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TYPE SPECIMENS OF TIPULIDAE DESCRIBED BY R. W. DOANE IN THE
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By

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ABSTRACT: The entomological career of R. W. Doane is briefly reviewed. For each included species, the following are presented: name (original combination), date and page reference to original description, present taxonomic status, numbers and kinds of types, condition of types, and comments. Most holotypes and lectotypes are illustrated. Lectotypes are designated for *Dicranomyia adjecta*, *D. particeps*, *Pachyrhina californica*, *P. snowii*, *Rhypholophus arcuatus*, *R. cornutus*, *R. longicornus*, *R. parallelus*, *Tipula alia*, *T. aspersa*, *T. atrisumma*, *T. biuncus*, *T. californica*, *T. coloradensis*, *T. cylindrata*, *T. derbyi*, *T. flavo-cauda*, *T. flavomarginata*, *T. madera*, *T. marina*, *T. newcomeri*, *T. occidentalis*, *T. pacifica*, *T. planicornis*, *T. pyramis*, *T. quaylii*, *T. rohweri*, *T. rusticola*, *T. silvestra*, *T. sternata*, *T. sylvicola*, *T. tergata*, *T. ungulata*, *T. vestigipennis*, *T. williamsii*.

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Rennie Wilbur Doane is known primarily as an economic entomologist, the author of several books in applied entomology, including *Insect Pests* (1910), *Economic Entomology and Zoology* (with V. L. Kellogg, 1915), *Insects and Disease* (1925), and *Forest Insects* (with E. C. VanDyke, W. F. Chamberlin and H. E. Burke, 1936). However, early in his professional career he became interested in Tephritidae and particularly Tipulidae, and for over a decade (1900-1912) he published extensively on the taxonomy of Tipulidae, describing in a dozen papers 151 species, mostly from the western United States. The bibliography that follows lists all of Doane's publications on Tipulidae.

Doane was born in Des Moines, Iowa, in 1871. At Leland Stanford Jr. University, he studied entomology when it was first offered there, under Prof. John Henry Comstock and Vernon L. Kellogg. Graduating in 1896, Doane took a position as Assistant Zoologist and Entomologist at Washington Agricultural College, Pullman. It was here that he began assembling his collection of crane flies. Following his promotion to Assistant Professor, Doane was assigned in 1901 to the Fisheries Experiment Station at Keyport, Washington, as its superintendent. Several of his tipulid specimens bear the Keyport label, which pertains to an area about nine miles north of Bremerton, in Kitsap County, Washington, on a channel of Puget Sound.

In the fall of 1905, Doane returned to California to accept an appointment as Assistant Entomologist at Stanford University. Here he was promoted to Instructor and Curator in 1906, and in 1909 was made Assistant Professor. He attained the rank of Associate Professor in 1915 and Professor in 1926. His work on the crane flies did not take him far afield, and most species described from his own collections of Tipulidae were from Palo Alto (Stanford) or other localities in the San Francisco Bay area. His developing interest in economic entomology, in contrast, took him in 1908 to the Society Islands and in 1913 to Samoa, to bring coconut pests under control. In California, he worked on the biology and control of various economic pests, particularly scale insects, on fleas in relation to plague, and on mosquito control. He retired in 1936 and died at Stanford on 1 December 1942. His crane fly collection was subsequently transferred from Stanford to the California Academy of Sciences; however, much of the collection assembled while Doane was associated with Washington Agricultural College (now Washington State University) remains in Pullman.

Sources of these biographical data are Pierson (1943), Alexander (1967), Essig (1931) and Osborn (1937).

In general, the type specimens of Doane's species described in 1908 through 1912 are in the collection of the California Academy of Sciences (CAS), while those described in his earlier papers are in the Washington State University collection. He seems to have brought with him to Stanford, however, a few representatives of the species described in

1900 and 1901, and in nearly every instance these may be identified as syntypes. Lectotypes for the 1900-1901 species should, where possible, be selected from the holdings at Washington State University (WSU).

Usually, Doane based his descriptions of new species on stated numbers of males and females, or on stated single specimens. Where there was only one specimen, it is of course the holotype. Where there were several, Doane usually in some way labelled only one as "type," and this one was put into the CAS collection with the status of holotype. Occasionally two or more syntypes were given "type" labels. Other original syntypes may or may not have been subsequently labelled, with a yellow tag, as "PROBABLE/PARATYPE/(specific name in capital letters)." This segregation of types from Doane's collection was done under the direction of Dr. E. S. Ross in 1946.

Many of the labelled "types" lack genitalia or wings (generally the right wing). Presence on certain specimens of such a label as "Hypo 3" suggests the hypopygium was dissected off and given a code number for subsequent association with that syntype. In a letter to E. S. Ross, dated 20 May 1946, G. F. Ferris wrote, concerning disposition of the Doane collection: "...I know that there is nothing left that didn't have definite indications as to significance and origin. He had, for example, a lot of slides of tipulid wings with no indication of what they came from, so I didn't keep them." In selecting lectotypes, I have sometimes bypassed such an apparently dissected specimen labelled "type" in favor of a more completely intact specimen from among the other syntypes. It seems to me most useful to designate as lectotype of each species the specimen that at present affords the most information about the species and that is also consistent with present understanding of the species.

According to the International Code of Zoological Nomenclature, Article 73, the presence of these "type" labels does not alter the status of syntypes, that is, does not confer on the specimens so labelled the status of holotype and upon other syntypes the status of paratypes. A holotype is to be designated in the published description (or must be the only specimen).

ACKNOWLEDGMENTS

Dr. Paul H. Arnaud, Jr., Curator and Chairman of the Department of Entomology, California Academy of Sciences, originated this re-examination of Doane's types as part of a program to catalogue all types in the Academy's collection. I am indebted to him for inviting me to San Francisco for part of June 1974 to study the types, and to him and his wife Madeline for truly extraordinary hospitality during my stay. Other members of the Department of Entomology at the Academy also contributed friendly assistance in many ways. I thank

Dr. William J. Turner, Director of the M. T. James Entomological Collection, Washington State University, Pullman, for his efforts in identifying type specimens among the Doane materials in his care. Finally, I express appreciation to Emeritus Professor Charles P. Alexander of Amherst, Massachusetts, for his help to me in this work, and for similar generous assistance in crane fly matters over the past 25 years.

FORMAT FOR THE SPECIES LIST

In the treatment of individual species I present information in the following sequence:

1. Name of the species in its *original combination*, followed on the same line by
2. Author's name (Doane) and
3. Date of publication of the description (with letter if necessary to indicate sequence of papers within a single year), and
4. Inclusive pages of description of the species.
5. Present status of the species, indicating such things as change of generic assignment, current subgeneric assignment, or synonymy.
6. Enumeration of the original type series and statement of the type locality or localities.
7. Portion of the type series now present in the collection of the California Academy of Sciences (CAS).
8. Lectotype designation, if appropriate, including pin-label data for the lectotype (or similar information for the holotype). Inscriptions on each pin-label are given within quotation marks, with diagonal lines separating lines on the label.
9. Condition of the holotype or lectotype.
10. Taxonomic comments, including such things as recognition characteristics of the species, references to figures, comparison of figures with others already published, notes on similar species, synonymy, etc.

Species are arranged in alphabetical order within genera; the genera are similarly in alphabetical sequence.

ABBREVIATIONS

Following are abbreviations used repeatedly on the plates: adm - adminiculum, bs - basistyle, gon - gonapophysis, id - inner dististyle, p - proctiger (tenth abdominal segment), 8s - eighth abdominal sternum, 9s - ninth abdominal sternum, 9t - ninth abdominal tergum.

Amalopsis ampla Doane, 1900: 195.

Present status: *Pedicia (Tricyphona) ampla ampla* (Doane).

Based on 8♂, 1♀ from Seattle, Washington. CAS collection: 1♂ syntype. Apparently only 1♂, 1♀ syntypes remain in the WSU collection.

Amalopsis constans Doane, 1900: 196.

Present status: *Pedicia (Tricyphona) constans* (Doane).

Described from 6 or more specimens representing both sexes, from Olympia (restricted type locality), Seattle, Tokeland and South Bend, Washington. CAS collection: 1♂ syntype, from Tokeland, Washington. There are 2♂ and a broken specimen from Olympia in the WSU collection.

Dicranomyia adjecta Doane, 1908a: 8.

Present status: *Limonia (Hesperolimonia) infuscata* (Doane).

Doane based the species on 2♂, 2♀ from the vicinity of Stanford University (Santa Clara Co.), California. CAS collection: 1♂, 2♀ syntypes.

LECTOTYPE, by present designation, the male syntype (CAS #5632), labelled "Corte Ma-/dera Cr. Cal./ 5/15-1906"; "R. W. Doane/Collector" and "Dicranomyia/adjecta/07 Doane" (in pencil, Doane's handwriting). A label pinned beside this specimen reads "Presumed type from head of Doane series (E.S.R. 1946)." All the legs and the left antenna are missing from the lectotype.

Alexander (1967: 85) gave the date of collection of one of the female syntypes as 12 October 1907, suggesting there might be a second generation each year; however, the label actually reads April (IV). There is another male in the CAS collection without date that could possibly be the missing syntype, but it bears a printed label similar to that of an adjacent specimen dated 1909 and is therefore not considered part of the type series.

The illustration by Alexander (1967: 231, fig. 253) is good, so I have not provided a further sketch of the lectotype. It should perhaps be noted that the base of the ventral dististyle is expanded somewhat dorsad, producing a shallow cleft in which the base of the dorsal dististyle lies. Also, the downturned, blackened spines at the apex of the dorsal dististyle are noticeably blunt-tipped.

Dicranomyia cervina Doane, 1908a: 8-9.

Present status: *Limonia (Dicranomyia) cervina* (Doane).

Described from a single male from the vicinity of Stanford University (Santa Clara Co.), California. CAS collection: the holotype.

HOLOTYPE, male (CAS #5633), labelled "Woodside Cal/ 4/4 1906"; "R. W. Doane/Collector"; "Dicranomyia/cervina/07 Doane" and "N.B. = distans O.S./C.P.A." The specimen is generally intact but lacks the right wing and left hind leg, and the genital segments have been removed to a microscope slide.

Alexander (1965: 46) regarded *cervina* as a synonym of *distans* (Osten Sacken). The two forms are similar in general appearance, wing characters, and even hypopygial structure. But in *cervina* there is a conspicuous, thumb-like projection from near the base of the rostrum of the ventral dististyle (figs. 1,2), the rostrum of the dististyle is distinctly rounded at apex, and the rostral spines are broader, more blade-like than those of *distans*. Comparison of my illustrations of *cervina* with Alexander's (1966: 317, fig. 35C) suggests also that *cervina* has a more curved dorsal dististyle and lacks a conspicuous ventral process on the basistyle (but the latter may be concealed by the slide preparation).

Doane's published generic name, *Dicranomsia*, was clearly only a typographical error.

Dicranomyia particeps Doane, 1908a: 7-8.

Present status: *Limonia (Dicranomyia) particeps* (Doane).

The species was described on the basis of 9♂, 6♀, all from Keyport (Kitsap Co.), Washington. CAS collection: 4♂, 4♀, 2 without abdomen, all syntypes.

LECTOTYPE, by present designation, a male (CAS #5631), labelled "7" (on a small tag); "Keyport Wash/July 1905 RWD" and "particeps." The specimen lacks both hind legs, and its terminal abdominal segments have been mounted on a microscope slide (see Alexander, 1959: 49).

One male from the type series was sent to C. P. Alexander; and since one of the syntypes without abdomen bears a label reading "Hypo 3," it is assumed to be a male. Four syntypes are apparently lost. The lectotype is selected to conform to Alexander's differentiation of *particeps* and *ypsilon* (Alexander, 1959). Of the four male syntypes present in the CAS collection, however, three are *Limonia ypsilon* Alexander, including the most fully labelled male from the head of the series as it stood in Doane's collection. Doane's description applies as well to *particeps* as to *ypsilon*, and it seems to me that the present designation of

a lectotype does away with what might have become a taxonomic problem.

At the time he described *L. ypsilon*, Alexander (1959) supposed that his *Limonia (Dicranomyia) uinta* (Alexander, 1948: 38-40) was a synonym of *L. (D.) particeps* (Doane). After comparing details of the lectotype of *particeps* (figs. 3, 4) with Alexander's (1948) illustration of *uinta*, however, I regard the two forms as distinct. Particularly the mesal lobe of the basistyle and the arrangement of setae on the rostrum of the ventral dististyle differ between these species.

Dicranomyia viridicans Doane, 1908a: 7.

Present status: *Limonia (Dicranomyia) humidicola* (Osten Sacken).

Described from 1♂ from the vicinity of Stanford University (Santa Clara Co.), California. CAS collection: the holotype.

HOLOTYPE, male (CAS #5630), labelled "Corte Ma-/dera Cr Cal/2 1906"; "R. W. Doane/Collector" and "Dicranomyia/viridicans/07 Doane" (Doane's misspelling). The holotype is a teneral specimen lacking left antenna, left middle leg and right front and middle legs. Its genital segments have been removed to a microscope slide; the left dististyles are shown in fig. 5.

Eriocera austera Doane, 1900: 192-193.

Present status: *Hexatoma (Eriocera) austera* (Doane).

Species based on 17♂♂ from Olympia, Washington. CAS collection: 1♂ labelled only "4 25/94"; "R. W. Doane/Collection" and "Probable/Paratype/austera" with an identification label, in Doane's pencilled writing, "Eriocera/austera/Doane." This is probably a syntype. The WSU collection has four males similarly lacking locality data yet probably syntypes.

Pachyrhina breviorcornis Doane, 1908b: 178-179.

Present status: *Nephrotoma breviorcornis* (Doane).

Described from a single male from Battle Creek (Calhoun Co.), Michigan. CAS collection: the holotype.

HOLOTYPE, male (CAS #5637), labelled "Battle Creek/Mich."; "type" (in pencil); and "Pachyrhina/breviorcornis/Doane." It lacks the right wing, apical half of the left antenna, and all legs except the right femur and part of the tibia. In the box with the type is a leg that was found

loose with the specimen in 1970.

Recognition characteristics of this species include its 13-segmented antennae, form of ninth abdominal tergum (fig. 6), and long, curved, horn-like gonapophyses (fig. 7, gon).

Pachyrhina californica Doane, 1908b: 176.

Present status: *Tipula (Hesperotipula) californica* (Doane).

The original description was based on "many males and females" from Stanford University (Santa Clara Co.), California. CAS collection: 1♀, 1 mating pair and possibly other syntypes, and 1♂ labelled "type" but not accepted as such, as discussed below.

The specimen bearing the "type" label is a damaged male also labelled "San Jose Cal/Apr. 1906" and "Pachyrhina/californica/02 type Doane." Both the type labels have more than one pin hole so may have been transferred from some other specimen. Since this specimen has a locality label not in agreement with the published type locality, I do not accept it as the type or as a syntype. Alexander (1967: 29) designated as lectotype a male from Stanford University, stating it was in the CAS collection. It seems likely he did not see the specimen labelled as the "type." The only male specimens in the CAS collection from "Stanford University" were collected in April 1908, the month of publication of the species' description. A female collected at Stanford University on 26 April 1904 and a mating pair labelled "Palo Alto Cal./6 April '95" might be parts of the original type series.

LECTOTYPE. In view of Alexander's designation of a lectotype, I have selected a male, intact except for lacking the right front and hind legs, to be lectotype (CAS #5634). It is labelled "Stan U Cal/20 Apr 1908" and "R. W. Doane/Collection," the date suggesting it *may* not actually be part of the original type series (unless publication of the April 1908 issue of Entomological News was considerably delayed).

In the original description, the generic name was inadvertently spelled *Pachyrina*.

Pachyrhina occidentalis Doane, 1908b: 177-178.

Present status: *Nephrotoma wulpiana* (Bergroth).

Described on the basis of "many males and females" from localities in California, Montana, Washington, Nevada and Arizona. But Doane specified that the type (by which he apparently meant to differentiate a holotype, in the current sense, from a series of paratypes - or at least intended to restrict the type locality) was from Stanford (Santa Clara Co.), California. CAS collection: the "type" male and 4♂,

10♀ "paratypes." There are also 1♂, 3♀ and 4 without abdomen, all probable "paratypes," in the WSU collection.

HOLOTYPE, male (CAS #5636), labelled "Stanford/Univ. Cal"; "type" and "Pachyrhina/occidentalis/Doane." It lacks the right wing, most of the right antennal flagellum, and all legs (but one leg is loose in the box with the specimen).

This commonly collected western species apparently broadly overlaps in range the similar *Nephrotoma ferruginea* (Fabricius) of more eastern North America but is the only representative of the genus in the Pacific coast states and British Columbia. The ninth abdominal tergum (fig. 9) and the dense brush of golden hairs on the margins of the eighth sternum (fig. 8) will differentiate males of *wulpiana* from those of *ferruginea*. Concerning the illustration: right lateral aspect is shown because the left side of the type is obscured by the wing; and the attenuated apex of the outer dististyle is curved downward out of sight.

Pachyrhina snowii Doane, 1908b: 176-177.

Present status: *Nephrotoma snowii* (Doane).

Description based on 1♂, 1♀ from Lander (Fremont Co.), Wyoming. CAS collection: only the male syntype.

LECTOTYPE, by present designation, the male syntype (CAS #5635), labelled "Near Lander Wyo./5000 to 8000 ft. July/Roy Moodie"; "24" (in red ink); and "Pachyrhina/snowii/Doane." The lectotype lacks its right wing, both antennae, and all legs except the right front one and part of the right middle femur.

Alexander (1965) divided *snowii* into a typical subspecies from Wyoming and a subspecies *alternata* (Dietz) from Colorado.

General aspects of the terminal abdominal segments of the lectotype are shown in figures 10 and 11. In dorsal aspect, the ninth tergum is broadly rounded (nearly semi-circular), shallowly indented medially, its posterior margins bearing many small, black denticles most densely crowded beside the indentation, or notch.

N. snowii resembles in many details *N. vittula* (Loew, 1864) and may prove to be a synonym of that species.

Rhypholophus arcuatus Doane, 1908c: 201.

Present status: *Ormosia (Ormosia) arcuata* (Doane).

This species was based on 2♀ from Ithaca (Tompkins Co.), New York. CAS collection: both syntypes.

