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NEW NEARCTIC CRANE-FLIES (TIPULIDAE, DIPTERA); PART XXI.

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In the present report I wish to define five species of crane-flies from California, all belonging to the subgenus *Lunatipula* Edwards of the major genus *Tipula* Linnaeus. These specimens were collected by Messrs. T. H. G. Aitken, Mont Cazier, Otto Degener, Anthony Downes, and C. D. Michener, to whom I am greatly indebted for the privilege of retaining the types of the various species. In western North America, the subgenus *Lunatipula* is represented by a host of species that break up into several well-defined groups of forms.

***Tipula (Lunatipula) degeneri* n. sp.**

General coloration of mesonotum opaque, light gray, with vague indications of more reddish gray praescutal stripes; antennae (male) with flagellar segments beyond the first black, strongly incised; wings yellowish gray, the prearcular and costal fields clearer yellow; stigma oval, pale brown; abdominal tergites polished yellow, with three brown stripes; sternites and hypopygium yellow; male hypopygium with the basistyle produced caudad into a conspicuous compressed-flattened blade, the tip acute, the lower margin fringed with long conspicuous setae; inner dististyle an elongate blade placed on the inner face of the prolongation of the basistyle, its head a compact polished black corrugated structure, the posterior portion a flattened blade, the cephalic angle further produced into a long spine; eighth sternite conspicuously fringed with long setae.

Male. Length about 18 mm.; wing 17 mm.; antenna about 5 mm.

Frontal prolongation of head polished yellow, subequal in length to remainder of head; nasus distinct; palpi brown, the terminal segment brownish black. Antennae (male) relatively long, as shown by the measurements; scape and pedicel yellow; first flagellar segment brownish yellow basally, blackened at tip, remainder of flagellum black; flagellar segments strongly incised, longer than their verticils. Head clear light gray, with black setae.

Pronotum reddish, sparsely pruinose. Mesonotum with the ground color light gray, with vague indications of more reddish gray stripes, these very poorly delimited; setae of interspaces sparse, yellow; scutal lobes brownish gray; scutellum brownish yellow, sparsely pruinose; mediotergite brownish yellow, with indications of a capillary dark brown median vitta; pleurotergite brownish yellow. Pleura chiefly obscure yellow to faintly brownish yellow, the dorso-pleural region weakly darkened. Halteres with stem obscure yellow, knob dark brown. Legs with the coxae yellow, sparsely pruinose; trochanters yellow; femora obscure yellow; tibiae brownish yellow, the tips weakly darkened; tarsi black; claws (male) toothed. Wings with a strong yellowish gray tinge, the prearcular and costal fields clearer yellow; stigma oval, pale brown; centers of outer radial cells vaguely darkened; obliterative areas before cord and across cell 1st M_2 relatively small and inconspicuous; veins brown, more brownish yellow in the brightened portions. Venation: R_1+2 entire; R_s about one-half longer than $m-cu$; R_2 unusually long, about two-thirds the outer section of R_1 ; petiole of cell M_1 subequal in length to the cell.

Abdominal tergites polished yellow, narrowly trivittate with brown, the extreme posterior borders of the segments pale; lateral dark tergal stripes narrow, becoming paler toward their lateral portions; sternites and hypopygium yellow. Male hypopygium with the tergite and sternite separated by a suture. Ninth tergite relatively small, its caudal margin truncate, with a quadrate median notch, the lateral lobes thus formed obliquely truncate; on lower surface of either side of tergite with a flattened lobe; groupings of setae across the caudal third of sclerite and at the outer lateral angles. Ninth sternite notched, on either side with a small cylindrical lobe that is tipped with numerous setae to form a relatively dense brush. Basistyle partially separated from the sternite by a long straight dorsal suture, the ventral suture short and poorly defined; basistyle produced caudad into a long compressed-flattened blade, its apex acute, its lower margin fringed with unusually long setae. Outer dististyle a small pale spatula. Inner dististyle of peculiar conformation, inserted at near midlength of blade of basistyle, the head an oval or conical polished black structure, with transverse corrugated blackened ridges; posterior portion of style produced directly backward into a flattened blade, the cephalic angle of which is further produced into a slender spine; outer caudal portion of blade with numerous long setae and terminating in a small point. Eighth sternite moderately sheathing; caudal margin broadly emarginate, with a conspicuous, very dense fringe of brown setae arranged in a marginal row, narrowly interrupted at the midline to form two distinct groups; inner portions of row adjoining the midline with the setae even more dense, shorter and more crinkly; extreme outer lateral angles of sternite with a further dense grouping of setae from close-set punctures; outer marginal bristles more or less distinctly separated from the remainder of the sternite by pale membrane.

