

NEW OR LITTLE-KNOWN CRANE-FLIES FROM CALIFORNIA

(TIPULIDAE, DIPTERA), I

By CHARLES P. ALEXANDER

In the present series of papers, I hope to consider certain of the rare and undescribed species of crane-flies that have been taken in California. During recent years there has been a vast increase in our knowledge of these flies in western North America and it is hoped that such studies may be continued during the future years and finally result in a comprehensive treatment of the group. A recent summary of the Tipuloidea of Northeastern North America* includes approximately 500 species of these flies. Due to its great size, and to the virtually unparalleled range both in altitude and latitude among our states, as well as a vast diversity in ecological conditions, it seems probable that California will be found to possess more species of these flies than occur in the above-mentioned section of North America. It will be many years before we have an adequate picture of the Tipulid fauna of California and to achieve such an end, it will require the co-operation and friendly interest of many entomologists and collectors. I would be most grateful for any specimens of these flies, particularly from the higher mountains and those pertaining to the spring fauna of the southern third of the state. The types of the new species here described are preserved in my collection.

1. TIPULA (LUNATIPULA) DIACANTHOPHORA sp. n.

Allied to *unicincta*; size large (wing, male, 19 mm.); general coloration of thorax light gray, the praescutum with four brown stripes, the narrow intermediate pair light reddish brown, the laterals slightly wider and darker brown; wings conspicuously patterned, the basal third chiefly yellow, the outer portions more grayish brown, patterned with darker brown and whitish subhyaline; outer radial field and a broad band before cord medium brown; a broad obliterate band before cord; male hypopygium with the tergal lobes slender, separated by a narrow U-shaped notch; inner dististyle with the dorsal and posterior crests long-extended, pale, the margin microscopically serrulate; gonapophysis with median arm expanded at apex and produced into two

*Alexander, Charles P. The Diptera or true flies of Connecticut. Tanyderidae, Ptychopteridae, Trichooceridae, Anisopodidae, Tipulidae, Conn. State Geol. and Nat. Hist. Surv. Bull. 64: 183-486, index 501-509; figs. 18-55 (with 389 individual illustrations); 1942 (published in 1943).

divergent spines; eighth sternite with lateral lobes extended into a single fasciculate bristle; central area of sternite with the anterior group of setae dilated on their outer ends.

MALE: Length about 18 mm. wing 19 mm.; antenna about 4.6 mm.

Frontal prolongation of head reddish brown, dusted with gray, especially above; nasus short and stout; palpi black, more or less pruinose. Antennae with scape brownish yellow, pedicel clearer yellow; first flagellar segment obscure brownish yellow, darker at near midlength; outer flagellar segments brownish black, the apices of the more proximal ones a trifle paler; flagellar segments weakly incised; longest verticils exceeding the segments in length. Head in front and on anterior vertex gray, on posterior vertex more brownish gray, with the faintest indication of a median capillary darker vitta.

Pronotum brownish gray. Mesonotum light gray, the praescutum with four brown stripes, the narrow intermediate pair light reddish brown, the laterals broader and darker brown; median gray stripe wider than the subtending intermediate brown lines, narrowed behind; scutal lobes each with two reddish brown areas. Pleura variegated with reddish brown and gray, the paler areas including most of the ventral sternopleurite and the narrower ventral anepisternum; dorsopleural region more buffy yellow. Halteres with stem obscure brownish yellow, brighter basally, the knob dark brown. Legs with the coxae light brown, sparsely pruinose; trochanters brownish yellow; femora and tibiae obscure yellow, the tips brownish black, more narrowly so on the latter; tarsi light brown, passing into black outwardly: claw (male) with a long tooth. Wings conspicuously patterned, the basal third chiefly yellow, the remainder with the ground grayish brown, patterned with darker brown and whitish subhyaline; the darker areas include the stigma, a small spot at end of Sc_2 , and the arculus; outer radial field and a broad band before cord somewhat paler brown; a broad obliterative band before cord, reaching bases of cells M_3 and M_4 and thence more diffused to the posterior border; centers of outer medial cells slightly brightened; bases of cells R to $2nd A$ narrowly pale; narrow pale streaks along vein $1st A$ and at outer end of cell $1st A$ near posterior portion; veins brown, more brownish yellow in the brightened fields. Venation: R_s a little more than twice $m-cu$; m longer than petiole of cell M_1 .