LECTOTYPE, by present designation, a female syntype (CAS #5638), labelled "Ithaca, N. Y./24 Apr. '94" and "Rhypholophus/arcuatus/Doane/Type." The right wing and all legs

except the right hind one are missing. Wing length is 7.35 mm, not 8 mm as described. Figure 12 is the ventral aspect of the left wing of the lectotype.

Rhypholophus cornutus Doane, 1908c: 202.

Present status: *Ormosia (Ormosia) cornuta* (Doane).

Description based on 2♂, 1♀ from Stanford (Santa Clara Co.), California. CAS collection: all three syntypes.

LECTOTYPE, by present designation, a male (CAS #5642), labelled "Corte Ma-/dera Cr Cal/ 5/15 1906"; "R. W. Doane/Collector"; "R. W. Doane/Collection" and "Probable/Paratype/cornutus." This male has no legs or antennal flagella remaining, while the female syntype, which had been labelled as "type," is more intact. Since specific identification in *Ormosia* depends upon characters of the male genitalia, however, I have designated as lectotype the syntype that has most taxonomic utility. The second male has had the genital segments removed to a microscope slide, it appears (i.e., is labelled "Hypo 24"), and that slide can no longer be found. The lectotype (figs. 13, 14) is in agreement with figure 483 in Alexander's Crane Flies of California (1965: 263).

Rhypholophus divexus Doane, 1908c: 201.

Present status: *Ormosia (Parormosia) fusiformis fusiformis* (Doane).

Described from a single female specimen from Keyport (Kitsap Co.), Washington. CAS collection: the holotype.

HOLOTYPE, female (CAS #5639), labelled "Keyport Wash/ July 1905 RWD" and "Rhypholophus/divexus/Doane/Type." The specimen lacks right wing, tip of right antenna, and all legs except right middle one and left front femur. The discal cell in the holotype is abnormal, being partially open into cell 2nd M₂, but the specimen agrees with the description of *fusiformis* in other respects. I have illustrated the left wing in ventral aspect (fig. 15) to facilitate comparison with illustrations of other species.

Rhypholophus longicornus Doane, 1908c: 201-202.

Present status: *Ormosia (Ormosia) longicornis* (Doane). Original spelling emended by Alexander (1965: 86).

Described on the basis of 2♂, 2♀ from Keyport (Kitsap Co.), Washington. CAS collection: all four syntypes.

LECTOTYPE, by present designation, a male (CAS #5640), labelled "Keyport Wash/July 1905 RWD"; "slide #1" and

"Rhypholophus/longicornus/Doane/Type." The genital segments (fig. 18) have been removed to a microscope slide, which is present with the type. Apical two-thirds of the right antenna are missing. The antennae of the male (fig. 16) are long and conspicuously verticillate, if extended parallel to the costa reaching nearly to the tip of Sc (cf. fig. 17).

Rhypholophus parallelus Doane, 1908c: 202.

Present status: *Ormosia (Ormosia) parallela* (Doane).

Described from 2♀ from Ithaca (Tompkins Co.), New York.
CAS collection: both syntypes.

LECTOTYPE, by present designation, a female syntype (CAS #5641), labelled "Ithaca, N. Y." and "Rhypholophus/parallelus/Doane/Type." The lectotype lacks its right wing, left antennal flagellum and half of right flagellum, and all legs except the right middle and hind ones. By use of the key to *Ormosia* provided by Alexander (1966: 462-464), *parallela* can be grouped with three or four other described species. It seems to me similar to *O. rubella* (Osten Sacken). Species in *Ormosia* have been differentiated largely on the basis of male genitalia, however, and it is probably best to leave *parallela* as an unrecognizable form (Alexander, 1965) until the genus is examined in detail. My accompanying figures 19 and 20 of the lectotype do not seem to me to be in any way diagnostic but might give some information to a better taxonomist.

Tipula acuta Doane, 1901: 116-117.

Present status: *Tipula (Triplixtipula) acuta* Doane.

Described on the basis of 4♂, 4♀, apparently all from Palo Alto (Santa Clara Co.), California. CAS collection: 3♀ syntypes, all from Palo Alto. The WSU collection contains 3♂, 1♀ and one without abdomen, probably all syntypes.

Tipula acutipleura Doane, 1912: 42.

Present status: *Tipula (Lunatipula) acutipleura* Doane.

Described from a single male from San Diego (San Diego Co.), California. CAS collection: the holotype.

HOLOTYPE, male (CAS #5648), labelled "San Diego/Cal."; "Type" and "Tipula/acutipleura/Doane/'11." (The misspelling is Doane's.) It is intact except that the left front leg, right middle leg, and parts of two tarsi are missing.

In the holotype, the lobes of the ninth abdominal tergum (fig. 23) are less sharp than figured by Alexander (1967: 191, fig. 119), and the adminiculum (fig. 22, adm) seems

less complicated when not slide-mounted. Characteristic of this uncommon species are the large inner dististyles and acutely prolonged basistyles (fig. 21) and yellowish, pubescent cushions on the mesal, posterior margins of the ninth sternum (fig. 22).

Tipula aequalis Doane, 1901: 108.

Present status: *Tipula (Triplimitipula) aequalis* Doane.

The species was based on 19♂, 4♀ from various places in Washington and California, with Pullman, Washington, the restricted type locality. CAS collection: 1♂ syntype from Keyport, Washington. There remain only 4♂, 1♀ in the WSU collection.

Tipula albimacula Doane, 1912: 51.

Present status: *Tipula (Bellardina) albimacula* Doane.

Described from one male from an unspecified locality in Arizona. CAS collection: the holotype.

HOLOTYPE, male (CAS #5662), labelled "Arizona/C. U. Lot 35"; below this a small rectangle of bluish paper without inscription; and "Tipula/albimacula/Doane/'11." The specimen has had the apical one-third of its abdomen cut off, and the right wing and all legs but the right hind one are missing.

The Rs is only slightly longer than the m-cu cross-vein. One striking characteristic of this species is the long verticils of the antennae, these being more than twice the length of their respective flagellomeres near the base of the flagellum (fig. 24).

Tipula alia Doane, 1911: 161-162.

Present status: *Tipula (Beringotipula) fallax* Loew.

The type series included 9♂, 2♀ from Keyport (Kitsap Co.), Washington, and 1♀ from Olympia (Thurston Co.), Washington. CAS collection: 3♂, 2♀ syntypes, all from Keyport.

LECTOTYPE, by present designation, a male (CAS #5643), labelled "Keyport Wash/July 1905 RWD" and "R. W. Doane/Collection." This specimen is intact except for the loss of the left middle leg. The male labelled "Hypo in vial/Key 1"; "wing photo 2" and "Type" was not selected because the separated hypopygium cannot be located at present. The left wing, which is attached to a card beneath the specimen, was illustrated by Doane in ventral aspect. The third male has its abdomen intact but is otherwise considerably damaged.

At the time he described *T. alia*, Doane differentiated it from *T. fallax* Loew. Specimens in his collection identified as *T. fallax*, however, are not that species. Alexander examined the lectotype of *T. fallax* in 1964 and subsequently illustrated that species in detail (1967: 179, fig. 76), showing three distinct branches, or arms, on the pendulous appendage of the inner dististyle. Doane (1911: 166) had supposed there were only two branches. Specimens lacking the prominent, hook-like middle portion of the appendage seem in other respects similar to *T. newcomeri* Doane (compare my figs. 76, 79 and Alexander's 1967 fig. 81). I am indebted to Dr. Alexander for a series of slides of *T. newcomeri* showing variation in this structure. Some additional details of the terminal abdominal segments of the lectotype of *T. fallax* Loew are included here (figs. 25-27) for comparison with *T. newcomeri* and related species of subgenus *Beringotipula*. It should be noted that the outer dististyle in figure 25 is curved mesad apically so that its rounded margin is concealed.

The specific name was misspelled *olia* in the description but was spelled correctly elsewhere in the paper and was corrected in the errata for volume 18 of *Psyche*.

Tipula alta Doane, 1912: 44.

Present status: *Tipula (Pterelachisus) alta* Doane.

Described on the basis of a single male individual from near Lander (Fremont Co.), Wyoming. CAS collection: the holotype.

HOLOTYPE, male (CAS #5651), labelled "Near Lander Wyo./ 5000 to 8000 ft. July/Roy Moodie"; "61" (in red ink); "Type" and "Tipula/alta/Doane/'11." The specimen is intact with respect to body and wings but lacks all legs except the left front one.

This is a small *Tipula*. The open discal cell noted by Doane is probably an anomaly. The hypopygium is characterized by large, complicated inner dististyles (figs. 28, 29), a small pubescent lobe at the posterior apex of each side of the ninth sternum, and a caudally facing, small, dark, polished concavity beneath the margin of the ninth tergum (concealed in dorsal aspect, fig. 30).

Tipula aspersa Doane, 1912: 51-52.

Present status: *Tipula (Sinotipula) aspersa* Doane.

This species was based on 1♂, 1♀ from Pacific Grove (Monterey Co.), California. CAS collection: the male syntype.

LECTOTYPE, by present designation, the male syntype (CAS #5663), labelled "Pac Gr Cal/30 Oct 1906" and "Tipula/asper-sus/Doane/'11." The lectotype lacks the apex of the left antenna and all legs from the left side (but one leg is loose in the tray with the specimen).

Alexander (1967: 215, fig. 197) showed the ninth abdominal tergum with rather broad apical lobes tipped with numerous black denticles - the appearance of the tergum when cleared and slide-mounted. In the dried lectotype, the lobes are slender, with divergent tips, the denticles on the lower surfaces and not visible from above. Figure 31 shows these differences as well as the characteristic pattern of distribution of the short hairs of the tergum. The posterior aspect of the hypopygium (fig. 32) may add somewhat to understanding the complex dististyles (cf. Alexander's fig. 197).

There is in the Doane collection (CAS) a female that was pinned next to the lectotype until E. S. Ross in 1946 segregated the types. It may be the female syntype but is labelled "Corte Madera Cr., Cal., 10-22-1907," which differs from the published type locality.

Tipula atrisumma Doane, 1912: 42-43.

Present status: *Tipula (Lunatipula) atrisumma* Doane.

Species based on 11♂, 5♀ from San Diego (San Diego Co.), California. CAS collection: 5♂, 5♀ syntypes.

LECTOTYPE, by present designation, a male syntype (CAS #5649), labelled "San Diego/Cal."; "Type" and "Tipula/atrasumma/Doane/1911." The lectotype is intact except for lacking its left hind leg.

Alexander (1967: 40) emended the specific name to *atrasumma*, as it was spelled on the pin label. In my opinion, however, this is an unjustified emendation under the terms of the International Code of Zoological Nomenclature. Further, it seems to me that Doane meant the name to say "black tip," for which *atrisumma* would be a correct term. Figures 33-35 present some aspects of the lectotype not shown by Alexander (1967: 193, fig. 125).

Tipula biarmata Doane, 1912: 55.

Present status: *Tipula (Lunatipula) albofascia* Doane.

Described on the basis of 1♂ from Keyport (Kitsap Co.), Washington. CAS collection: the holotype.

HOLOTYPE, male (CAS #5669), labelled "Keyport Wash/July 1905 RWD"; "Type" and "Tipula/biarmata/Doane/11." The apex of the right wing and both front and middle legs are missing from the holotype.

The illustration by Alexander (1967: 191, fig. 121) portrays the ninth abdominal tergum in a composite of dorsal and ventral aspects, and the processes of the inner dististyle somewhat out of their natural positional relationships, probably as a result of use of a slide-mounted specimen. Since this species (*T. albofascia*) is very similar to *T. bifalcata* in many details, I have provided sketches of taxonomically useful aspects of the hypopygium (figs. 36-39) for comparison with Alexander's illustrations of *T. bifalcata*.

Tipula bifalcata Doane, 1912: 55.

Present status: *Tipula (Lunatipula) bifalcata* Doane.

Described from a single male taken at San Diego (San Diego Co.), California. CAS collection: the holotype.

HOLOTYPE, male (CAS #5668), labelled "San Diego/Cal."; "Type" and "Tipula/bifalcata/Doane/'11." The holotype lacks its abdomen beyond the third segment and all its legs except the left hind one. It has little taxonomic usefulness, but in those characteristics that can be compared it seems to agree with Alexander's (1967: 34, 191, fig. 122) identification of the species.

Tipula bisetosa Doane, 1901: 111-112.

Present status: *Tipula (Lunatipula) bisetosa bisetosa* Doane.

Description based on 19♂, 14♀ syntypes from Pullman, Washington, and 2♂ syntypes from Collins, Idaho. CAS collection: 1♂, 1♀ syntypes from Pullman. In the WSU collection are 3♂, 2♀ and 2 syntypes without abdomen.

Tipula bituberculata Doane, 1901: 101.

Present status: *Tipula (Trichotipula) bituberculata* Doane.

Species described from 2♂, 1♀ from an unstated locality in California. The WSU collection has 1♂ syntype. CAS collection: 2♂, labelled "San Diego, Cal." and "Probable/Paratype/bituberculata." Since the WSU syntype bears the type number assigned by Doane (#153), it is clear that not both males in the CAS collection are syntypes, unless Doane had more specimens than he indicated in the description.

Tipula biuncus Doane, 1912: 58.

Present status: *Tipula (Lunatipula) biuncus* Doane.

The species was described on the basis of 1♂, 1♀ from an unspecified locality in southern California. CAS collection: both syntypes.

LECTOTYPE, by present designation, the male syntype (CAS #5673), labelled "S. Cala."; "C. U. Lot 35"; below this a blank slip of bluish paper; "Type" and "Tipula/biuncus/Doane/'11." The lectotype lacks the front and hind legs on both sides and the apical one-third of the right antennal flagellum.

Alexander (1965: 35) recently catalogued the species under its original name but later (Alexander, 1967: 41) apparently inadvertently spelled the name *biunca*.

To my knowledge, this species has never been illustrated. Accordingly, some taxonomically important details of the lectotype are included here (figs. 40-42). The ninth abdominal tergum (fig. 41) is characterized by two somewhat divergent, blunt, darkened lobes and a U-shaped median notch flanked by thin, nearly transparent marginal blades. Two darkly sclerotized tips, apparently of the adminiculum, project conspicuously backward (fig. 42). These structures, from which Doane derived the specific name, lie in a vertically oriented fork that seems to be another apex of the adminiculum (fig. 40).

Tipula californica Doane, 1912: 49.

Present status: *Tipula (Triplimitipula) doaneiana* Alexander. The specific name *californica* is preoccupied in *Tipula* by *californica* Doane, 1908 (described as a *Pachyrhina*).

Described on the basis of 2♂ specimens from Palo Alto (Santa Clara Co.), California. CAS collection: both syntypes.

LECTOTYPE, by present designation, a male syntype (CAS #5660), labelled "Palo Alto, Cal./2 Apr. '92" (or possibly '97, the year pencilled over a printed '93) and "Tipula/californica/Doane/1911." The specimen lacks all right legs, left middle and hind legs, and knob of the right haltere. The paralectotype lacks its terminal abdominal segments; it is more distinctly dated 14 Apr. '92 (over '93).

Large spines on abdominal sternum 8 shown by Alexander (1967: 223, fig. 229) are not visible in the types, probably being concealed by dense hairs. Also concealed in my drawing (fig. 44) is the apex of the adminiculum ("phallosome"), which in the lectotype has the membranous tenth segment resting upon it. A hypopygial character not mentioned by earlier authors is a broad, thick, transverse flange on the lower ninth sternum (figs. 43, 44). Against the posterior

face of this flange, on each side, hangs a brush of fine, coiled golden hairs.

Tipula carinata Doane, 1901: 103-104.

Present status: *Tipula (Platytipula) carinata* Doane.

Species based on 45♂, 12♀ syntypes from Pullman (Whitman Co.), Washington. CAS collection: 1♂, 1♀ syntypes. There are 12♂, 2♀ remaining in the WSU collection.

Tipula cognata Doane, 1901: 123-124.

Present status: *Tipula (Yamatotipula) cognata* Doane.

Described from 6♀ syntypes from Seattle and Olympia, Washington, and Moscow Mountain (near Moscow), Idaho. It appears to have been Doane's intent to restrict the type locality to Olympia (Thurston Co.), Washington. CAS collection: one of 5♂ that Doane only tentatively assigned to this species, thus not technically a syntype, although it was before Doane when he described *T. cognata*.

Tipula coloradensis Doane, 1911: 164-165.

Present status: *Tipula (Beringotipula) coloradensis* Doane.

The original description was based on 1♂, 3♀ from Tabernash (Grand Co.), Colorado. CAS collection: all four syntypes, as well as 1♂ with same locality and date labels but technically not part of the type series.

LECTOTYPE, by present designation, the male syntype (CAS #5646), labelled "Tabernash,/Col. Aug./E. S. Tucker"; "L. S. Jr. U./Lot 492/Sub. 6"; "Hypo in/vial"; "Type" and "Tipula/coloradensis/Doane/1911." This specimen lacks the apical one-third of the abdomen, the right haltere, and all legs except the left hind femur. It appears that Doane removed the hypopygium, but this can no longer be found. The second male in the CAS collection is a topotype, bearing the first two labels listed for the lectotype. On the basis of this more intact male (figs. 46-50), I judge that *Tipula fundata* Alexander (1945: 407), listed by Alexander (1965: 32) as a synonym of *T. coloradensis*, is a valid species. There are clear differences in the shape of the apex of the ninth abdominal tergum, the gonapophyses, and especially the inner dististyles.

Tipula cylindrata Doane, 1912: 46.

Present status: *Tipula (Serratipula) cylindrata* Doane.

The species was described on the basis of 3♂ from San Diego (San Diego Co.), California. CAS collection: 3♂ syntypes.

LECTOTYPE, by present designation, a male syntype (CAS #5655), labelled "San Diego/Cal."; "Type" and "Tipula/cylindrata/Doane/1911." The lectotype lacks its left front and middle legs and right hind leg, has some psocid or dermestid damage to the thorax, and had the right wing almost torn off near the base (the last now repaired). One of the paralectotypes is in slightly better condition than the lectotype but is not labelled "Type."

A characteristic of this species not mentioned in existing descriptions is the arrangement of hairs on the terminal abdominal segments. On the ninth tergum and sternum and most of the eighth sternum there is a covering of fine hairs bent cephalad at their bases and closely appressed to the surface. These hairs are of such fineness, density and nearly parallel arrangement as to give to the surface a look of brushed satin. Scattered among them are larger hairs, more erect yet still inclined cephalad (contrast my figs. 51, 53 and fig. 190 of Alexander, 1967). In the types, the posterior margin of the ninth tergum is glabrous, and the lateral lobes are not distinctly truncate (cf. Alexander, 1967: 213, fig. 190). The ninth sternum is deeply cleft, nearly to the posterior margin of the eighth sternum, which is unmodified (fig. 52).

