are spent in moist or wet rotting hard wood logs.

*Empedomorpha empedoides* (Alexander). June 6, in light trap. Apparently comes but sparingly to light. This seems to be a prairie species. It was described from specimens taken near Cimarron, Kansas and has also been recorded from North Dakota, Texas and New Mexico. Dr. Alexander found the adults abundant on sand flats of the Arkansas river in a Tiger-beetle association.

*Nephrotoma ferruginea* (Fabricius). June 6, in light trap; June 10, swept from vegetation of creek margin. Ranges over all of the eastern United States as far as the great plains. A species of open woods and grass lands. The larvae feed upon the roots of grasses.

*TIPULA (CINCTOTIPULA) CIMARRONENSIS*, sp. nov.

Head and thorax dull honey yellow, palpi with the first and last joints blackish, the intermediate joints brown; antennae with the scape yellow, the flagellum brown. Abdomen distinctly banded yellow and brown. The eighth sternite of male broad, entire. The body with conspicuous black, straight, stout hairs.

Male.—Length, 12-14 mm; length of wing, 11.5-12.7 mm.

Females.—Length 14.5-17.2 mm; length of wing, 13.5-15.3 mm.

Frontal prolongation of the head stout, short, rather tumid above; honey yellow above, the lower sides infuscated; with numerous long black hairs. Nasus elongate, honey yellow, the tip infuscate and bearing a tuft of yellowish brown hairs. Palpi moderately short; the first and fourth joints blackish brown, the intermediate joints somewhat lighter brown. Remainder of the head, except for the postgenae which are somewhat infuscate, honey yellow; the vertex occiput and postgenae with numerous stout,

black hairs. Antennae moderately elongate in both sexes; bent back, in the male, they would almost reach the base of the abdomen; in the female, to or slightly beyond the wing roots. The scape is honey yellow, the flagellum brownish, darker brown toward the tip. Each joint of the flagellum bears a pale pubescence and several stout black hairs, beyond the second flagellar joint the hairs are confined to a whorl on the basal enlargements.

Pronotum brownish yellow with numerous stout black hairs. Mesonotal prescutum with the usual stripes not evident, the broad median area pale, dull yellow, bordered on either side by a dull brown stripe that occupies the position of interstripe and lateral stripe. The region of the interstripe with black, stout hairs. Scutum infuscated on the lobes, dull yellow in the median area. Scutellum and postnotum honey yellow, somewhat pollinose, with conspicuous black hairs along the lateral margins. Pleura dull, yellowish brown, somewhat whitish pollinose about the wing roots. Coxae and trochanters dull honey yellow. Femora honey yellow save for narrow brown rings at their apices. Tibiae and tarsi yellowish, somewhat darker on the apical tarsi. The yellow coloration of the legs obscured by a dense even growth of short, black hairs. Halteres dull brown, their bases bright brownish yellow.

Wings (fig. 3-a) with the veins brown, the membrane hyaline with an even brownish tinge, unmarked save for the distinct brown stigma and a faint, whitish obliterative streak that extends from just proximal of the stigma thru the bases of cells R-3 and R-4-5, across the basal portion of cell 1st M-2 to end in the base of cell M-4. Venation with cell 1st M-2 large, elongate, pentagonal; its distal end acute. M-Cu cross-vein evident but very short, almost punctiform, about opposite R-M cross-vein. Petiole of cell M-1 about half as long as the cell. Cells R-3, R-5, and M-1 with a very scant growth of short hairs in their central apical areas, most marked in cell R-5.

Abdomen distinctly banded with yellow and brown. The tergites and sternites are honey yellow save that the caudal and lateral margins of the tergites, and the caudal margins of the sternites are walnut brown. The brown becomes more extensive on the caudal segments. The basal abdominal segments bear a caudal ring of black hairs, the other segments are completely covered by this growth of scattered black hairs.

Male genitalia with the 9th tergite (fig. 3-c) extensive, shining, brownish yellow, with a deep and broad V-shaped caudo-median notch. The margins of this notch are somewhat chitinized, brown and bear a thin, pale, long pubescence and numerous peg-like, short, stiff setae. Ninth sternite incomplete, forming two truncated lobes that are separated basally but with their disto-mesal angles almost contiguous; the truncated distal ends with scant tufts of reddish brown, slender hairs, the ventral surfaces with longer, stouter black hairs. Pleural suture short, incomplete, shallow. Pleurites rather large, their caudo-ventral angles directed slightly mesad and bearing tufts of reddish brown hairs, the lateral and other caudal surfaces of the pleurites with numerous long, stout black hairs. Pleural appendages two: the dorsal appendage elliptical, blade-like, the margins chitinized and curved mesad, the outer surface with numerous black, stiff hairs; the ventral appendage with the base inflated and bearing two large flattened plates, the caudal plate rounded, the anterior plate triangular, arcuated cephalad at mid-length, the apical half pointed, chitinized, brown. Eighth sternite (fig. 3-b) prominent, broad, its caudal margin entire.

Ovipositor brown, straight; the tergal valves elongate, laterally flattened, their apices rounded; sternal valves short, extending little beyond mid-length of tergal valves, apices somewhat pointed.

Holotype, male, 5 miles north of Kenton, Cimarron Co., Oklahoma, July 6, 1926 (T. H. Hubbell)

Allotopotype, female, taken and pinned in copulation with type.

Paratopotypes, 2 males and 2 females, July 6, 1926.

Paratypes, 3 females, Wichita National Forest, Comanche Co., Oklahoma, June 6-11, 1926. (T. H. Hubbell).