Abdominal tergites chiefly gray, with a weakly indicated median brown stripe, the fourth segment darker brown; outer tergites more interspersed with yellow; lateral tergal borders broadly obscure yellow, the caudal margins more narrowly so; sternites reddish, the caudal borders narrowly yellow; hypopyg-

ium brownish yellow to light brown. Male hypopygium (Fig. 1) having the ninth tergite, *9t*, with the lobes unusually slender, lying subparallel, the median notch correspondingly narrow, deep U-shaped; dorsal surface of tergite with a deep median furrow extending the entire length. Ninth sternite, *9s*, with the appendage appearing as a large elongate cushion. Basistyle, *b*, entire; lower ventral angle produced into a short sclerotized blade. Outer dististyle at apex expanded into a broad spatula that is provided with numerous black setae, some of the outer ones very long. Inner dististyle, *id*, with the beak darkened, relatively narrow; lower beak expanded at apex into a rounded black knob; dorsal crest becoming high and much produced behind, the outer margin microscopically serrulate and very pale; outer basal lobe large and broad, the apex obtuse; sensory area placed near base of lobe; vestiture of lobe yellow, long and abundant, some of the apical and posterior ones very long. Gonapophyses, *g*, with the paired lateral rods acute; a shorter median structure has a stout, gently arcuated stem that is expanded at apex and produced into two strong divergent spines, their tips acute. Eighth sternite, *8s*, with the lateral lobes relatively slender, at tip extended into a single powerful reddish bristle, the elements comprising it so completely united that the fasciculate nature is virtually lost; on mesal face of lobe with two smaller flattened bristles; along mesal margin near base with a row of long bent setae that merge into a more numerous group at the midline; central area with the outer median lobe suboval, provided with two groups of setae that are remarkably expanded at their tips into flattened frond-like blades; posterior median lobe expanded outwardly, its apical border weakly emarginate; surface clothed and bordered by abundant long fimbriate setae.

Holotype, ♂, Strawberry, Tuolumne County, August 6, 1939 (T. H. G. Aitken).

The most similar described species are *Tipula (Lunatipula) bigeminata* Alexander and *T. (L.) uncinata* Doane, which agree rather closely in size and color. The present fly has the praescutal stripes differently colored and with the structure of the male hypopygium distinct. The differences in the hypopygial characters from *uncinata* are very marked and include almost every structure of the organ. The unpaired gonapophysis is somewhat as in the otherwise distinct *T. (L.) spatha* Doane.

2. TIPULA (LUNATIPULA) MODOC sp. n.

Size medium (wing, male, about 16 mm.); general coloration of thorax gray, the praescutum with four entire reddish brown stripes; nasus present; antennae with basal three segments yellow, the remainder very weakly bicolored; flagellar segments

strongly incised; wings infuscated, with a restricted darker brown and more extensive whitish subhyaline pattern, the latter including a band before cord that reaches the posterior border of wing along vein M_4 ; abdomen yellow, the tergal stripes poorly defined, the median one virtually lacking; male hypopygium with the caudal margin of tergite produced into two submedian spines that are weakly divergent; outer dististyle strongly narrowed on distal third; inner dististyle with the beak very slender, lower beak lacking, dorsal crest very small, erect; outer basal lobe a large blade that is extended at tip into a long curved spine; eighth sternite narrowed outwardly, its caudal margin fringed with abundant long reddish setae.