Tipula derbyi Doane, 1912: 47-48.

Present status: *Tipula (Hesperotipula) derbyi* Doane.

Original description based on "many males, 6 females," all from Stanford University (then Palo Alto, Santa Clara Co.), California. CAS collection: 110♂, 39♀ having label data suggesting they might belong to the type series, as discussed below. From these, 107♂ and 6♀ are selected, on the basis of condition, to comprise the syntypic series.

LECTOTYPE, by present designation, a male syntype (CAS #5658), labelled "L. S. Jr. U./Lot 517/Sub 34" and "R. W. Doane/Collection." The male earlier labelled as "Type" is not selected because of its generally poor condition; the lectotype is the best preserved male in the series, taking into consideration easy visibility of the genital structures.

There are three major groups of specimens potentially comprising the type series. One, consisting of 54♂, 12♀, is labelled "Stan U Cal/20 Apr 1908" and "R. W. Doane/Collection." Two females in this group have been labelled "Probable/Paratype/derbyi" by someone on the CAS curatorial staff;

these, therefore, are accepted as two of the six intended female syntypes. The second group comprises 53♂, 22♀, labelled "L. S. Jr. U./Lot 517/Sub 38" and "R. W. Doane/Collection." One male from this group bears the "Type" label and Doane's identification label. From this group I have selected the two females in best condition to be part of the syntypic series. The third group, 2♂, 5♀, is labelled "L. S. Jr. U./Lot 517/Sub 34" and "R. W. Doane/Collection." One female in this group bears Doane's pencilled "Type" label (as on the male mentioned); it and the best remaining female in the group are accepted as the last two female syntypes, completing the six. There seems to be no reason to reject any of the males in these groups from syntypic status, except perhaps that some are no longer taxonomically useful specimens. Accordingly, 106 of them are regarded as paralectotypes.

Alexander (1967: 185, fig. 102) illustrated the complicated inner dististyle, eighth sternum and ninth tergum. In my sketch of the lateral aspect of the lectotype (fig. 54), I have omitted the inner dististyle in order to show more clearly the profile of the ninth tergum. The dorsal aspect of the ninth tergum is shown in figure 55.

Tipula dorsolineata Doane, 1901: 98.

Present status: *Tipula (Trichotipula) dorsolineata* Doane.

Based on 5♂, 10♀ syntypes from Pullman, Washington, and 1♀ syntype from Keyport, Washington. Because of his peculiar method of indicating restriction of type locality, Doane's intent has, I think, been mistaken by Alexander (1967: 59), who took the Keyport female to have the status of holotype. By comparison of locality data for *T. dorsolineata* with those for *T. illustris* on the same page, one sees that the word "Type" follows the intended typical locality designation. Moreover, Doane regularly selected a male as "Type" (or so labelled the specimens) unless he had only females before him. CAS collection: 1♂ (without abdomen), 1♀ fairly intact, and 1♀ without abdomen, all from Pullman, Washington. In the WSU collection are 2♂, 1♀ syntypes, all from Pullman.

Tipula flavicoma Doane, 1912: 57.

Present status: *Tipula (Lunatipula) incisa incisa* Doane.

Described from a single male from Montana, without further locality data. CAS collection: the holotype.

HOLOTYPE, male (CAS #5672), labelled "Montana/C. U. Lot 35"; a blank slip of bluish paper; "Type" and "Tipula/flavicomā/Doane/'11." The specimen lacks its right wing and apex of the left wing (beyond stigma and cell 1st M₂) and all legs

except the left hind one.

Tipula incisa is a widespread western species. The typical subspecies was described from Washington by Doane in 1901. It occurs also in British Columbia and Montana. Other subspecies are recognized from New Mexico, Arizona, Kansas and Oklahoma, and as far east as Ohio (Alexander, 1965: 36).

Some details of the hypopygium of the holotype of *T. flavicomma* are shown in figures 56-58.

Tipula flavocauda Doane, 1912: 60.

Present status: *Tipula (Lunatipula) flavocauda* Doane.

Description based on 3♂, 3♀, said in the original description to be from San Diego, California, but labelled "Arizona." CAS collection: 3♂, 2♀ syntypes.

LECTOTYPE, by present designation, a male syntype (CAS #5677), labelled "Arizona/C. U. Lot 35."; "111"; a blank slip of bluish paper; "Type" and "Tipula/flavocauda/Doane/1911." The specimen lacks the right front and middle legs, left middle leg, and knob of right haltere.

Tipula (L.) flavocauda has been recorded three times from San Bernardino Co., California (Alexander, 1967: 42), so it may actually occur at or near the erroneously published type locality. Alexander (1965: 36; 1967) listed *T. buenoi* as a synonym of *T. flavocauda*. Although this seems probable, I note differences especially in the ninth abdominal tergum and sternum between the lectotype of *T. flavocauda* (figs. 59-62) and the specimen of *T. buenoi* illustrated by Alexander (1946: 500, fig. 4).

Tipula flavomarginata Doane, 1912: 46-47.

Present status: *Tipula (Lunatipula) flavomarginata* Doane.

Described from 8♂ from San Diego (San Diego Co.), California. CAS collection: 2♂ syntypes.

LECTOTYPE, by present designation, a male syntype (CAS #5656), labelled "San Diego/Cal."; "R. W. Doane/Collection" and "Probable/Paratype/flavomarginata." This male lacks the left middle leg, right front and middle legs, and most of the left and half of the right antennal flagella. Another male is labelled "Type" but is not made lectotype because it is even more damaged and because the genital segments are not in taxonomically useful condition.

Since the illustration of the ninth abdominal tergum given by Alexander (1967: 195, fig. 133) is a composite of dorsal and ventral aspects, I have provided a dorsal view of this sclerite in the lectotype (fig. 64). The lateral aspect (fig. 63) shows some taxonomically useful details of the

ninth sternum, as well as the length of the ventral projections from the ninth tergum.

Tipula fulvinodus Doane, 1912: 45.

Present status: *Tipula (Lunatipula) fulvinodus* Doane.

Species described from a single male from Grand Coulee (Grant Co.), Washington. CAS collection: the holotype.

HOLOTYPE, male (CAS #5653), labelled "Grand Coulee, Wash/Foster Coulee./24. June '02"; "Type" and "Tipula/fulvinodus/Doane/'11." Body and wings of the holotype are intact, but the right front, left middle and both hind legs are missing.

This species will not be identified as a *Lunatipula* by existing keys because it lacks the tuft of small setae on the squama of the wing, as noted by Alexander (1948: 283). In other respects, though, it appears to belong to that subgenus.

Some details of the hypopygium of the holotype are shown in figures 65 and 66.

Tipula fumosa Doane, 1901: 99-100.

Present status: *Tipula (Yamatotipula) dejecta* Walker.

This species was based on 7♂, 1♀ syntypes from Columbus (Franklin Co.), Ohio. CAS collection: 2♂ syntypes, one of them without abdomen. There is 1♂ syntype in the WSU collection.

Tipula illustris Doane, 1901: 97-98.

Present status: *Tipula (Angarotipula) illustris* Doane.

Described on the basis of 7♂ syntypes from Idaho, Washington, and Michigan. Doane apparently intended to restrict the type locality to St. Anthony (Fremont Co.), Idaho. CAS collection: 1♂ syntype, without abdomen, from Olympia, Washington. Three males remain in the WSU collection.

Tipula impudica Doane, 1901: 104.

Present status: *Tipula (Lunatipula) impudica* Doane.

Based on 5♂, 1♀ syntypes from various localities in Washington, the restricted type locality being Wawawai, Whitman Co. CAS collection: 1♂ syntype from Almota, Washington, and 1♂, 1♀ syntypes from Pullman, Washington. Two additional males are in the WSU collection.

Tipula incisa Doane, 1901: 118.

Present status: *Tipula (Lunatipula) incisa incisa* Doane.

Based on 4♂, 1♀ syntypes from Wawawai and 2♀ syntypes from Pullman (all Whitman Co.), Washington. CAS collection: 1♂ syntype from Wawawai, without its abdomen. There are 2♂, 2♀ in the WSU collection. Doane also described this species as *T. flavicomis*; see under that name, above.

Tipula incurva Doane, 1912: 43.

Present status: *Tipula (Pterelachisus) incurva* Doane.

The species was described from one male specimen from an unspecified locality in Nebraska. CAS collection: the holotype.

HOLOTYPE, male (CAS #5650), labelled "Nebraska"; "V 24 01"; "Hypo in/vial"; "Type" and "Tipula/incurva/Doane/'11." It lacks the abdomen, all legs, left antennal flagellum and right haltere.

Alexander (1965: 33) supposed *T. incurva* might be a synonym of *T. angulata* Loew, but this seems unlikely to me. Although the holotype is in rather dilapidated condition, it can be placed with confidence in the *trivittata* group of subgenus *Pterelachisus*. Of particular significance is the absence of the nasus, a characteristic not noted by Doane. I think *T. incurva* may be a western Nebraska species.

The right wing of the holotype is shown in figure 67.

Tipula lamellata Doane, 1901: 105-106.

Present status: *Tipula (Lunatipula) lamellata* Doane.

Description based on 5♂, 1♀ syntypes from Pullman (Whitman Co.), Washington. CAS collection: 3♂ syntypes, two of them without abdomen. The remaining 2♂, 1♀ syntypes are in the WSU collection.

Tipula madera Doane, 1911: 162-163.

Present status: *Tipula (Beringotipula) madera* Doane.

Species described on the basis of 4♂, 2♀ from Stanford University and vicinity (Santa Clara Co.), California. CAS collection: 3♂, 2♀ syntypes.

LECTOTYPE, by present designation, a male syntype (CAS #5644), labelled "Stan U Cal/28 May 1908"; "R. W. Doane/Collection" and "Tipula/madera/Doane/'11." The lectotype lacks all its legs except the right hind one and has the right antennal flagellum broken near mid-length but adhered to the left flagellum. Otherwise it is in good condition.

Another male, from Corte Madera Creek, near the Stanford campus, has been labelled "Type" but is not selected as lectotype because it lacks the terminal abdominal segments and thus is of limited taxonomic utility.

Alexander (1967: 179, fig. 78) gives a composite dorsal-ventral illustration of the ninth abdominal tergum. The median-apical process of this tergum is best seen in posterodorsal aspect (fig. 69). Figures 68 and 70 present further details of the hypopygium of the lectotype.

Tipula marina Doane, 1912: 44-45.

Present status: *Tipula (Serratipula) marina* Doane.

Described from 3♂ syntypes from Palo Alto (Santa Clara Co.), California. CAS collection: 2♂ syntypes.

LECTOTYPE, by present designation, a male syntype (CAS #5652), labelled "Salt Marshes/Palo Alto Cal/ 3/22 1906"; "R. W. Doane/Collector"; "Type" and "Tipula/marina/Doane/'11." This specimen is intact except for the lack of its right hind leg.

The median tuft of hairs on the posterior margin of the eighth abdominal sternum, illustrated by Alexander (1967: 213, fig. 192), is not evident on the lectotype. Also, the posterolateral corners of the ninth tergum in the lectotype (fig. 72) are more rounded than shown by Alexander, and the inner dististyle (fig. 71) is of a somewhat different appearance, in part due to the fact that the abundant hairs of its dorsal and mesal surfaces are virtually recumbent, rather than erect as shown by him.

Tipula meridiana Doane, 1912: 58.

Present status: *Tipula (Yamatotipula) meridiana meridiana* Doane.

Described on the basis of a single male from Arizona, without more detailed locality. CAS collection: the holotype.

HOLOTYPE, male (CAS #5674), labelled "Arizona/C. U. Lot 35."; a small bluish tag without inscription; "Type" and "Tipula/meridiana/Doane/'11." This specimen lacks all legs except part of the right front femur, but one leg is glued to the pin-label. Both antennae are broken off at the base.

Alexander (1965: 28) lists the range of this form as Arizona, California and Utah, the California record being from Monterey Co. (Alexander, 1967: 69). The range of subspecies *continentalis* is given as Alaska to California and Colorado, with records from many parts of California. Thus, the ranges of these two nominal subspecies overlap broadly. As I am at present unaware of all the evidence, I am

following Alexander's placement of the two forms. Since the evidence from ranges clashes with my concept of subspecies, however, it seems to me that subspecific rank might have been assigned on the basis of degree of difference and that *T. meridiana* Doane and *T. continentalis* Alexander are more likely similar but different species.

In the holotype, the ninth abdominal tergum (figs. 74, 75) is less widely cleft and its apical lobes less covered with blackened denticles than shown by Alexander (1967: 229, fig. 245). There is a conspicuous projection between abdominal sterna 8 and 9 (fig. 73).

Tipula newcomeri Doane, 1911: 163-164.

Present status: *Tipula (Beringotipula) newcomeri* Doane.

Original description based on 4♂, 4♀ from Deer Park (Placer Co.), California. CAS collection: 4♂, 4♀ syntypes, as well as four additional specimens with label data that indicate they were collected together with the types.

LECTOTYPE, by present designation, a male syntype (CAS #5645), labelled "Deer Park/Placer Co./Cal./El. 6500/Jun. 25 '08"; "Type" and "Tipula/newcomeri/Doane." The lectotype is generally intact, but the right front and hind legs and left middle leg are missing, as well as the apical two-thirds of the right antennal flagellum.

This seems to differ from the species illustrated as *T. newcomeri* by Alexander (1967: 24, 178, fig. 81). The pendulous lobe of the inner dististyle more nearly resembles that shown by Alexander (1967: 178, fig. 76) for *T. fallax*, which is otherwise quite different in structure. The gonapophyses of the lectotype and male paralectotype (fig. 77) are as shown by Alexander for *T. newcomeri*, but there are conspicuous differences in the shapes of the outer dististyle and apical armature of the ninth abdominal tergum (cf. my figs. 76, 78, 79).

Although there are 6♂, 5♀ and one broken specimen from Deer Park (June and July, 1908 and 1909) in the Doane collection, and I can see no reason to exclude any of them from the type series, I have selected the 4♂ and 4♀ in best condition to reconstitute the described series of eight individuals.

Tipula nigrocorporis Doane, 1912: 45.

Present status: *Tipula (Vestiplex) nigrocorporis* Doane.

Described on the basis of one male from Estes Park (Larimer Co.), Colorado. CAS collection: the holotype.

HOLOTYPE, male (CAS #5654), labelled "Estes Park/August '92/F. H. Snow"; "27" (in red ink); "Type"; "Tipula n sp./

goes to *serta* Lw. but/color etc not right" and "Tipula/nigro-corporis/Doane/1911." The holotype lacks all its legs, but part of one is glued to the upper pin-label. The specimen is otherwise generally intact.

The coloration of this species is striking: head, thorax and first abdominal segment are blackish brown to black, with areas of silver-gray pollinosity. The rest of the abdomen is nearly orange (Doane called it brownish yellow), with brownish lateral margins on the terga. The ninth tergum (fig. 81) bears an irregular transverse ridge near mid-length and has the unevenly rounded lateral lobes transversely grooved posteriorly; its postero-median area merges with the dorsum of the membranous tenth segment (proctiger). Most of the antennal flagellomeres are deeply indented ventrally, with a thick ventral lobe just beyond the base (fig. 80).

Tipula occidentalis Doane, 1912: 59-60.

Present status: *Tipula* (*Triplicitipula*) *praecisa* Loew. New synonymy.

Description based on 6♂ specimens from San Diego (San Diego Co.), California. CAS collection: 6♂ syntypes.

LECTOTYPE, by present designation, a male syntype (CAS #5676), labelled "San Diego/Cal."; "Type" and "Tipula/occidentalis/Doane/1911." The lectotype has all legs except the right middle one missing but is otherwise in good condition.

Alexander (1967: 64) considered *T. occidentalis* "very close to *praecisa* Loew" and thought the two "may prove to be synonymous." It is, in fact, curious that Doane described this species since in his collection are several specimens identified by him as *T. praecisa* Loew that are clearly the same as his *T. occidentalis*. I have compared my notes and sketches (figs. 82-84) of the lectotype of *T. occidentalis* with the somewhat larger male syntype of *T. praecisa* Loew, and in my opinion both specimens represent the same species.

In the CAS collection are 7♂ specimens with label data (place) same as on the lectotype. Five of these have been labelled "Probable/Paratype/occidentalis." These are accepted as the five besides the lectotype that comprise the described type series, though there seems no particular reason to exclude any of the seven.

Tipula pacifica Doane, 1912: 48-49.

Present status: *Tipula* (*Sinotipula*) *pacifica* Doane.

The original description was based on 3♂, 2♀ from Deer Park, Placer Co., California, and 1♀ from Keyport (Kitsap Co.), Washington. CAS collection: 1♂, 2♀ syntypes from

Placer Co., California, and 1♀ from Keyport, Washington. Doane recorded the California specimens as "Types," restricting the type locality, but the Washington female has syntypic status.

LECTOTYPE, by present designation, the remaining male syntype (CAS #5659), labelled "Deerpark/Placer Co./El. 6500 Cal./Aug. 1, 1908"; "Type" and "Tipula/pacifica/Doane/1911." The specimen lacks its right front and middle legs and has the right rear leg broken off and reattached with glue. A female labelled the same as the lectotype for locality and date is also labelled "type ♀" in Doane's writing. The second female from California is labelled only "Placer Co./VII-29-09/El. 8500 ft." and not Deer Park.

Although existing illustrations of this species (Alexander, 1967, figs. 203-205) are generally accurate, certain additional details from the lectotype may be seen in my figures 85 and 86.

Tipula planicornis Doane, 1912: 52-53 (as *planicornia*).

Present status: *Tipula (Triplitipula) planicornis* Doane.

The type series consisted of 20♂, 8♀ from San Diego (San Diego Co.), California. CAS collection: 12♂, 2♀ syntypes.

LECTOTYPE, by present designation, a male syntype (CAS #5664), labelled "San Diego/Cal."; "R. W. Doane/Collection" and "T. planicornis/D" (in Doane's pencilled writing). The lectotype is intact except for the lack of its right front leg.

The original spelling, *planicornia*, is improperly formed, and the emendation by Alexander (1967) seems justified under Article 33 of the International Code of Zoological Nomenclature. It seems also from the manuscript identification label that *planicornis* was the name Doane intended. Only two specimens in the type series bear name labels in Doane's writing, and on both labels the termination of the specific name is "-is."