Habitat. California.

Holotype. ♂, Sequoia National Park, June 8, 1942 (Otto Degener).

I am very pleased to name this fly for the collector, Dr. Otto Degener, to whom I am greatly indebted for many crane-flies from Hawaii, the Fiji Islands, and our Pacific Northwest. The fly is very different from all other American species of the subgenus. It should be noted that the structure of the blade of the basistyle of the male hypopygium, while suggesting that found in the members

of the *streptocera* group, actually is of entirely different type and the fly is not to be referred to this group of species.

***Tipula (Lunatipula) micheneri* n. sp.**

Belongs to the *streptocera* group; general coloration yellow, the praescutum with three more reddish stripes; *Rs* nearly three times *m-cu*; male hypopygium with the tergite terminating in two large flattened lobes that are separated by a relatively narrow V-shaped notch, each lobe terminating in a small blackened point from which leads back a long carina on the ventral face of lobe; horn of basistyle relatively short, twisted, much widened on proximal half; rostrum of inner dististyle short but very slender; median brush of eighth sternite forming a compact group of at least twenty setae.

Male. Length about 15 mm.; wing 15 mm.; antenna about 4.2 mm.

Frontal prolongation of head elongate, brownish yellow; nasus distinct; palpi brownish black. Antennae with scape and pedicel yellow, the flagellum medium to dark brown; flagellar segments only gently incised. Head black, sparsely pruinose, more heavily so on front and on the very narrow orbits; anterior vertex relatively narrow, a little less than three times the diameter of scape.

Pronotum brown medially, paling to yellow on sides. Mesonotal praescutum with the ground color yellow, with three more reddish stripes that are inconspicuous against the ground; scutum yellow, the centers of the lobes more evidently infuscated; posterior sclerites of notum testaceous yellow. Pleura uniformly polished reddish yellow; dorsopleural membrane pale. Halteres with stem obscure yellow, knob brownish black. Legs with the coxae and trochanters yellow; femora yellow, the tips narrowly and very inconspicuously pale brown; tibiae and basitarsi obscure yellow or brownish yellow, the outer tarsal segments passing into black; claws (male) toothed. Wings grayish subhyaline, the prearcular and costal fields yellow; stigma pale brown; a small brown spot at origin of *Rs*; centers of cells beyond cord with distinct pale brown streaks; cells basad of cord unmarked or virtually so; veins brown, more yellowed in the brightened fields. Macrotrichia of cells sparse and scattered, virtually restricted to cells *R*₃ and *R*₄. Venation: *Rs* nearly three times *m-cu*; cell 1st *M*₂ small, narrowed outwardly, *m-cu* short, cell *M*₄ virtually parallel-sided.

Abdominal tergites yellow, with a slightly interrupted median black stripe and conspicuous black triangular spots near the outer anterior angle of tergites three to six, inclusive; sternites yellow; hypopygium large, chestnut-yellow. Male hypopygium with the tergal plate distinctive, terminating in two separate dorsal lobes that are separated from one another by a relatively narrow V-shaped notch; lobes large, flattened, smooth, each terminating in a small blackened point from which leads backward a long carina on ventral face of lobe; ventral tergal lobes low, transverse, separated by a small U-shaped notch, their margins truncated. Basistyle with the horn relatively short and twisted, much widened on proximal half, its tip acute. Inner dististyle with the rostrum short but very slender; dorsal crest low, entire; outer basal lobe relatively small. Outer dististyle oval, small. Eighth sternite with the lateral detached lobes unusually chitinated and compact, their oblique faces with a dense cushion of short-branched, roughened setae; median brush of sternite compact, comprised of at least a score of long straight setae that appear to be unbranched or virtually so.

Habitat. California (Riverside Co.)

Holotype. ♂, Herkey Creek, San Jacinto Mts., altitude 5,000 feet, June 19, 1940 (C. D. Michener).

This interesting species is named in honor of the collector, Dr. Charles D. Michener, to whom I am indebted for several crane-flies from California.

The fly is entirely distinct from the other described members of the group. It is perhaps closest to *mutica* Dietz, which has the structure of the hypopygium quite distinct, including the tergite, horn of basistyle, the unusually long-beaked inner dististyle, the elongate outer dististyle, and the eighth sternite. I am still uncertain as to whether all members of the group have macrotrichia in the outer cells of the wing. In some, these are reduced to one or two scattered trichia, in other species very numerous and conspicuous.