MALE: Length about 16 mm.; wing 16.5 mm.; antenna about 5 mm.

Frontal prolongation of head obscure yellow, slightly more darkened medially on sides; nasus long and slender; palpi with basal two segments obscure brownish yellow, outer segments black, incisures paler. Antennae moderately long; basal three segments yellow, remainder of flagellum weakly bicolored, the basal swellings more blackened than the remainder; flagellar segments very strongly incised, the outer swelling being virtually as prominent as the basal one; longest verticils exceeding the segments. Head light buffy gray in front, darker gray behind, the vertex with a conspicuous brown median vitta, this widest on the anterior vertex; vertical tubercle lacking or inconspicuous.

Pronotum brownish gray, darker brown and more bulbous at the midline. Mesonotal praescutum gray, with four entire reddish brown stripes, the intermediate pair only slightly narrowed behind; scutal lobes with similar reddish brown areas; scutellum more infuscated; mediotergite gray, with a vague central darkening. Pleura and pleurotergite more uniformly brownish gray; dorsopleural membrane buffy yellow. Halteres with stem yellow, knob dark brown, its apex paling to obscure yellow. Legs with coxae pale, sparsely pruinose; trochanters yellow; femora obscure yellow, the tips narrowly dark brown, the amount subequal on all legs; tibiae similar, the tips more narrowly darkened; tarsi passing into black; claws (male) toothed. Wings with the ground somewhat strongly infuscated, restrictedly patterned with darker brown and with extensive whitish subhyaline areas; prearcular and costal regions scarcely differentiated in color from the remainder; the darkest spots include the stigma and a confluent area over anterior cord, with small darkenings over origin of R_s and tip of Sc ; some of the cells with somewhat differentiated centers in the infuscated ground; the whitish areas include major marks before cord and beyond stigma, the former reaching the posterior wing border as a seam along vein M_4 ; other white

areas before origin of *Rs*, basal half of cell *R*, tip of vein *1st A*, a faint marginal area in cell *1st A* near vein *2nd A*, and major pale markings in bases of Anal cells; veins brown, more yellowed in the prearcular and costal fields. Venation: *Rs* about two and one-half times *m-cu*; $R_1 + 2$ entire; *m* subequal to petiole of cell M_1 .

Abdomen with tergites yellow, the first more brownish gray; median dark tergal stripe not or scarcely indicated, the sublateral pair present but much broken, chiefly represented by long brownish areas on basal portions of segments; lateral tergal borders gray; sternites more uniformly yellow; hypopygium relatively large. Male hypopygium (Fig. 2) having the ninth tergite, $9t$, entirely separate from the sternite; caudal margin with a deep V-shaped median notch, subtended by acutely pointed blackened submedian lobes and much broader and flatter blackened lateral lobes or flanges; submedian spines directed slightly laterad and thus appearing weakly divergent; dorsal surface of tergite with a membranous median furrow; on ventral face, on either side of midline, with a further blackened lobe or plate. Ninth sternite with the appendage small, conspicuously bilobed, the upper lobe with very long setae, the lower one with much shorter subappressed bristles. Basistyle, *b*, relatively narrow, entire, the inner and outer margins sinuous but not produced into lobes or spines. Outer dististyle, *od*, broad on more than the proximal half, the apex suddenly narrowed. Inner dististyle, *id*, with the beak unusually long and slender, blackened, the lower beak not developed; dorsal crest a small, elongate-triangular yellow blade that ends in an acute point; outer basal lobe very large, nearly as extensive as the main body of style, its proximal portion widely expanded, the apex produced into a long curved spine; outer margin of lobe, including the concave edge of the spine, conspicuously fringed with setae; sensory area comprised of rather numerous facets, placed on main body of style at base. Eighth sternite, $8s$, sheathing, the caudal border gently concave, fringed with abundant long reddish setae, the outermost of the series longest, their tips incurved toward the midline.