The similarity in hypopygial structure between *T. planicornis* (Figs. 87-89) and *T. vestigipennis* (Figs. 116-117) is striking, but so is the difference in wing development. See comments under *T. vestigipennis*.

Tipula pyramis Doane, 1912: 53.

Present status: *Tipula (Eremotipula) pellucida* Doane. Alexander (1965: 38) stated this synonymy but subsequently (1967: 26) apparently inadvertently omitted it. It seems to me correct, on the basis of published figures of *T. pellucida*, although I have not seen the type of *T. pellucida* (new name

by Doane, 1912, for *T. clara* Doane, 1901, preoccupied by *T. clara* Kirby, 1884).

Tipula pyramis was described on the basis of 7♂ syntypes from Pyramid Lake (Washoe Co.), Nevada. CAS collection: 5♂ syntypes.

LECTOTYPE, by present designation, a male syntype (CAS #5665), labelled "Pyramid Lake/Nev. June 1911"; "Coll. E. J. Newcomer"; "R. W. Doane/Collection" and "Probable/Paratype/pyramis." This specimen (figs. 90-92) is intact except for the loss of its left hind leg and minor repair to the right front leg. The right haltere is glued to the upper pin-label. Originally another male syntype was labelled "Type" but is not selected as lectotype because its hypopygium has been removed and lost, and there is damage to the legs and one wing.

Tipula quaylii Doane, 1909: 18-19.

Present status: *Tipula (Triplicitipula) quaylii* Doane.

The type series was stated to comprise 15♂, 2♀ from Yuba City (Sutter Co.), California. CAS collection: 11♂, 1♀ specimens judged to be most of the original series, for reasons given below.

LECTOTYPE, by present designation, a male (CAS #12074), labelled "L. S. Jr. U./Lot 517 Sub 36"; "R. W. Doane/Collection" and "Probable/Paratype/quaylii." This individual is intact except for missing its left middle leg. The left hind leg is glued to the first label. The entire series of 11♂, 1♀ bear the Leland Stanford Jr. University, Lot 517, Sublot 36 label. Another male is also labelled "Probable/Paratype/quaylii" and one other male is labelled "*T. quaylii*/Yuba Co." Note the variant spelling of the specific name and the locality, just east of Sutter Co. I have made several inquiries to determine if there is any key or catalogue by which the Stanford University lot numbers might be identified, but to date I have had no success in this. The types of *T. quaylii* should be in Doane's Stanford collection, and I am assuming that the series discussed here are the types, subplot 36 referring to Quayle's collection from Yuba City (or Yuba County).

In this small, brownish gray *Tipula* the wings are shorter than the halteres (figs. 95-96). The ninth tergum and some other parts of the abdomen (figs. 93-94) are covered with fine, pale, appressed hairs that give them a satin-like lustre.

Tipula retusa Doane, 1901: 109.

Present status: *Tipula (Lunatipula) retusa* Doane.

Described from 10♂, 4♀ syntypes from various localities in Washington. CAS collection: 1♂ syntype from Wawawai, 24 April 1897, and 1♀ syntype from Seattle, without date. Remaining in the WSU collection are 2♂, 3♀ syntypes and one broken specimen that is probably a syntype.

Tipula rohweri Doane, 1911: 165.

Present status: *Tipula (Beringotipula) rohweri* Doane.

Described from 3♂, 1♀ syntypes from Florissant (Teller Co.), Colorado, and 2♂, 3♀ from Big Horn County, Wyoming. CAS collection: 2♂, 1♀ syntypes from Florissant and 1♂, 1♀ syntypes from Big Horn County.

LECTOTYPE, by present designation, a male syntype (CAS #5647), labelled "Florissant/Colo. July/26 (Ckll.)"; "in marsh"; "Type" and "Tipula/rohweri/Doane/1911." The apical half of the abdomen is missing from the lectotype, as well as the apical half of each antennal flagellum, the right hind leg and left middle and hind legs. The right wing has been removed to a card that accompanies the lectotype, and there is one leg loose in the tray beside the type. The second male from Florissant is damaged even more and is not of much taxonomic use. Only the male from Big Horn Co., Wyoming, has the genital segments intact. Doane indicated that Florissant, Colorado, was the type locality, but since he seems to have had a good eye for structural details, I think we can accept the Wyoming male (figs. 97-99) as representative of the species. Although the Colorado and Wyoming localities are separated by nearly 400 miles, the respective specimens seem to be conspecific with regard to characters that can be compared.

Tipula (B.) monoana Alexander seems to differ only slightly from *T. rohweri* in structure of the hypopygium.

Tipula rupicola Doane, 1912: 50.

Present status: *Tipula (Bellardina) rupicola* Doane.

Described from a single male taken in Oak Creek Canyon (Coconino Co.), Arizona. CAS collection: the holotype.

HOLOTYPE, male (CAS #5661), labelled "Oak Creek Canon/ Ariz. 6000 ft. Aug/F. H. Snow"; "57" (in red ink) and "Tipula/rupicola/Doane/'11." The apex of the abdomen has been cut off at the fifth segment, and the specimen lacks the right wing, left hind leg and right front and middle legs.

Since the radial sector is slightly longer than the m-cu

cross-vein, this individual would run to subgenus *Sinotipula* by existing keys. Doane described in considerable detail the hypopygium that is now missing.

Tipula rusticola Doane, 1912: 47.

Present status: *Tipula (Setitipula) rusticola* Doane.

This species was based on 2♂ specimens from Keyport (Kitsap Co.), Washington. CAS collection: both syntypes.

LECTOTYPE, by present designation, a male syntype (CAS #5657), labelled "Keyport Wash/July 1905 RWD"; "Type" and "Tipula/rusticola/Doane/1911." The lectotype lacks right middle leg and both hind legs and has a 2-3 mm section of the costa of the right wing, just before the stigma, missing. But it is generally in good condition. The other male lacks the apical portion of its abdomen.

The ninth abdominal tergum (fig. 100) has notched outer lobes and a shallow median depression without hairs. The complexity of the inner dististyles is shown better by Alexander (1967: 213, fig. 195) than by my figure 101, yet the latter shows the conspicuous lateral projection from the posterior portion of the dististyle. The gonapophyses are fringed with large, flattened setae (fig. 101), and there is a whitish median zone extending from the bases of the gonapophyses to the unmodified posterior edge of the eighth sternum, which is also whitish.

Tipula silvestra Doane, 1909: 18.

Present status: *Tipula (Triplimitipula) silvestra* Doane.

Described from 2♀ specimens taken at Pacific Grove (Monterey Co.) and 1♀ from Stanford University (Santa Clara Co.), California. CAS collection: both syntypes from Pacific Grove.

LECTOTYPE, by present designation, a female syntype (CAS #12075), labelled "III-29-08/Pac. Grove,/Cal." and "R. W. Doane/Collection." The lectotype lacks all legs on the left side and the right hind leg but is otherwise intact.

Although not bearing any earlier type labels, these two females from Doane's collection are regarded as two of the three syntypes. Their label data are correct. No other specimens are present in the Doane collection.

The structure of the ovipositor seems taxonomically helpful, the eighth sternum especially being long, its hypovalves increasing slightly in width toward the tip and being nearly truncate at apex (fig. 102). The tenth tergum, separated from the cerci by an extensive membranous region, is transversely grooved near its posterior end and is 1.45 times as long as the cerci. Including the hypovalves, the eighth sternum is 3.0 times as long as the cerci (all measurements

are greatest length, lateral aspect).

Doane described the male of this species as *Tipula ungu-lata* (which see, below).

Tipula simplex Doane, 1901: 103.

Present status: *Tipula (Triplimitipula) simplex* Doane.

Based on 2♂ syntypes taken at Palo Alto (Santa Clara Co.), California, and stated by Doane to be in the WSU collection. There are no type specimens in the CAS collection (cf. Alexander, 1967: 66), and only one of the syntypes remains in the holdings of WSU. Numerous specimens in the Doane materials in the CAS are either undated or are dated after the species was described.

Tipula spatha Doane, 1912: 59.

Present status: *Tipula (Lunatipula) spatha* Doane.

Species described from one male from an unspecified locality in Arizona. CAS collection: the holotype.

HOLOTYPE, male (CAS #5675), labelled "Arizona/C. U. Lot 35."; a small, blank, bluish tag; "Type" and "Tipula/spatha/Doane/'11." The holotype is intact except for the lack of all legs but the left middle one.

Since, to my knowledge, this species has never before been illustrated, I offer drawings of details of the hypopygium of the holotype (figs. 103-105).

Tipula spectabilis Doane, 1901: 120-121.

Present status: *Tipula (Lunatipula) macrolabis macrolabis* Loew.

Described on the basis of 10♂ syntypes from Collins (Bingham Co.), Idaho. CAS collection: 2♂ syntypes, labelled "Collins, Idaho/27 July, 1898"; "R. W. Doane/Collection" and "Probable/Paratype/spectabilis." Only one male syntype remains in the WSU collection.

Tipula sternata Doane, 1912: 56.

Present status: *Tipula (Lunatipula) sternata* Doane.

Species based on 2♂ from Stanford University (Stanford, Santa Clara Co.), California. CAS collection: one male syntype.

LECTOTYPE, by present designation, the remaining male syntype (CAS #5670), labelled "Stan U Cal/Apr 190-"; "Type" and "Tipula/sternata/Doane/'11." The specimen lacks its

front legs (except part of the left femur), parts of the middle tarsi, and its abdomen, which is broken off at the thorax. It thus has slight taxonomic value; however, the species is readily recognizable. The accompanying illustrations (figs. 106-107), made from a specimen collected in Monterey Co., California, 30 May 1950, by J. Linsdale, are offered to complement those by Alexander (1967: 203, fig. 160).

Tipula streptocera Doane, 1901: 113.

Present status: *Tipula (Hesperotipula) streptocera* Doane.

This species was based on 4♂, 1♀ syntypes from Collins (Bingham Co.), Idaho, and Olympia and Tokeland, Washington. CAS collection: 1♂ (without abdomen) from Collins, Idaho. There is also 1♀ from Collins, Idaho, 27 July 1898. But since the WSU collection has 1♂ and 1♀ from Collins, as well as the males from Olympia and Tokeland, the female in the CAS collection cannot be a syntype, despite the label indicating it was collected the same place and date as the types.

Tipula sulphurea Doane, 1901: 99.

Present status: *Tipula (Yamatotipula) sulphurea sulphurea* Doane.

Based on 16♂, 6♀ syntypes from Battle Creek (Calhoun Co.), Michigan. CAS collection: 1♂, 1♀ syntypes labelled "Battle Creek/Mich." and 1♂, probably a syntype, but without locality label. In the WSU collection, there remain only 2♂ and 1 broken syntypes.

Tipula sylvicola Doane, 1912: 53-54.

Present status: *Tipula (Triplimitipula) sylvicola* Doane.

Description based on 5♂ syntypes from Keyport (Kitsap Co.), Washington, and 1♂ from an unspecified locality in southern California. Doane indicated that the type locality was Keyport. CAS collection: 5♂ syntypes, including the one from California.

LECTOTYPE, by present designation, a male syntype (CAS #5666), labelled "Keyport Wash/July 1905 RWD"; "Type" and "Tipula/sylvicola/Doane/1911." The lectotype is generally intact, lacking only its right front leg.

The syntype from southern California closely resembles *T. williamsii* Doane from the San Francisco Bay area, but *T. williamsii* is more darkly marked and has a somewhat more angular margin to the outer dististyle and paler hairs on the inner, triangular lobe of the eighth abdominal sternum.

The darker markings of *T. williamsii* include especially wider, darker brownish areas at the sides of the abdominal terga. Alexander (1967: 66) regarded *T. sylvicola* as "allied to *aequalis* but may be distinct." Specimens identified as *T. aequalis* Doane in Doane's collection, however, I judge to be very nearly the same as, if not conspecific with, *T. praecisa* Loew, but lacking a distinct dorsal brown stripe on the abdominal terga they will key (Alexander, 1967: 61) to *T. lygropis* Alexander. These specimens are at the same time quite unlike Alexander's (1967: 223, fig. 227) illustration of *T. aequalis* with respect to the form of the ninth abdominal tergum.

Since this species was not illustrated either by Doane (1912) or Alexander (1967), I offer three sketches of hypopygial details based on the lectotype (figs. 108-110).

Tipula tergata Doane, 1912: 56-57.

Present status: *Tipula (Lunatipula) tergata* Doane.

This species was described from two males from Pyramid Lake (Washoe Co.), Nevada, and one male from an unspecified locality in southern California. Doane restricted the type locality to Pyramid Lake. CAS collection: the 2♂ syntypes from Nevada.

LECTOTYPE, by present designation, a male syntype (CAS #5671), labelled "Pyramid Lake/Nev. June 1911"; "R. W. Doane/Collection"; "Probable/Paratype/tergata" and "T. tergata Doane/type removed from/here by E. S. R. 1946." This syntype lacks all legs except part of the right hind femur but is otherwise intact. The other syntype, originally labelled "Type," has had the abdomen removed at the third segment and lacks three of its legs; therefore, it is not selected as lectotype.

The hypopygium of the lectotype differs in several details, notably in the shape of the ninth abdominal tergum, from the only published illustrations of this species (Alexander, 1967: 203, fig. 161). Accordingly, I have illustrated it in lateral aspect (fig. 111) and the ninth tergum in dorsal aspect (fig. 112).

Tipula ungulata Doane, 1912: 54.

Present status: *Tipula (Triplimitipula) silvestra* Doane.

T. ungulata was described on the basis of 16♂, 4♀ syntypes from San Diego (San Diego Co.), California. CAS collection: 9♂, 1♀ syntypes.

LECTOTYPE, by present designation, a male syntype (CAS #5667), labelled "San Diego/Cal."; "Type" and "Tipula/ungulata/Doane/1911." The specimen lacks both front legs but is

otherwise intact.

The illustration by Alexander (1967: 227, fig. 239, as *T. silvestra*) shows the inner dististyle correctly, the ninth tergum apparently in ventral aspect (compare with my fig. 115), but omits the "strongly chitinized, claw-like appendages" of the ninth sternum that give the species its name. These appendages while curved are not sharply tipped, thus perhaps not strictly claw-like; however, they are conspicuous in both the lateral and posterior aspects of the male hypopygium (figs. 113-114).

Tipula unicineta Doane, 1901: 115-116.

Present status: *Tipula (Lunatipula) unicineta* Doane.

Description based on 7♂, 7♀ syntypes from Collins (Bingham Co.), Idaho (restricted type locality); Moscow Mountain, Idaho; Pullman, Washington; and Keyport, Washington. CAS collection: 1♂ syntype from Keyport, Washington. There are 3♂ syntypes and 2 without abdomen in the WSU collection.

Tipula vestigipennis Doane, 1908d: 47.

Present status: *Tipula (Triplicitipula) vestigipennis* Doane.

Described from 4♂, 3♀ from San Francisco (San Francisco Co.), California, and 1♀ from Stanford (Santa Clara Co.), California. CAS collection: 2♂, 3♀ syntypes.

LECTOTYPE, by present designation, a male (CAS #12076), labelled "San Francisco/ 5/7 '07/Williams" (written in pencil); "L. S. Jr. U./Lot 517/Sub 30"; "R. W. Doane/Collection"; "Probable/Paratype/vestigipennis" and "Tipula/vestigipennis/Doane/D." (Note Doane's spelling error.) The lectotype lacks its right wing and right hind leg but is generally intact.

This species is structurally very similar to *Tipula planicornis* Doane, except that the wings are extremely reduced. (Compare my figs. 116-117 and 87-89.) It is known only from the vicinity of San Francisco Bay, while *T. planicornis* has so far been found only farther south in California. The possibility that these two nominal species are geographic races of a single species needs to be investigated.

Tipula williamsii Doane, 1909: 19.

Present status: *Tipula (Triplicitipula) williamsii* Doane.

In the original description, Doane stated that the type series consisted of 5♂, 6♀ specimens from San Francisco (San

Francisco Co.), California. CAS collection: 5♂, 6♀ specimens judged to be syntypes, as discussed below.

LECTOTYPE, by present designation, a male (CAS #12077), labelled "L. S. Jr. U./Lot 517/Sub 37"; "R. W. Doane/Collection"; "Probable/Paratype/williamsii" and "Tipula/williamsii/Doane/D." This specimen is intact except for lacking its right front and both hind legs.

The CAS collection includes under *T. williamsii* a series of 33♂, 49♀ with identical label data, i.e., subplot 37 of lot 517 in the Stanford University collection. Since the types of *williamsii* should be in the Doane (Stanford) collection and are not known to be elsewhere, I am assuming that they are among this lot. Accordingly, I have selected the 5♂, 6♀ in best condition to make up the type series, and have labelled them appropriately. It seems likely that F. X. Williams gave Doane additional specimens after learning that they represented an undescribed species.

See comments under *Tipula sylvicola*, above.

