NEW SUBGENERA AND SPECIES OF CRANE-FLIES FROM CALIFORNIA (PTYCHOPTERIDAE AND TIPULIDAE: DIPTERA)

BY

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For many years work has proceeded on the preparation of a comprehensive report covering the crane-flies of California. It is expected that the results of this study will be published as one of the Bulletins of the California Insect Survey under the auspices of the Department of Entomology and Parasitology of the University of California at Berkeley. In advance of this final report I am describing a series of new species, with a few further subgenera, that have become available during this study, the present paper being restricted to the family Ptychopteridae and to the subfamily Limoniinae in the Tipulidae. In a comparable paper, published in Pacific Insects in June 1965, various new species and subgenera in the subfamily Tipulinae of the Tipulidae were considered. The total number of new species in these two papers is 45, together with a dozen new subgeneric groups. In the present report the illustrations that are provided relate chiefly to the new subgenera and no attempt has been made to include the more numerous drawings representing the new species. These latter, with further illustrations, will be included in the final Bulletin.

During the progress of this survey, Mrs. Alexander and I visited California in ten separate years between 1946 and 1964 and were able to collect these flies in all sections of the state and at various periods during the summer months. In 1957, 1958, and 1959 this field work was supported by a grant from the National Science Foundation, No. G 5188, and in 1963 by a supplementary grant No. GB 740; my sincere gratitude and appreciation is extended for this help. During the first half of 1964 I was a member of the staff in entomology at the University of California at Berkeley and during this period assembled the first draft of the Bulletin and made many illustrations to be used in this work. Also during this period numerous determinations of accumulated local collections were made, including the description of the new

species that are being published in the two papers above mentioned. In the Bulletin, full acknowledgement of aid and cooperation from the very many persons who have participated in the work will be made and at this time I will express my appreciation only to a few, these including from the staff of the University at Berkeley Drs. E. Gorton Linsley, Dilworth D. Jensen, Ray F. Smith, and Robert L. Usinger of the Administration, and Drs. Frank R. Cole, Paul D. Hurd, Jr., and Jerry A. Powell of the teaching staff. Further assistance was received from various members of the California Academy of Sciences, San Francisco, including Drs. Paul H. Arnaud, Hugh B. Leech, and Edward S. Ross; and from the members of the San Jose State College and the University of California at Davis. I am most grateful also for important collections received from Drs. R. Edward Bellamy, George W. Byers, John A. Comstock, Donald G. Denning, Ashley B. Gurney, Jacques Helfer, C. Dennis Hynes, and Jean Linsdale. Still others in the past who have made collections of particular importance include Messrs. Otto Degener, Carl W. Kirkwood, A. L. Melander, E. I. Schlinger, John Sperry, E. P. Van Duzee, M. C. Van Duzee, and E. C. Van Dyke. Many others have contributed in this manner and will be mentioned in the present report or in the forthcoming Bulletin.

The types of the new species are preserved in various institutions, including particularly the Alexander Collection, California Academy of Sciences (CAS), University of California Insect Survey (CIS), and the University of Kansas (KU).

PTYCHOPTERIDAE

Ptychoptera byersi n. sp.

Allied and generally similar to *lenis*, differing in the hypopygial structure, especially the ninth tergite.

Male. — Length about 11.5-12 mm.; wing 10-11 mm.; antenna about 5-5.1 mm.

Rostrum narrowly blackened medially above, sides broadly yellow; labella yellowed; palpi obscure brownish yellow, terminal segment dark brown. Antennae with scape yellow, remainder black; flagellar segments cylindrical, longer than their verticils. Head polished black.

Pronotum yellowed dorsally, sides of scutum dull black. Mesonotal praescutum and scutum black, subnitidous, the four praescutal areas indi-

cated by narrow more polished impressions; posterior part of median scutal area and the scutellum yellow; postnotum black, pleurotergite with abundant yellow setae. Pleura gray, dorsopleural membrane more buffy. Halteres with stem yellow, knob vaguely more darkened. Legs with fore and middle coxae yellow, each with two oblique black marks, one basal, the other nearly terminal, the pale stripe on midcoxa broad, posterior coxae chiefly blackened, pruinose; femora obscure yellow, tips brownish black, narrowest on posterior pair, extreme bases blackened beneath; tibiae brownish yellow, tips narrowly darkened; tarsi brownish black. Wings tinged with brown, prearcular field and costal border more yellowed; very restricted brown clouds at *r-m* and outer radial fork, still smaller on *m-cu* and outer medial fork; veins brown, *Sc* and *R* more yellowed. Venation: *r-m* at fork of *Rs*.

Abdomen, including hypopygium, black, posterior borders of intermediate tergites narrowly, lateral margins somewhat more broadly, yellowed. Male hypopygium with tergite distinctive, the terminal lobe of either side very slender, its blackened sclerotized point nearly apical, extending beyond the tip of the lobe; subterminal lobe larger and stouter, elongate, narrowed to the tip, the surface beneath microscopically roughened, basal lobe slender; median tergal lobe long, nearly parallel-sided, tip obtuse. Blackened glabrous blade of dististyle elongate, elevated. Lobes of ninth sternite blackened, the tips slightly paler. Outer margin of eighth sternite strongly produced medially into an obtuse lobe.

Holotype. — ♂, Mount Shasta City, Siskiyou County, California, June 18, 1959 (Byers and party), K.U. Paratopotype 1 ♂.

I am pleased to name this fly for Dr. George W. Byers, outstanding student of the Mecoptera and Tipulidae. Although it is closely related to *Ptychoptera lenis* Osten Sacken, the structure of the male hypopygium, especially the ninth tergite, indicates the distinctness of the species.

TIPULIDAE

LIMONIINAE

LIMONIINI

Genus *Limonia* Meigen; subgenus *Hesperolimonia* n. subgen.

Antennae with flagellar segments becoming progressively elongated outwardly, terminal segment about one-third longer than the penultimate; verticils of outer segments very long. Claws long and nearly straight, with a long slender spine before midlength, with an isolated basal group of about six slender spines, the outermost longest, the others progressively smaller basad. Wings (fig. 1) with vein *Sc* relatively short, Sc_1 ending about opposite one-fifth *Rs*, Sc_2 longer, near its tip. Vein *Sc* without trichia on the proximal third to half. Male hypopygium (fig. 9) with the tergite, *t*, trans-

verse, posterior border very gently emarginate, cephalic border slightly convex; margins of plate thickened, the lateral and posterior borders more broadly so; a few strong setae on each lobe. Basistyle, *b*, elongate, its ventromesal lobe applied to most of mesal face of style, the cephalic end slightly protuberant. Dorsal dististyle, *d*, a powerful straight rod, narrowed slightly at near midlength, thence expanded into a head, its margin with about 15 to 18 appressed black spines; ventral style with less than one-half the area of the basistyle, body oval, the prolongation very narrowly connected, appearing as a powerful sigmoid arm; two spines on basal half of prolongation, arising from slightly unequal tubercles. Gonapophysis, *g*, with mesal-apical lobe straight, apex shallowly bidentate. Aedeagus, *a*, broad, terminating in two divergent lobes, the genital openings lateral.

Type of subgenus. — *Limonia* (*Hesperolimonia*) *infuscata* (Doane): Western Nearctic (Alaska, British Columbia, south to California, east to Idaho and Wyoming). No other species is known.

The group is defined essentially on the structure of the male hypopygium, particularly the unique dorsal dististyle. The ventral style shows some similarity to species of the subgenus *Achyrolimonia* Alexander, the known species of which are Arctogaean in distribution. This latter group has the outer dististyle microscopically scabrous on outer surface, but without the concentration of large spines at apex and with the tip of the aedeagus simple.

Limonia (Dicranomyia) kernensis n. sp.

General coloration of thorax brownish gray, the praescutum without stripes; rostrum yellow; antennae with scape and pedicel dark brown, proximal flagellar segments yellowed, the remainder more infuscated, segments oval; knobs of halteres scarcely darkened; legs yellow, outer tarsal segments infuscated; wings faintly tinged with yellow, stigma lacking, Sc_2 at tip of Sc_1; abdominal tergites dark brown, sternites yellowed; male hypopygium with posterior border of tergite very gently emarginate; ventral dististyle with three rostral spines; gonapophysis with mesal-apical lobe small.

Male. — Length about 6 mm.; wing 6.8 mm.

Rostrum yellow, relatively long, exceeding one-half the remainder of head; palpi with first segment yellow, remainder dark brown. Antennae with scape and pedicel dark brown, proximal five or six flagellar segments abruptly yellow, outer ones more infuscated; proximal flagellar segments short-oval, the outer ones a trifle longer, terminal segment slightly exceeding the penultimate; longest verticils subequal to or shorter than the segments. Head above brownish gray, front and narrow orbits clearer gray, ventral surface more yellowed; anterior vertex relatively broad, nearly twice the diameter of the scape.

Pronotal scutum brownish gray, scutellum and pretergites yellow. Mesonotal praescutum almost uniformly dark brownish gray, without stripes; scutal lobes brownish gray, posterior outer angles yellowed, median region and scutellum gray, parascutella yellow; postnotum brownish gray, the suture yellowed, especially anteriorly. Pleura brownish gray, dorsopleural membrane, metapleural area and region surrounding wing base yellowed. Halteres light yellow, knob very insensibly more darkened. Legs with coxae yellow, the fore pair slightly darker basally; trochanters yellow; legs yellow, outer tarsal segments infuscated; claws elongate, with a major basal spine. Wings faintly tinged with yellow, costal region clearer yellow, stigma lacking; veins very pale brown, brownish yellow in costal region. Longitudinal veins beyond cord with macrotrichia, virtually lacking on Cu_1. Venation: Sc_1 opposite origin of *Rs*, Sc_2 at its tip; *Rs* and basal section of R_{4+5} subequal, gently curved; M_{3+4} subequal to distal section of M_3; *m-cu* at fork of *M*.