Holotype, ♂, Cedarville, Modoc County, May 29, 1939 (T. H. G. Aitken & Mont A. Cazier).

The specific name, *modoc*, is that of an important group of Indians of Lutuamian stock, inhabiting Oregon and northeastern California. The only allied species so far discovered is *Tipula* (*Lunatipula*) *perfidiosa* sp. n., which differs particularly in the details of structure of the male hypopygium, as described. The peculiar outer basal lobe of the inner dististyle is somewhat as in *T. (L.) retusa* Doane, but the general appearance and other structures of the hypopygium are entirely different in the two flies.

3. TIPULA (LUNATIPULA) PERFIDIOSA sp. n.

Allied to *modoc*; mesonotal praescutum brownish gray with four relatively narrow reddish brown stripes that are very narrowly bordered by slightly darker brown; wings conspicuously patterned with dark brown, pale brownish gray, and whitish subhyaline, the last including a complete band at cord and seams bordering most of the veins; abdomen obscure yellow, conspicuously trivittate with dark brown; male hypopygium with the lobes on ventral aspect of ninth tergite extended into acute points; basistyle on lower outer margin with a small spinous point; inner dististyle with the apex of the dorsal crest truncate; outer basal lobe a broadly flattened blade that extends into a slender spine; eighth sternite with the apical brush small, the setae continued basad as a narrow row adjoining the midline.

MALE: Length about 15 mm. wing 16 mm.; antenna about 5 mm.

FEMALE: Length about 18 mm.; wing 16.5 mm.

Frontal prolongation of head brownish yellow, sparsely pruinose above at base; nasus small but distinct; palpi dark brown, the terminal segment blackened; incisures restrictedly pale. Antennae with the scape and pedicel yellow; first flagellar segment brown; remainder of flagellum brownish black to black, the stems of the more proximal segments being a little paler than the basal swellings; segments strongly incised. Head above dark gray, clearer gray in front and on the narrow posterior orbits, a narrow dark brown median vitta.

Pronotum brownish gray, patterned with darker brown, Mesonotal praescutum with the ground brownish gray, with four relatively narrow but conspicuous reddish brown stripes that are very narrowly bordered by slightly darker brown; posterior sclerites of notum with the ground color gray, the scutal lobes patterned with reddish brown; scutellum and mediotergite with a central brown vitta. Pleura brownish yellow, sparsely pruinose and very vaguely patterned with darker. Halteres with stem yellow, knob dark brown, its apex vaguely more brightened. Legs with the coxae pale brownish yellow, more darkened basally, especially the fore pair; trochanters yellow; femora brownish yellow, the tips brownish black, preceded by a subequal, somewhat clearer yellow ring; tibiae and proximal two tarsal segments brownish yellow, the tips narrowly darkened; remainder of tarsi brownish black; claws (male) toothed and conspicuously hairy. Wings conspicuously patterned with dark brown, pale brownish gray and whitish subhyaline; the darkest color includes the stigma, tip of *Sc*, origin of *Rs*, and a spot in cell *R* at near one-third the length; the slightly paler brown areas include

much of remainder of wings, being broken by broad and conspicuous white seams to the veins and in the obliterative band at cord, the latter completely traversing the wing along vein M_4 ; wing margin in outer radial field narrowly whitened, cells R , R_1 and M more extensively whitened; veins dark brown, clear yellow in the brightened costal and prearcular fields. Venation: R_s somewhat less than three times $m-cu$; R_{1+2} entire; m subequal to or longer than the petiole of cell M_1 .

