

A Reclassification
of
Western Hemisphere Typhlocybinae
(Homoptera, Cicadellidae)
by

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INTRODUCTION

The present problem was undertaken at the joint suggestion of Dr. R. H. Beamer of the University of Kansas, and Dr. P. W. Oman of the Division of Insect Identification of the United States Department of Agriculture.

The last treatment of the genera of the subfamily was that of McAtee (1934a). That classification was based primarily on the venation of the apical portions of the fore and hind wings, and aside from those characters mentioned in the key, the genera were not characterized. The venation of the base of the hind wings was not taken into account in the key, nor were the characters of the male genitalia, although genitalic characters already had come to be of recognized value in establishing the identity of species.

The emphasis which the venation of the wing apex received as a result of the McAtee classification led generally to the oversight of many other useful characters, and indeed to the neglect of the most significant characters of the wings themselves, the venation of the vannal region of the hind wings. Following the McAtee classification, workers describing new species placed these in already existing genera, frequently without pausing to analyze their relationships to the genotypes involved. There resulted many heterogeneous genera which could be recognized almost solely on the basis of the venation of the wing apices, and occasionally not even that well.

Since 1934, Ribaut (1936b), in a study of the French Typhlocybiinae, recognized interspecific relationships and placed the French species in groups which in some cases constitute genera, and in others constitute species groups within genera. Oman (1949a) described two new genera in the subfamily, and pointed out the need for a critical study of the group. DeLong and co-workers have also described several genera and subgenera.

The aim of the present paper has been to restudy the Western Hemisphere typhlocybine genera with a view to a fuller characterization of genera and the development of a more natural system of classification. It has been necessary, in so doing, to describe a number of new genera. Moreover, in several instances, it has been found necessary to base a new genus on a single species, most often in cases involving Neotropical species. The tropics of the New World, however, have been so poorly covered by collectors that the writer subscribes to the opinion that many of the Neotropical genera which are monobasic in the present treatment are not likely to remain so when more collecting has been done.

In other cases, the same paucity of material has led to the retention of some genera which are admittedly heterogeneous, for example in the Alebrini, where forms which were fairly closely related morphologically were retained in the same genus for want of sufficient material to establish where discontinuity in variation might occur.

THE SUBFAMILY TYPHLOCYBINAE

Definition. Relatively few constant characters have been found in this group of diversified insects. Most of the characters formerly cited as diagnostic for the subfamily have failed to survive the collection and study of additional materials.

The comparatively small size of the leafhoppers of the subfamily is useful, to some extent, in identifying it, but the smallest members of some other subfamilies are exceeded in size by the largest Typhlocybinae. There has been a reduction in area and venation in the apical portion of the costal area of the hind wing, but such a reduction is present in some non-typhlocybinae leafhoppers, and its degree is variable within the Typhlocybinae.

From a practical standpoint, all leafhoppers which lack discal branching of the longitudinal veins of the fore wings, based of the bases of the apical cells, may be placed in this subfamily. And even this character is not infallible, for in certain Alebrini, the occurrence of adventitious cross veins may present the appearance of branched longitudinal veins, an appearance certain to be confusing to one not familiar with the group. Coincident with this lack of discal branching of the longitudinal veins, is the occurrence of only two antepical cells, a character which does, however, occur in another subfamily.

Nomenclature. This work has employed the name Typhlocybinae in its title, because that name conforms to the practice of retaining suprageneric names with priority. Apparently the

first use of the group name was that of Kirschbaum (1868b:16) who used "Typhlocybae" as a subfamily name.

If one did subscribe to using the oldest generic name as a basis for a subfamily name, then because of a nomenclatorial problem concerning the true identity of the genus Cicadella Dumeril, the correct name of the subfamily would be presently in question. Dumeril (1806a), in a publication which listed a synoptic table of some families of Homoptera, divided the leafhoppers into two groups: those with ocelli, and those without ocelli. He mentioned the name Cicadella in his discussion of the group in which ocelli were present.

In the same year, Froriep (1806a), in a German translation of the Dumeril work, listed Cicadella vittata (L.) as an example of the group in which ocelli were present, and this was the first (and at that time the only) included species. On the basis of this, Cicada vittata Linnaeus can be considered the genotype of the genus Cicadella Dumeril, and if this course is followed, then Cicadella Dumeril is a genus in the subfamily under treatment, and incidentally the oldest genus, and the subfamily could be appropriately designated "Cicadellinae".

But, on the other hand, as Wagner (1950a) has pointed out, Cicada vittata L. is a species which does not have ocelli, and its selection by Froriep as an example of Cicadella Dumeril can be considered to have violated the intent of Dumeril. Wagner therefore designated Cicada viridis L. as genotype of Cicadella Dumeril, pointing out that this species does have ocelli, and does not, therefore, violate the intent of

Duméril. Moreover, he suggested that this selection of genotype had the added advantage of making Cicadella Duméril and Cicadella Latreille isogenotypic, thereby relegating the latter to synonymy under the former.

The writer subscribes to the opinion that the solution is not as simple as Wagner suggests. In the first place, it seems that Froriep's designation of Cicada vittata L. as an example of Cicadella Duméril may be construed as a type fixation, in spite of the fact that it does not conform to the original characterization of Duméril, unless a ruling to the contrary is forthcoming from the International Commission on Zoological Nomenclature. Certainly the selection of a genotype which violates, in one character or more, the original description of a genus is no novel occurrence. Moreover, as Oman (*in litt.*) has pointed out, Duméril himself, in a subsequent paper (1816a) listed vittata as an included species in his own genus Cicadella.

Dr. Wagner's action was probably motivated partly by the desire to restore the name Cicadella to the group recently designated Tettigellinae, which group was called Cicadellinae based on Cicadella Latreille (type, Cicada viridis L., by subsequent designation of Van Duzee, 1917) until 1946 (China and Fennah 1946a). The writer agrees that such a course would minimize the confusion in the literature, and Dr. Wagner's action is followed herein. It is hoped, however, that the status of Cicadella Duméril will be stabilized by a ruling of the Commission.

The removal of the name Cicadella from this subfamily restores the name Eupteryx as the oldest genus, and the subfamily could be appropriately designated Eupteryginae.

Phylogeny. The relationship of the Typhlocybinae to other subfamilies has long been obscure. The present work has done little to clarify this question, and the writer is unable to state which of the various subfamilies of Cicadellidae are probably closely related to the Typhlocybinae, or indeed whether only a single subfamily is to be sought in this connection.

It would be impractical to hope for any solution of the problem of phylogeny within the subfamily from a study of the Western Hemisphere forms alone, or even with a consideration of Palaearctic forms as well. It has been found convenient, however, in the present treatment, to represent relationships suggested by morphological considerations in a conventional "tree" form in two instances. It is hoped that other students of the group will look upon these as they have been considered by the writer--as tentative, and as a basis for further investigation in the light of studies of species from other faunal regions. Further remarks on phylogeny are included in the sections below which deal with tribal characteristics.

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The University of Louisville has helped greatly through a grant-in-aid, in facilitating the work.

Plate 1 was made by Mr. Arthur D. Cushman of the Division of Insect Identification, U. S. Department of Agriculture. Mrs. Barbara Rozen, of the University of Kansas has inked most of the rest of the illustrations used herein.

To the above persons and institutions the writer is obliged, and to them rightly belongs much of the credit for whatever herein may be found to be creditable.

TECHNIQUE

Techniques are, in the final analysis, individual matters, and there are probably as many techniques and modifications of techniques as there are experts. Any technique which will make the internal male genitalia available for study under very high magnification is a suitable one for this group of insects, provided the structures are not damaged in the process. The following method is that preferred by the writer, for the study of the genital capsule and its contents. Little of it is original.

The entire abdomen is removed from the specimen and placed in ten per cent caustic potash which is then heated to the boiling point. The abdomen is allowed to remain in the hot caustic for a period which varies with the degree of sclerotization of the specimen. In heavily sclerotized specimens, the abdomen is removed from the solution when the conjunctivae become conspicuously pale. In less heavily sclerotized specimens, the abdomen is removed from the solution when it becomes hyaline. The abdomen is placed in distilled water for about ten minutes, then transferred to acid fuchsin (0.5%). After a few minutes, the abdomen is placed in acidulated distilled water for a few minutes to remove the excess stain. It is then placed in a hollow-ground slide in a drop of acidulated glycerine (made by adding two drops of glacial acetic acid to a dropper bottle of glycerine). The genital capsule is then removed from the abdomen and studied in toto.

The staining procedure outlined above permits minute examination of the capsule with "high dry" of the compound microscope, and the resolution of even minute microsetae.

After the in toto examination, using minuten nadeln, the conjunctiva at the base of the anal tube is cut through, throughout its circumference, the anal hooks, if present, are loosened with gentle pressure, and the needles are passed between the aedeagus and the anal tube to sever the minute connections which remain after the maceration process. The anal tube, with its hooks, is thus removed in one piece.