Abdominal tergites dark brown, sternites yellowed. Male hypopygium with tergite narrowly transverse, posterior border very gently emarginate, the borders and central region thickened; lobes with few but strong marginal setae. Basistyle a little smaller than the ventral dististyle, ventromesal lobe short, obtuse, with long setae. Dorsal dististyle pale brown, relatively slender (tip broken in type); ventral style with rostral prolongation infuscated, pointed; three rostral spines in a close group near base of prolongation. Gonapophysis with mesal-apical lobe small, darkened, curved gently to the acute tip. Aedeagus terminating in two elongate pale lobes, their tips obtuse.

Holotype. — ♂, Kern River Canyon, 9.8 miles from mouth upriver, Kern Co., California, April 14, 1962 (R. E. Bellamy No. 5125); Alexander Collection.

Limonia (*Dicranomyia*) *kernensis* is most similar to species such as *L.* (*D.*) *fulva* (Doane), *L.* (*D.*) *stigmata* (Doane), and some others, differing in the coloration of the body, antennae and legs, and in the structure of the male hypopygium, including the three rostral spines. *L.* (*D.*) *distans* (Osten Sacken) likewise has three such spines but in all other regards is entirely distinct.

Elliptera usingeri n. sp.

General coloration of praescutum light gray with four black stripes; legs dark brown to brownish black; wings brownish yellow, in male with costal and outer radial fields more yellowed, the latter dilated; a brown cloud over *r-m* and adjacent elements of the cord; vein R_2 preserved, cell M_2 commonly open by atrophy of the basal section of vein M_3, in cases cell *1st* M_2 closed.

Male. — Length about 5-9 mm.; wing 5.5-12 mm.

Female. — Length about 5-7 mm.; wing 5.5-8 mm.

Rostrum gray; palpi black. Antennae black throughout; intermediate and outer flagellar segments subglobular, with short stiff verticils, terminal segment abruptly smaller. Head brown, light gray pruinose behind the antennae and on orbits.

Pronotum brownish gray. Mesonotal praescutum light gray with four black stripes, the intermediate pair virtually confluent, separated by a vague capillary paler vitta that is more evident at posterior end; posterior sclerites of notum blue gray, each scutal lobe with two blackened areas, the anterior one larger; notum glabrous. Pleura light gray, very vaguely patterned with darker; dorsopleural membrane brown. Halteres with stem brown, basal third more yellowed, knob black. Legs with coxae light gray, apices of the fore pair restrictedly obscure yellow beneath; trochanters brown, ventrally obscure yellow; remainder of legs dark brown to brownish black, in cases the femoral bases obscure yellow, more extensive on fore legs; vestiture of legs short and spinoid; claws of male very long, nearly straight. Wings (fig. 2) brownish yellow with a brown cloud over *r-m* and adjoining parts of cord; in male the costal and outer radial fields more yellowed, the latter dilated; veins dark brown. Venation unusually variable; vein *Sc* relatively short, Sc_1 ending shortly before fork of *Rs*, Sc_2 far retracted; vein R_2 present, about its own length beyond the fork of *Rs*, R_{2+3} and R_2 thus subequal: commonly with basal section of R_{1+5} angulated, with a weak spur directed basad into cell *R*: very rarely vein R_2 lacking, in cases being present on one wing while absent on the other; cell M_2 commonly open by atrophy of basal section of vein M_3, in rare cases *m* also atrophied leaving the outer section of vein M_3 suspended in the wing membrane, as common in many Blepharoceridae; more rarely cell *1st* M_2 closed, in cases on the wings of one side only, in other abnormal specimens the basal section of M_3 partially atrophied, partially closing the cell. Further abnormalities of venation numerous, in cases with vein M_{1+2} deflected cephalad and fused apically with R_{1+5}, closing cell R_5.

Abdomen dark brown, sparsely pruinose, pleural membrane more yellowed; midventral region and hypopygium paler brown, the latter with long yellow setae.

The males have the outer radial field of wing dilated, especially cells R_1 and R_2, the condition more accentuated in the larger specimens, a comparable condition being found in *Elliptera astigmatica* Alexander but not so evident in *E. clausa* Osten Sacken. An analogous and even more accentuated condition is found in the males of certain other Nearctic Limoniinae, notably in *Dactylolabis* (*Dactylolabis*) *pemetica* Alexander and *Empedomorpha empedoides* (Alexander).

Holotype. — ♂, Route 180, Kings Canyon National Park, Fresno Co., California, 4700 feet, June 2, 1963 (C. P. and M. M.

Alexander); Alexander Collection. Allotopotype ♀. Paratopotypes, numerous ♂ ♂ ♀ ♀, 4500-4800 feet, May 31-June 5, 1963 (C. P. and M. M. Alexander).

This exceptionally distinct fly is named for Dr. Robert L. Usinger, Chairman of the Division of Entomology and Acarology at the University of California, Berkeley and President of the Entomological Society of America. Dr. Usinger is a world authority on various families of the Heteroptera, including the Aradidae, Cimicidae and Reduviidae, and author of many entomological papers and texts, including the "Aquatic Insects of California", 1956; 1964, with collaborators. It is a pleasure to dedicate this fly to him, unquestionably the most interesting discovery that we made in California in 1963.

The adult flies were found on wet dripping granitic cliffs along Highway 180 into Kings Canyon, especially in places where percolating streams flowed over the rocky faces and where there was an abundant gelatinous algal growth. The adults were abundant in such places, walking rapidly over the rock surface chiefly by a sideways motion, many being found in copula. The immature stages occurred in the gelatinous ooze, the larvae crawling about, the pupal cases protruding from the mass with about the anterior third protruding. A medium sized red ant was preying on the larvae at the margins of the wet areas, in one instance a group of seven or eight individuals noted dragging a living *Elliptera* larva toward their nests on dryer places on the cliff. When the craneflies first were found the cliffs were dripping wet but each day the saturated areas decreased and by June 5th, the last day that observations were made, the cliffs virtually were dry and it was evident that the whole area would be completely dessicated within a few days. It seems certain that the long dry period to follow must be spent in the egg stage. Associated with *Elliptera usingeri* on these cliffs were about equal numbers of the commoner and widely distributed *E. clausa* Osten Sacken which similarly was emerging in numbers from the same spots. In much fewer numbers and associated with these two species of *Elliptera* were two other craneflies, *Limonia* (*Dicranomyia*) *homichlophila* Alexander and *L.* (*D.*) *defuncta concinna* (Williston).

Dicranoptycha linsdalei n. sp.

Size small (wing about to 8 mm.); general coloration of thorax brownish gray, pleura more yellowish brown, pruinose; legs yellow, tips of femora and tibiae weakly darkened, tarsi blackened; wings strongly fulvous; abdomen of male brownish yellow, sternites clearer yellow, seventh segment blackened to form a ring, in the female the abdomen more uniformly yellowed; ovipositor with cerci small, triangular; male hypopygium with the outer dististyle spinulose on outer surface; apices of gonapophyses obtuse; phallosome produced into a short glabrous projection.

Male. — Length about 6.3-8 mm.; wing 6.2-8 mm.

Female. — Length about 6.5-8 mm.; wing 6-8 mm.

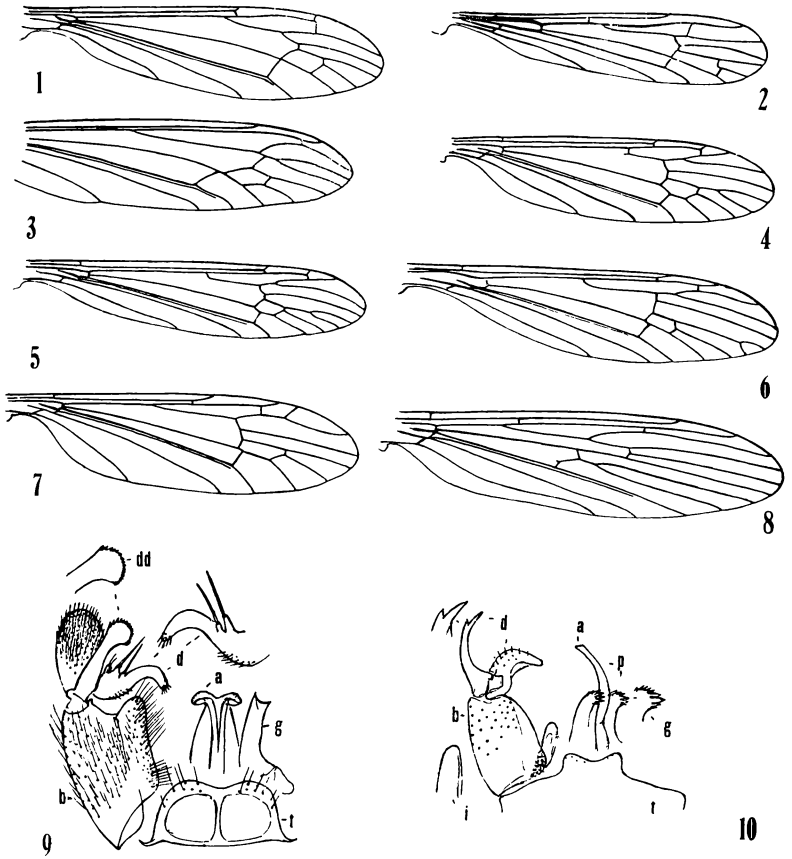
Rostrum brown, palpi black. Antennae black throughout. Head light gray.