Abdomen obscure yellow, both the tergites and sternites conspicuously trivittate with dark brown; lateral tergal borders yellow, the caudal margins narrowly silvery; male hypopygium chiefly yellow, the eighth segment more yellowish brown. Ovipositor (Fig. 3, *o*) with the cerci relatively stout, straight, the tips obliquely truncated and microscopically but evidently toothed; both dorsal and lateral surfaces of cerci with strong carinae; lower margin fringed with sparse long yellow setae; hypovalvae shorter, broadly compressed-flattened. Male hypopygium (Fig. 3) having the posterior border of ninth tergite, $9t$, with two divergent blackened lobes or spines that are separated by a deep V-shaped notch; ventral face near base of split with a sharp black spine that is directed laterad; on lateral portion of ventral face with a second, much longer and more slender spine. Ninth sternite, $9s$, with the appendage very unequally bilobed, the large dorsal portion with a brush of long yellow setae, the reduced subcylindrical lower lobe with small inconspicuous bristles. Basistyle, *b*, entire; outer border sinuous, opposite base of outer basal lobe of inner style produced into a small sharp spinous point. Outer dististyle flattened, the distal fourth narrowed, the entire style, but especially the outer margin and apex, with long coarse black setae. Inner dististyle, *id*, with the body heavily blackened, including the slender beak; lower beak lacking, as in the subgroup; dorsal margin and crest yellow, the latter erect, its apex truncate to broadly obtuse; near base of blade, immediately distad of the sensory area, with a conspicuous smooth-margined blackened flange; outer basal lobe a broadly flattened blade that extends into a long slender spine; inner portion of blade sclerotized and entirely glabrous; ventral portion, including the lower margin, with long coarse setae. Eighth sternite, $8s$, with the apical brush much smaller than in *modoc*, the series of setae continued basad as a narrow row of coarse punctures that are provided with large bristles; on the lateral side of this row with a large whitish subhyaline area.

Holotype, ♂, Old Fort Tejon, Kern County, May 15, 1939 (T. H. G. Aitken). *Allotopotype*, ♀

The nearest ally is *Tipula (Lunatipula) modoc* sp. n., with which species it has been compared in the previous description.

The most conspicuous hypopygial differences are to be found in the tergite, inner dististyle, and eighth sternite. The somewhat peculiar structure of the cerci (Fig. 3, *o*) indicates a more distant relationship with *T* (*L.*) *flavomarginata* Doane.

4. TIPULA (LUNATIPULA) MONO sp. n.

Allied to *barbata*; size small (wing, male, under 11 mm.); general coloration of mesonotum brownish gray, with four narrow, very distinct, dark brown stripes; femora obscure yellow, the tips narrowly darkened; wings with a strong and unusually uniform brown suffusion, restrictedly patterned with darker and with conspicuous obliterative areas; *Rs* not exceeding twice *m-cu*; abdomen yellow, the tergites trivittate with dark brown, the sternites with a similar very conspicuous median darkening; male hypopygium with the caudal margin of tergite bearing two very obtuse lobes that are separated from one another by a deep median split; outer dististyle long and narrow, pale; inner dististyle with the disk provided with unusually long and conspicuous tubercles that bear strong setae; outer basal lobe terminating in a narrow point or flange, with a second similar extension near the tip; appendage of ninth sternite bilobulate, its setae unusually short and strong; eighth sternite with the lateral lobes densely fringed with long yellow setae in various groups, including a very powerful roughened major bristle on either side.

MALE: Length about 10 mm. wing 10.5 mm.; antenna about 3.1 mm.

Frontal prolongation of head dark brown above, more brownish yellow on ventral third; nasus long and slender. Antennae with scape and pedicel yellow, flagellum brownish black; flagellar segments unusually simple, scarcely incised, the basal enlargement thus feebly developed; longest verticils a little shorter than the segments; scape elongate, equal to flagellar segments one and two combined. Head brownish gray, with a conspicuous narrow dark brown median stripe extending from the small vertical tubercle to the occiput.