One of the needles is next inserted through the anterior opening of the capsule (left by removal of the abdomen) and placed laterad of and in contact with, but not pressing upon, one of the styles at its base. The other needle is inserted through the opening left by removal of the anal tube and its point placed slightly caudad of the point of the first needle. A gentle mesad nudge of the second needle separates the style from the plate to which it is articulated. The procedure is then repeated for the opposite style. The needles are then moved in an arc around the dorsal apodeme as a center, to sever any remaining connections between the aedeagus and the capsule wall, and the internal genitalia are then removed from the capsule which is left intact. Difficulties occur in the Alebrini, where the articulating surface between the style and the male plate is quite long. Difficulty is also experienced in some Alebrini and in Dicranoneura where the

connective is membranous and hence not of aid in sustaining the relative positions of the internal structures. In such cases, the writer prefers to leave the internal genitalia attached to the male plates (which thus serve to support them) and to remove the pleural and dorsal walls of the ninth segment in one piece so that the internal structures can be seen without any intervening integument to diminish the resolution.

When drawings are to be made, the author uses a very small amount of Boric Acid Ointment, as an adhesive, smeared in the concavity of the slide before the glycerine is added. The specimen may be studied under the binocular dissecting microscope, from several different aspects, without any contact with the adhesive. After study in situ, the capsule is oriented for drawing and moved to the edge of the adhesive, and its anterior rim pressed lightly into the adhesive. The slide is now moved to the monocular microscope for drawing. The Abbé condenser of the compound microscope will compensate for a great degree of difference in intensity of stain. Destaining is seldom necessary, but may be accomplished quickly by washing in water briefly, or more slowly by allowing the structures to remain in glycerine. In orienting the structures with the dissecting microscope, good results are achieved using a dark background behind the translucent adhesive and a light background (a piece of white paper) beneath the structures being oriented.

In making drawings of the genitalia, a ruled ocular and coordinate paper were employed. Because of the great variation in size of structures in different species, the drawings were made at several different magnifications, as indicated opposite the plates. In all of the drawings of the genital capsule, the anal tube is diagrammatic.

There has been some difference of opinion among workers as to the advisability of removing the internal male genitalia, or leaving them in the capsule. Advocates of the latter method are probably motivated by a desire not to distort the styles, which may rotate somewhat at their articulation with the connective, during or after dissection. If the styles are drawn in detail, however, another worker will have a sufficient number of reference points to orient the structures properly for comparison. If drawings are made with the styles oriented in such a way that their broadest portion is uppermost, especially, the orientation is easily duplicated for comparison. This has been done in a number of instances in the present paper, and the view has been designated "broad aspect". Actually, it may be lateral or ventrolateral. Its use enables permanent slide mounts to be used to advantage where a worker desires to employ such a technique.

After study, the internal structures and the anal tube are placed within the genital capsule, and the latter placed within the empty abdominal wall which thus serves as a container for the smaller structures. The abdomen is next placed in a drop or two of glycerine in the bottom of a small vial through the cork of which the pin bearing the specimen is thrust diagonally, so that the glycerine tends to remain at the bottom of the vial out of contact with the cork.

For taxonomic purposes the wings may be exposed for observation by inserting a dull-pointed needle, from the rear, beneath the combined wings, between the wings and the dorsum of the abdomen, keeping the long axis of the needle parallel to the midline of the dorsum. The needle is then lifted vertically, so that it pulls out, as an overlying flap, the mesal margin of whichever hind wing lies uppermost. If care is employed, no damage to the specimen results, and the venation at the base of the hind wing can be seen in the flap thus exposed. The venation at the apex of the hind wing can be seen by gently lifting the fore wing and pulling it slightly laterad.

If wing slides are to be made, the dry wings are removed from one side of the specimen and placed on a clean dry slide. The jugal lobe is unfolded and pressure applied to one point along the jugal fold to keep the lobe from springing back to its original position. Four small drops of plastic adhesive are placed on the slide to hold the corners of a square cover glass, which is next applied and pressed slightly to flatten the wings. An air mount is thus obtained. For drawing these, the writer employs a projection apparatus. The width of the wing veins was not indicated in any of the drawings included here.

In the case of most of the Carnegie Museum specimens, the wings were torn badly in many instances, and greatly folded and stuck together in other instances. It was possible, by immersing the specimens in water, to remove the wings without further damage to them. The wings were then flattened and

unfolded or uncoiled against the surface film of a drop of water, which was allowed to dry. The cover glass was applied as described above to form an air mount.

MORPHOLOGY

It is not within the scope of the present undertaking to give a detailed account of the morphology of the typhlocybine leafhoppers. For a more detailed account than that which follows, the reader is referred to recent works of Oman (1949a), Ribaut (1938b), Kramer (1950a) and Evans (1946a). In general, the terms used are those which have been used over a long period of time by taxonomists in the group.

The wings. The homologies of the wing veins have not yet been settled to the satisfaction of workers in the group, with the result that some of the veins still bear names of convenience, rather than names which express their relationship to a typical venation pattern. It seems fairly generally agreed that the three principal longitudinal veins are R, M, and Cu in both wings. The system used by Beamer (1958a) is used for the fore wing in this treatment. The apical cells, for convenience, have been numbered from inner to radial margin. Oman (1949a) employed this unusual method of numbering the apical cells because supernumerary cross veins to the costa occur in the preapical region of the fore wing fairly commonly in some groups of leafhoppers (occasionally in the subfamily under discussion). Such veinlets rarely occur in the commissural preapical region. Thus, starting from the commissural margin of the fore wing, less confusion results than

would occur if the numbers started from the costal margin.

In the hind wing, the posterior branch of vein R may retain its separate identity to its apex, or it may undergo a preapical fusion with the apical portion of the anterior branch of vein M (Plate 2, fig. 5, "R+M"). The m-cu cross vein is usually diagonal, so that Cu_1 appears to be forked apically, but what appears to be the anterior branch is actually m-cu continued as M_{3+4} (fig. 5) according to recent studies, and Cu_1 is actually unbranched. Vein Cu_2 is always unbranched in this subfamily. The hind wing possesses two folds, one functional fold, the jugal fold, which delimits the jugal lobe, and a second more anterior non-functional vannal fold. Between these folds is the vannal area of the wing. It exhibits a maximum of two veins, here designated 1V and 2V which are always at least partially fused. The apices of at least some of the longitudinal veins are prolonged in a common submarginal vein, of variable extent between species groups.

The longitudinal veins of the hind wings present many good generic characters, and some characters of suprageneric value. The vannal veins appear to be very conservative, as does the course of vein Cu_2 . The apex of Cu_1 , in some groups, has undergone coalescence with M_{3+4} , a development which appears to have occurred polyphyletically. In the Alebrini, the degree of fusion of R and M is a somewhat variable character between species of a genus, and even between wings of a single specimen.

As in the case of the fore wings, supernumerary cross veins frequently occur also in the hind wings, but are easily recognized as such from their position. A cross vein is typically present between R and M when these are not fused apically. This cross vein and the base of vein M_{2+4} (which has the appearance of a cross vein) have been found to be quite inconstant in position.

In the descriptions which follow, in discussing comparative lengths and widths of cells, unless otherwise designated, the greatest length or width is meant. In the case of the apical cells of the fore wing, the width is measured at right angles to the long axis of the wing even though this may be the greatest dimension of the cell.

The male genital capsule. The tergum and pleura of the ninth segment are collectively designated the pygofer. From the very narrow sclerotized ventral portion of the ninth segment there arise a pair of lobose appendages which extend caudad beneath the pygofer. The homology of these male plates is not known, but it is generally held that they are not true segmental appendages. In most genera, the male plates are flat pouch-like structures, but in the Alebrini, they appear to be cylindrical apically, perhaps as a result of a rolling and fusing process. Both the pygofer and the male plates usually bear setae, the general arrangement of which is frequently constant for a given genus. The pygofer often bears a pair or pairs of pygofer processes (or pygofer hooks) which arise as projections from the pygofer wall. They may arise as thickenings of the

dorsal or ventral portion of the wall, or from the posterior pygofer margin. They are constant in manner of origin in some genera, variable in one or both of these features in others. In illustrating the capsule, the pygofer hooks have been drawn in situ unless this complicates the illustration too much or tends to obscure other features. Occasionally, the anal tube gives rise to sclerotized processes, the anal hooks.

The internal male genitalia. The aedeagus (Plate 2, fig. 7) is essentially a campanulate structure, with the terminal opening at the narrow end. The broader basal opening is here designated the genital atrium, and its border the atrial rim. The term shaft is restricted to that portion of the aedeagus traversed by the completely enclosed gonoduct. The shaft is usually directed dorsocaudad. At the periphery of the genital atrium, usually as a modification of the atrial rim, an apodeme occurs. Usually it is dorsal, but it may be paired and arise laterally from the atrial rim. Frequently, it is of similar form in closely related species (e.g. Kunzeana spp.). Occasionally, the atrium is preceded by a conspicuous preatrial portion, here designated the preatrium. When a preatrium is present, it articulates with the connective, and when it is absent, the articulation with rare exceptions is with the ventral portion of the atrial rim. Aedeagal processes occur in great variety. They may be preatrial or atrial in origin, or they may arise on the shaft or on the apodeme. In the descriptions which follow, the processes are designated as to

their origin wherever possible. Occasionally they occur in such a manner as to be difficult of definition, for example in the region of the ventral limit of the preatrium and the beginning of the shaft. In such cases, they are referred to simply as "aedeagal processes" with further description of their point of origin.