Pronotum brownish gray. Mesonotum brownish gray, without distinct pattern, the humeral region of praescutum clearer yellow. Pleura yellowish brown with a strong pruinosity. Halteres pale, apices of knobs infuscated. Legs with coxae yellow, the fore pair slightly more pruinose basally; femora yellow, tibiae and basitarsi yellowed, their tips weakly darkened, outer tarsal segments blackened. Wings strongly fulvous, the costal border more yellowed; veins very pale brown. Longitudinal veins of outer half of wing with long trichia. Venation: *Rs* subequal to or longer than cell *1st* M_2; *m-cu* at or before midlength of M_{3+4}.

Abdomen of male with tergites brownish yellow, sternites clearer yellow, seventh segment blackened to form a conspicuous ring; hypopygium light yellow. In female the color is generally the same but the blackened ring lacking. Ovipositor with cerci small, triangular in outline. Male hypopygium with outer dististyle slender, narrowed to a long terminal spine, the outer margin of distal half with appressed spinules; inner style longer, with conspicuous setae, the terminal ones longer. Gonapophysis appearing as a gently curved flattened blade, tip obtuse. Phallosome terminating in a short glabrous projection, in outline much like the gonapophysis but smaller.

Holotype. — ♂, Hastings Natural History Reservation, Monterey Co., California, in creek bed near Museum, July 17, 1948 (Jean Linsdale). Allotopotype. — ♀, with type. Paratopotypes, numerous specimens of both sexes, with the types, July 15-18, 1948, July 9, 1949; paratypes, abundant males and females, Upper Big Creek, Hastings Reservation, July 18, 1948, June 5, 1950; Finch Creek, July 2, 1950 (Jean Linsdale). Types in CIS collection; paratypes widely distributed in various collections.

I dedicate this fly to Dr. Jean M. Linsdale, former Research Associate in charge of the Frances Simes Hastings Natural History



Text-figs. 1-10. Fig. 1, *Limonia* (*Hesperolimonia*) *infuscata* (Doane), venation; Fig. 2, *Elliptera usingeri* n. sp., venation; Fig. 3, *Pedicia* (*Pedicia*) *bellamyana* Alexander, venation; Fig. 4, *Limnophila* (*Arctolimnophila*) *subcostata* (Alexander), venation; Fig. 5, *Limnophila* (*Hesperolimnophila*) *rubida* Alexander, venation; Fig. 6, *Limnophila* (*Brachylimnophila*) *brevifurca* Osten Sacken, venation; Fig. 7, *Gonomyodes* (*Gonomyopsis*) *doaneana* n. sp., venation; Fig. 8, *Molophilus* (*Promolophilus*) *nitidus* Coquillett, venation; Fig. 9, *Limonia* (*Hesperolimonia*) *infuscata* (Doane), male hypopygium; Fig. 10, *Limnophila* (*Arctolimnophila*) *subcostata* (Alexander), male hypopygium; *b*, basistyle; *d*, dististyle; *dd*, dorsal dististyle; *g*, gonapophysis; *i*, interbase; *p*, phallosome; *t*, tergite.

Reservation of the University of California, Monterey Co., California. This distinguished field naturalist and student of animal

and plant ecology spent nearly twenty years building up a representative collection of the life of the reservation, including a very large series of crane-flies, rich in species and specimens and apparently including most of the fauna of the northern Santa Lucia Mountains. Basic series representing the species are placed in the Museum at the reservation, in the CIS collection at Berkeley, and in the authors collection, with less complete series in some other institutions. The most similar regional species is *Dicranoptycha laevis* Alexander, readily told by the general coloration and especially by the hypopygial structure, including the phallosome and the glabrous outer dististyles.

PEDICIINI

Pedicia (Pedicia) bellamyana Alexander

Pedicia (Pedicia) bellamyana Alexander; Great Basin Naturalist, 24: 117-118; 1964.

The type, a female, was from Mineral King, Tulare Co., California, taken by Dr. R. E. Bellamy and son; known also from Plumas and Trinity Counties, California. A further specimen, a broken female from Cypress Creek, Vancouver, British Columbia, taken August 16, 1931, by Hugh B. Leech, is referred here.

The fly is distinguished from all known species of the typical subgenus *Pedicia* Latreille by the loss of cell M_1 of the wings. Despite this striking character, the species is close to *Pedicia (Pedicia) magnifica* Hine and evidently has been derived from this species since the male hypopygium of the two virtually is identical. The venation is shown (fig. 3).

Pedicia (Tricyphona) bianchii n. sp.

Most similar to *unigera*; mesonotum buffy, praescutum with brown stripes, pleura buffy yellow; knobs of halteres weakly infuscated; wings brownish yellow, without a stigmal darkening, cell M_2 closed or open; male hypopygium with the interbase stout, the apical point relatively short; dististyle with stem slender, narrower than the emargination that separates it from the apical lobe of the basistyle.

Male. — Length about 8.5-9 mm.; wing 8-8.5 mm.; antenna about 1-1.1 mm.

Female. — Length about 10 mm.; wing 9.5 mm.

Rostrum dark brown; palpi black. Antennae short, black, 14-segmented; flagellar segments much shorter than their verticils, the outer two more or less united. Head dark gray.

Pronotum light brown. Mesonotal praescutum buffy with three brown stripes, the central one darker, in the female divided by a pale central vitta; posterior sclerites of notum buffy yellow, each scutal lobe with a single triangular brown area. Pleura buffy yellow. Halteres with stem yellow, clearer basally, knob weakly infuscated. Legs with coxae and trochanters yellow; remainder of legs pale brown. Wings tinged with brownish yellow, stigma lacking; veins light brown. Venation: R_{1+5} present, with *r-m* near its outer end; cell M_2 open in the holotype, closed in the remaining type material; *m-cu* variable in position, from shortly before the fork of *M* to beyond.

Abdomen elongate; tergites brown, sternites somewhat paler. Ovipositor with cerci very long and relatively slender, tips subacute. Male hypopygium with tergal lobes low. Basistyle with the interbase stout, narrowed gradually outwardly, apical point slender but relatively short, surface with abundant delicate setulae. At apex of basistyle a double structure that is interpreted as representing an outer subquadrate lobe of the basistyle and a dististyle, the latter more slender than in *unigera*, the stem narrower than the emargination.

Holotype. — ♂, Waddell Creek, Santa Cruz Co., California, December 11, 1929 (F. Bianchi); ex the Doane Collection, CAS; Stanford University Lot 6043, sub 3. Allotopotype. — ♀. Paratopotype. — ♂, February 27, 1930 (F. Bianchi); Stanford University Lot 6063, sub 6.

The species is named for Dr. Fred Bianchi who conducted a survey of the insect fauna of Waddell Creek during 1929 and 1930 while a student at Stanford University. The fly is very close to *Pedicia* (*Tricyphona*) *unigera* Alexander, differing in the diagnostic characters listed, especially the structure of the hypopygium, including the dististyle and interbase.

Dicranota (Rhaphidolabis) denningi n. sp.

Belongs to the *nooksackensis* group; antennae of male relatively short, if bent backward extending about to the wing root, flagellar segments with vestiture relatively long and coarse, verticils conspicuous; thorax gray, praescutum with three black stripes; legs black, femoral bases narrowly more yellowed; wings with a blackish suffusion, the stigma and veins darker brown, *Rs* relatively short, Sc_1 ending just before level of fork of *Rs*, the latter angulated and spurred near origin; male hypopygium with tergal lobes broadly obtuse, inner margins of lateral tergal arms with numerous acute teeth; inner apical lobe of basistyle with nearly the outer half a narrow spinelike blade, the tip subacute.

Male. — Length about 5.5 mm.; wing 5.5 mm.; antenna about 1.5 mm.

Female. — Length about 5.5 mm.; wing 6 mm.

Rostrum black, sparsely pruinose; palpi black. Antennae 13-segmented, black, relatively short, if bent backward extending about to the wing root; flagellar segments long-oval with evident apical pedicels, vestiture abundant, relatively long and coarse, erect, verticils much longer, approximately one-half the segment; terminal segment about two-thirds the size of the penultimate. Head brownish gray, center of vertex more infuscated.

Pronotum brownish gray. Mesonotal praescutum gray with three conspicuous blackened stripes, the central area broader, weakly divided at posterior end, not reaching the suture; posterior sclerites of notum and the pleura gray, scutal lobes more darkened, sternopleurite weakly infuscated. Halteres with stem yellowish white, knob infuscated. Legs with coxae gray; trochanters brown; remainder of legs black, femoral bases narrowly and indistinctly more yellowed. Wings with a blackish suffusion, stigma darker brown, relatively conspicuous; veins dark brown. Venation: *Sc* relatively short, Sc_1 ending just before level of fork of *Rs*, the latter angulated and spurred near origin, shorter in the holotype; veins R_{1+2} and basal section of R_2 subequal; *m-cu* about one-half its length beyond the fork of *M*.

Abdomen blackened, pruinose to appear dark gray. Male hypopygium with tergite large, its posterior border broadly emarginate; intermediate tergal lobes very widely separated, apices broadly obtuse, darkened; lateral tergal arms yellowed, jutting beyond the inner lobes, apex subtruncate or very obtuse; a mesal flange, its margin with numerous acute teeth directed outwardly. Basistyle with outer apical lobe pale, clavate, with abundant long setae, inner lobe with more than the basal half a gently curved yellow rod, narrowed suddenly into a blackened spinelike blade, the tip subacute; interbase a narrow pale blade, tip subacute. Dististyle subequal in length to outer lobe of basistyle, appearing as a flattened blade with relatively few chiefly apical setae. Phallosome elongate, the darkened aedeagus subtended by the shorter pale gonapophyses.