Pronotum brownish gray, with a single narrow dark brown median spot. Mesonotum brownish gray, the praescutum clearer gray on sides, with four narrow but unusually distinct and clear cut dark brown stripes, the intermediate pair a little wider than the median ground vitta, narrowly united at their extreme posterior ends; besides the four primary stripes, the praescutum has paler brown clouds in the humeral and sublateral fields; posterior sclerites of notum gray, each scutal lobe with two separate dark brown areas; scutellum and mediotergite with a central dark brown vitta, on the latter narrowed to a point behind. Pleura and pleurotergite gray, restrictedly patterned with dark brown, most

evidently so on the dorsal anepisternum, center of sternopleurite and on the pteropleurite; dorsopleural membrane clear light yellow. Halteres dark brown, the base of stem narrowly yellow, base of knob vaguely whitened. Legs with the coxae brownish gray, the fore pair somewhat darker; trochanters brownish yellow, the fore pair again slightly darkened on the outer face; femora obscure yellow, the tips narrowly darkened, the amount subequal on all legs; tibiae and basitarsi obscure yellow, the tips more narrowly more infuscated; outer tarsal segments passing into brownish black; claws (male) toothed. Wings with a strong and unusually uniform brownish suffusion, the stigma darker brown; obliterative areas restricted but conspicuous against this darkened ground, occurring as a small post-stigmal brightening and an extensive band at cord, the latter reaching the base of cell M_3 ; less evident pale streaks along certain of the veins, especially the distal half of M , all of vein $1st A$ and in the bases of both cells $1st A$ and $2nd A$; cell Sc more uniformly yellow; veins dark brown, more yellowed in the brightened fields. Venation: R_s relatively short, not exceeding twice the length of the relatively short $m-cu$; R_{1+2} entire; petiole of cell M_1 and m subequal in length.

Abdomen yellow, the tergites conspicuously trivittate with dark brown, the sternites with an even broader median brown stripe that is narrowed but scarcely interrupted on the basal rings of the segments; hypopygium chiefly obscure yellow or brownish yellow. Male hypopygium (Fig. 4) having the caudal border of ninth tergite, $9t$, produced into two stout lobes that are separated from one another by a very deep median notch or split; each lobe at apex more or less thickened and with the outer apical angle produced slightly laterad. Ninth sternite with the appendage bilobed, the margins fringed with unusually short strong spinous dark-colored setae. Basistyle entire, its posterior border unarmed. Outer dististyle, od , an elongate, very slender pale lobe that is provided with relatively short setae, the longest only about one-fourth as long as the lobe. Inner dististyle, id , complex, the main body with unusually conspicuous tubercles that bear short strong setae; lower beak blackened at tip, the beak more flattened; dorsal crest unusually extensive and conspicuous, pale, its surface with delicate microscopic parallel striolae; outer basal lobe terminating in a narrow point or flange, with a second similar extension on the margin before apex. Eighth sternite, $8s$, transverse, the lateral angles obtusely rounded, internally bearing smaller lobes that are fringed with long conspicuous setae, those of a smaller, more mesal lobe shorter and directed more toward the midline; near the lateral portion of the setiferous area on either side a single very powerful bristle that is covered with microscopic papillae, as in *barbata* and allies, these bristles strongly decussate.

Holotype, ♂, Bodie, Mono County, August 7, 1939 (T. H. G. Aitken & Mont A. Cazier).

The specific name, *mono*, is that of a Californian Indian stock of Shoshonean origin, the Eastern Monos inhabiting the general vicinity of Mono Lake. Although it differs in all details of structure of the male hypopygium, it seems apparent that the present fly is most nearly related to species such as *Tipula (Lunatipula) barbata* Doane and certain allies in the Rocky Mountain area. Details of structure of the inner dististyle and eighth sternite further this belief.

5. TIPULA (LUNATIPULA) BISETOSA Doane.

Davis Creek, Modoc County, altitude 5000 feet, July 6, 1922 (A. W. Lindsey).

6. TIPULA (LUNATIPULA) LUCIDA Doane.

Mount Shasta, Shasta County, east side, altitude 6000 feet, July 17, 1939 (Merton C. Lane).