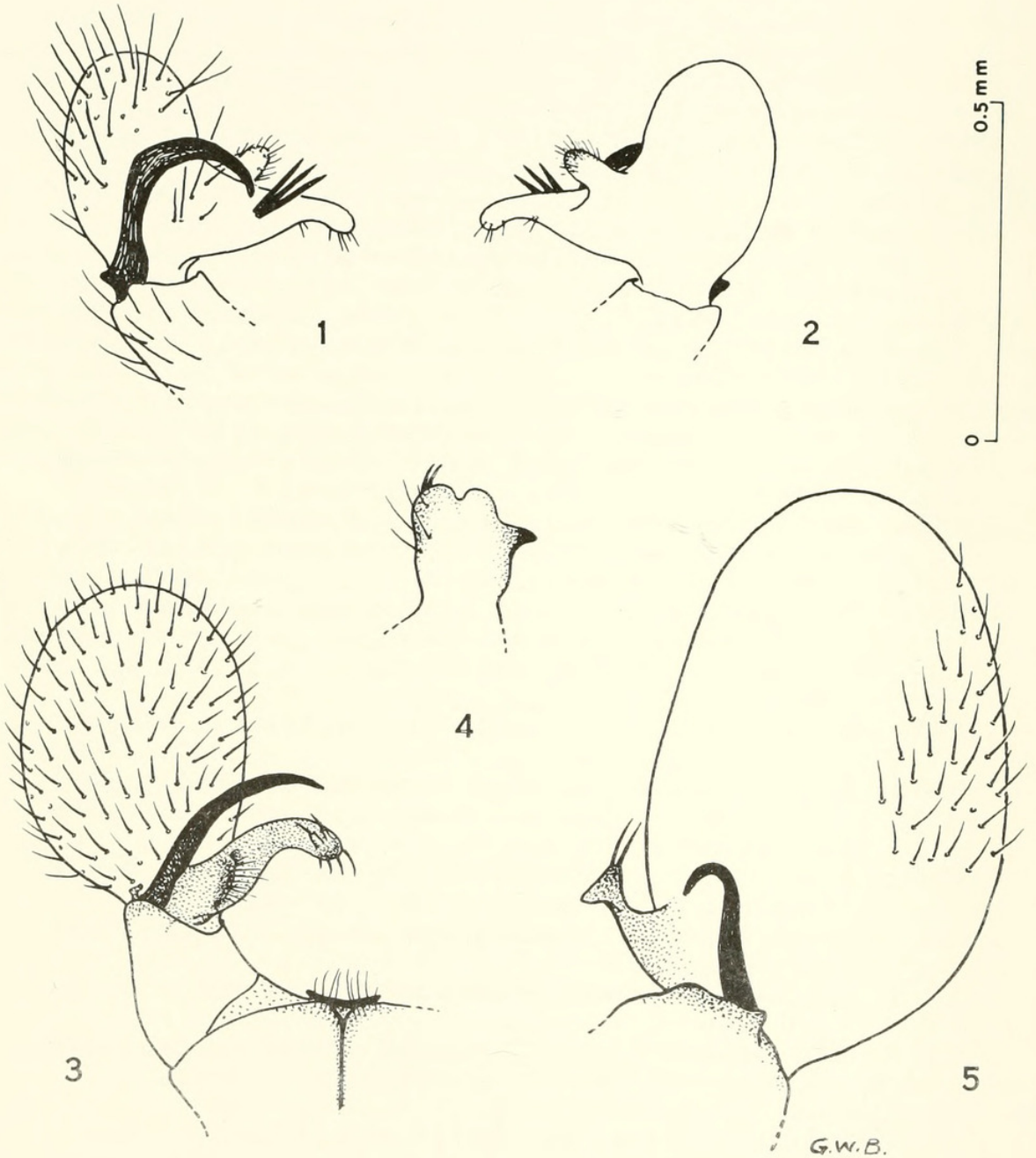
Alexander (1967: 227, fig. 242) illustrated the inner dististyle in apparently somewhat mesal aspect (cf. my fig. 118), and his drawing of the eighth sternum shows the subtriangular median lobe, which is concealed in my figure 120. He also emended the specific name to *williamsii*.

REFERENCES

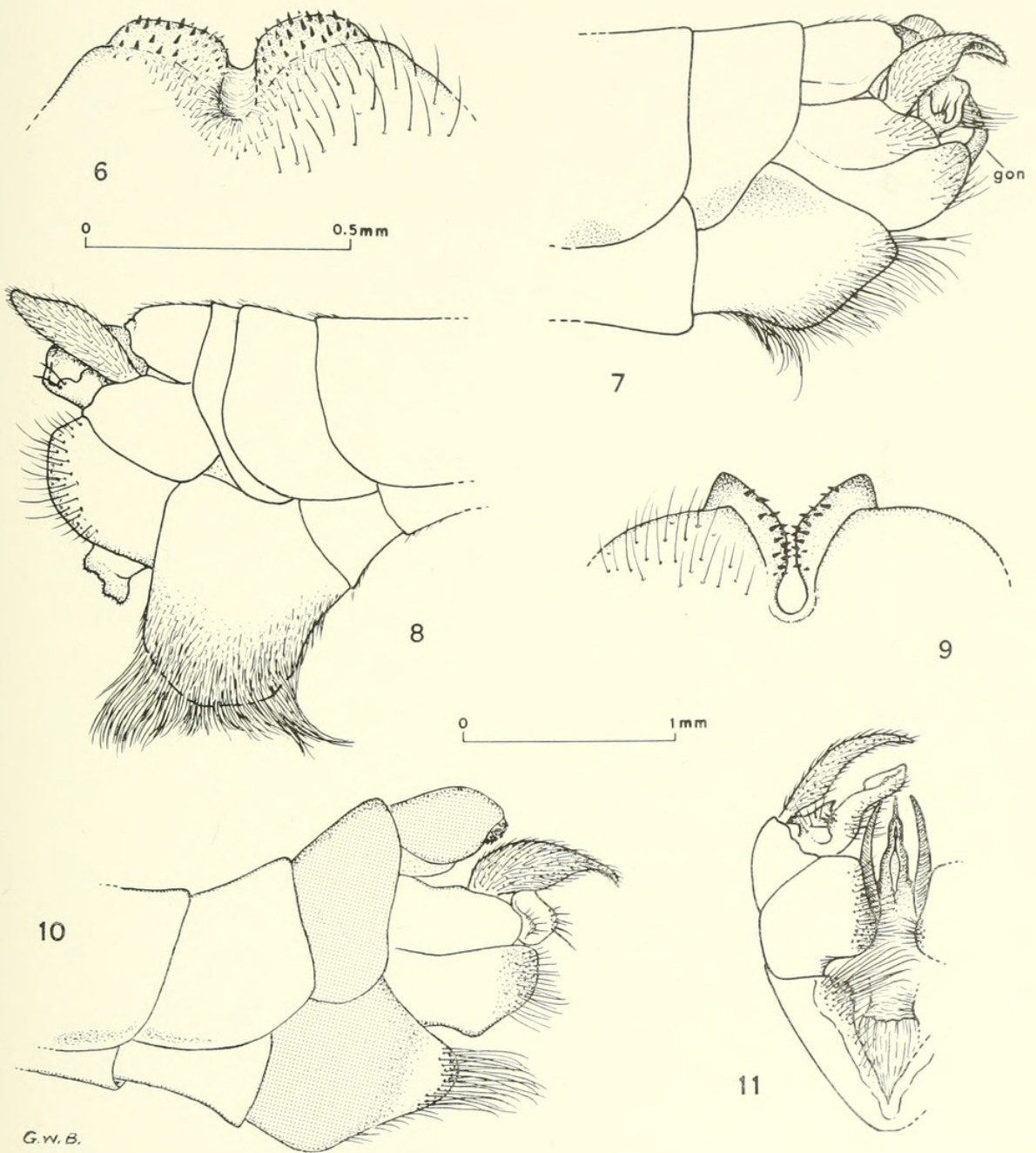
ALEXANDER, C. P.

- 1946. Records and descriptions of North American crane-flies (Diptera). Part VI. Tipuloidea of Arizona, New Mexico and Trans-Pecos Texas, I. American Midland Naturalist, vol. 35, pp. 484-531.
- 1948. Records and descriptions of North American crane-flies (Diptera). Part VII. The Tipuloidea of Utah, I. American Midland Naturalist, vol. 39, pp. 1-82.
- 1949. Records and descriptions of North American crane-flies (Diptera). Part VIII. The Tipuloidea of Washington, I. American Midland Naturalist, vol. 42, pp. 257-333.
- 1959. Undescribed species of crane-flies from the western United States and Canada (Dipt.: Tipulidae). Part XIX. Entomological News, vol. 70, pp. 47-54.
- 1965. Family Tipulidae. Pp. 16-90 in Stone, A. et al., A catalog of the Diptera of America north of Mexico. Agricultural Research Service, United States Department of Agriculture, Handbook No. 276.

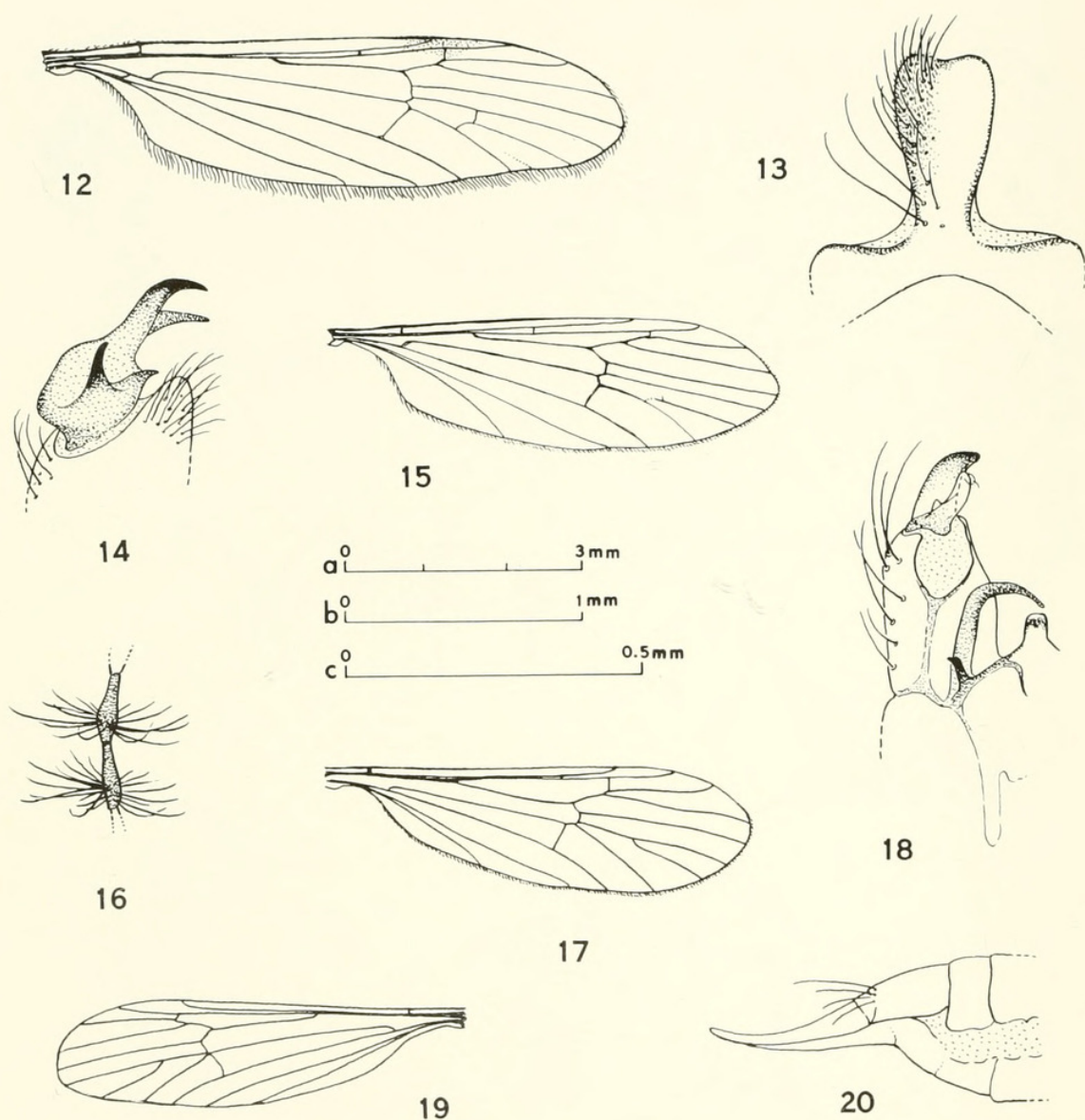
1966. Family Tipulidae. Pp. 196-486 in Crampton, G. C., C. H. Curran and C. P. Alexander, Guide to the insects of Connecticut, Part VI, The Diptera or true flies of Connecticut. First fascicle. Connecticut State Geological and Natural History Survey, Bulletin 64, originally published 1942, reprinted 1966.
1967. The crane flies of California. Bulletin of the California Insect Survey, vol. 8, pp. 1-269.
- DOANE, R. W.
1900. New North American Tipulidae. Journal of the New York Entomological Society, vol. 8, pp. 182-198, plates VII, VIII.
1901. Descriptions of new Tipulidae. Journal of the New York Entomological Society, vol. 9, pp. 97-127.
1907. Notes on the subapterous female of *Tipula simplex* Doane. Entomological News, vol. 18, pp. 15-16.
- 1908a. Notes on the tipulid genus *Dicranomyia*. Entomological News, vol. 19, pp. 5-9.
- 1908b. New North American *Pachyrrhina*, with a table for determining the species. Entomological News, vol. 19, pp. 173-179.
- 1908c. New species of the tipulid genus *Rhypholophus*, with a table for determining the North American species. Entomological News, vol. 19, pp. 200-202.
- 1908d. A new species of *Tipula* with vestigial wings. Psyche, vol. 15, pp. 47-49.
- 1908e. Variations in the wing venation in some Tipulidae. Entomological News, vol. 19, pp. 405-407, plate XVII.
- 1908f. A remarkable outbreak of *Tipula* larvae. Entomological News, vol. 19, pp. 437-438.
1909. More *Tipula* with vestigial wings. Psyche, vol. 16, pp. 17-19.
1911. *Tipula fallax* and others. Psyche, vol. 18, pp. 160-166.
1912. New western *Tipula*. Annals of the Entomological Society of America, vol. 5, pp. 41-61.
- ESSIG, E. O.
1931. A history of entomology. Macmillan Co., New York. 1029 pp.
- OSBORN, H.
1937. Fragments of entomological history. Columbus, Ohio; published by the author.
- PIERSON, C. J.
1943. Rennie Wilbur Doane, 1871-1942. Journal of Economic Entomology, vol. 36, p. 131.



FIGURES 1-5. FIGURES 1, 2. *Dicranomyia cervina* Doane, male holotype. 1, right dististyles, dorsal aspect. 2, same, ventral aspect. FIGURES 3, 4. *Dicranomyia particeps* Doane, male lectotype. 3, right basistyle, dististyles and portion of ninth tergum, dorsal aspect. 4, inner lobe of basistyle, ventral aspect. FIGURE 5. *Dicranomyia viridicans* Doane, male holotype, left dististyles, dorsal aspect, most hairs omitted.

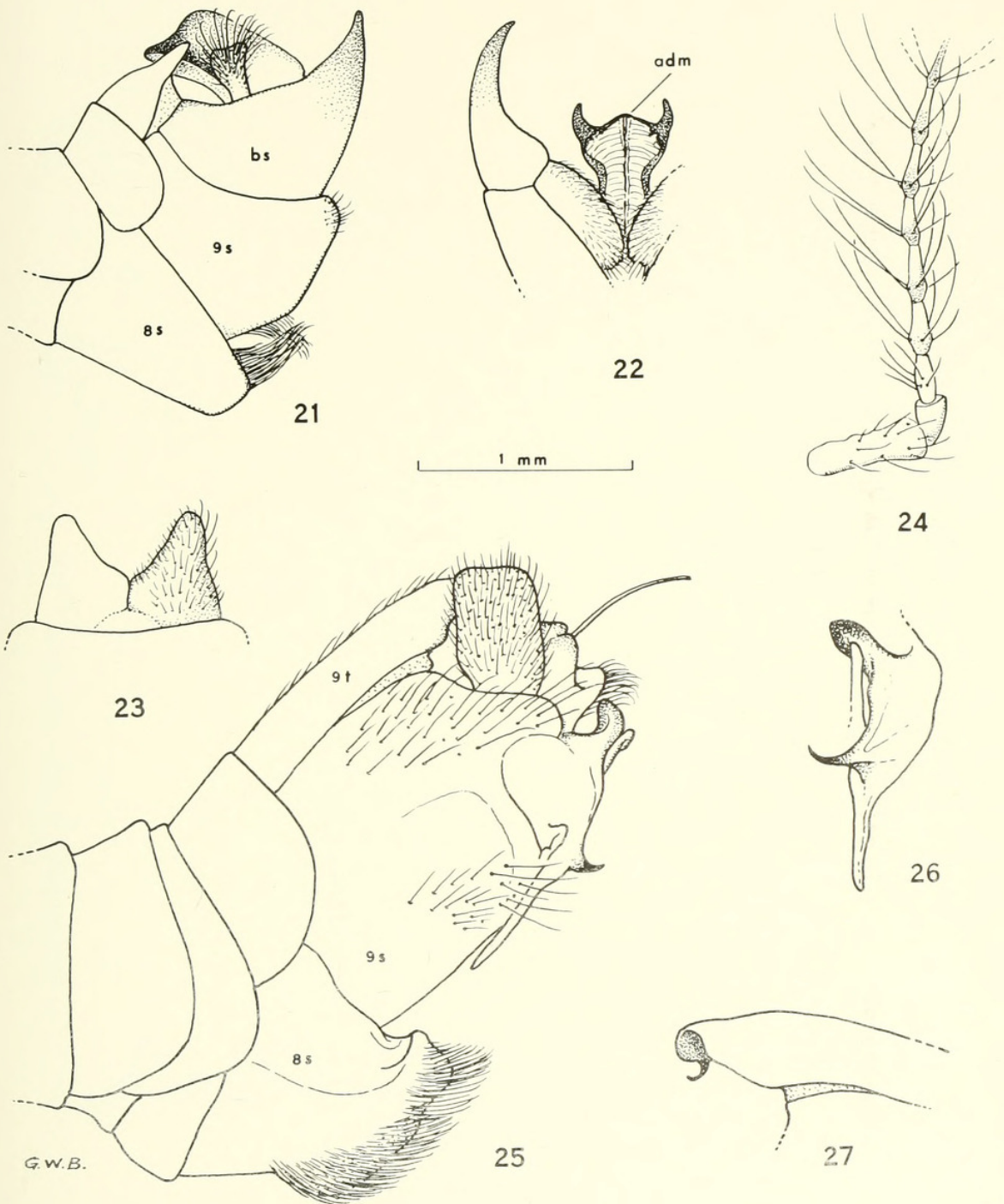


FIGURES 6-11. - FIGURES 6, 7. *Pachyrrhina brevioricornis* Doane, male holotype. 6, posteromedian portion of ninth tergum, dorsal aspect. 7, terminal abdominal segments, left lateral aspect (gon - gonapophysis). FIGURES 8, 9. *Pachyrrhina occidentalis* Doane, male holotype. 8, terminal abdominal segments, right lateral aspect. 9, posteromedian portion of ninth tergum, dorsal aspect. FIGURES 10, 11. *Pachyrrhina snowii* Doane, male lectotype. 10, terminal abdominal segments, left lateral aspect. 11, hypopygium, posterior aspect. Upper scale: figures 6, 9.