Holotype. — ♂, Seven Oaks, San Bernardino Mountains, San Bernardino Co., California, along the Santa Ana River, 5000 feet, May 23, 1963 (C. P. Alexander); Alexander Collection. Allotopotype. — ♀, with the type.

The species is named for Dr. Donald G. Denning, outstanding student of the Nearctic Trichoptera, to whom I am indebted for many interesting Tipulidae from California. The previously described species of the *nooksackensis* group include *Dicranota (Rhaphidolabis) brevispinosa* Alexander, of southwestern Washington, and *D. (R.) nooksackensis* Alexander, ranging from Alaska to Oregon. The present fly is closest to *brevispinosa,* especially in the structure of the ninth tergite, differing evidently in the inner

apical lobe of the basistyle. In the latter species the yellow basal arm is unusually long, the blackened spinelike outer point short but gradually produced into a very long hairlike point that is subequal in length to the remainder of the arm.

Dicranota (Rhaphidolabis) denningi brevicula n. subsp.

Characters most as in typical *denningi* as regards the length and structure of the antennae, differing especially in the structure of the male hypopygium, especially the outer apical lobe of the basistyle. This is a relatively stout gently curved flattened blade that terminates in a short pale spine or point that appears to consist of two closely approximated elements. In both males that are available these points are only three to four times as long as broad, their tips truncate and appearing as if broken but appear to represent a normal condition.

Holotype. — ♂, Castle Crags State Park, Shasta Co., California, June 20, 1964 (D. G. Denning). Allotopotype. — ♀, pinned with type. Paratopotypes. — 1 ♂, 1 ♀.

Dicranota (Rhaphidolabis) denningi evanescens n. subsp.

Generally similar to typical *denningi*, especially in the hypopygial structure, differing especially in the length and structure of the antennae of the male and in the much paler wings and veins.

Male. — Length about 6.5 mm.; wing 6.5 mm.; antenna about 2 mm.

Antennae longer, if bent backward extending about to the base of halteres; flagellar segments longer, apical pedicels less evident, vestiture abundant but short and pale, the slightly longer verticils only about one-fourth to one-third the segment. Wings faintly infuscated, the veins paler than in the typical subspecies. Venation: Sc_1 ending beyond level of the fork of Rs; cell M_1 relatively deep, about two-thirds as large as cell M_{2}. Male hypopygium almost as in typical *denningi*; lateral tergal arms with the marginal teeth very small to subobsolete. Outer apical lobe of basistyle broader, appearing as a more flattened darkened blade with the tip obtuse.

Holotype. — ♂, Finch Creek, Hastings Natural History Reservation, Monterey Co., California, evening of April 12, 1951 (Jean Linsdale); CIS.

Dicranota (Rhaphidolabis) trichopyga n. sp.

General coloration of mesonotum brownish gray, praescutum with three darker brown stripes; antennae short, 13-segmented, brownish black; legs brownish yellow; wings faintly tinged with gray, stigma lacking, cell R_3 sessile; male hypopygium with mesal face of basistyle and the very broad median tergal lobe with abundant long pale setae.

Male. — Length about 7 mm.; wing 7.5 mm.; antenna about 0.9 mm.

Rostrum dark brown, sparsely pruinose; palpi black. Antennae short, 13-segmented, brownish black; flagellar segments oval, subequal to their verticils. Head brownish gray.

Pronotum light brownish gray, disk darker, with long erect setae. Mesonotal praescutum brownish gray, clearer gray on sides, disk with three darker brown stripes, central part of median area paler; scutum brownish gray, each lobe with a major darker brown area; scutellum testaceous; postnotum brown. Pleura brownish gray. Halteres with stem yellow, knob brown. Legs with coxae brownish gray; trochanters obscure yellow; remainder of legs brownish yellow, including the tarsi. Wings faintly tinged with gray, the extreme base yellowed, stigma lacking; veins light brown. Venation: Cell R_3 sessile; R_2 more than twice R_{1+2}; *m-cu* at near one-third M_{3+4}; cell *2nd A* relatively broad.

Abdominal tergites brown, sternites paler, subterminal segments slightly darker, hypopygium yellowed. Male hypopygium with tergite transverse, posterior border with median lobe very broad, very gently emarginate, the entire lobe with numerous very long brownish yellow setae, the longest nearly equal to the diameter of the tergite, their tips twisted; lateral tergal arms about as in *cayuga*, apices oval. Basistyle with lower apical lobe short and obtuse, with relatively sparse dark spinoid setae, upper lobe elongate, subequal to the dististyle, the outer third with abundant darkened spinoid setae; mesal face of basistyle with abundant very long brownish yellow setae that are subequal to or a little shorter than those of the tergite; interbase bidentate, the spines unequal. Dististyle strongly bent at near midlength, shaped like a boomerang, apex obtuse. Aedeagus darkened, elongate, apex suboval.

Holotype. — ♂, Waddell Creek, Santa Cruz Co., California, February 18, 1930 (F. Bianchi); CAS.

Regional species that have the lateral arms of tergite and the interbase generally similar to those of the present fly include *Dicranota* (*Rhaphidolabis*) *cayuga* (Alexander) and *D.* (*R.*) *vanduzeei* Alexander, both of which differ most evidently in the hypopygial structure, particularly the tergite and dististyle. The conspicuous hairy vestiture of the hypopygium is quite different from that of other regional species.

HEXATOMINI

Dactylolabis (Dactylolabis) hispida n. sp.

Size large (wing of female over 11 mm.); general coloration gray, the praescutum with four narrow black stripes; head and praescutal interspaces with stiff erect black bristles; wings brownish yellow, clearer yellow in the prearcular and costal fields, veins darkened; vein R_{2+3+4} very short, from

one-sixth to one-fourth R_{2+3}; abdomen brownish black; ovipositor with cerci short-triangular in outline, ventrally with abundant delicate white setae.

Female. — Length about 10.8-11 mm.; wing 11.5-12 mm.

Rostrum and palpi black. Antennae black. Head gray, with numerous stiff black bristles that are slightly porrect, more conspicuously so in front.

Pronotal scutum brownish black, sparsely pruinose, paler anteriorly; two transverse rows of black bristles, narrowly interrupted at the midline, the anterior row with about eight bristles on either side, the posterior band with somewhat fewer; pronotal scutellum paler brown. Mesonotal praescutum gray with four narrow black stripes, the intermediate pair subnitidous, narrowed on posterior third, on anterior portions more approximated to become subconfluent; interspaces with short stiff black setae, about 14 to 15 on either side; lateral stripes more nitidous, polished black, narrowed anteriorly and curved laterad into the pseudosutural foveae, crossing the suture behind onto the scutal lobes, becoming polished at suture; median region of scutum paler, especially behind, with few blackened bristles on sides and on the fulvous posterior callosities; scutellum brown, behind paling to brownish fulvous; mediotergite light gray on anterior half, polished black behind. Pleura chiefly gray, more darkened on ventral sternopleurite and narrowly so on the ventral anepisternum; dorsopleural membrane extensively yellowed, including the anterior spiracle, the color extended ventrad almost to the fore coxa. Halteres light yellow, knob weakly infuscated. Legs with coxae obscure yellow, more darkened basally especially on the fore pair; trochanters yellow; femora yellow, tips narrowly darkened; tibiae yellow, the extreme base and slightly narrower tip darkened; tarsi brownish black. Wings strongly brownish yellow, clearer yellow in the prearcular and costal fields; cord and outer end of cell *1st* M_2 darkened, not or scarcely including the membrane; veins beyond cord brownish black, yellowed in the brightened fields. Venation: Extreme tip of vein R_3 atrophied; R_{2+3+4} very short, from about one-sixth to one-fourth R_{2+3}; cell M_1 nearly three times its petiole; *m-cu* close to the fork of *M*.

Abdomen brownish black, polished. Ovipositor with basal shield elongate, polished castaneous; cerci short-triangular, carinate dorsally, narrowed to the acute tips, ventrally tumid and whitened, with abundant delicate white setae.

Holotype. — ♀, Eight miles southeast of Bartle, Shasta Co., California, June 17, 1959 (G. W. Byers); K.U. Paratopotypes. — 2 ♀ ♀.

In its general appearance, *Dactylolabis* (*Dactylolabis*) *hispida* is most similar to species such as *D.* (*D.*) *knowltoni* Alexander and *D.* (*D.*) *parviloba* Alexander, differing from all regional species in the unusually coarse black vestiture of the head and thorax. The structure of the ovipositor is most as in *D.* (*D.*) *nitidithorax* Alexander, which otherwise is entirely distinct.

LIMNOPHILA Macquart

Limnophila Macquart; Suit. à Buffon, 1, Hist. Nat. Ins. Dipt., p. 95; 1834.

Genus *Limnophila* Macquart; subgenus *Arctolimnophila* n. subgen.

Antennae of male relatively long, especially in *claggi*; flagellar segments long-oval, subequal to or exceeding the longest verticils. Wings (fig. 4) with *Sc* short, Sc_1 ending before fork of *Rs*, Sc_2 near its tip; R_{1+2} and R_2 short, subequal; veins R_2 and R_1 divergent outwardly, cell R_3 at margin twice or more times as extensive as cell R_1; cell M_1 present. Veins beyond cord with macrotrichia, before cord lacking except on *C* and *R* and the outer end of basal section of Cu_1. Male hypopygium (fig. 10) with the tergite, *t*, produced medially into a transverse lobe, its posterior border gently emarginate. Dististyles, *d*, terminal, outer style glabrous, tip unequally bidentate, inner style fleshy, narrowed outwardly, with abundant setae and fewer stout bristles from distinct punctures. Interbase, *i*, appearing as a small oval glabrous blade. Phallosome, *p*, including the stout simple tubular aedeagus and powerful gonapophyses that terminate in several spinous points, the more cephalic group larger and stouter; apophyses short and stout in *subcostata*, much larger, ribbonlike, in *claggi*.