7. TIPULA (LUNATIPULA) MEGALABIATA Alexander.

Miami, Mariposa County, June 7, 1940 (T. H. G. Aitken).

8. TIPULA (LUNATIPULA) DORSIMACULA SHASTA Alexander.

Kingsbury Grade, Mono County, May 27, 1939 (Mont A. Cazier). Although the general appearance of this subspecies is very different from that of typical *dorsimacula* Walker, the structure of the male hypopygium is so similar that it seems best to assign it as above.

9. ELLIPTERA ASTIGMATICA Alexander.

Sequoia National Park, Tulare County, June 6-8, 1942 (Otto Degener).

10. ELLIPTERA CLAUSA Osten Sacken.

Osten Sacken found numerous specimens in the wet moss in the spray of Vernal Fall, Yosemite, June 11, 1876. Although the fly is now known to have a wide range in California, I have no record of its occurrence outside the state.

Konocti Bay, Clear Lake, Lake County, May 10, 1926 (M. C. VanDuzee).

Berkeley, Contra Costa County, May 20-23, 1915 (M. C. VanDuzee).

Wildcat Cañon, Contra Costa County, April 30, 1939 (C. D. Michener).

Sunol, Alameda County, April 26, 1939 (T. H. G. Aitken).

Santa Cruz, Santa Cruz County, May 17, 1919 (E. P. Van Duzee).

Finch Creek, Hastings Reserve, Santa Lucia Mountains, Monterey County, April 29-May 21, 1943 (Jean Linsdale).

Wawona, Mariposa County, altitude 5000 feet, June 6, 1939 (Anthony Downes).

Sequoia National Park, Tulare County, June 6-8, 1942 (Otto Degener). Associated with the last species.

Herkey Creek, San Jacinto Mountains, Riverside County, altitude 5000 feet, June 10, 1940 (C. D. Michener).

Alpine, San Diego County, April 9, 1915 (M. C. VanDuzee).



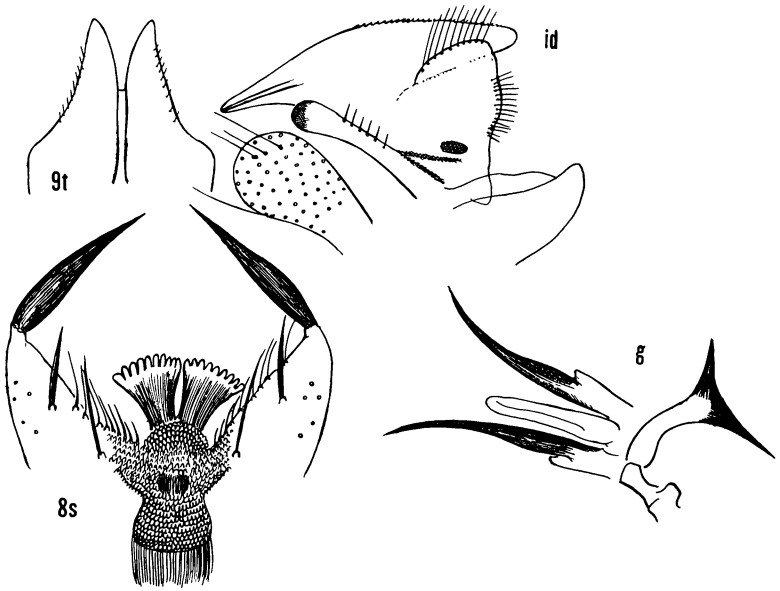


PLATE 13

Tipula (Lunatipula) diacanthophora sp. n.; details of male hypopygium. (Symbols: g, gonapophysis; id, inner dististyle; s, sternite; t, tergite).