The connective articulates with the styles laterally (Plate 2, fig. 8), and with the base of the aedeagus apically. It occurs as a linear cross-bar, a triangle, in the form of the letters "U" or "V" or "Y" or in the form of a trapezium. It may possess various thickenings. In most cases the apex is curved dorsad and the aedeagus articulates with the subterminal portion, but the articulation may be terminal, dorsal, or much more basad. Occasionally the connective is thin and membranous and observed only with difficulty, even with good staining. Frequently, the form of the connective is constant within a genus.

The styles (Plate 2, fig. 8) occur one on each side of the connective. They consist each of a short cephalad-produced portion and a longer caudad-produced portion. The anterior portion is quite variable in form and appears to have little taxonomic value. The posterior portion is quite conservative in form and frequently exhibits characters diagnostic for genera. In the remainder of this treatment, in referring to the length of the style, unless otherwise designated, only the posterior portion (connective to posterior apex) is under consideration.

In form, the style may be slender and tubular, or it may exhibit expansions in one or more planes, forming a lobe or lobes. It may bear setae which are quite constant in arrangement. Apparently in the higher genera of Erythroneurini, it has undergone a first, then a second apical extension from a simple form with an expanded apex. The accuracy of this idea, based purely on the morphology of the style apices cannot be established here. It might be strengthened or weakened by careful ontogenetic studies of the development of the apex of the style in species of Erythroneura. In figures 8 to 15, a series of style apices have been illustrated to show what appears to be first, an apical extension from a style with a flattened apex, such as occurs in Dikrellidia (fig. 8), for example; second, a flattening of this first extension from the apex of the style to form a broad, flat extension, as in Zygina (fig. 9), and third, a second extension from the apex of the first to form the posterior point (and the anterior point, when present) of the style, as in many Erythroneura species.

Following the above hypothesis, the parts of the style have been labeled accordingly, in order to make possible more precise descriptions. The lobe of the basic style pattern is designated the preapical lobe, and the first and second extensions have been designated as such. The mesal extremity of the first extension, in keeping with the terminology established in the literature, is designated the heel, and the posterior extremity of the second extension, the posterior point.

In some members of the Alebrini, a preapical expansion of the style occurs which apparently is not homologous with the preapical lobe mentioned above, for there is no indication that the narrower apical portion is of the nature of an extension, for no line of demarcation can be seen between the basal portion and the "extension".

Genitalia preparations of the Alebrini, usually have preserved the bulbus ejaculatorius and the duct leading from it to the genital atrium. The same structure is seldom preserved in macerated specimens in other groups.

The head. The form of the head has been little used in the present system of classification, in spite of the fact that its form is quite characteristic, so much so that experienced taxonomists in Cicadellidae may frequently make an accurate determination of a genus from the head alone. Reducing the general appearance of the head to tangible characters represents a problem not solved in the course of this work. It is a problem rendered more difficult by the difference in head shape between male and female. The writer has found the width of the ocellocular area (Plate 1, fig. 2) to be useful in certain descriptions. This distance is measured along a line across the top of and tangential to the first antennal segment, from inner margin of eye to the inner margin of the antennal base.

LITERATURE

Full bibliographic references are not given in the text or in the species lists. Instead, references are made to the appropriate citation in "Bibliography of the Homoptera", by Z. P. Ketcalf (1948a), which may be consulted for the full reference. In the species lists, the reference to the bibliography is followed by a colon, followed in turn by the page number on which the original description of the species occurs. In the case of references not included in the Ketcalf bibliography, the bibliography at the end of the present paper should be consulted.

In those instances where the original description was not verified by the writer, Oman's (1949a) work has been followed, usually, and these references have been indicated (**fide Oman*) in the species lists.

PROCEDURE

An attempt has been made to study as many species as possible, comparing them with genotypes, and placing them accordingly, describing new genera where such a course was indicated. The genera have been as completely characterized as possible. Where some characters have appeared of unusual value in diagnosis, they have been italicized in the descriptions.

Except in the case of genotypes, no particular effort has been made to discover synonyms, and doubtless several of these occur in the lists of species which accompany the genera. Except in a few cases, varieties have not been listed.

KEY TO TRIBES OF TYPHLOCYBINAЕ

1. Fore wing with an appendix ----- ALEBRINI
Fore wing without an appendix ----- 2
2. Hind wing with submarginal vein present (except in
(Typhlocybella) and extending laterad then basad along
costa beyond apex of vein "R₄M" ----- DIKRANEURINI
Hind wing with submarginal vein present or absent at wing
apex, when present not extending beyond apex of posterior
branch of R (or "R+M" where fusion occurs)----- 3
3. Vein 1V absent; style with distinct preapical lobe and
apical extension ----- ERYTHRONEURINI
Vein 1V present; style without distinct preapical lobe
and apical extension ----- TYPHLOCYBINI

TRIBE ALEBRINI

The species in this tribe all possess both vannal veins in the hind wing. In the fore wing, the fourth apical cell does not attain the wing apex, and an appendix is present, extending to or around the wing apex. Discal macrosetae are nearly always present on the pygofer, and usually a small group of microsetae occurs on the disc near the outer basal angle of the male plate. The styles usually lack a preapical lobe, and in those species in which the lobe is present, the narrower more caudad remainder of the style is seldom clearly of the nature of an extension as it usually is in other tribes where

this feature is present. The style is more intimately fused with the male plate than in other tribes, rendering dissection more difficult. The male plates are usually rolled apically, presenting a tubular appearance in cleared specimens. In macerated specimens, the bulbus ejaculatorius and the duct leading from it to the genital atrium are nearly always preserved.

The submarginal vein of the hind wing is usually close to, and often confluent with the apical wing margin, and it is wanting occasionally.

In all species of this tribe, in cleared specimens, the mid-dorsal line of the genital capsule appears membranous to the apex of the preceding segment, or if sclerotized medially near the base of the ninth segment, then the sclerotization appears to be secondary, arising in the membranous portion, which is visible laterally. In all other tribes, the sclerotization is continuous from pleural region to pleural region of the ninth segment, over the dorsum, although the dorsal arch of sclerotized integument may be only a narrow basal band.

KEY TO GENERA OF ALEBRINI

1. Head short, broad, enclosing pronotum nearly to its hind margin; male plates very long, greatly exceeding tip of pygofer; pygofer lacking setae over disc ---- Hadralebra

Head not unusually broad; male plates not greatly exceeding tip of pygofer; pygofer with setae usually present on disc (exception: Balera, Rhabdotalebra) ----- 2

2. Fore wing with two longitudinal veins confluent proximad of bases of apical cells ----- 3
- Fore wing without confluent longitudinal veins proximad of apical cells (longitudinal veins occasionally connected by a cross vein) ----- 4
3. Fore wings with veins M and Cu confluent proximad of apical cells ----- Aphanalebra
- Fore wings with veins R and M confluent proximad of bases of apical cells ----- Habela
4. Fore wing with only three apical cells as result of fusion of second and third apical veins ----- Kallebra
- Fore wing with four apical cells; second and third apical veins never completely fused ----- 5
5. Hind wing with Cu_2 confluent with submarginal vein at point distad of apparent forking of Cu_1 ----- Orsalebra
- Hind wing with Cu_2 confluent with submarginal vein at point opposite to or proximad of apparent forking of Cu_1 ----- 6
6. Aedeagal shaft, in dorsal aspect, broadly inflated throughout its length; style apex strongly sigmoid ----- Balera
- Aedeagal shaft, in dorsal aspect, not strongly inflated throughout its length; style apex straight or occasionally sinuate, not strongly sigmoid ----- 7

- 7. Aedeagus, in lateral view, appearing bifurcate at apex ----- Diceratalebra
- Aedeagus, in lateral view, not appearing bifurcate at apex ----- 8
- 8. Connective membranous ----- 9
- Connective, at least partially, heavily sclerotized -- 10
- 9. Fore wing with apex of cell R broadly expanded, much broader than cell M; aedeagus with single median ventral atrial process ----- Trypanalebra
- Fore wing with apex of cell R not broadly expanded, not or slightly broader than cell M; aedeagus without ventral atrial process ----- Paralebra
- 10. Head not distinctly produced medially, in dorsal aspect, its anterior and posterior margins subparallel; eyes massive, the median length of crown exceeding distance between eyes ----- 11
- Head distinctly produced medially, the margins not subparallel, or if so, then eyes small and the median length of crown much less than distance between eyes ----- 12
- 11. Fore wing with appendix extending completely around apex ----- Alebra
- Fore wing with appendix not extending around apex ----- Brunerella

12. Fore wing with apex of cell M transverse, occurring distad of basal third of inner apical cell ----- 13

Fore wing with apex of cell M oblique or angular, or if transverse, then occurring opposite basal third of inner apical cell ----- 14

13. Base of outer apical cell nearly opposite apex of cell R; aedeagus in lateral aspect, with width of unpaired ventral process (rarely absent) greatly exceeding width of midpoint of shaft ----- Habralebra

Base of outer apical cell much proximad of apex of cell R; unpaired ventral aedeagal process, when present, narrower than shaft ----- Elabra

14. Pygofer with submarginal macrosetae grouped very near posterodorsal margin; aedeagus in lateral aspect with apodeme saddle-shaped ----- Ahabdotalebra

Pygofer with discal macrosetae; aedeagal apodeme not saddle-shaped in lateral aspect ----- 15

15. Pygofer hooks various in origin, but not dorsal ----- Protalebra

Pygofer hooks dorsal in origin ----- Protalebrella

Genus Hadralebrea, nov.