Type of subgenus. — *Limnophila* (*Arctolimnophila*) *subcostata* (Alexander): Northeastern Nearctic. The more western Nearctic *L.* (*A.*) *claggi* Alexander likewise belongs here.

The structure of the outer dististyle of the hypopygium is suggestive of that of the genus *Shannonomyia* Alexander, which has this style conspicuously setiferous and with the gonapophyses simple, not multispinous as in the present group. The structure of the phallosome separates the group from other subgenera of *Limnophila*.

Genus *Limnophila* Macquart; subgenus *Hesperolimnophila* n. subgen.

Antennae 16-segmented, the proximal five flagellar segments short, verticils of lower faces of these segments lacking in *rubida*, present but small and weak in *euxesta*; terminal flagellar segment subequal to the penultimate. Wings (fig. 5) with *Sc* long, Sc_1 ending about opposite *r-m*, Sc_2 longer; *Rs* long, about three times *m-cu*, in cases angulated and spurred near origin; cell M_1 present, longer than its petiole. Veins behind *R* chiefly glabrous, in *euxesta* with macrotrichia on distal section of R_5 and more sparsely on M_1 and M_{3+4}, in *rubida* more abundant, on all veins beyond the general level of cell *1st* M_2. Male hypopygium (figs. 11, 12) with posterior borders of both the tergite, *t*, and sternite gently concave. Basistyle, *b*, produced at apex beyond the point of insertion of the dististyles into a strong lobe. Outer dististyle, *d*, glabrous, appearing as a long simple rod, the small simple apex slightly decurved, obtuse; inner style elongate, fleshy. Phallosome, *p*, including strong outer arms or apophyses, their tips obtuse

(*rubida*) or pointed; other inner apophyses present, most complex in *euxesta*; aedeagus, *a*, simple, straight, very short in *rubida*, long and slender in *euxesta*, the tip weakly emarginate.

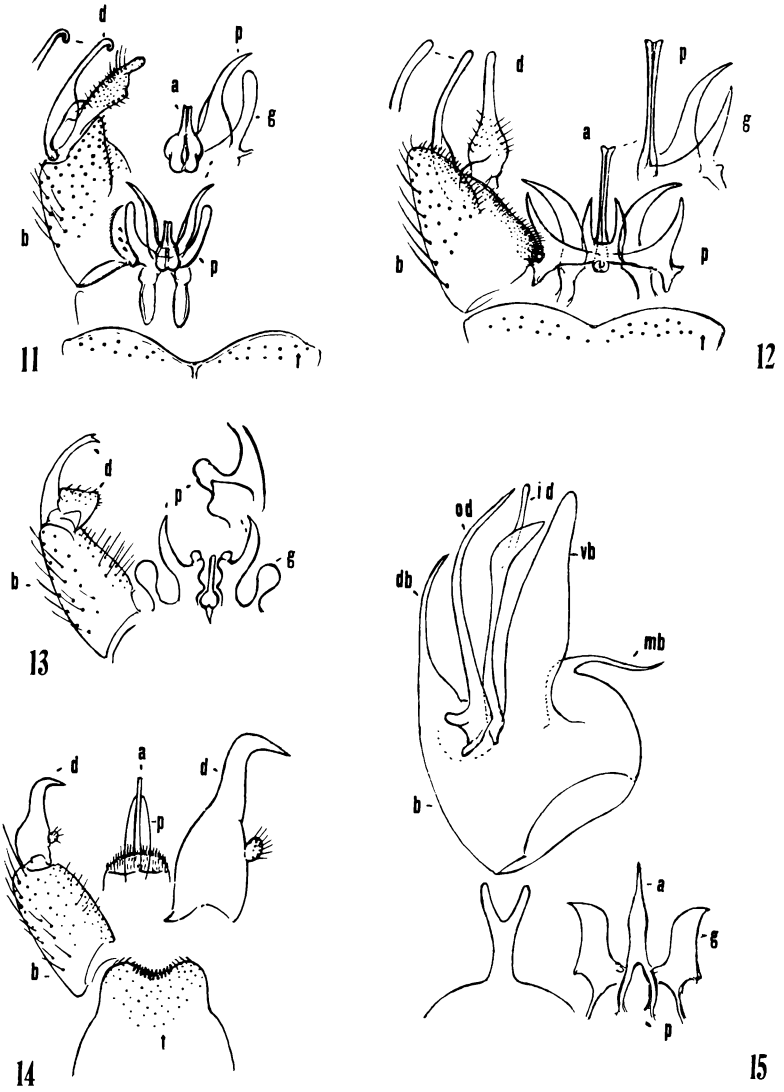
Type of subgenus. — *Limnophila* (*Hesperolimnophila*) *rubida* Alexander. Other species include *L.* (*H.*) *euxesta* Alexander and *L.* (*H.*) *nycteris* Alexander, all Western Nearctic.

Hesperolimnophila differs from other subgenera of *Limnophila* that have the outer dististyle of the hypopygium glabrous by the emarginate ninth tergite, subterminal dististyles, simple obtuse apex of the outer style, and the nature of the aedeagus. The most similar group appears to be *Afrolimnophila* Alexander, with numerous species in the Ethiopian and Oriental regions and with a single representative, *Limnophila* (*Afrolimnophila*) *amabilis* Alexander, in California. This group likewise has the outer dististyles glabrous but this pointed at apex, terminal in position, apex of the aedeagus decurved, and the gonapophyses appearing as paddle-like blades.

Genus *Limnophila* Macquart; subgenus *Brachylimnophila* n. subgen.

Antennae 16-segmented, verticils longer than the segments. Head short, broadly rounded behind. Pronotum massive, especially the scutum. Mesonotal praescutum with the tuberculate pits lying far forward, close to anterior margin, well separated; pseudosutural foveae large. Wings (fig. 6) without stigmal trichia or setae on squama; Sc_2 some distance from tip of Sc_1; in Nearctic species cell M_1 unusually small, commonly one-third its petiole or less; in some specimens of *brevifurca* the cell lost by fusion of the enclosing veins; the European *adjuncta* (Walker) has cell M_1 deeper, subequal in length to its petiole. Male hypopygium (fig. 13) with the outer dististyle, *d*, glabrous, unequally bidentate at apex, inner style short and fleshy. Phallosome, *p*, including the small straight aedeagus and large horn-shaped inner apophyses; lateral apophyses appearing as short paddle-like blades.

Type of subgenus. — *Limnophila* (*Brachylimnophila*) *brevifurca* Osten Sacken: Nearctic. Other Nearctic species includes *L.* (*B.*) *occidens* Alexander, very similar in the structure of the male hypopygium but differing in the much larger size. The European *Limnophila* (*Brachylimnophila*) *nemoralis* (Meigen), with various named subspecies or varieties, and *L.* (*B.*) *adjuncta* (Walker) belong here, together with other still unnamed species or races in Asia.



Text-figs. 11-15. Fig. 11, *Limnophila* (*Hesperolimnophila*) *rubida* Alexander, male hypopygium; Fig. 12, *Limnophila* (*Hesperolimnophila*) *euxesta* Alexander, male hypopygium; Fig. 13, *Limnophila* (*Brachylimnophila*) *brevifurca* Osten Sacken, male hypopygium; Fig. 14, *Gonomyodes* (*Gonomyopsis*) *doaneana* n. sp., male hypopygium; Fig. 15, *Molophilus* (*Promolophilus*) *nitidus* Coquillett, male hypopygium; *a*, aedeagus; *b*, basistyle;

Edwards (Trans. Soc. British Ent., 5: 89-90; 1938) placed the European species in *Pilaria* Sintenis as the so-called *nemoralis* group but in my opinion the group should not be removed from *Limnophila*. The otherwise distinct subgenus *Dicranophragma* Osten Sacken agrees most closely in hypopygial structure, particularly in the dististyles and outer gonapophyses.

Hexatoma (Eriocera) aitkeni n. sp.

General coloration of praescutum light brown, clear gray laterally, the disk with four narrow dark brown stripes, the median ground line broader than the intermediate stripes; antennae short, about one-third the wing; all femora yellow, the tips narrowly brownish black; wings with cell M_1 present.

Male. — Length about 15 mm.; wing 14.5 mm.; antenna about 5 mm.

Rostrum light brown, palpi black, the second segment subequal in length and diameter to the first flagellar segment of antenna. Antenna short, 7-segmented; scape light brown, darker above, flagellum black; flagellar segments decreasing in length and thickness outwardly, first segment with numerous long black setae beneath, terminal segment microscopic. Head brown, sparsely pruinose, orbits broadly light gray; vertical tubercle low; setae of vertex white, long and delicate.

Prothorax brownish gray. Mesonotal praescutum with disk light brown, with four narrow dark brown stripes, the intermediate pair separated by a ground line that is slightly wider, sides of praescutum light gray; vestiture erect, long, white; scutum brownish gray, each lobe with a single large brown area; scutellum brownish gray, with very long white setae; mediotergite brownish gray, posterior border and the depressed areas at anterolateral angles brown, pleurotergite brown, light gray anteriorly. Pleura chiefly light gray, pteropleurite with very long white setae. Halteres with stem light brown, more orange basally, knob dark brown. Legs with all coxae light gray, with long white setae; trochanters obscure orange; femora of all legs yellow, their tips abruptly brownish black, including the outer eighth to tenth, narrowest on posterior legs; tibiae and basitarsi light brown, outer tarsal segments darker. Wings suffused, the cells variegated with paler, especially cells *R*, *M*, *Cu* and R_1; darker seams along veins *Cu* and *2nd A*; stigma small, darker brown; veins brown. Veins unusually glabrous. R_5 with a sparse series of small trichia. Venation: R_{2+3+4} shorter than R_{2+3}; cell M_1 present; *m-cu* about one-fourth its length beyond fork of *M*.