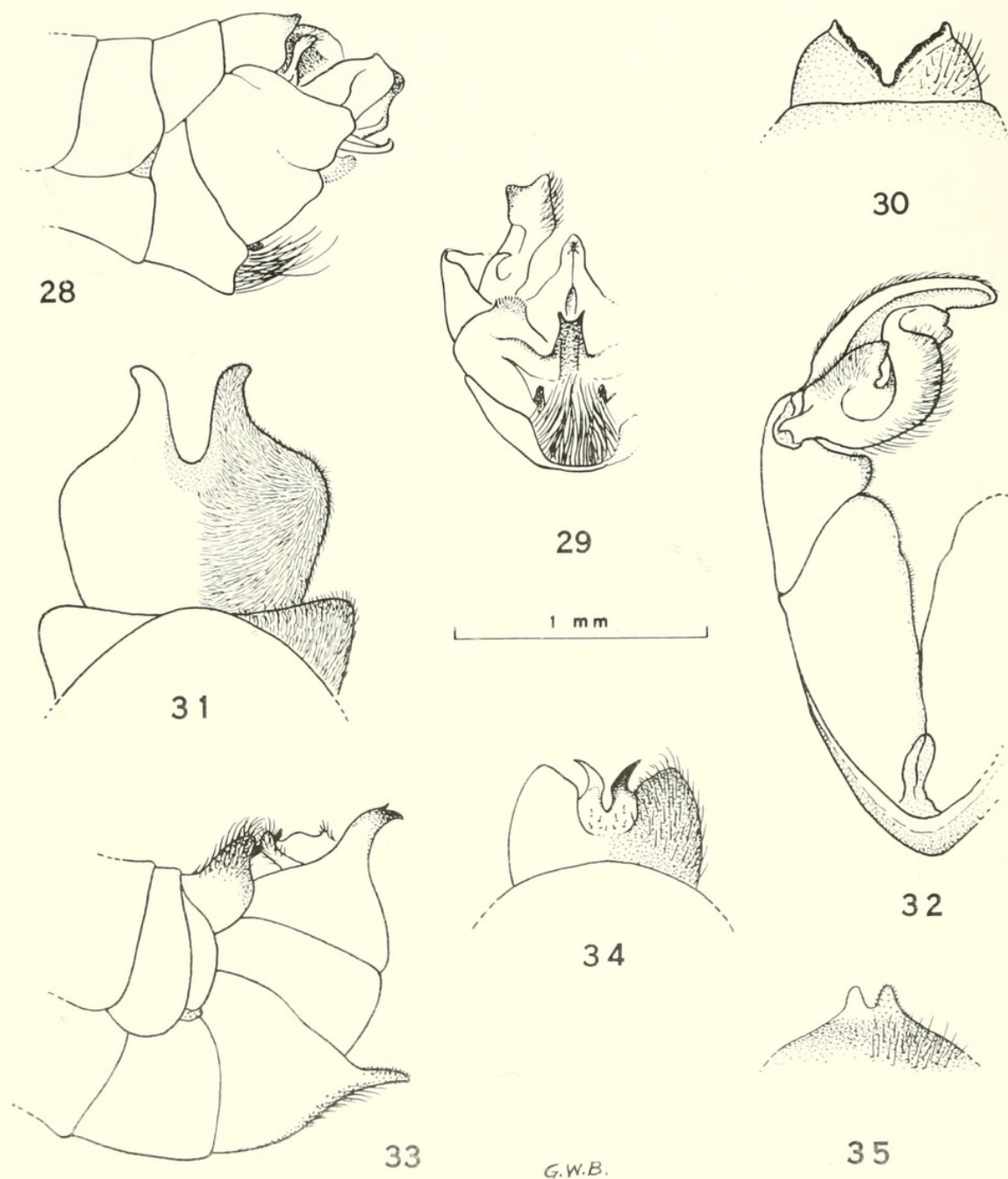


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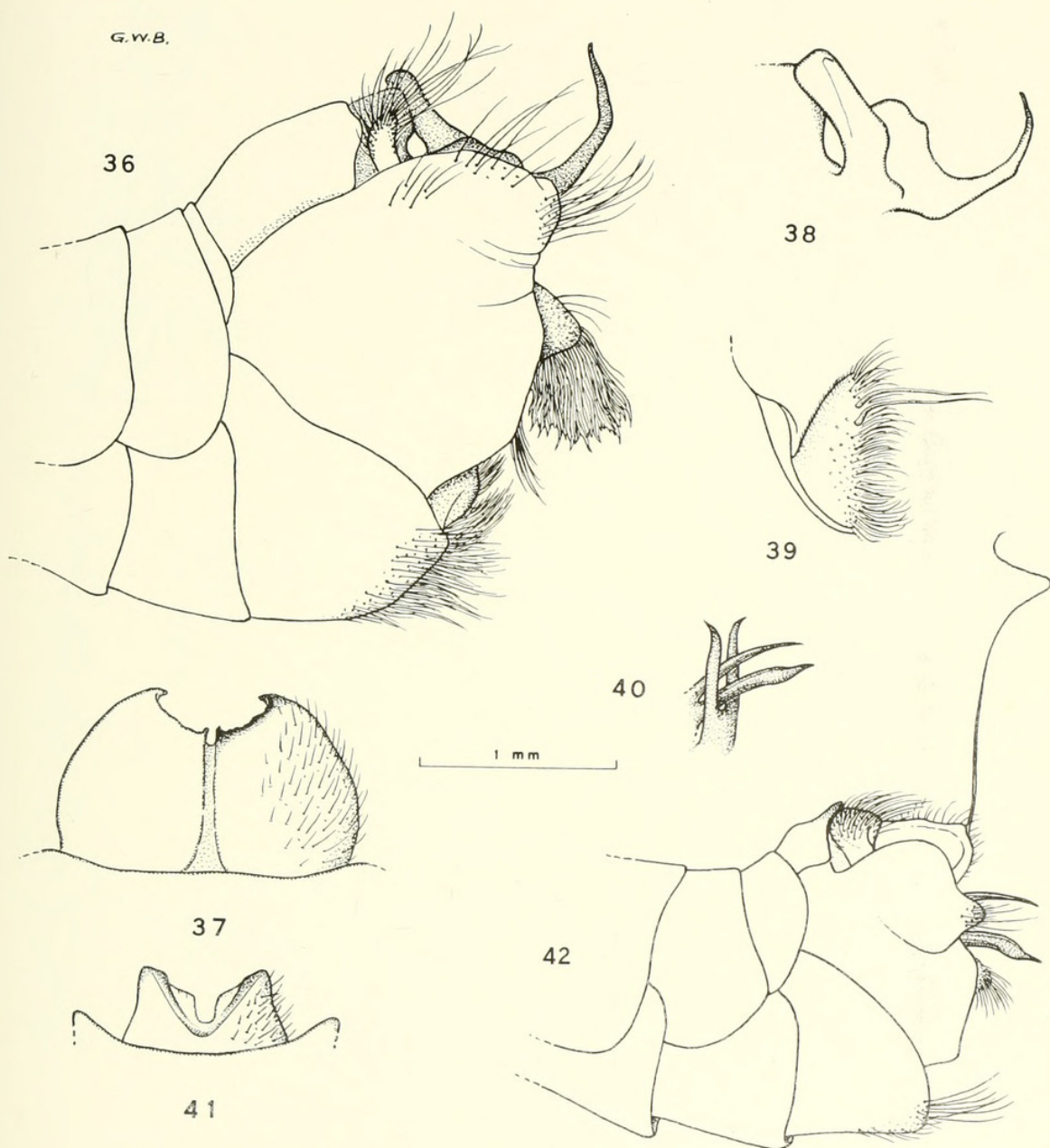
FIGURES 12-20. FIGURE 12. *Rhypholophus arcuatus* Doane, female lectotype, left wing, ventral aspect. FIGURES 13, 14. *Rhypholophus cornutus*, male lectotype. 13, ninth tergum, dorsal aspect. 14, left ventral dististyle, ventral (posterior) aspect. FIGURE 15. *Rhypholophus divexus* Doane, female holotype, left wing, ventral aspect. FIGURES 16-18. *Rhypholophus longicornis* Doane, male lectotype. 16, representative flagellar segments. 17, right wing. 18, right basistyle and dististyles, dorsal aspect. FIGURES 19, 20. *Rhypholophus parallelus* Doane, female lectotype. 19, left wing. 20, terminal abdominal segments, right lateral aspect. Scale a: figures 12, 15, 17, 19. Scale b: figures 16, 20. Scale c: figures 13, 14, 18.



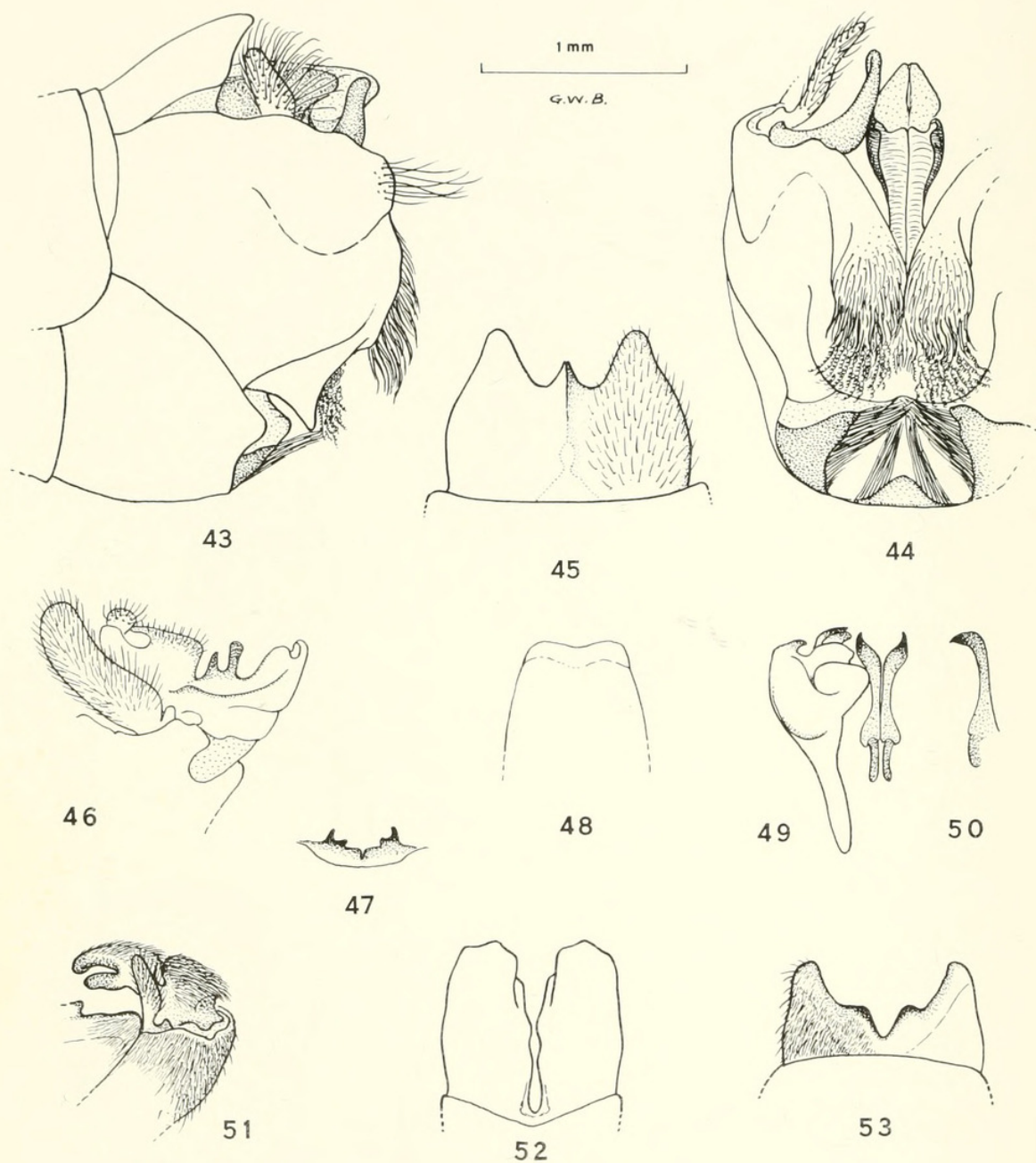
FIGURES 21-27. FIGURES 21-23. *Tipula acutipleura* Doane, male holotype. 21, terminal abdominal segments, left lateral aspect. 22, hypopygium, in part, posterior aspect. 23, ninth tergum, dorsal aspect. FIGURE 24. *Tipula albimacula* Doane, male holotype, basal portion of right antenna, lateral aspect. FIGURES 25-27. *Tipula fallax* Loew, male holotype. 25, terminal abdominal segments, left lateral aspect. 26, lower appendage of inner dististyle, posterolateral aspect. 27, ninth tergum, right lateral aspect. adm - adminiculum, bs - basistyle, 8s - eighth sternum, 9s - ninth sternum, 9t - ninth tergum.



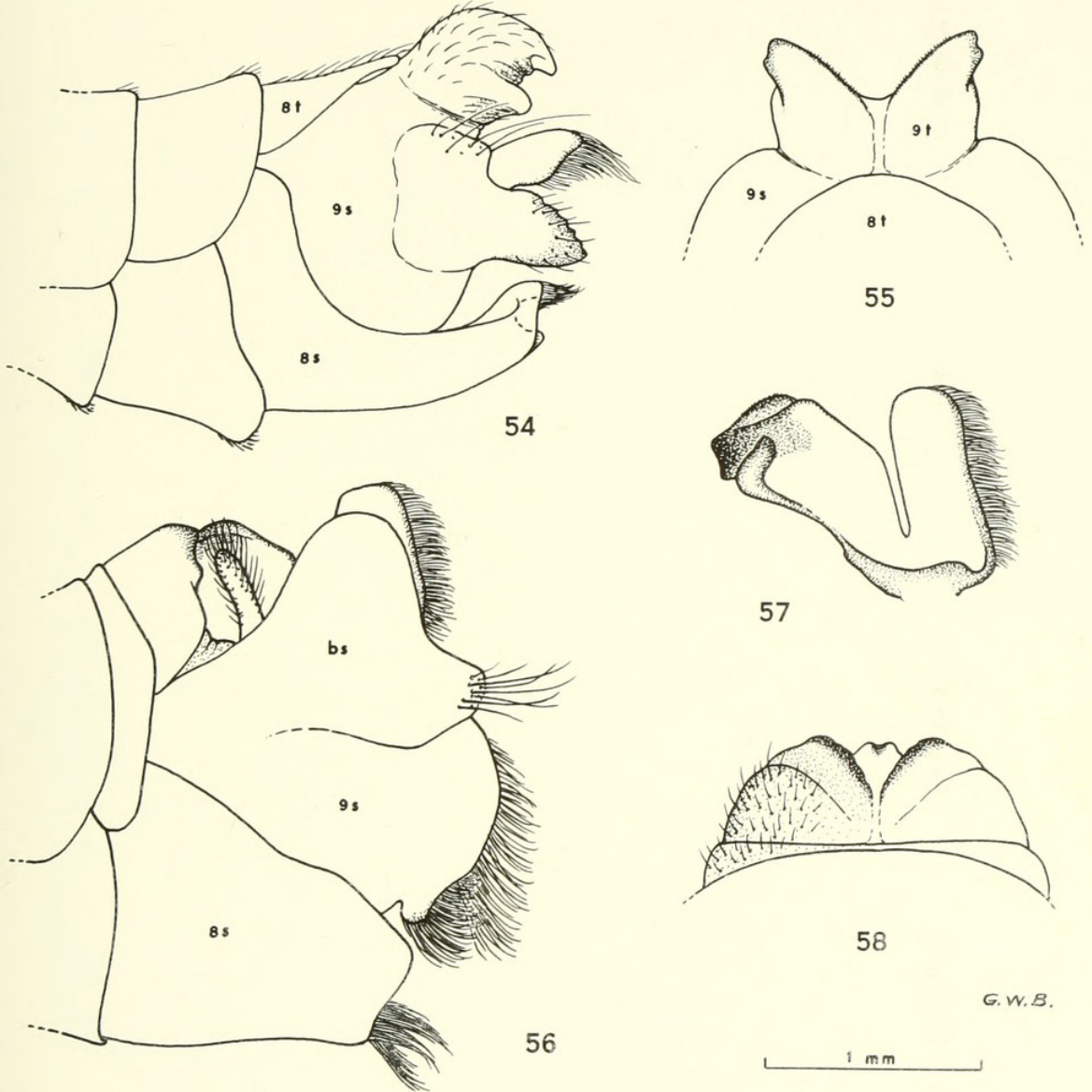
FIGURES 28-35. FIGURES 28-30. *Tipula alta* Doane, male holotype. 28, terminal abdominal segments, left lateral aspect. 29, lower parts of hypopygium, posterior aspect. 30, ninth tergum, dorsal aspect. FIGURES 31, 32. *Tipula aspersa* Doane, male lectotype. 31, ninth tergum, dorsal aspect. 32, hypopygium, posterior aspect. FIGURES 33-35. *Tipula atrisumma* Doane, male lectotype. 33, terminal abdominal segments, left lateral aspect. 34, ninth tergum, dorsal aspect. 35, eighth sternum, ventral aspect.