***Tipula (Lunatipula) contortrix* n. sp.**

Belongs to the *streptocera* group; general coloration yellow, the praescutum with three black stripes that are more or less opaque by a grayish pruinosity; femora with tips narrowly blackened; wings with stigma dark brown; male hypopygium with the tergite produced into two lobes that are separated by a broad V-shaped notch, each lobe produced into an acute point; basistyle with horn long and slender, strongly twisted; inner dististyle with beak short, simple, subacute; posterior prolongation of main body of style unusually long, more or less cultriform in outline, the outer basal lobe unusually large.

Male. Length about 14 mm.; wing 15 mm.; antenna about 5 mm.

Female. Length about 13 mm.; wing 14.5 mm.

Frontal prolongation of head brownish black; nasus distinct; palpi black. Antennae (male) relatively long, as shown by the measurements; scape and pedicel light yellow; basal flagellar segments indistinctly bicolored, dark brown with the base narrowly yellow; on about the tenth and succeeding segments the color becomes uniformly dark brown; flagellar segments feebly incised, longer than the verticils. Head black, gray pruinose, more heavily so in front.

Pronotum broadly infuscated medially, paling to yellow on the sides. Mesonotal praescutum obscure polished yellow with three black stripes that are more or less opaque and obscured by a gray pruinosity, heaviest over the lateral stripes; posterior sclerites of notum yellow, each scutal lobe with two confluent black areas that are sparsely pruinose. Pleura and pleurotergite yellow. Halteres with stem obscure yellow, knob dark brown. Legs with the coxae and trochanters yellow; femora yellow, the tips narrowly but conspicuously blackened, the amount subequal on all legs; tibiae and basitarsi obscure yellow, the tips very narrowly and inconspicuously darkened; remainder of tarsi passing into brownish black. Wings with the ground color of cells basad of cord pale brownish yellow, of those beyond cord more whitish subhyaline, with conspicuous darker centers to the cells; prearcular and costal cells more yellowed; stigma unusually dark brown and correspondingly conspicuous; a small brown spot at origin of *Rs*; veins brown, more yellowed in the brightened fields. Macrotrichia of cells much reduced to virtually lacking. Venation: *Rs* more than three times the unusually short *m-cu*; cell 1st *M*₂ narrowed outwardly.

Abdominal tergites yellow, with a nearly continuous black median stripe, the posterior border of the second segment narrowly pale; tergites two to five with oval black lateral spots near cephalic portion of each segment, in female becoming more extensive on outer segments to form a darkened ring on the seventh tergite; sternites more uniformly yellow in male, the intermediate sternites conspicuously blackened in female; male hypopygium chiefly castaneous. Male hypopygium with the tergite produced into two lobes that are separated by a broad V-shaped notch; each lobe with the lateral angle narrowed to an acute point; surface of tergite with unusually few setae. Basistyle with the horn long and slender, strongly twisted. Outer dististyle long-oval. Inner dististyle with the beak relatively short but subacute, simple; dorsal crest low; posterior prolongation of main body of style unusually long, compressed-flattened, more or less cultriform in outline; outer basal lobe a very large, broadly flattened plate, with a further inner constricted arm; surface of outer

basal lobe with numerous long pale setae. Eighth sternite with the two lateral semidetached lobes densely set with short compact setae; although this region of the unique type (mounted on a slide) is more or less damaged, there does not appear to be any median brush of setae, as in most other members of the group.

Habitat. California (Nevada Co.).

Holotype. ♂, Nevada City, June 13, 1939 (Mont Cazier). *Allotopotype.*

♀. *Paratopotype.* 1 ♀; all mounted on a single pin.

This interesting fly is readily told from all related species by the structure of the male hypopygium. In the unusually heavy praescutal stripes, the fly is most like *coronado* Alexander but the hypopygium is entirely different. This latter structure is perhaps most similar to that of *micheneri* n. sp., especially as regards the tergite, but all details of the horn of the basistyle and the inner dististyle are entirely different in the two flies.

***Tipula (Lunatipula) supplicata* n. sp.**

Belongs to the *streptocera* group; general coloration obscure yellow, the mesonotal praescutum with three black stripes, their surface subopaque by a thin grayish pruinosity; tips of femora only weakly infuscated; male hypopygium with the tergite of peculiar shape, the ventral plates appearing as narrowly separated flattened blades, their tips obtusely rounded, each produced into an arm that is directed laterad and caudad to lie outside the tergal plates; horn of basistyle relatively short, dilated on basal third; inner dististyle unusually compact, beak short but slender; posterior lobe small, obtusely rounded; eighth sternite with the median group of setae reduced to about four.