Abdominal tergites brown, the proximal four segments darker, lateral borders narrowly more buffy orange; sternites brownish gray, with indications of a narrow broken brown central stripe; hypopygium brown.

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d, dististyle; *db*, dorsal lobe of basistyle; *g*, gonapophysis; *id*, inner dististyle; *mb*, mesal lobe of basistyle; *od*, outer dististyle; *p*, phallosome; *t*, tergite; *vb*, ventral lobe of basistyle.

Holotype. — ♂, Mount Hamilton, Santa Clara Co., California, 3000 feet, May 19, 1940 (T. H. G. Aitken); Alexander Collection.

The species is named for Dr. Thomas H. G. Aitken to whom I am indebted for many interesting Tipulidae from California. The most similar regional species having the antennae short in both sexes are *Hexatoma* (*Eriocera*) *albihirta* (Alexander) and *H.* (*E.*) *brevipila* (Alexander), both with the femora extensively blackened.

ERIOPTERINI

Gnophomyia (Gnophomyia) toschiae n. sp.

Body black, sparsely pruinose, sides of pronotal scutellum orange yellow; antennae and legs black; knobs of halteres very light yellow; wings weakly infuscated, the outer fourth more whitened, costal field and linear streaks in certain cells similarly pale, veins black; R_{2+3} short, about one-third R_{2+3+4}, cell *1st* M_2 narrow; male hypopygium with central lobe of tergite with microscopic blunt spinules, outer dististyle glabrous, tip obtuse, inner style compact, with a group of about six spinoid setae in the outer emargination.

Male. — Length about 7.5 mm.; wing 7 mm.; antenna about 2.2 mm.

Rostrum, palpi and antennae black; proximal flagellar segments long-oval, the outer ones shorter, terminal segment slender. Head black, sparsely pruinose to appear opaque.

Pronotum dark gray. Mesonotum blackened, sparsely pruinose to appear subnitidous, pseudosutural foveae large, black, shiny, the adjacent region orange yellow; median region of scutum and the scutellum somewhat more pruinose; dorsopleural region light brown. Halteres short, stem brownish black, knob very light yellow. Legs with coxae and trochanters black, gray pruinose; remainder of legs black. Wings weakly infuscated, the outer fourth more whitened; costal field and linear streaks across cell *1st* M_2, M_1, outer third of *Cu* and base of *1st A* similarly pale; stigma elongate, dark brown, conspicuous; veins black. Venation: R_{2+3} short, subequal to or shorter than R_2 or about one-third R_{2+3+4}; cell *1st* M_2 narrow; *m-cu* about one-third its length beyond the fork of *M*.

Abdomen, including hypopygium, black. Male hypopygium with median lobe of posterior border of tergite low-transverse, the glabrous outer angles obtuse; central region very low convex with abundant microscopic blunt spinules. Basistyle relatively short and stout, inner apical angle produced into a small lobe. Outer dististyle a glabrous nearly straight blade, tip obtuse; ventral style compact, the apical margin sinuous, with a compact group of about six short spinoid setae in the emargination; outer lobe of style obtuse, with long delicate setae. Phallosomic plate broad, without lateral shoulders, apex very obtuse.

Holotype. — ♂, Sage Hen, near Hobart Mills, Nevada Co., California, July 5, 1962 (C. A. Toschi); CIS.

The species is named for the collector, Miss Charlotte A. Toschi. This is the first record of the genus as now restricted from the Pacific Coast States. It is generally similar to the more eastern *Gnophomyia* (*Gnophomyia*) *cockerelli* Alexander and *G.* (*G.*) *tristissima* Osten Sacken, differing in the details of wing pattern and venation, and in the hypopygial structure, particularly the tergite, dististyles and phallosome.

Gonomyia (Idiocera) heteroclada n. sp.

Closest to *proserpina*; male hypopygium with lateral branch of inner arm of the outer dististyle reduced to a small spine or spur.

Male. — Length about 5 mm.; wing 5.5 mm.

Female. — Length about 6 mm.; wing 6 mm.

Rostrum dark brown; palpi black. Antennae dark brown; relatively long, if bent backward extending to beyond the wing root. Head buffy to light brown, center of vertex darkened.

Pronotum gray, sides yellowed. Mesonotal praescutum gray with two conspicuous brown longitudinal stripes that occupy the interspaces, continued across the suture onto the scutal lobes; posterior sclerites of notum gray, the anterior interpostnotal region more yellowed. Pleura brownish gray, with a conspicuous pale yellow ventral stripe, dorsopleural region yellowed. Halteres with stem elongate, yellow, knob dark brown. Legs with coxae yellow, bases narrowly infuscated; trochanters yellow; remainder of legs obscure yellow, the outer tarsal segments a trifle darkened. Wings subhyaline, patterned with brown, as common in the subgenus, including areas at arculus, origin of *Rs*, tip of *Sc*, R_{1+2+3}, fork of R_{2+3+1}, cord, outer fork of *M*, and a marginal cloud in outer radial field; stigma large, paler brown; veins brown. Venation: *Sc* long, Sc_1 at near one-half to two-thirds *Rs*, Sc_2 at or near the extreme tip; *Rs* square and spurred at origin; veins R_{1+2} and R_3 contiguous or narrowly confluent at margin, closing cell R_2.

Abdomen brown, the segments margined with yellow; hypopygium yellowed, styli black. Male hypopygium generally as in *proserpina*; lateral branch of inner arm of outer dististyle reduced to a small spine that is only about one-fifth as long as the major portion. Aedeagus only slightly narrowed outwardly, generally parallel-sided.

Holotype. — ♂, Hastings Natural History Reservation, Monterey Co., California, along Robertson Creek, June 15, 1948 (Jean Linsdale); CIS. Allotopotype. — ♀, pinned with type. Paratopotypes. — 4 ♂ ♀, chiefly teneral.

Gonomyia (*Idiocera*) *heteroclada* is closest to *G.* (*I.*) *proserpina* Alexander, differing especially in the structure of the outer dististyle of the hypopygium, as described.

Gonomyia (Gonomyia) colei n. sp.

Allied to *poliocephala*; rostrum yellow; antennae black throughout; mesonotal praescutum yellow with three light brown stripes; male hypopygium with outer apical lobe of basistyle very long and relatively slender; dististyle with a slender basal arm, its tip obtuse, at base with a small acute spine with a strong seta; phallosome with gonapophyses blackened, slightly unequal; apex of aedeagus unequally bilobed.

Male. — Length about 5 mm.; wing 5.5 mm.

Rostrum yellow; palpi black. Antennae black throughout; flagellar segments long-oval, passing into elongate, proximal segments shorter than their longest verticils. Head gray.

Pronotum light yellow. Mesonotal praescutum yellow with three light brown stripes, lateral borders broadly of the ground color, interspaces more obscured; scutal lobes light brown, central area and scutellum yellow, postnotum obscure yellow. Pleura yellow with a more whitened sheen. Halteres elongate, stem whitened, knob brown. Legs with coxae and trochanters light yellow; remainder of legs very pale brown, outer tarsal segments blackened. Wings subhyaline, unpatterned; veins pale brown. Venation: *Sc* short, Sc_1 ending opposite origin of *Rs*, the latter in direct alignment with R_2; *r-m* at or close to fork of *Rs*; cell *1st* M_2 small, a little shorter than vein M_4; *m-cu* at or just beyond fork of *M*.

Abdomen yellow, tergites broadly dark brown medially; hypopygium yellow. Male hypopygium with outer apical lobe of basistyle very long and relatively slender, its length subequal to the remainder of style. Dististyle with body relatively narrow, terminating in two slightly unequal modified setae; on outer margin near base with a slender arm that is subequal in length, blackened outwardly, tip obtuse, near its base with a small acute spine bearing a strong basal seta. Phallosome beyond the insertion of the apophyses short and broad, unequally bilobed, the longest lobe, that appears to be the aedeagus, subequal in length to the apophyses, the latter blackened, conspicuous, slightly unequal, gradually narrowed into long slender spines.

Holotype. — ♂, Mill Creek Canyon, San Bernardino Mountains, San Bernardino Co., California, June 9, 1924 (F. R. Cole); CIS.

I take great pleasure in dedicating this fly to the collector, Dr. Frank R. Cole, one of the countries outstanding students of the Diptera. The most similar regional species include *Gonomyia (Gonomyia) filiformis* Alexander and *G. (G.) poliocephala* Alexander which differ evidently in the hypopygial structure, especially the outer lobe of basistyle, dististyle and phallosome.

Lipsothrix fulva n. sp.

General coloration of thorax fulvous, sides of praescutum light yellow; outer cells of wing with abundant macrotrichia; abdomen yellow, tergites

with a dark brown central stripe, subterminal segments more darkened to form a narrow ring.

Male. — Length about 10-10.5 mm.; wing 10-10.5 mm.; antenna about 3.6-3.7 mm.

Female. — Length about 12-13 mm.; wing 10.5-12 mm.

Rostrum obscure yellow, proximal two segments of palpi brown, terminal segments black. Antennae of male relatively long; basal segments yellow, flagellum pale brown, the bases of the more proximal segments slightly more yellowed, the outer ones more uniformly darkened. Head light brown, anterior vertex and orbits darker.