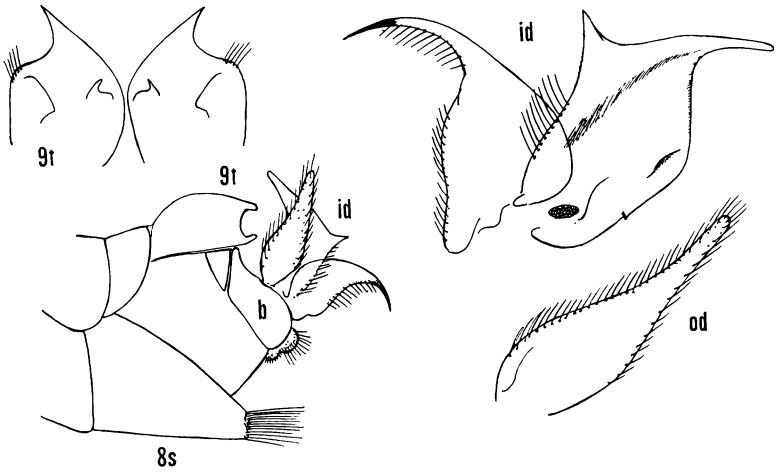


PLATE 14

Tipula (Lunatipula) modoc sp. n.; details of male hypopygium. (Symbols: b, basistyle; id, inner dististyle; od, outer dististyle; s, sternite; t, tergite).

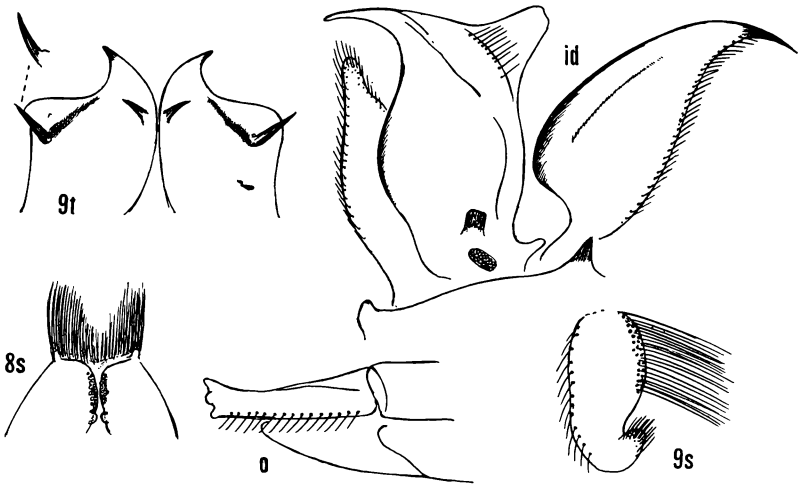


PLATE 15

Tipula (Lunatipula) perfidiosa sp. n.; details of male hypopygium. (Symbols: *id*, inner dististyle; *o*, ovipositor; *s*, sternite; *t*, tergite).

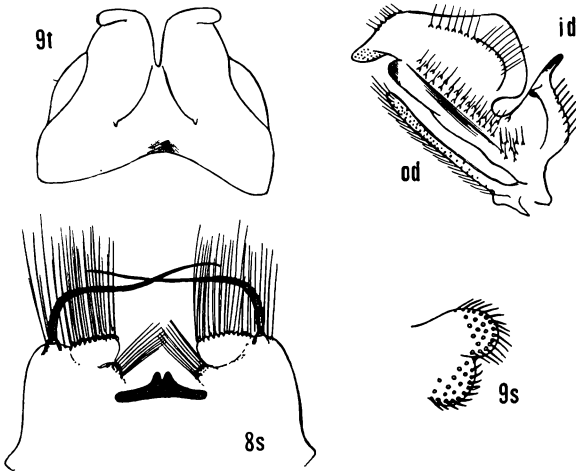


PLATE 16

Tipula (Lunatipula) mono sp. n.; details of male hypopygium. (Symbols: *id*, inner dististyle; *od*, outer dististyle; *s*, sternite; *t*, tergite).