Male. Length about 12 mm.; wing 12-12.5 mm.; antenna about 3.2 mm.

Female. Length about 12 mm.; wing 12-12.5 mm.

Frontal prolongation of head polished brownish yellow; nasus distinct; palpi black. Antennae relatively short; basal three segments yellow; succeeding segments dark brown. Head black, sparsely pruinose, more heavily so in front.

Pronotum brown to brownish black. Mesonotal praescutum obscure yellow, with three black stripes, the median one more or less divided by a capillary reddish median vitta; surface of notum subopaque because of a thin grayish pruinosity; posterior sclerites of notum yellow, the scutal lobes with black central areas. Pleura yellow. Halteres with stem obscure yellow, knob brownish black. Legs with coxae and trochanters yellow; femora obscure yellow, the tips narrowly and rather weakly infuscated; tibiae and basitarsi obscure yellow, the tips very narrowly darkened; remainder of tarsi brownish black to black. Wings with the ground color whitish subhyaline, especially beyond the cord; centers of cells beyond cord with pale brown central areas, as common in the group; stigma and a small spot at origin of *Rs* medium brown; prearcular and costal fields yellow; veins brown, more brightened in the flavous fields. Macrotrichia of cells very reduced in number, with only one or two in cell *R*₃ and about four in cell *R*₅. Venation: *Rs* exceeding three times *m-cu*.

Abdominal tergites obscure yellow, the more proximal segments with a nearly continuous median black vitta and isolated black sublateral spots on segments two or six, inclusive; sternites yellow; hypopygium chestnut yellow. Male hypopygium with the ninth tergite of peculiar conformation, the dorsal plates small, with very obtuse apices; ventral plates appearing as narrowly separated flattened blades with obtusely rounded tips, their outer margins produced as slender arms that are directed laterad and thence nearly caudad, their tips obtuse. Horn of basistyle relatively short, only about one-third longer than the dististyle, its basal third much dilated, thence gradually narrowed to an acute point. Outer dististyle a small oval dusky lobe. Inner dististyle unusually compact, nearly parallel-sided, the beak very short but relatively slender; posterior lobe of main body small, obtusely rounded, provided with unusually long,

coarse setae that are directed laterad; outer basal lobe of style a relatively small, narrow, glabrous blade, its tip obtuse. Eighth sternite with the usual paired, semidetached lateral lobes with abundant, conspicuously branched or fimbriated setae; median group of setae reduced to four, these similarly fimbriated.

Habitat. California (Riverside Co.)

Holotype. ♂, San Jacinto River Canyon, May 1939 (T. H. G. Aitken).

Allotopotype. ♀, pinned with type. *Paratopotype.* 1 ♀, pinned with type; *paratypes.* 2 ♂♂, Idyllwild, May 14, 1939 (T. H. G. Aitken).

This fly is entirely distinct from the previously described forms, differing especially in the structure of the male hypopygium, as the ninth tergite, horn of the basistyle, inner dististyle, and eighth sternite. In some regards it suggests *opisthocera* Dietz but the hypopygial structures are entirely distinct. The blackened praescutal stripes suggest some species that are otherwise not very closely related, as *contortrix* n. sp., and *coronado* Alexander. The specific name is an allusion to the elevated lateral arms of the ninth tergite of the male hypopygium.

***Tipula (Lunatipula) downesi* n. sp.**

General coloration of mesonotum dark gray, the praescutum with four relatively inconspicuous grayish brown stripes, the intermediate pair widely separated; antennae with scape and pedicel yellow, flagellum with segments dark brown, their bases blackened; femora with tips narrowly blackened; wings grayish brown, with a restricted brown pattern and conspicuous white obliterative areas, including prestigmal and poststigmal markings; male hypopygium with the inner dististyle profoundly divided into two slender arms, the outer basal lobe provided with blackened spinous points; eighth sternite sheathing, at apex dilated into two divergent flaplike lobes, their margins fringed with long conspicuous setae; ovipositor with base of cerci dilated into a circular saucer-like structure, hypovalvae acutely pointed at tips.

Male. Length about 14.5-15 mm.; wing 16.5-17 mm.; antenna about 5.8-6 mm.

Female. Length about 18 mm.; wing 18 mm.