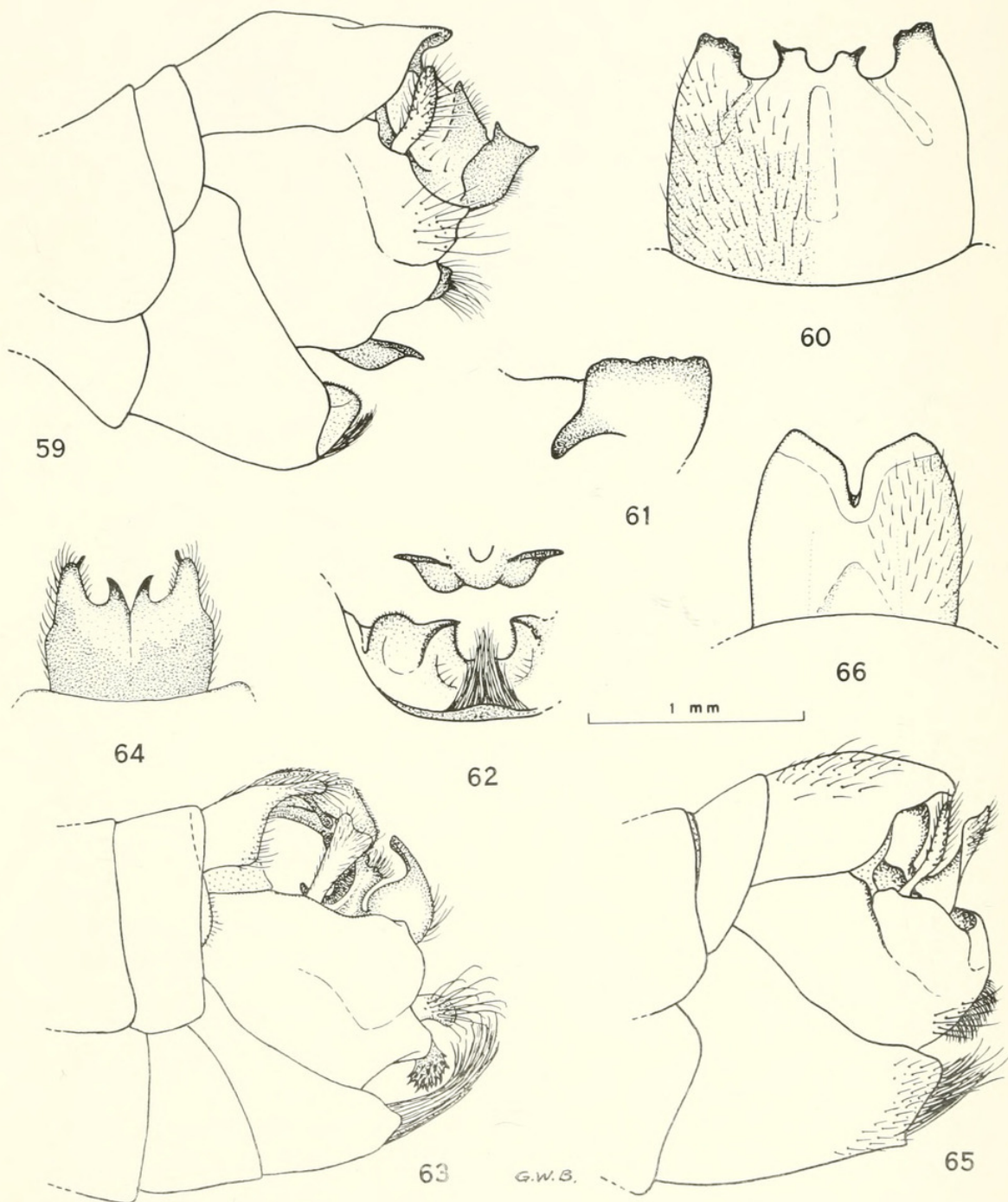
FIGURES 36-42. FIGURES 36-39. *Tipula biarmata* Doane, male holotype. 36, terminal abdominal segments, left lateral aspect. 37, ninth tergum, dorsal aspect. 38, posterior base of inner dististyle, posteromesal aspect. 39, left half of apex of eighth sternum, posterior aspect. FIGURES 40-42. *Tipula biuncus* Doane, male lectotype. 40, adminiculum, dorsolateral aspect. 41, ninth tergum, dorsal aspect. 42, terminal abdominal segments, left lateral aspect.



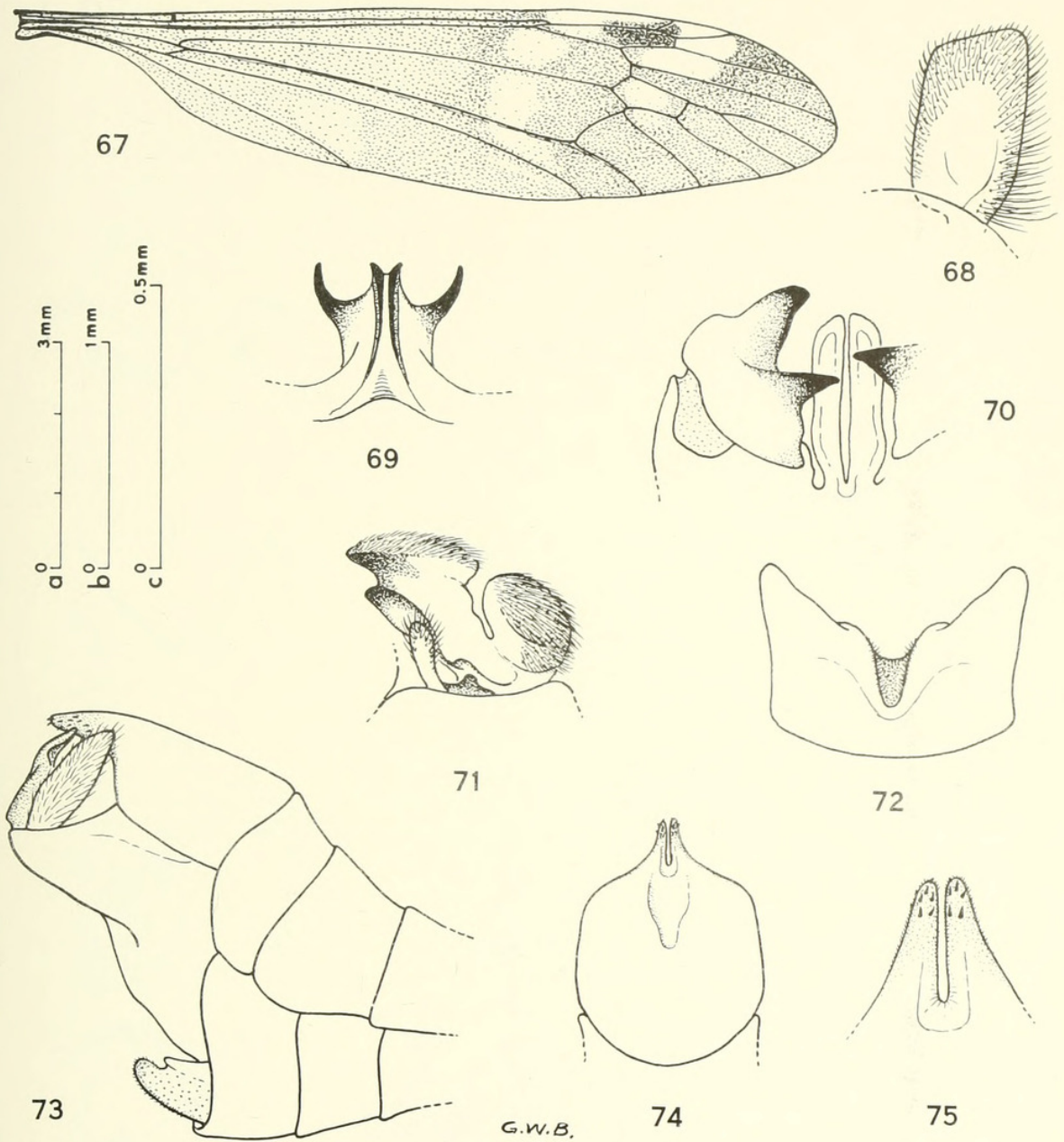
FIGURES 43-53. FIGURES 43-45. *Tipula californica* Doane, male lectotype. 43, terminal abdominal segments, left lateral aspect. 44, hypopygium, posterior aspect. 45, ninth tergum, dorsal aspect. FIGURES 46-50. *Tipula coloradensis* Doane, male lectotype. 46, left dististyles, left lateral (slightly dorsolateral) aspect. 47, median process of ninth tergum, posterior aspect, inverted. 48, ninth tergum, dorsal aspect. 49, inner dististyle and gonapophyses, posterior aspect. 50, gonapophysis, lateral aspect. FIGURES 51-53. *Tipula cylindrata* Doane, male lectotype. 51, apex of left basistyle and left dististyles, left anterolateral aspect. 52, ninth sternum, posterior aspect. 53, ninth tergum, dorsal aspect.



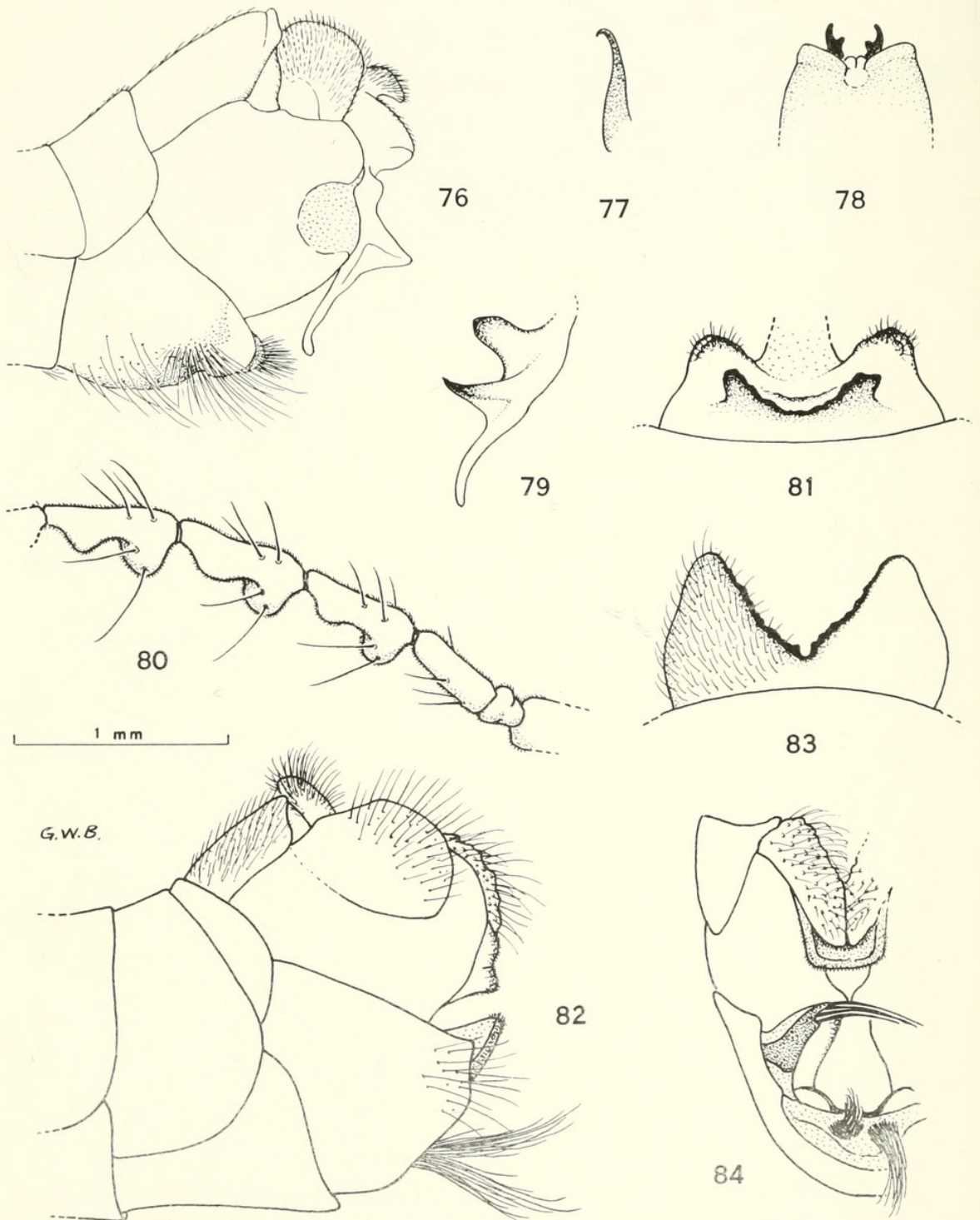
FIGURES 54-58. FIGURES 54-55. *Tipula derbyi* Doane, male lectotype. 54, terminal abdominal segments, left lateral aspect. 55, ninth tergum and adjacent sclerites, dorsal aspect. FIGURES 56-58. *Tipula flavicomis* Doane, male holotype. 56, terminal abdominal segments, left lateral aspect. 57, reconstruction of left inner dististyle, lateral aspect. 58, ninth tergum, dorsal aspect. bs - basistyle, 8t, 8s - eighth tergum and sternum, 9t, 9s - ninth tergum and sternum.



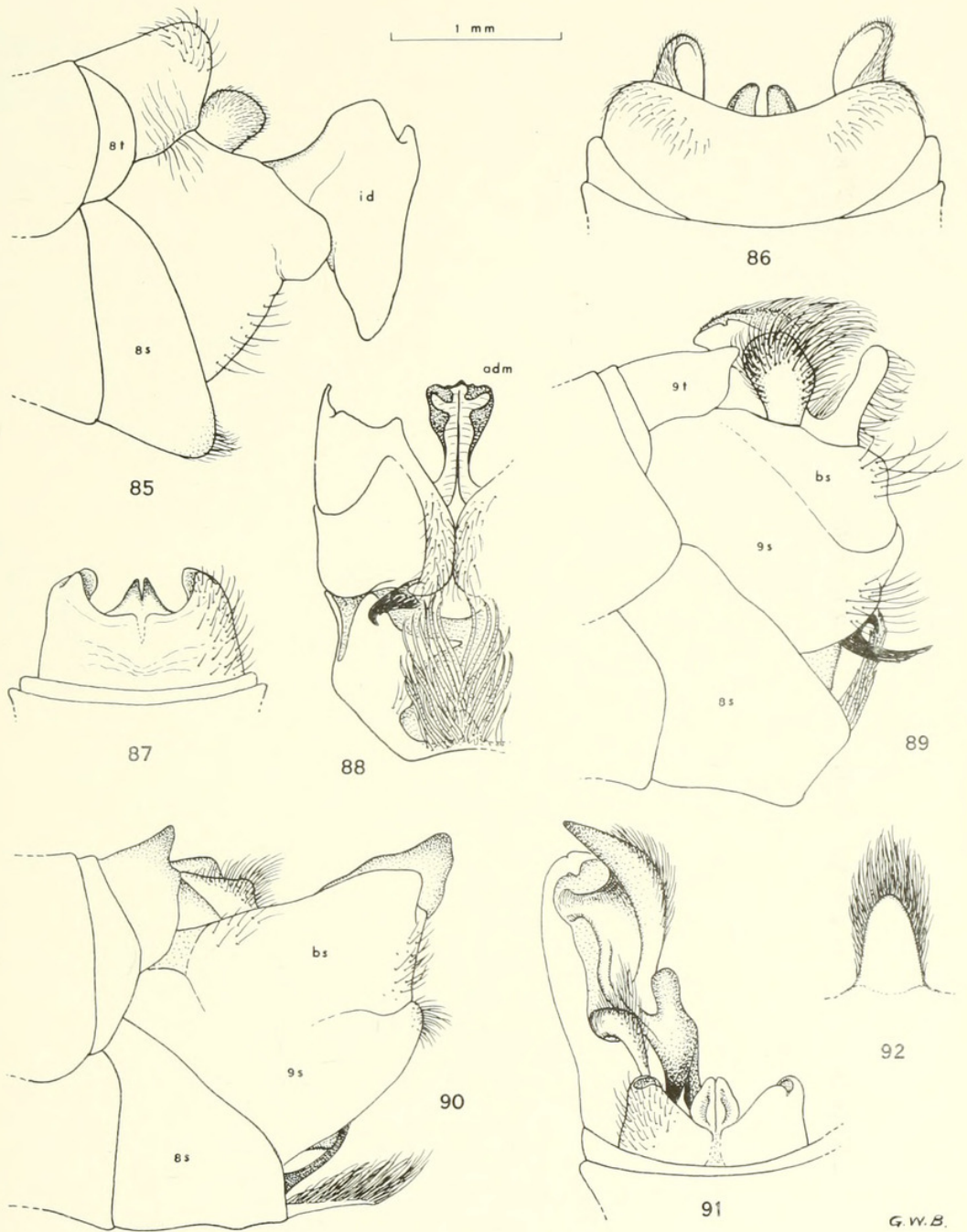
FIGURES 59-65. FIGURES 59-62. *Tipula flavocauda* Doane, male lectotype. 59, terminal abdominal segments, left lateral aspect. 60, ninth tergum, dorsal aspect. 61, right lateral projection of ninth tergum, to show ventral tooth, enlarged from scale of other figures. 62, lower portions of hypopygium, posterior aspect. FIGURES 63, 64. *Tipula flavomarginata* Doane, male lectotype. 63, terminal abdominal segments, left lateral aspect. 64, ninth tergum, dorsal aspect. FIGURES 65, 66. *Tipula fulvinodus* Doane, male holotype. 65, terminal abdominal segments, left lateral aspect. 66, ninth tergum, dorsal aspect.