(Pl. 4, fig. 16)

Type of the genus, Dikraneura (Hylcoidea) laticeps Osborn.

Hand wings: submarginal vein present, extending at least to apex of wing; vein Cu_1 apparently branched apically (i.e. its apical portion not fused with M_{3+4}); vein Cu_2 confluent with submarginal vein at point proximad of vein $m-cu$.

Fore wings: fourth apical cell short, subtrapezoidal; other apical cells successively shorter towards commissural margin.

Genital capsule: male plates greatly elongate, greatly exceeding tip of pygofer, without macrosetae; pygofer lacking setae over disc; pygofer hooks ventral in origin.

Internal male genitalia: style short, broad, flattened dorsoventrally, without preapical lobe or apical extension; connective massive, plate-like, its anterior margin broadly convex, its apex extending nearly as far caudad as style apices, the aedeagal articulation terminal in a socket; aedeagus with preatrium very long, shaft very short.

The head is conspicuously broader, in dorsal aspect, than the rest of the body, and surrounds the pronotum laterally except for the apical portions of the lateral margins.

This genus is unique, among those studied, in genital structure, and has several features which may be considered primitive, especially the form of the tips of the styles. Unfortunately the wing venation cannot be completely described, because the single specimen of the type species possessed only wing fragments.

The genus is known only from the type species, from Bolivia. laticeps (Osborn), 1928a: 277 (Dikraneura (Hyleidea)), new combination

Genus Aphanalebra McAtee

(Pl. 4, fig. 17)

Protalebra (Aphanalebra) McAtee, Journ. N. Y. Ent. Soc. 34: 152. 1926, new status.

Type of the genus, Protalebra unipuncta Baker, by original designation.

Hind wings: vein 1V branching from vein 2V near its base; submarginal vein confluent with apical wing margin; posterior branch of R and M_{1+2} not confluent, separate throughout their length, connected by a preapical cross vein; vein Cu_1 appearing branched apically; vein Cu_2 attaining submarginal vein near middle of wing, much basad of vein m-cu.

Fore wings: appendix not extending around wing apex; first apical cell longer than other apical cells, slender, much broader at base than at apex; second apical cell angular basally, petiolate, with sides subparallel; third apical cell very small, triangular, long-petiolate; fourth apical cell open basally, extending apicad nearly to wing apex; veins M and Cu fused basad of base of first apical cell; wing apex smoothly rounded.

Genital capsule: male plate elongate, slender, in ventral aspect with lateral margin gradually tapered on apical half to rounded apex; in lateral aspect plate exceeding pygofer and with oblique row of macrosetae over apical half, with group of close-set microsetae below lateral margin near middle its length, and

several irregularly arranged microsetae more distad; pygofer, in lateral aspect, with oblique row of macrosetae over disc and cluster of similar setae above posteroventral margin, a small group of ventral microsetae above basal third of male plate; posteroventral pygofer margin extending mesad as thick process bifid at extremity.

Internal male genitalia: style without preapical lobe or apical extension, in dorsal aspect gradually narrowed posteriorly to convexly truncate apex, apical fifth slightly curved laterad; connective membranous; aedeagus with unilateral apodemal process on left side, nearly as long as shaft, the process extending directly ventrad, then curved and directed posterodorsad, shaft in lateral aspect sharply decurved at extreme apex, bisinuate basad of recurved portion, apodeme Y-shaped, dorsal portion of atrium attached ventrally near origin of stem of "Y"; gonoduct with curious tightly-coiled appearance in apical two-thirds, preatrium wanting.

The head, in dorsal aspect, is much narrower than the pronotum, and well-produced medially, longer medially than next the eye. The anterior margin is broadly rounded. The median length of the pronotum is at least twice the median length of the crown, with lateral margins greatly divergent posteriorly and posterior margin shallowly emarginate. In lateral aspect, the face is flat, its contour strongly divergent from the line of the dorsum. The pleural portion of the pronotum is much broader than the ocellocular area.

The type species is from Brazil.
unipuncta (Baker), 1899b: 404 (Protalebra)

Genus Habela, nov.

(Pl. 5, fig. 16)

Type of the genus, Protalebra tabebuiae Dozier.

Hind wings: vein 1V branching from vein 2V near its midpoint; submarginal vein wanting apically; longitudinal veins not attaining wing apex; posterior branch of R and M_{1+2} concurrent for a short distance preapically, separate apically, the free part of the posterior branch of R only a short spur; vein Cu_1 appearing branched apically; vein Cu_2 confluent with submarginal vein near middle of wing, much basad of vein m-cu.

Fore wings: appendix not extending around wing apex; veins R and M concurrent before inner basal angle of outer apical cell, all apical veins thus arising from cell M; first and second apical cells long, slender, the first much broader than second; third apical cell long-stalked; outer apical cell longer than broad, pentagonal, not attaining wing apex.

Genital capsule: male plate with oblique double row of macrosetae on disc, in lateral view with small group of microsetae near lateral margin on basal half, and irregularly arranged smaller microsetae over apical half; pygofer, in lateral view, with group of submarginal macrosetae paralleling dorsal margin preapically, two smaller setae within ventrolateral margin and small group of microsetae just dorsad of outer basal angle of male plate; pygofer hook arising from posterior lobe of pygofer, directed dorsocaudad.

Internal male genitalia: style narrowed basally and apically, broadened on middle half its length, preapical lobe well-developed, apex narrowed and directed posterolaterally, obliquely truncate apically; connective Y-shaped, the aedeagal

articulation terminal; aedeagus with elongate preatrium, shaft long, slender, curved in large arc, the apex directed cephalad above the dorsal apodeme, dorsal apodeme with pair of flattened divergent processes, aedeagal shaft lacking processes.

The anterior margin of the head, in dorsal aspect, is parabolous, the median length exceeding the distance between the eyes. The head, including the eyes, is narrower than the broadest portion of the pronotum. In lateral aspect, the crown is sharply rounded to the face, which is convex on its upper half. The pronotum is short and broad, the lateral margins strongly divergent posteriorly, the posterior margin scarcely emarginate. The width of the pleural portion of the pronotum exceeds the width of the ocellocular area.

The type species is from Cuba, and is the only species representing this genus seen by the writer.

tabebuiae (Dozier), 1927b: 260 (*Protalebra*), new combination
bicineta Osb., 1928a: 259 (*Protalebra*), new synonymy

Genus *Kallebra* McAtee

(Pl. 5, fig. 19; Pl. 6, fig. 20)

Protalebra (*Kallebra*) McAtee. Journ. N. Y. Ent. Soc. 34: 152.
1926, new status.

Type of the genus, *Protalebra ninettae* Baker, by original designation.

Hind wings: vein 1V branching from vein 2V near its base; submarginal vein present (its apical extent undetermined); posterior branch of R touching M_{1+2} preapically, then diverging, the two veins extending separately towards wing apex; vein Cu_2 confluent with submarginal vein at point much basad of apparent forking of vein Cu_1 .

Fore wings: appendix not extending around wing apex; only three apical cells present (probably as result of fusion of second and third apical veins); inner apical cell much longer than other two, the three apical cells, measured near mid-length of central one, approximately equal in width; outer apical cell subequal in length to central apical cell; cell M much broader than cell R.

Genital capsule: male plate, in ventral aspect, broad on basal half, outer margin strongly converging towards mesal margin on apical half to sharply rounded apex, with submarginal row of macrosetae paralleling lateral margin over third quarter of length, with basal lateral internal broad heavily-sclerotized thickening along lateral margin on basal half and extremely heavily sclerotized point at apex of thickening near middle of length of plate; in lateral aspect, plate with microsetae dispersed over apical half, plate extending as far distad as apex of pygofer; pygofer with submarginal group of few microsetae near ventral margin and few macrosetae on disc; pygofer hook weak, arising from ventral pygofer margin and extending posteromesad.