Frontal prolongation of head brownish yellow, restrictedly pruinose above; palpi with proximal two segments brownish yellow, the outer ones passing into brownish black. Antennae (male) relatively elongate, as shown by the measurements; scape and pedicel yellow; succeeding segments dark brown, with more blackened basal enlargements; flagellar segments feebly incised, verticils shorter than the segments. In female, antennae shorter and more simple in construction, as usual in the genus. Head gray, clearer in front and on orbits, more brownish gray behind; a narrow but evident dusky capillary median vitta; vertical tubercle very reduced.

Pronotum light gray, vaguely patterned with darker. Mesonotum dark gray, the praescutum, with four relatively inconspicuous grayish brown stripes, these narrow and entire; intermediate stripes separated by a ground vitta that is only a little narrower than the stripes themselves; posterior sclerites of notum gray, patterned with darker, including the scutal lobes and on either side of base of scutellum. Pleura gray. Halteres with stem dusky, its base narrowly yellow; knob brownish black. Legs with coxae light gray; trochanters yellow; femora yellow, the tips narrowly and rather inconspicuously blackened, the amount subequal on all legs; tibiae and basitarsi yellowish brown, the tips vaguely darker; remainder of tarsi black; claws (male) toothed. Wings grayish brown, very restrictedly patterned with brown and white; prearcular and costal fields slightly more yellow; the dark areas include the oval dark brown stigma and slightly paler brown clouds at origin of *Rs* and along the cord, more extensive over the anterior cord; white obliterative areas conspicuous against the ground, extending from before the stigma into the base of cell *M*₂; a poststigmal white area; veins

brown, slightly more brightened in the costal and prearcular fields. Venation: R_1+2 entire; R_s a little more than twice $m-cu$; petiole of cell M_1 , a little longer than m .

Abdomen with the tergites obscure yellow, trivittate with dark brown, the median stripe more conspicuous and more nearly continuous, interrupted by pale caudal rings on the second and third segments; sublateral stripes subobsolete, a little more evident at the cephalic portion of sclerite; lateral borders broadly pale; sternites obscure yellow, the more proximal segments narrowly more darkened basally; hypopygium chestnut-brown. Male hypopygium with the ninth tergite entirely separate from the sternite. Ninth tergite posteriorly with a broad V-shaped median notch, the sublateral lobes thus formed obtuse, provided with abundant setae that become shorter at apex of lobe, such setae being subtended by small triangular points to produce a roughened appearance; posterior lateral border of tergite further produced into a smaller acute lobe that is separated from the sublateral lobes by a more rounded notch; mid-dorsal and posterior portions of tergite more membranous than the portions at and immediately behind the lobes. Ninth sternite with the lobes small, oval, densely tufted with long, crinkly, yellow setae. Basistyle entirely cut off from sternite by a suture; narrow, not produced apically. Outer dististyle long and slender but entirely pale and inconspicuous. Inner dististyle of very peculiar conformation, both the main body and the outer basal lobe being long and narrow; beak obtuse and not blackened or otherwise differentiated in color from the posterior portion of this lobe, provided with coarse erect setae; outer basal lobe narrow, at apex bearing two divergent, slender, heavily blackened lobes and an additional blackened rod that is shallowly split at apex into two points; sensory area at point of juncture of the lobes, semilunate in outline, with numerous pits; main body of style with a broad flattened flange that involves about the outer half of style. Gonapophyses heavily sclerotized, slender, at apex produced into a long, narrow apical spine and a subapical, shorter and stouter one. Eighth sternite sheathing, elongate, narrowed outwardly, at apex again expanded into two divergent flap-like lobes that are separated by a very wide V-shaped incision; posterior margin of lobes fringed with very long reddish setae. Ovipositor of peculiar conformation. Dorsal shield short and polished; cerci at their bases expanded into semicircular, cuplike structures, the actual blades arising from the lower and inner margin of the circular orifice; blades of cerci flattened, lying obliquely to almost transversely, their tips obtuse; hypovalvae very thin and membranous, compressed-flattened, their tips produced into small acute points.

Habitat. California.

Holotype. ♂, Mirror Lake, Yosemite, altitude 4,000 feet, June 6, 1939 (A. Downes). *Allotopotype.* ♀ *Paratopotype.* 1 ♂.

I take great pleasure in naming this species for the collector, who captured and sent to me numerous crane-flies from various parts of California, particularly the Yosemite National Park. The fly is very different from all other described members of the subgenus, especially in the very peculiar ovipositor and hypopygium, more particularly the inner dististyle and eighth sternite of the male and the cerci of the female. No other species known to me can be compared profitably with this fly.