Holotype, allotype and part of the paratypes in the collection of the Museum of Zoology of the Univ. of Michigan remaining paratypes in the collection of the Museum of Zoology of the University of Oklahoma and in collection of Dr. C. P. Alexander.

The types and paratopotypes were taken from the walls and ceiling of an old mine shaft, in dim light about 35 feet back from the opening of the shaft. The mine shaft which was driven horizontally into the face of

Black Mesa is moist and also contained numerous cave crickets (*Ceuthophilus* sp.) The types hung in copulo from the ceiling.

The Wichita National Forest specimens were all taken in the trap light. It is very likely that they came from rock crevices in Cache Canyon.

The closely allied eastern species of this subgenus are frequenters of moist, cool, shaded situations such as caves, crevices in rocks and shaded mossy cliffs.

*Tipula translucida* Doane. June 6, 7, and 11, in light trap. June 7, swept from grassy meadows. June 11, resting on a tree trunk, at night. Apparently common. This fly is known from Pa., Md., Ind., and Tennessee, and seems to be rather rare species in the east.

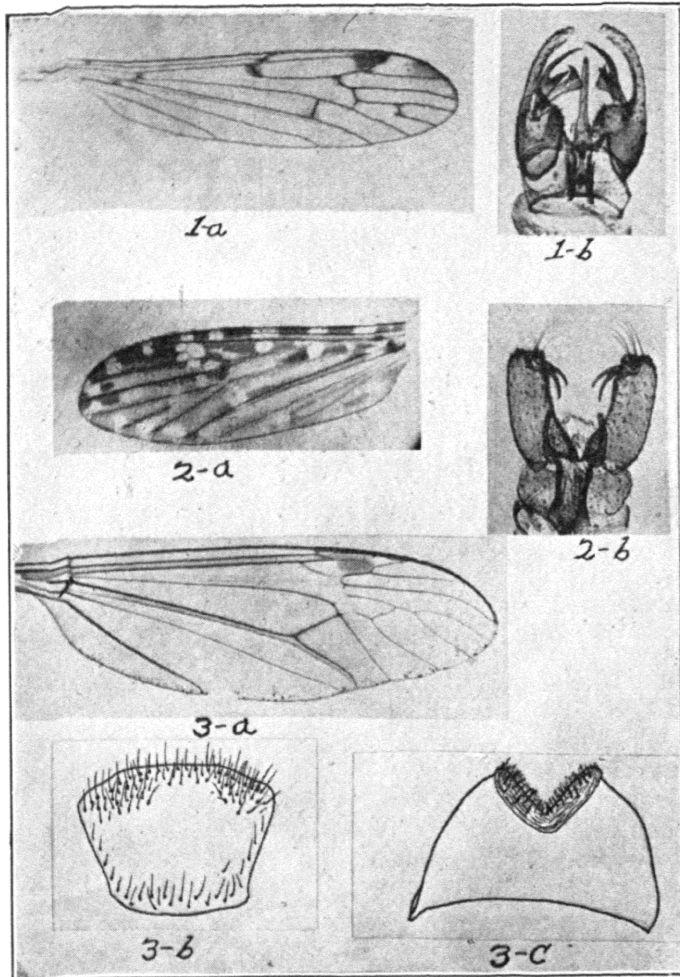
*Tipula kansensis* Alexander. June 6, in light trap. June 8 and 11 taken hanging from willow twigs near the creek, at night. Apparently only recorded from the type locality, Lawrence, Douglas Co., Kansas.

*Tipula bella* Loew. June 11, a single male taken at night, resting on the trunk of a tree. A common species in the eastern states, where it occurs in the vicinity of streams. The larvae and pupae are found in saturated soil of stream margins.

A female *Tipula* of the *submaculata* group was also taken but cannot be identified without the male.

The only crane-flies collected outside of Wichita National Forest were: a pair of *Geranomyia canadensis* (Westwood) taken in copulo while resting on a willow log near a stream course, Texas Co., Okla.; June 23; and the specimens of *Tipula cimarronensis* taken in Cimarron County.

The collection made in the Wichita National Forest shows an interesting mixture of eastern mesic forest forms with members of a presumably south-western fauna. In the present list eastern forms predominate but the collection was made from a principally mesic situation, and the short season represented, June 6 to 11, could easily give a misleading proportion of eastern species. The surprising extensions of the known ranges of several eastern species, altho they emphasize how little is known of crane-fly distribution, probably approach the western limits to which the species have established themselves. Several species are presumed to be south-western because they are not known from Kansas, Iowa or Colorado, where considerable collecting has been done and they are represented in a collection made in the Davis Mountains of Texas by Mr. O. C. Poling. Three of the species: *Tipula kansensis* Al., *Gonomyia kansensis* Al., and *Empedomorpha empedoides* Al. seem to be prairie species but may be also of south-western origin.



## EXPLANATION OF FIGURES

- 1-a Wing of *Gonomyia (Ptilostena) gaigei*  
 1-b Male genitalia of *Gonomyia (Ptilostena) gaigei*, dorsal view of cleared mount  
 2-a Wing of *Erioptera (Mesocyphona) hubbelli*  
 2-b Male genitalia of *Erioptera (Mesocyphona) hubbelli*, ventral view of cleared mount.  
 3-a Wing of *Tipula (Cinctotipula) cimarronensis*  
 3-b Eighth abdominal sternite of *Tipula (C.) cimarronensis*, diagrammatic  
 3-c Ninth tergite of *Tipula (C.) cimarronensis*, diagrammatic