Pronotal scutum yellow, narrowly darkened in front, with abundant black setae, scutellum light yellow. Mesonotum fulvous, sides of praescutum light yellow. Pleura fulvous yellow, dorsopleural region clearer yellow. Halteres yellow, knobs weakly darkened. Legs with all coxae and trochanters yellow; femora brownish yellow, tips narrowly brownish black, the amount subequal on all legs, including approximately the outer twelfth; remainder of legs yellowed, tips of tibiae very narrowly dark brown. Wings yellowed, prearcular and costal fields clearer yellow; veins pale brown. Abundant macrotrichia in centers of outer cells and in stigmal region. Venation: R_1 deflected strongly caudad, cell R_3 at margin nearly twice cell R_1.

Abdominal tergites yellow, with a narrow dark brown central stripe, broadly interrupted on posterior third of each segment, the last area, on segment seven, slightly expanded; sternites yellow, outer two-thirds of segment seven and base of eight more darkened; hypopygium yellow.

Holotype. — ♂, near Del Loma, Trinity Co., California, June 20, 1959 (Byers and party); K.U. Allotopotype. — ♀. Paratopotypes. — 5 ♂ ♀.

Allied to *Lipsothrix nigrilinea* (Doane) and *L. shasta* Alexander in the trichiation of the wing cells, differing evidently in the body coloration, particularly the mesonotum and abdomen. In *nigrilinea* the dorsum of the thorax and abdomen is almost continuously darkened; in *shasta*, the abdomen is yellowed with only the subterminal segments darkened to form a ring.

Genus *Gonomyodes* Alexander; subgenus *Gonomyopsis* n. subgen.

Characters as in typical *Gonomyodes*, differing especially in the structure of the hypopygium. Antennal scape enlarged; flagellar verticils elongate. Tuberculate pits placed far forward, separated by a distance about equal to twice their diameter; pseudosutural foveae conspicuous. Wings (fig. 7) with petiole of cell R_3 longer than the cell. Male hypopygium (fig. 14) with the tergite, *t*, large, about as broad as long, posterior border with a broad emargination. Dististyles, *d*, terminal, including the simple arcuated

bladelike outer style and the small oval inner style. Phallosome, *p*, with lateral flange of aedeagus narrowed, gonapophyses apparently lacking. It should be noted that the inner dististyle, as described, in one paratype as mounted on a microscope slide appears to be borne on the outer or lateral margin, this condition apparently resulting from torsion in the process of mounting.

Type of subgenus. — *Gonomyodes* (*Gonomyopsis*) *doaneana* n. sp.: Western Nearctic (California).

The characters upon which the group are based are so distinct that it seems probable that it will be recognized as representing a valid genus.

Gonomyodes (Gonomyopsis) doaneana n. sp.

General coloration of thorax brownish black; legs brown; wings weakly suffused, with a restricted pale brown pattern that includes areas at anterior cord and in cell *R*; cell R_2 at margin nearly twice as extensive as cell R_1; male hypopygium with tergite large, dististyles terminal, outer style a glabrous yellow blade, aedeagus with a narrow subtending flange.

Male. — Length about 5 mm.; wing 5.5 mm.; antenna about 1.5 mm.

Rostrum and palpi black. Antennae black throughout; verticils much longer than the segments. Head light gray; vertex broad.

Pronotal scutum brown, scutellum orange laterally. Mesonotum brown to brownish black, sides of praescutum and scutum more pruinose; posterior callosities of scutal lobes and posterior border of scutellum obscure yellow; mediotergite gray, posterior half more darkened; tuberculate pits and pseudosutural foveae black, conspicuous. Pleura brown, dorsopleural region slightly paler. Halteres with stem dirty white, knob weakly infuscated. Legs with coxae and trochanters obscure yellow, the latter elongate, especially the middle pair; remainder of legs brown; vestiture appressed, inconspicuous. Wings (fig. 7) weakly suffused, with a pale brown pattern that includes especially the large stigma and a comparable area over the anterior cord, with narrower seams over posterior cord and outer end of cell *1st* M_2; a pale brown linear streak in center of cell *R*; extreme wing base vaguely more yellowed; veins brown. Macrotrichia on longitudinal veins beyond cord, including also the outer ends of basal section of Cu_1 and both Anals. Venation: *Sc* long, Sc_1 ending nearly opposite fork of *Rs*, Sc_2 removed, Sc_1 about one-third *Rs*; vein R_2 before midlength of stigma, R_{2+3+4} and R_{3+4} subequal; vein R_3 oblique, longer than the distance on *C* between it and R_{1+2}; cell R_3 at margin nearly twice as extensive as cell R_1; cell *1st* M_2 rectangular, relatively narrow, shorter than any of the veins beyond it; *m-cu* just beyond one-third M_{3+4}; Anal veins divergent.

Abdomen, including hypopygium, dark brown. Male hypopygium (fig. 14) with the tergite, *t*, large, the breadth across basal half subequal to the length; posterior border shallowly emarginate to form two low rounded lobes that are provided with very abundant delicate appressed retrorse setae,

those at midline of margin much shorter and stouter, spinoid; disk of tergite with sparse scattered small setae. Outer setae of basistyle, *b*, very long, nearly equal to the dististyle. Dististyles, *d*, terminal, the outer style appearing as a glabrous yellow blade, sinuously bent and narrowed to a terminal point, the tip nearly acute; near base of style on inner margin with a small hyaline oval lobe that represents the inner style, provided with a few long setae. Phallosome, *p*, with a broad basal plate, its surface with dense short setulae; apex subtruncate, the narrow aedeagus projecting beyond, with a narrow subtending flange that is only slightly broader than the diameter of the genital tube within.

Holotype. — ♂, Stanford University, Santa Clara Co., California, January 1906 (R. W. Doane); CAS; from the Doane Collection, Leland Stanford Junior University Lot 497, sub 2. Paratopotypes. — 5 ♂♂, with the type. The material bore the label by Doane "*Limnophila* n. sp. ? goes to *quadrata*". Superficially the fly suggests this species but actually belongs to a different tribe.

I am pleased to dedicate this particularly distinct fly to Professor Rennie W. Doane (1872-1942), capable pioneer student of western North American crane-flies. The fly is readily told from other regional species by the coloration and characters of venation and hypopygium. Superficially it resembles certain species of the quite different genus *Rhabdomastix* Skuse.

Erioptera (Psiloconopa) margarita monoensis n. subsp.

Male. — Length about 4.5 mm.; wing 5 mm.

Female. — Length about 5 mm.: wing 6 mm.

Generally similar to typical *margarita* Alexander (Alaska and Yukon Territory, southeast to Utah, Wyoming and Colorado), differing especially in the details of structure of the male hypopygium.

Head yellow, rostrum clearer yellow; palpi black. Antennae with scape light yellow, pedicel brownish yellow, flagellum brown to brownish black. Mesonotum obscure yellow, praescutum darker, especially the anterior end of central area; scutellum, postnotum and pleura clear yellow. Halteres light yellow. Legs yellow, tips of femora and tibiae narrowly darkened, posterior femora more uniformly yellow. Wings obscure yellow; veins brownish yellow. Male hypopygium generally as in typical *margarita*, differing especially in the broad inner gonapophyses which are widest at near three-fourths the length, thence narrowed to an acute point, the width fully twice that of the outer apophysis. In typical *margarita* the inner apophyses are slender black spines that vary from one-half to subequal to the width of the outer apophysis, narrowed very gradually to the tip.

Holotype. — ♂, Leavitt Meadow, Mono Co., California, 7200 feet, in flight trap, August 13, 1963 (H. B. Leech); CAS. Allotopotype. — ♀.

Ormosia (Ormosia) arnaudi n. sp.

Belongs to the *similis* group; general coloration of thorax light yellowish brown; antennae of male elongate, nearly two-thirds the wing; flagellar segments long-fusiform, the dilated base with a single long verticil and abundant outspreading setae; male hypopygium with tergite subquadrate, posterior border broadly emarginate; interbase a long slender black spine; phallosome including two powerful black spines that have the same general shape and length as the interbase, at base with a small acute spine that is directed cephalad.

Male. — Length about 4.8 mm.; wing 5 mm.; antenna about 3.2 mm.

Female. — Length about 6 mm.; wing 5.5 mm.

Rostrum and palpi black. Antennae of male elongate, being nearly two-thirds the wing; proximal segments testaceous, outer ones darker; flagellar segments long-fusiform, the outer half narrowed, the enlarged base with a single verticil that is subequal to the segment and nearly equal to the outspreading setae. Head brownish gray.

Pronotal scutum infuscated, scutellum light yellow. Mesonotum light yellowish brown, including the praescutal stripes, humeral region yellowed. Pleura yellowish brown, the dorsopleural region clearer yellow. Halteres with stem pale yellow, knob very slightly darker. Legs with coxae and trochanters light yellow, remainder of legs more obscure yellow, including the tarsi. Wings tinged with brown, the stigma darker; veins light brown. Venation: R_2 oblique, subequal to or shorter than R_{2+3}; basal section of M_3 lacking; cell *2nd* M_2 about twice its petiole; vein *2nd A* gently sinuous on more than the outer third.

Abdomen brown, the sternites slightly paler. Male hypopygium with tergite large, subquadrate, only slightly constricted beyond midlength; posterior border with a broad U-shaped emargination; lateral margins with short dense setulae, surface and lobes with numerous long pale setae. Basistyle with interbase a powerful black spine, gently curved to the acute tip, more distally on face of style with a small blackened spine. Dististyles as in the *similis* group, subequal in length; outer style more or less plaited, outer end truncate, with rows of microscopic setae; inner style broad at base, outer third more narrowed. Phallosome including two powerful black spines, narrowed gradually to the acute tip, nearly equal in shape and size to the interbase but broader basally, at proximal end with a small acute spine that is directed cephalad.