Internal male genitalia: style, in lateral aspect, without preapical lobe, but with distinct apical extension, in dorsal aspect with obliquely truncate apex; connective membranous; aedeagus with well-developed dorsal apodeme giving off two slender elongate processes nearly as long as shaft, shaft slender, elongate, slightly decurved apically; preatrium wanting.

The head is well-produced medially, the median length greatly exceeding the width between the eyes, and nearly equal to that of the pronotum. In dorsal aspect, the anterior margin of the head appears nearly right-angled, with the apex rounded. The lateral margins of the pronotum are divergent posteriorly, and the posterior margin is shallowly concave. In lateral aspect, the face is smoothly and slightly convex, its contour strongly divergent from that of the dorsum. The width of the pleural portion of the pronotum exceeds the width of the ocellular area.

The genus is known only from the type species, from Brazil. *ninettae* (Baker), 1899b: 403 (Protalebra)

Genus Orsalebra, nov.

(Pl. 6, fig. 21; Pl. 7, fig. 22)

Type of the genus, Orsalebra robusta, n. sp.

Hind wings: vein 1V branching from 2V near its midpoint; submarginal vein extending around wing apex and distinct from apical margin, continued beyond apex of posterior branch of R along costal margin towards base of wing, becoming evanescent near mid-costal margin; posterior branch of R separate from M_{1+2} apically, but connected with it by a preapical cross vein; vein Cu_1 apparently branched apically; vein Cu_2 attaining submarginal vein at point distad of vein m-cu.

Fore wings: appendix extending around wing apex; bases of first, second, and third apical cells transverse, these cells successively shorter towards costal margin; outer apical cell open at base; second apical cell with lateral margins subparallel; third apical cell broader apically than at base.

Genital capsule: male plate, in ventral aspect, broad basally, abruptly narrowed on outer margin at apical third, apex broadly rounded, disc of basal two-thirds with sparse weak macrosetae, similar setae limited to mesal portion on apical third; pygofer in lateral aspect with middle of posterior margin produced posteriorly, with sclerotized subquadrate thickening at its apex, with few macrosetae on posterior portion of disc before apical sclerotization and small group of microsetae near center of disc dorsad of outer basal angle of male plate.

Internal male genitalia: style elongate, slender, in lateral aspect with distinct preapical lobe and slender dorsal apical extension directed dorsomesad; connective U-shaped, the closed end dorsal, its plane forming right angle with plane of long axis of styles; aedeagal articulation on posterior face of closed end of connective; aedeagus in lateral view with elongate preatrium; in dorsal view with shaft curved gradually dorsad to near apex, then posteroventrad, extreme tip truncate, shaft broadly grooved on dorsal face from base to beginning of ventrally curved apical portion, the groove there replaced by dorsal carina retrorse at base, flanked by two similar lateral carinae, shaft with pair of laterally extending once-forked processes arising from its sides, each of the branches pectinate in appearance; in lateral view, the forked shaft processes arising just basad of an unpaired shaft process which lies closely appressed to the shaft apically and bears the three carinae already described; dorsal apodeme forked near tip, well-developed.

This strange genus appears to be related to Alebra and has several characters which suggest an affinity with the Dikraneurini: the venation of the fore wings, the venation of the hind wings (except the unfused posterior branch of R and M_{1+2}) especially the position of the confluence of Cu_2 with the submarginal vein, and the apical extension of the styles. It may stand along the line which leads to the Dikraneurini. Only the genotype is known, at present.

Orsalebra robusta, n. sp.

Form. General form broad, robust; head including eyes subequal in width to greatest width of pronotum, but little produced, median length of crown only small fraction of width between eyes, apex broadly rounded, crown broadly rounded to face; face in profile slightly concave above middle its length; ocelli present, slightly closer to eyes than to each other; pronotum broader than long, lateral margins divergent posteriorly, humeral angles broadly rounded, posterior margin shallowly emarginate, width of pleural portion of pronotum slightly exceeding width of ocellocular area; female sternite VII considerably produced medially, broadly convex laterally. Wings, male genital capsule and internal male genitalia as in generic description above.

Color: Dorsum pale yellowish white, a pair of faint spots around each ocellus, three longitudinal discal pronotal vittae over basal two-thirds, basal angles of scutellum and apex except extreme tip, a claval vitta paralleling claval suture and a corial vitta parallel to this, a second corial vitta fainter

and parallel to radial margin, pale yellow to orange; extreme tip of clavus and small portion of adjoining appendix deep, apex of brachial cell and bases of apical cells paler, black; face with suggestion of two yellow markings at base; remainder of venter stramineous except dark tarsal claws.

Described from male holotype and female allotype specimen from Hda Talahua Bolivar, Ecuador, collected at an altitude of 3100 M. by F. M. and H. H. Brown. Types in Snow Entomological Collection.

Genus Balera, nov.

(Pl. 7, fig. 23)

Type of the genus, Dikraneura pellucida Osborn.

Hind wings: submarginal vein present, distinct from apical wing margin, confluent with apex of posterior branch of R; posterior branch of R and M_{1+2} not confluent, vein Cu_1 appearing branched apically; vein Cu_2 confluent with submarginal vein at point much basad of cross vein m-cu.

Fore wings: appendix not extending around wing apex; all apical cells much longer than broad, their bases angulate except inner apical cell which is oblique at base; inner apical cell much broader than other apical cells; third apical cell not stalked; outer apical cell extending distad nearly to wing apex; apex of cell M angulate, occurring opposite basal third of inner apical cell.

Genital capsule: male plate, in lateral aspect with group of macrosetae forming double row on disc of basal half, apical half with sparsely arranged microsetae; lateral margin near base with irregular row of microsetae; pygofer without macrosetae on disc but with a submarginal row of these occurring parallel to dorsolateral margin, a small group of microsetae on disc dorsad of outer basal angle of male plate; pygofer hook directed mesad, not differentially sclerotized.

Internal male genitalia: style, in lateral view, short, with distinct preapical lobe, apex curved dorsad with few setae along posterior margin then sharply ventrad, the apical half of the style thus appearing sigmoid; connective V-shaped, turned dorsad at extreme apex, the aedeagal articulation subterminal; aedeagus inflated, preatrium and dorsal apodeme weak, shaft keeled laterally, the keels widened apically forming pair of dorso-laterally extended membranous lobes, these continuous through a similar ventral apical lobe extending distad from ventral margin of transverse gonopore.

The head, in dorsal aspect, is broadly triangular, with the apex obtusely angular. Its width, including the eyes, is greater than the width of the pronotum. The median length of the crown is subequal to the width between the eyes. In lateral aspect, the crown is rounded to the face, which is flat except for a slight concavity near its middle. The pronotum is narrow, the lateral margins subparallel, the posterior margin shallowly emarginate. The pleural portion of the pronotum is much wider than the ocellocular area.

The genotype is from Bolivia.

pellucida (Osborn), 1928a: 271 (Dikraneura), new combination.

Genus Diceratalebra, nov.

(Pl. 7, fig. 24; pl. 8, fig. 25)

Type of the genus, Alebra sanguinolinea Baker.

Hind wings: vein 1V branching from vein 2V near its midpoint or slightly more proximad; submarginal vein present, confluent or not with apical wing margin; posterior branch of R and M_{1+2} fused for a short distance preapically or not, separate apically; vein Cu_1 appearing branched apically; vein Cu_2 confluent with submarginal vein at point basad of vein m-cu.

Fore wings: appendix present, extending around apex of wing (interrogata) or not; inner apical cell broad basally, much narrower on apical half; second apical cell narrow basally with lateral margins nearly parallel; third apical cell sessile or petiolate; outer apical cell short, not attaining wing apex, its length slightly exceeding its width; cell R extending more distad than cell M; cell M with oblique or obliquely angular apex.

Genital capsule: male plate, in ventral aspect, elongate, slender, gradually tapered to abruptly rounded apex, with single row of macrosetae over apical two-thirds (middle two-fourths in robusta), extending obliquely from disc distad to and along mesal margin; in lateral aspect with numerous irregularly arranged macrosetae between these and lateral margin; pygofer produced posterodorsad, with single vertical row of macrosetae, and with group of macrosetae just dorsad of outer basal angle of male plate; pygofer hook arising along posteroventral margin or on disc near margin quite distant from base of male plate, directed posteroventrad or posterodorsad.

Internal male genitalia: style short, without distinct preapical lobe or apical extension, curved slightly laterad at apex; connective heavily sclerotized and trapezoidal, or membranous; aedeagus short, laterally compressed, appearing bifid at apex, but with the dorsal ramus comprising the shaft and bearing the gonduct, the ventral ramus actually a ventral process of the shaft.

The head is distinctly produced medially, with the apex rounded, in dorsal aspect. The median length of the crown is equal to, or exceeds, the width between the eyes, but is less than the median length of the pronotum. The lateral margins of the pronotum are sharply divergent posteriorly, and the posterior margin is shallowly concave. In lateral aspect, the contour of the face is convex, and strongly divergent from the line of the dorsum. The pleural portion of the pronotum is broader than the ocellocular area. Ocelli are present.