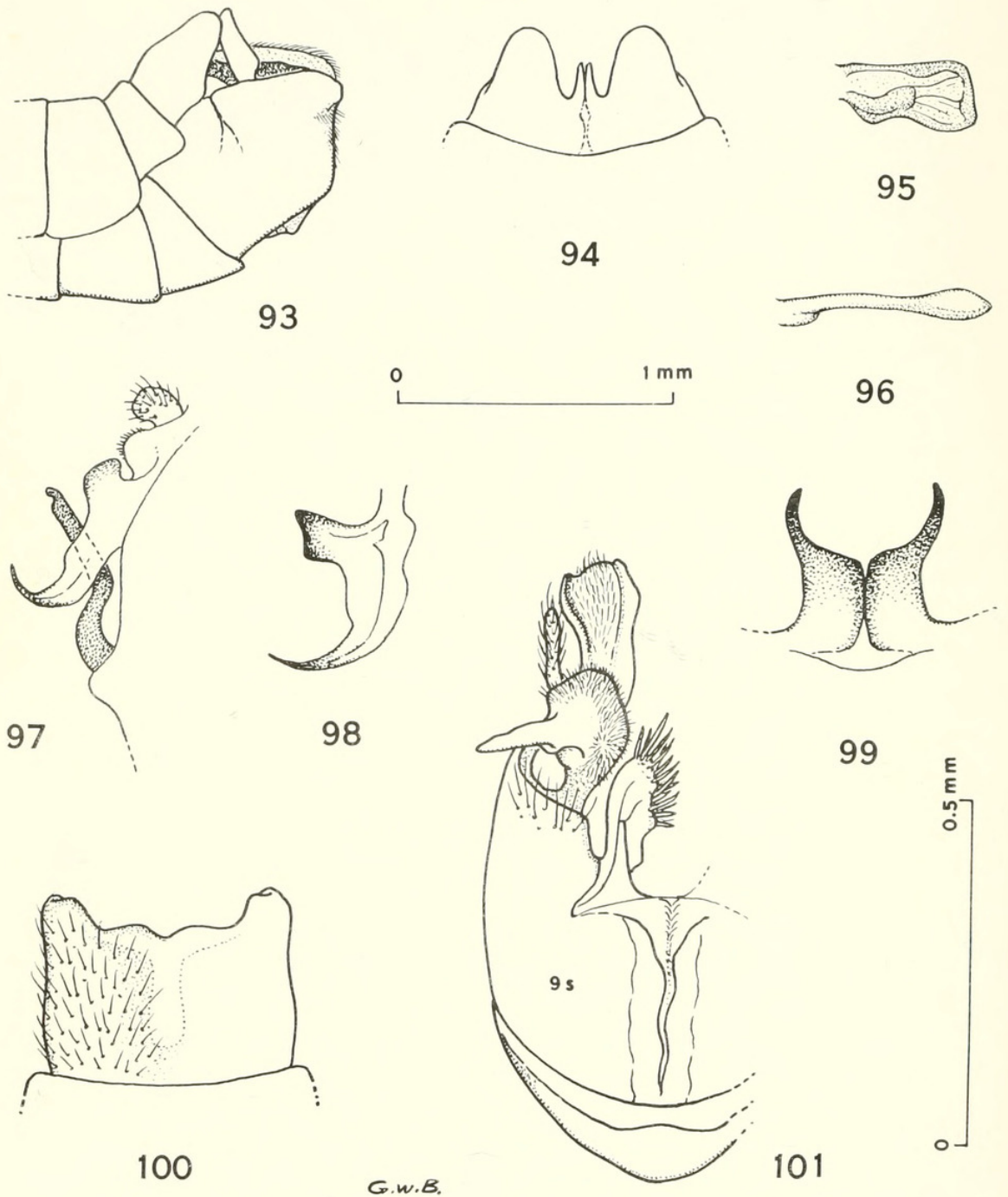
FIGURES 67-75. FIGURE 67. *Tipula incurva* Doane, male holotype, right wing. FIGURES 68-70. *Tipula madera* Doane, male lectotype. 68, left outer dististyle, lateral aspect. 69, median projection of ninth tergum, posterior aspect, inverted, reconstructed in part from paralectotype. 70, left inner dististyle and gonapophyses, posterior aspect. FIGURES 71, 72. *Tipula marina* Doane, male lectotype. 71, left dististyles, lateral aspect. 72, ninth tergum, dorsal aspect. FIGURES 73-75. *Tipula meridiana* Doane, male holotype. 73, terminal abdominal segments, right lateral aspect. 74, ninth tergum, dorsal aspect. 75, apical projections of ninth tergum, dorsal aspect. Scale a: figure 67. Scale b: figures 68, 70-74. Scale c: figures 69, 75.



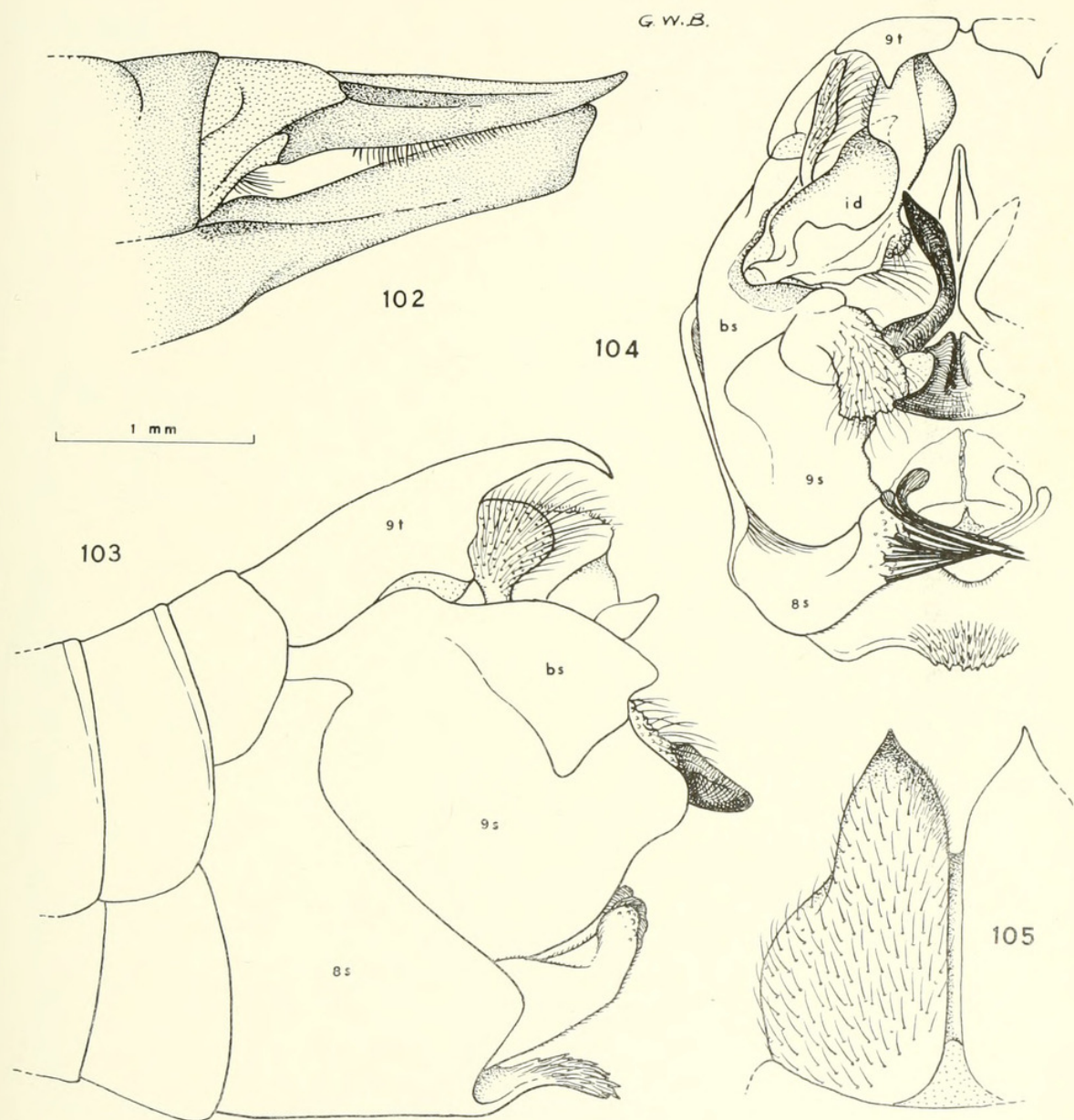
FIGURES 76-84. FIGURES 76-79. *Tipula newcomeri* Doane, male lectotype. 76, terminal abdominal segments, left lateral aspect. 77, gonapophysis, lateral aspect. 78, ninth tergum, posterodorsal aspect. 79, lower appendage of right inner dististyle, right posterolateral aspect. FIGURES 80, 81. *Tipula nigrocorporea* Doane, male holotype. 80, base of left antenna, left lateral aspect. 81, ninth tergum, dorsal aspect. FIGURES 82-84. *Tipula occidentalis* Doane, male lectotype. 82, terminal abdominal segments, left lateral aspect. 83, ninth tergum, dorsal aspect. 84, lower portions of hypopygium, posterior aspect.



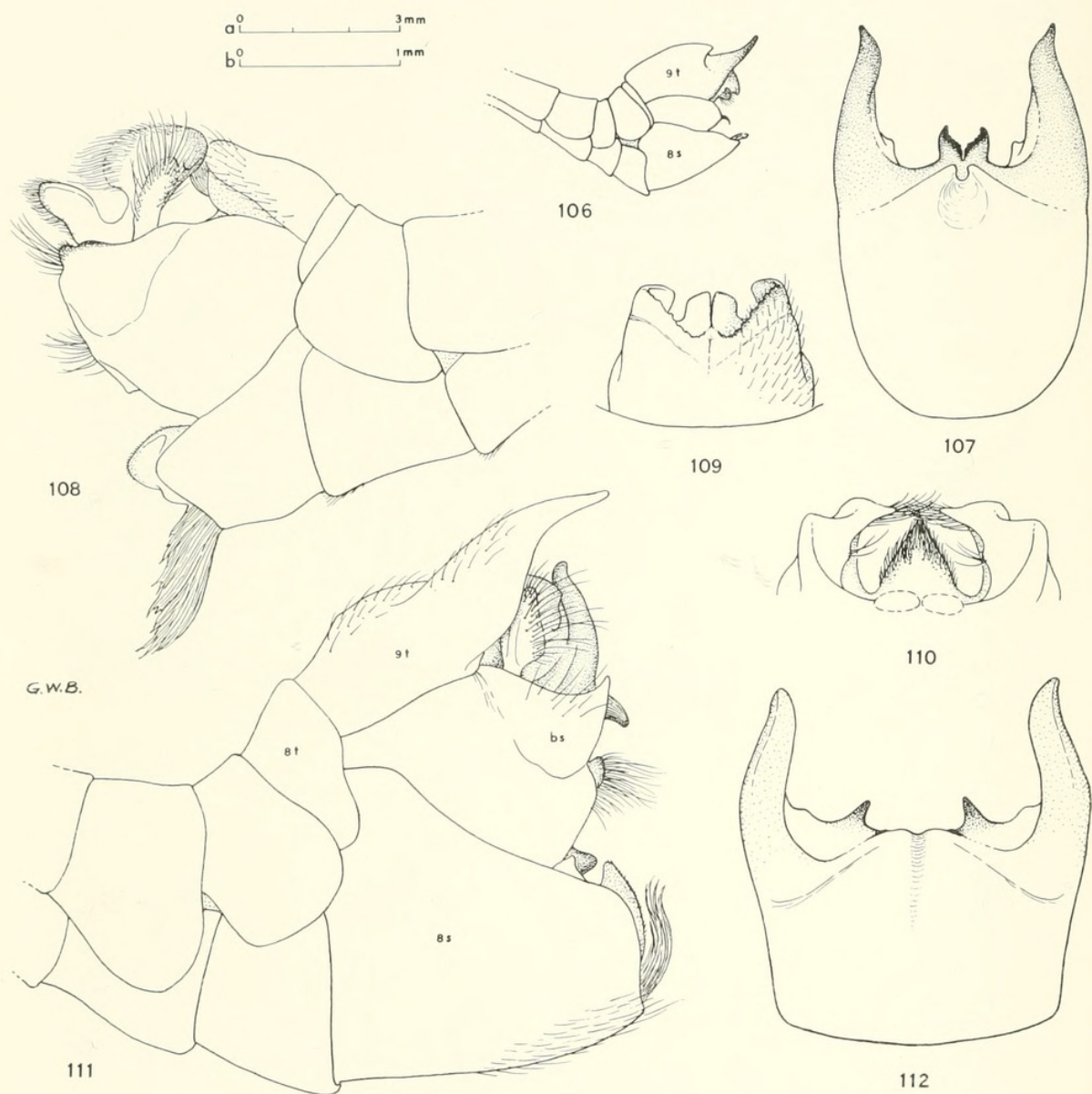
FIGURES 85-92. FIGURES 85, 86. *Tipula pacifica* Doane, male lectotype. 85, terminal abdominal segments, left lateral aspect. 86, ninth tergum and apices of outer dististyles, dorsal aspect. FIGURES 87-89. *Tipula planicornis* Doane, male lectotype. 87, ninth tergum, dorsal aspect. 88, lower portions of hypopygium, posterior aspect. 89, terminal abdominal segments, left lateral aspect. FIGURES 90-92. *Tipula pyramis* Doane, male lectotype. 90, terminal abdominal segments, left lateral aspect. 91, ninth tergum, right basistyle and right dististyles, dorsal aspect. 92, median prolongation of eighth sternum, ventral aspect. adm - adminiculum, bs - basistyle, id - inner dististyle, 8t, 8s - eighth tergum and sternum, 9t, 9s - ninth tergum and sternum.



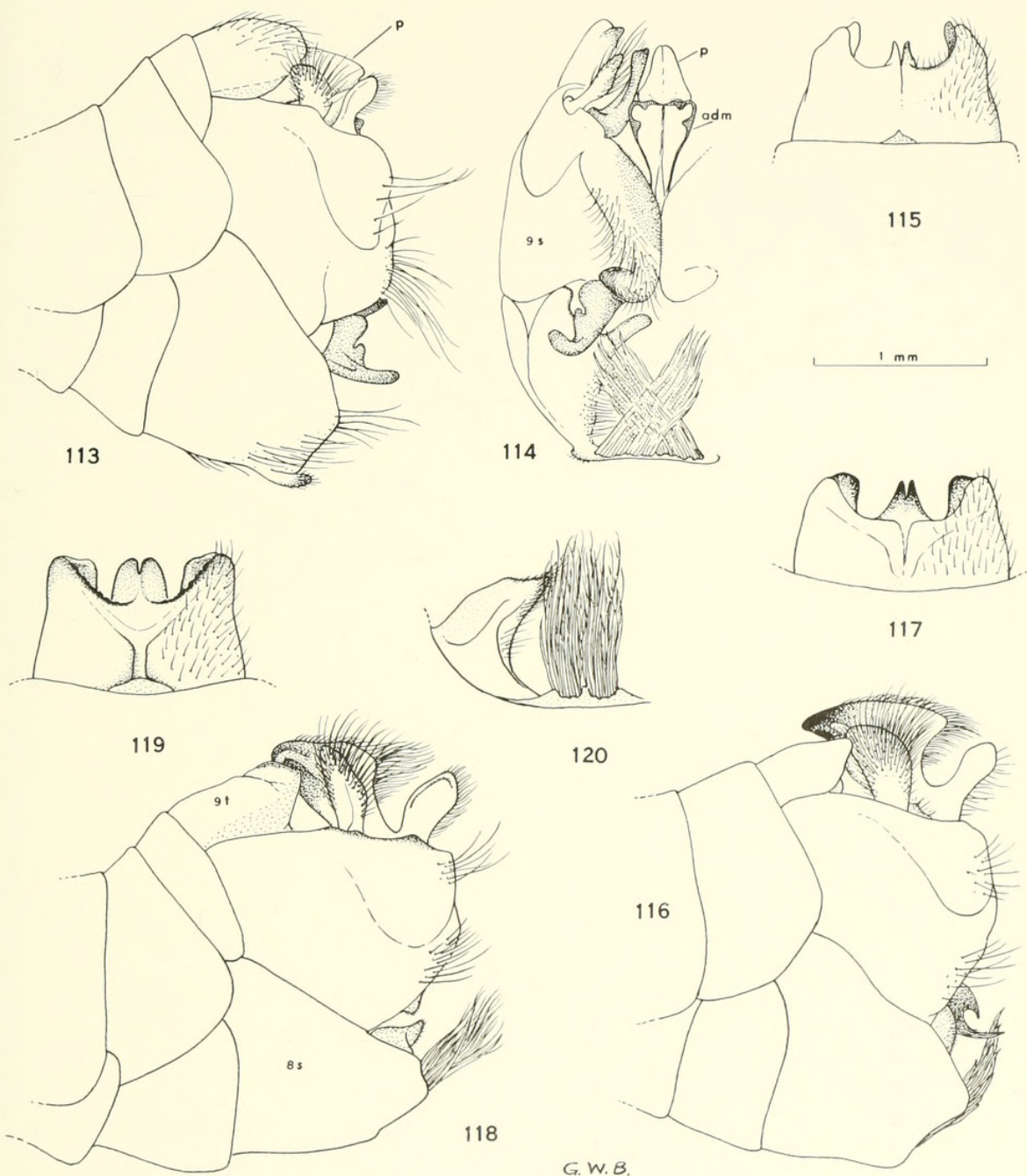
FIGURES 93-101. FIGURES 93-96. *Tipula quaylii* Doane, male lectotype. 93, terminal abdominal segments, left lateral aspect. 94, ninth tergum, dorsal aspect. 95, left wing, lateral aspect (cf. fig. 96). 96, left haltere, left lateral aspect. FIGURES 97-99. *Tipula rohweri* Doane, male lectotype. 97, gonapophysis (shaded) and portion of right inner dististyle, right lateral aspect. 98, lower appendage of right inner dististyle, right posterolateral aspect. 99, median projection of ninth tergum, posterodorsal aspect. FIGURES 100, 101. *Tipula rusticicola* Doane, male lectotype. 100, ninth tergum, dorsal aspect. 101, left half of hypopygium, posterior aspect. 9s - ninth sternum. Upper scale: figures 93-98, 100-101. Lower scale: figure 99.



FIGURES 102-105. FIGURE 102. *Tipula silvestra* Doane, female lectotype, ovipositor, left lateral aspect. FIGURES 103-105. *Tipula spatha* Doane, male holotype. 103, terminal abdominal segments, left lateral aspect. 104, hypopygium, posterior aspect. 105, ninth tergum, dorsal aspect. bs - basistyle, id - inner dististyle, 8t, 8s - eighth tergum and sternum, 9t, 9s - ninth tergum and sternum.



FIGURES 106-112. FIGURES 106, 107. *Tipula sternata* Doane, male from Monterey Co., California. 106, terminal abdominal segments, left lateral aspect. 107, ninth tergum, dorsal aspect. FIGURES 108-110. *Tipula sylvicola* Doane, male lectotype. 108, terminal abdominal segments, right lateral aspect. 109, ninth tergum, dorsal aspect. 110, eighth sternum, posterior aspect. FIGURES 111, 112. *Tipula tergata* Doane, male lectotype. 111, terminal abdominal segments, left lateral aspect. 112, ninth tergum, dorsal aspect. bs - basistyle, 8t, 8s - eighth tergum and sternum, 9t, 9s - ninth tergum and sternum. Scale a: figure 106. Scale b: figures 107-112.



FIGURES 113-120. FIGURES 113-115. *Tipula ungulata* Doane, male lectotype. 113, terminal abdominal segments, left lateral aspect. 114, hypopygium, posterior aspect. 115, ninth tergum, dorsal aspect. FIGURES 116, 117. *Tipula vestigipennis* Doane, male lectotype. 116, terminal abdominal segments, left lateral aspect. 117, ninth tergum, dorsal aspect. FIGURES 118-120. *Tipula williamsii* Doane, male lectotype. 118, terminal abdominal segments, left lateral aspect. 119, ninth tergum, dorsal aspect. 120, left and median portions of eighth sternum, posterior aspect. adm - adminiculum, p - proctiger (tenth segment), 8s - eighth sternum, 9t, 9s - ninth tergum and sternum.



Byers, George W. 1976. "Type specimens of Tipulidae described by R.W. Doane in the collection of the California Academy of Sciences." *Occasional papers of the California Academy of Sciences* 124, 1–51.

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