Holotype. — ♂, Eureka, Humboldt Co., California, August 12, 1953 (P. H. Arnaud, Jr.); CAS. Allotopotype. — ♀, with the type.

The species is named for Dr. Paul H. Arnaud, Jr., distinguished student of the Tachinidae. Other regional members of the group that have simple unmodified dististyles and with the interbase a strong spine include *Ormosia* (*Ormosia*) *albrighti* Alexander, *O.* (*O.*) *heptacantha* Alexander, *O.* (*O.*) *nonacantha* Alexander, and some others, all differing in the details of structure of the hypopygium, including especially the interbase and phallosome.

Ormosia (Ormosia) bigladia n. sp.

Belongs to the *similis* group, allied to *curvicornis*; thorax almost uniformly light brown; antennae of male elongate, flagellar segments nodulose; male hypopygium with the tergite broad, posterior border with a shallow U-shaped emargination, lateral lobes distinct, posterior portion with very long setae; inner armature of phallosome with four acute points.

Male. — Length about 6 mm.; wing 6.5 mm.; antenna about 4 mm.

Rostrum brown, palpi black. Antennae of male elongate; proximal three segments yellow, remainder black; flagellar segments enlarged basally, tapered into slender apical necks, the enlarged part with abundant long white setae that exceed the segments. Head gray.

Pronotal scutum brown, scutellum yellow. Mesonotum light brown, the closely approximated tuberculate pits polished brownish black. Pleura light brown, the ventral sternopleurite and meron slightly darker. Halteres yellow, knob infuscated. Legs with coxae and trochanters yellow, remainder of legs more obscure yellow. Wings light brown, stigmal region a little darker; veins brownish yellow. Macrotrichia of cells delicate, abundant. Venation: R_{2+3+4} a trifle longer than either R_{2+3} or basal section of M_1; cell M_2 open by atrophy of basal section of M_3; outer fourth of vein *2nd A* gently sinuous.

Abdomen light brown, hypopygium slightly more brownish yellow. Male hypopygium with tergite broad, slightly narrowed outwardly, posterior border with a broad U-shaped emargination to form rounded lobes; setae of posterior end very long, the longest about one-third the length of tergite. Basistyle unarmed. Dististyles virtually terminal; outer style with abundant appressed teeth on outer third; inner style with apex obtuse. Phallosome including long slender blackened spines that narrow to acute points; inner armature of phallosome relatively small, including four acute points.

Holotype. — ♂, 26.5 miles northeast of Crescent City, Del Norte Co., California, June 22, 1959 (G. W. Byers); K.U.

Very closely allied to *Ormosia* (*Ormosia*) *curvicornis* n. sp., differing in details of the male hypopygium, especially the ninth tergite and phallosome.

Ormosia (Ormosia) curvicornis n. sp.

Belongs to the *similis* group, allied to *bigladia*; general coloration of mesonotum uniformly brown, pleura more brownish yellow; antennae of male long, flagellar segments nodulose; legs light brown; wings pale brown, costal region slightly darker, cell M_2 open by atrophy of basal section of M_3; male hypopygium with tergite broad, apex broadly emarginate; apex of inner dististyle a short blackened point; phallosome comprised of two strong blackened horns, slightly incurved; narrowed to long points; inner armature very reduced.

Male. — Length about 5.3 mm.; wing 6 mm.; antenna about 4.2 mm.

Rostrum dark brown, palpi brownish black. Antennae of male elongate, approximately two-thirds the wing; scape and pedicel brownish yellow, flagellum dark brown; flagellar segments dilated basally, tapering into long apical stems, the enlarged parts with very long outspreading white setae that are subequal to the segments, longer than the sparse blackened verticils. Head gray.

Pronotal scutum pale brown, scutellum pale yellow. Mesonotum almost uniformly brown, the praescutal interspaces concolorous, indicated by yellow setae; lateral and posterior parts of mediotergite paler. Pleura brownish yellow, vaguely more darkened dorsally; dorsopleural membrane light yellow. Halteres with stem yellow, knob weakly darkened. Legs with coxae and trochanters yellow; remainder light brown, the outer two tarsal segments darker. Wings pale brown, costal region slightly darker; veins pale brown. Venation: R_2 beyond the fork, about twice R_{2+3}; cell M_2 open by atrophy of basal section of M_3; vein *2nd A* gently sinuous on outer third.

Abdominal tergites brown, basal segments and sternites paler. Male hypopygium with the tergite broad, very slightly narrowed outwardly, posterior border very shallowly emarginate, the setae of moderate length. Basistyle unarmed. Dististyles terminal, outer style subtruncate at apex, the outer third with abundant appressed points, on the outer end appearing fimbriate; inner style subequal in length, the apex a blackened point, with a strong carina on face of style. Phallosome comprised of two strong black spines, slightly curved, narrowed to long acute black points, the two taken together appearing sublyriform.

Holotype. — ♂, Willow Creek, Humboldt Co., California, June 20, 1959 (G. W. Byers); K.U. Paratopotype. — ♂.

The only other generally similar regional species having an open cell M_2, elongate male antennae and the phallosome of the hypopygium with two powerful horns, include *Ormosia* (*Ormosia*) *albrighti* Alexander, *O.* (*O.*) *bigladia* n. sp., and *O.* (*O.*) *decussata* Alexander, all of which have the hypopygial details quite distinct.

Ormosia (Ormosia) dicera n. sp.

Allied to *tricornis*; thorax ranging from dark to lighter brown; antennae

short; male hypopygium with the upper arm of outer dististyle bispinous.

Male. — Length about 5 mm.; wing 5 mm.; antenna about 1-1.1 mm.

Rostrum and palpi black. Antennae short; flagellar segments relatively long; verticils very long, about three times the segments, the dense white setae much shorter. Head dark brown.

Thorax dark brown in type, pale yellowish brown in the paratypes; posterior borders of scutal lobes yellowed. Halteres pale yellow. Legs with coxae of holotype brown, yellowed in the paratypes; remainder of legs brown. Wings pale brown, stigmal region poorly delimited, slightly darker; veins very pale brown, only slightly darker than the ground. Macrotrichia of cells pale brown, very abundant. Venation: R_{2+3+4} about one-half longer than basal section of R_5; *m-cu* at fork of *M*; vein *2nd A* very gently sinuous on outer third.

Abdomen brown to dark brown. Male hypopygium with median lobe of tergite narrowed at base, only about one-third the diameter across the subtruncated apex; subtending plate broad, hyaline, the margins blackened, outer border with dense setae. Dististyles generally as in *tricornis*; outer style with two arms, each produced into two strong spines, the lower arm with the spines much longer, slightly unequal; in a paratype, the upper arm has the lower spine weakly bispinous at tip; inner style elongate, with a powerful erect spine on outer margin at near two-thirds the length. Gonapophysis unequally bispinous, the inner spine elongate, gently curved, nearly three times as long as the short acute outer spine. Aedeagus slender.

Holotype. — ♂, Avenue of the Giants, Redwood Highway, Humboldt Co., California, June 21, 1959 (G. W. Byers); K.U. Paratopotypes. — 2 ♂♂.

Ormosia (*Ormosia*) *dicera* is related to other western Nearctic species such as *O.* (*O.*) *cerrita* Alexander, *O.* (*O.*) *cornuta* (Doane), *O.* (*O.*) *davisi* Alexander, *O.* (*O.*) *unicornis* Alexander and *O.* (*O.*) *tricornis* Alexander, especially the last, differing almost solely in the hypopygial structure, as described.

MOLOPHILUS Curtis

Molophilus Curtis; British Entomology, p. 444; 1833.

Genus *Molophilus* Curtis; subgenus *Promolophilus* n. subgen.

Based on the so-called *nitidus* group. Characters as in the typical subgenus, differing in the structure of the male hypopygium (fig. 15). Ninth tergite, *t*, with the posterior border produced caudad into a sclerotized plate, emarginate to form a furcula. Phallosome, *p*, with the gonapophyses appearing as two separate flattened blades. Aedeagus relatively short and stout, especially at base. Basistyle, *b*, with the dorsal and mesal lobes produced into slender spines. Venation (fig. 8).

In typical *Molophilus* the gonapophyses are united into a single oval phallosomic plate.

Type of subgenus. — *Molophilus* (*Promolophilus*) *nitidus* Coquillett: Western Nearctic. Other species include the western Nearctic *M.* (*P.*) *dirhaphis* Alexander, *M.* (*P.*) *millardi* Alexander, *M.* (*P.*) *nitidulus* Alexander, *M.* (*P.*) *subnitens* Alexander, and *M.* (*P.*) *bilobulus* Alexander, of western China, the last with the separate gonapophyses very large and conspicuous. I have in my collection a further undescribed species from the eastern Himalayas (Sikkim). A further group of *Molophilus,* typified by the western Nearctic *M.* (*M.*) *harrisoni* Alexander, had been placed in the *nitidus* group but differs in having the gonapophyses united into a single phallosomic plate, as in the typical subgenus, but with either side of the plate produced laterad into a strong spine or point. The ninth tergite has the posterior border produced into a plate or lobe, in cases not unlike that found in *Promolophilus.* For the present I am retaining this group, which may be called the *harrisoni* group, in the typical subgenus but believe that when the species of the world are better known it may require a further subgeneric name. Other members of this group include *Molophilus* (*Molophilus*) *albibasis* Alexander, of Japan, *M.* (*M.*) *appollyon* Alexander, of Afghanistan, Pakistan and Kashmir, *M.* (*M.*) *grishma* Alexander, of Sikkim, and *M.* (*M.*) *sudra* Alexander, of Assam.