The genus is Neotropical in distribution.

cubana (Osborn), 1928a: 261 (Protalebra), new combination
interrogata (Knull), 1940b: 291 (Alebra), new combination
sanguinolinea (Baker), 1903d: 5 (Alebra), new combination
robusta (Gillette), 1898a: 712 (Alebra), new combination

Genus Trypanalebra, nov.

(Pl. 8, fig. 26)

Type of the genus, Protalebra maculata Baker.

Hind wings: vein IV branching from vein 2V at its midpoint or more proximad; submarginal vein present, confluent with apical

wing margin; posterior branch of R not confluent with vein M_{1+2} ; vein Cu_1 appearing branched apically, the apparent forking near middle of wing; vein Cu_2 confluent with sub-marginal vein near middle of wing occasionally nearly opposite vein m-cu.

Fore wings: appendix not extending around wing apex; inner apical cell longer than second, not conspicuously wider at base than at apex; second apical cell slender, parallel-sided, in width equalling or exceeding inner apical cell; third apical cell triangular, petiolate or not at base; outer apical cell short, trapezoidal, not attaining wing apex, its width nearly or entirely equal to its length; cell R extending farther distad than cell M and expanded apically, its expanded apex usually in contact with all the apical cells; wing apex smoothly rounded.

Genital capsule: male plate, in ventral aspect, slender, gradually tapering to sharply rounded apex, with single row of macrosetae over apical two-thirds, parallel to lateral margin, irregularly arranged except a close-set group at about basal third of length of plate; pygofer, in lateral aspect, with vertical or oblique row of macrosetae over disc, and small group of microsetae just dorsad of outer basal angle of male plate, posterior pygofer margin distinct, or poorly delimited from ventral margin; posterior pygofer margin inrolled and giving rise to short pygofer hook; anal hooks wanting.

Internal male genitalia: style short, without preapical lobe or conspicuous apical extension, in lateral aspect with apex decurved and acute; connective membranous; aedeagus laterally compressed, preatrium wanting, shaft short, directed

posterodorsad, giving off pair of dorsal processes along its length; single median atrial process arising ventrally and extending far beyond apex of shaft.

The leafhoppers of this genus are small, and marked with yellow and black, and with a dark saddle across the middle of the dorsum. The head, including the eyes, is narrower than the pronotum. In dorsal aspect, the anterior margin of the head is broadly rounded. The distance between the eyes greatly exceeds the median length of the crown which is much less than the median length of the pronotum. The lateral margins of the pronotum are greatly divergent posteriorly, and the posterior margin is shallowly concave. The pleural portion of the pronotum is broader than the ocellocular area. Ocelli are present.

The genus is Neotropical and Sonoran in distribution. In addition to the genotype, the writer has examined an undescribed species from Arizona,

maculata (Baker), 1903d: 6 (Protalebra), new combination

Genus Paralebra McAtee

(Pl. 8, fig. 27)

Protalebra (Paralebra) McAtee, Journ. N. Y. Ent. Soc. 34: 147, 151. 1926, new status.

Protalebra (Plagalebra) McAtee, op. cit.: 147, 150. 1926, new synonymy.

Type of the genus, Protalebra similis Baker, by original designation.

Hind wings: vein 1V branching from vein 2V basad of its midpoint; submarginal vein confluent with apical wing margin; posterior branch of R not confluent with vein M_{1+2} ; vein Cu_1 appearing forked apically; vein Cu_2 confluent with submarginal vein near midpoint of wing, basad of cross vein m-cu.

Fore wings: appendix not extending around wing apex; inner apical cell much broader in basal half than at apex; second apical cell longer than broad; third apical cell stalked, its apex scarcely attaining wing apex; outer apical cell short, trapezoidal, not attaining wing apex; cell R extending more distad than cell M; cell M simple or possessing a cross vein (singularis).

Genital capsule: male plate, in ventral aspect, gradually narrowed to sharply rounded apex, in lateral aspect with oblique group of macrosetae over middle two-fourths, with numerous irregularly arranged microsetae laterad and distad of these; pygofer with vertical row of discal macrosetae and group of microsetae near ventral margin, posterior margin produced or truncate, with ventral weak pygofer hook consisting of differentially sclerotized portion of pygofer wall, with or without additional digitate undifferentially-sclerotized process.

Internal male genitalia: style without preapical lobe or apical extension, its apex gently curved mesad or laterad; connective membranous; aedeagus with elongate heavily sclerotized atrial rim in form of inverted U, the dorsal closed portion expanded somewhat to form the apodeme, with pair of atrial processes arising dorsally or ventrally, extending laterad or parallel to aedeagal shaft; shaft elongate-campanulate, the apex turned slightly dorsad, without processes.

The head, in dorsal aspect, is well produced, rounded or angular at apex, with the crown flat or slightly concave. The pronotum is much broader than long, and broader than the head, including the eyes. The lateral margins of the pronotum are divergent posteriorly, and the posterior margin is concave. In lateral aspect, the contour of the face is flat or shallowly concave, and sharply divergent from the line of the dorsum. The pleural portion of the pronotum is much broader than the ocellocular area.

The genus has a Neotropical distribution. In addition to the species listed here, an undescribed Cuban species has been examined.

similis (Baker), 1899b: 403 (Protalebra), new combination

singularis (Baker), 1899b: 402 (Protalebra), new combination

Genus Alebra Fieber

(Pl. 9, fig. 28; Pl. 10, fig. 29)

Alebra Fieber. Kat. d. Eur. Cic. : 14. 1874.

Type of the genus, Cicada albostrigella Fallén, by subsequent designation of Oshanin (Kat. Pal. Hemip. : 111. 1912).

Hind wings: vein 1V branching from vein 2V near its midpoint; posterior branch of R not fused with vein M_{1+2} ; vein Cu_1 appearing branched apically; submarginal vein extending around wing apex and confluent with extremity of posterior branch of R; vein Cu_2 confluent with submarginal vein opposite vein m-cu.

Fore wings: appendix present, extending around wing apex; first, second and third apical cells subequal in length, the first slightly wider than either second or third; outer apical cell open basally; pattern formed by bases of apical cells nearly an unbroken transverse line.

Genital capsule: male plate with fairly numerous macrosetae arranged in linear group along mesal margin, a small group of coarse short macrosetae on lateral margin on middle third, a close-set cluster of setae on dorsal face of apex of plate, several microsetae on disc and on lateral margin on apical half; pygofer, in lateral view, with bilobed posterior margin, the dorsolateral lobe short, bearing sparse short setae, the ventrolateral lobe longer and bearing an antepical group of macrosetae and a few discal microsetae.

Internal male genitalia: style elongate, without preapical lobe or apical extension, with small lobate ventral extension slightly distad of articulation with connective, apex acute, smoothly and sharply curved ventrad; connective triangular, the aedeagal articulation terminal; aedeagus with preatrium distinct, atrium small, dorsal apodeme well-developed, shaft elongate, slender, without ornamentation or processes, gonopore terminal; shaft asymmetrical in ventral aspect as result of curvature to one side; anal hooks and pygofer processes wanting.

The head, including the eyes, is narrower than the pronotum. The median length of the crown is less than the width between the eyes. The anterior and posterior margins of the crown are subparallel. In lateral aspect, the crown is broadly rounded to the convex face. The pronotum is long, greatly exceeding in length the median length of the crown. The lateral margins are divergent posteriorly, the posterior margin shallowly emarginate. The pleural portion of the pronotum is considerably wider than the ocellocular area.

The North American specimens of the type species which have been dissected revealed constant difference from an European specimen from Hungary, which agreed fairly well with a French specimen illustrated by Ribaut. Several North American specimens were dissected and found to be identical in structure of genital capsule and internal male genitalia. The specimen figured is one of the North American forms. In the European forms (vide Ribaut 1936), the lower of the two posterior pygofer lobes arises further ventrad on the posterior margin, and the dorsal aedeagal apodeme is slightly different. It seems doubtful to the writer that such differences, though constant in the specimens studied, are indicative of specific differences between Palaearctic and Nearctic forms.

From the Western Hemisphere, only the genotype is known. *albostriella* (Fallén), 1826a:54 (*Cicada*) (vide Oman)

Genus Brunerella, nov.

(Pl. 10, fig. 30; pl. 11, fig. 31)

Type of the genus, Brunerella magnifica, n. sp.

Hind wings: vein 1V branching from vein 2V basad of its midpoint; submarginal vein present, extending to wing apex and confluent with apex of vein M_{1+2} ; posterior branch of R represented by a long spur; vein Cu_1 appearing branched apically; vein Cu_2 confluent with submarginal vein considerably basad of vein m-cu.

Fore wings: appendix not extending around wing apex; first, second, and third apical cells slender and progressively shorter in that order, their margins subparallel; outer apical

cell trapezoidal, not attaining wing apex; inner apical cell slightly wider than either second or third apical cell; cell M with apex transverse, occurring opposite basal third of inner apical cell.

Genital capsule: male plate, in ventral aspect, with diagonal row of macrosetae across distal portion of basal third, and a similar row along mesal margin nearly to apex, outer margin abruptly narrowed beyond basal third, then parallel to inner margin to rounded apex; in lateral aspect, plate with group of small submarginal setae slightly distad of outer basal angle, a row of stout microsetae near to and paralleling lateral margin over distal half, disc with sparse microsetae; pygofer, in lateral aspect, slightly emarginate posterodorsally and with well-produced posterior lobe, disc with few preapical macrosetae and with short stout microsetae located above lower part of oblique posteroventral margin; pygofer hooks and anal hooks wanting.

Internal male genitalia: style, in broad aspect, biramous basally, the connective articulating between the arms, outer margin nearly straight, slightly expanded preapically, inner margin bisinuate, then narrowing obliquely and slightly concavely to blunt apex; connective narrow, its anterior margin shallowly angulate at center, the aedeagal articulation membranous; aedeagal shaft with preatrium short (disregarding membranous articular portion), a pair of apodemes arising from lateral atrial margin, sharply curved dorsad and mesad; shaft simple, tubular, unornamented, without processes.

The head is short and robust, the eyes massive. Ocelli are present.

This genus is dedicated to Dr. S. C. Bruner, of the Department of Phytopathology and Entomology of the Cuban Ministry of Agriculture, who has been most cooperative and who has collected some specimens in the type series.

Brunerella magnifica, n. sp.

Form. Head, including eyes, subequal in width to greatest width of pronotum, in dorsal aspect with apex broadly rounded before eyes, scarcely produced, the median length of crown more than double width between eyes; in profile with crown broadly rounded to convex face, with ocelli on margin between eyes, not visible from above, nearly touching mesal margins of compound eyes; pronotum short, median length about half width, lateral margins slightly divergent posteriorly, posterior margin shallowly concave, pleural portion not broad but in width greatly exceeding narrow ocellocular area; scutellum broadly exposed; abdomen heavily sclerotized; female sternite VII gradually produced medially in rounded posterior projection, the posterior margin sinuate each side of this; male plates and female pygofer lacking conspicuous dark macrosetae. Wings, genital capsule, and internal male genitalia as in generic description.

Color. Crown of head ivory white, with an irregular orange "V" in center, the arms broadly touching the eyes; pronotum sanguineous, except posterior margin medially which is slate gray, with dark border between red and gray portions laterally, pleural portion of pronotum red above lower extremity; scutellum greenish yellow, a slender dark transverse line just before extreme apex; fore wings pruinose, a pale brick-red streak along costa near base, an angulate broad sanguineous vitta,

its apex directed mesad, in basal half of clavus, and contingent red spot in adjacent corium, the posterior margin of both narrowly edged in black; apical half of clavus except extreme tip and inner half of adjacent corium amber, the corial portion continuing caudad, becoming fumose, and broadening to cover apical cells except few slate gray fenestrae and brick-red apical veins; base of outer apical cell fumose next costal margin; face and legs ivory; hind tibiae narrowly embrowned apically; female pygofer black with pale setae.

Holotype male, allotype female and paratype male from 30 miles east of Jalapa, Mexico, collected December 31, 1949 by Dr. R. H. Beamer, in Snow Entomological Collections. Eight male specimens examined from Almandares River near Havana, Cuba, collected December 11, 1931 by Dr. S. C. Bruner on Bourreria succulenta, in collection of Dr. bruner.

The Cuban specimens differ in color to a considerable degree from the Mexican ones, although the genitalia appear identical. In the Cuban material, the red color of the anterior portion of the pronotum invades the more posterior gray portion in a large median tooth which extends nearly to the base of the pronotum, while the dark gray between the red and gray on the pronotum is more pronounced than in the Mexican form. The angular red markings of the anterior part of the fore wing are deeper red and more extensive, forming a deep red line across the basal fourth of the wing except hyaline areas, one adjoining scutellum on each wing, and one on each wing astride claval suture, this transverse line bordered behind with dark. The amber yellow of the central part of the wings extends completely across both wings nearly as far distad as the apex of the clavus. The wing

apices are more deeply dark and the dark marking extends cephalad to include the tip of the clavus.

Genus Habralebra, nov.

(Pl. 11, fig. 32)

Type of the genus, Protalebra nicaraguensis Baker.

Hind wings: vein 1V branching from vein 2V near its base; submarginal vein present, nearly confluent with wing apex to apex of vein M_{1+2} ; posterior branch of R not confluent with vein M_{1+2} (posterior branch of R evanescent apically in type species); vein Cu_1 appearing branched apically; vein Cu_2 confluent with submarginal vein at point considerably proximad of vein m-cu.

Fore wings: appendix not extending around wing apex; first, second, and third apical cells elongate, slender, the inner longer than either the second or third; outer apical cell short, not attaining wing apex, its base nearly opposite apex of cell R; cell M with apex transverse and occurring distad of basal third of inner apical cell, wider apically than cell R.

Genital capsule: male plate with oblique single row of macrosetae over middle third its length, or more extensive, extending along mesal margin apically to near apex of plate, microsetae arranged variously; pygofer, in lateral aspect, with posterior margin produced, with single row of macrosetae over disc and group of microsetae dorsad of basal third of male plate, with ventral margin rolled mesad and often giving rise to posteriorly directed pygofer hook; anal hooks wanting.

Internal male genitalia: style various in form, apex curved gradually laterad; connective papilionaceous, Y-shaped, or occurring as a cross-bar, the apical portion occasionally

turned dorsad, the aedeagus then joined to connective by a membranous connection; aedeagus, in lateral view, with elongate preatrium or none, dorsal apodeme well-developed, Y- or T-shaped, atrium giving rise to single ventral process which is thicker than apical half of long tapering shaft.

The head, including the eyes, is narrower than the pronotum, and deltoid. In dorsal aspect, the median length of the crown exceeds the distance between the eyes. In lateral aspect, the crown is sharply rounded to the face. The pronotum, in dorsal aspect, has the lateral margins slightly divergent posteriorly and is smoothly concave on the posterior margin. The width of the pleural portion of the pronotum very greatly exceeds the width of the ocellocular area. The species examined are pale in color, with dorsal markings of pale yellow and black.

The genus has a Neotropical distribution. It seems to be nearly related to Elabra.

Several undescribed species from South America have style apices with a distinct preapical lobe and what appears to be an apical extension, the latter broad apically and suggestive of the condition found in Zygina in the Erythroneurini. One of the paratypes of bifasciata, erroneously designated, has style apices of this sort.

amoena (Baker), 1899b: 404 (Protalebra), new combination
bifasciata (Gillette), 1898a: 711 (Alebra), new combination
nicaraguensis (Baker), 1903d: 6 (Protalebra), new combination
trimaculata (Gillette), 1898a: 712 (Alebra), new combination

Apparently the genotype was described from a single female specimen from San Marcos, Nicaragua. This specimen, in the Pomona College collection, did not bear a type label. A series of specimens of this species, from Mexico, from the D. M. DeLong collection, was examined by the writer.

Genus Elabra, nov.

(Pl. 11, fig. 33; pl. 12, fig. 34)

Type of genus, Protalebra eburneola Osborn.

Hind wings: submarginal vein present, confluent with apical wing margin and with apex of posterior branch of vein R; posterior branch of R fused with vein M_{1+2} through part of its length or not, the two veins separate apically; vein Cu_1 appearing branched apically; vein Cu_2 confluent with submarginal vein at point basad of vein $m-cu$.

Fore wings: appendix not extending around wing apex; inner apical cell broader or narrower than second apical cell; third apical cell trapezoidal or triangular, not stalked; outer apical cell short, not attaining wing apex, its base considerably basad of apex of cell R; apex of cell M transverse, not oblique, occurring distad of basal third of inner apical cell.

Genital capsule: male plate variable between species as to location of setae; pygofer with discal macrosetae, and group of microsetae on disc above outer basal angle of male plate, occasionally with macrosetae or microsetae on posterodorsal margin, and microsetae on posteroventral margin; pygofer hooks present or absent, median or dorsal in origin when present; anal hooks usually poorly developed.

Internal male genitalia: style without preapical lobe or apical extension, slender, tubular, straight or slightly curved at apex; connective in form of large cross-bar (except in attenuata); aedeagus with preatium well-developed or absent, dorsal apodeme well-developed (except in attenuata); aedeagus often with pair of short ventral processes along its length.

The species included here are small and delicate in appearance, with elongate heads, the median length of the crown exceeding the distance between the eyes. The face, in profile, is slightly convex. The pleural portion of the pronotum is very broad, exceeding in width the ocellular area.

The distribution is Neotropical.

attenuata (Osborn), 1928a: 269 (Dikraneura), new combination

albidula (Osborn), 1928a: 271 (Dikraneura), new synonymy

eburneola (Osborn), 1928a: 257 (Protalebra), new combination

parallela (Osborn), 1928a: 274 (Dikraneura), new combination

parana (Osborn), 1928a: 268 (Dikraneura), new combination

quadrifasciata (Osborn), 1928a: 272 (Dikraneura), new combination

sarana (Osborn), 1928a: 268 (Dikraneura), new combination

Genus Rhabdotalebra, nov.

(Pl. 12, fig. 35; Pl. 13, fig. 36)

Type of the genus, Protalebra octolineata Baker .

Hind wings: vein 1V branching from vein 2V near its midpoint; submarginal vein confluent with apical wing margin; posterior branch of R fused with M_{1+2} for a short distance preapically or not, the two veins always separate apically; vein Cu_1 appearing branched apically; vein Cu_2 confluent with submarginal vein near mid-length of wing, much basad of cross vein m-cu.

Fore wings: appendix not extending around wing apex; inner apical cell much broader at base than at apex, longer than other apical cells; second apical cell angular at base (except in brunnea); third apical cell petiolate, scarcely attaining wing apex; apex of cell M opposite basal third of inner apical cell.

Genital capsule: male plate, in ventral aspect, slender, gradually tapered, with macrosetae over apical two-thirds, or on basal half, their arrangement not uniseriate, in lateral aspect with microsetae irregularly arranged on distal two-thirds of plate; pygofer lacking macrosetae on disc, but with sub-marginal group near posterodorsal margin, with microsetae dispersed on disc; posteroventral margin of pygofer inrolled and thickened to form pygofer hook which projects posterodorsad.

Internal male genitalia: style broadened near middle of its length, with apical median extension curved slightly laterad, preapical lobe well-developed or not; connective heavily sclerotized; aedeagus lacking basal or atrial processes, shaft simple, occasionally with paired terminal processes, preatrium well-developed, apodeme saddle-shaped in lateral aspect, elongate in axis of base of aedeagal shaft.

In dorsal aspect, the head, including the eyes, is narrower than the pronotum, and distinctly produced medially to the rounded apex. The median length of the crown is slightly greater than the median length of the pronotum (exception: octolineata). The lateral margins of the pronotum are divergent posteriorly and the posterior margin is shallowly concave. In lateral aspect, the face is slightly convex, its contour sharply divergent from the line of the dorsum. Ocelli are absent.

The genus is Neotropical.

brunnea (Oman), 1937d: 567 (Protalebra), new combination
octolineata (Baker), 1903d: 7 (Protalebra), new combination
signata (McAtee), 1926b: 148 (Protalebra), new combination,
new status

Genus Protalebra Baker

(Pl. 13, fig. 37)

Protalebra Baker. Psyche 8: 401, 402. 1899.

Type of the genus Alebra curvilinea Gillette, by original designation.

Hind wings: vein 1V branching from vein 2V near its midpoint or more basad; submarginal vein present, extending around wing apex, confluent with apical wing margin or not, its apex joining apex of posterior branch of R; posterior branch of R confluent with M_{1+2} for a short distance or not; vein Cu_1 appearing branched apically; vein Cu_2 confluent with submarginal vein at point basad of vein m-cu.

Fore wings: appendix not extending around wing apex; first and second apical cells of various forms, the first longer than the second; third apical cell sessile and quadrangular, triangular, or petiolate; outer apical cell short, not attaining wing apex.

Genital capsule: male plate variable as to arrangement of setae; pygofer with group of macrosetae on disc not limited to narrow area along posterodorsal margin; pygofer nooks ventral, posteroventral, or posterior in origin.

Internal male genitalia: style of varied form, usually short, and without preapical lobe or apical extension; connective sclerotized; aedeagus of various forms, preatrium usually well-developed, dorsal apodeme long or short, aedeagal shaft without processes.

At present, this genus is heterogeneous. It includes a considerable variety of forms, as well as those species which have not been studied, or only the females of which have been studied. In the list which follows, the species which have not been studied are prefixed with a single asterisk, while those for which no males have been studied are prefixed with a double asterisk.

*apicalis Van Duzee, 1907a: 74

*aureovittata (DeLong), in Wolcott 1923b: 267 (Alebra)

pallida Osborn, 1928a: 260

*cordiae Osborn, 1929b: 102

curvilinea (Gillette), 1898a: 710 (Alebra)

decorata (Osborn), 1928a: 255 (Alebra), new combination

**lenticula Osborn, 1929b: 103

*lineola Osborn, 1928a: 263

**nexa McAtee, 1926b: 150

omega Van Duzee, 1907a: 75

**picea Osborn, 1928a: 265

*sabana Osborn, 1928a: 259

*scriptozona Van Duzee, 1923a: 186

**sublunata (Osborn), 1928a: 289 (Erythroneura), new combination

*transversalis Baker, 1903d: 6

vexillifera Baker, 1899b: 404

Genus Protaibrella, nov.

(Pl. 13, fig. 38; pl. 14, fig. 39)

Type of the genus, Protaibrella brasiliensis Baker.

Mind wings: vein 1V branching from vein 2V near its midpoint; submarginal vein present, confluent with wing margin at apex; posterior branch of R confluent with vein M_{1+2} for a short distance preapically but separate at apex, or not so confluent; vein Cu_1 appearing branched apically, the apparent forking near middle of discal area; vein Cu_2 confluent with submarginal vein near mid-length of wing, occasionally nearly opposite vein m-cu.

Fore wings: appendix not extending around wing apex; base of inner apical cell not in contact with cell R; second apical cell shorter than inner apical cell, its width at mid-length equalling or exceeding width of adjacent part of inner apical cell; third apical cell triangular or petiolate; outer apical cell broad, short, not attaining wing apex; cells R and R' subequal in width at their broadest preapical portions; wing apex obliquely truncate.

Genital capsule: male plate, in ventral aspect, elongate, slender, gradually tapered to sharply rounded apex, with macrosetae throughout its length arranged laterally along margin, or laterally and discally; in lateral aspect, plate with number of microsetae irregularly arranged near lateral margin; pygofer with small group of macrosetae extending from posterodorsal portion of disc to posterodorsal margin, with dispersed group of microsetae just dorsad of outer basal angle of male plate, these occasionally extending dorsad on disc; posterior pygofer margin truncate or produced; pygofer hook dorsal in origin, internal, directed ventrad, simple or bifid.

Internal male genitalia: style short, stout, without pre-apical lobe and without conspicuous hairs or setae; connective sclerotized, in form of cross-bar or "V"; aedeagus with preatrium well-developed; shaft short, dorsal apodeme elongate, as long as shaft; shaft and apodeme simple, without processes.

The species of this genus are slender and elongate. The head is narrower than the pronotum. In dorsal aspect, the anterior margin of the head is rounded or subangulate. Except in the genotype, the median length of the crown exceeds the distance between the eyes. The pronotum is long, its median length exceeding that of the crown. The lateral margins of the pronotum are sharply divergent posteriorly and the posterior margin is shallowly concave. In lateral aspect, the line of the face is convex and sharply divergent from the line of the dorsum. The pleural portion of the pronotum is broader than the ocellular area.

The genus is Neotropical in distribution.

In addition to the species listed, an undescribed species from Mexico has been examined.

brasilienis (Baker), 1898b: 405 (Protalebra), new combination
terminata (Baker), 1898b: 404 (Protalebra), new combination

Alebra dorsalis Gillette was examined and found to be non-typhlocybinae. Dr. Usan kindly examined the type and stated that it belongs in Deltocephalinae, near the genus Aianus.

TRIBE DIKRANEURINI

The tribe is characterized by the presence, in the hind wing, of a submarginal vein which extends around the wing apex beyond the apex of vein "R₄₊₅", then basad along the costal margin, although this character is not found in the genus Tynplocybella, where apparently the submarginal vein has been lost in an extreme reduction of wing venation. Coupled with this character, except as noted below, is a characteristic development of the style apex which displays a distinct preapical lobe and a mesal apical extension. The extension may appear to arise as a uniform development from the preapical portion, so that there is no clear line of demarcation at its base; or it may arise from the dorsal region of the apex of the preapical portion of the style, and possess a clear line of demarcation at its base; or it may arise from the dorsal face of the style in the region anterior to the preapical lobe. The apical extension is never broad and truncate as in Zygina, and there is never a second extension from it as in Erythroneura. The extension is conical or cylindrical.

The male plates characteristically possess an oblique group of few macrosetae. The pygofer usually lacks macrosetae, but usually possesses small setae situated posterodorsally on the disc, or along the posterior margin. Pygofer hooks are frequently present, and most often arise dorsally, usually overhanging a posterior pygofer lobe.

The hind wings present evidence of considerable evolution within the tribe, with a tendency towards reduction in size, fusion of veins 1V and 2V, migration of vein C_{u2} towards the vannal fold and away from the apical half of the wing, and the

fusion of the apex of vein Cu_1 with vein M_{3+4} . In the more primitive venation, veins 1V and 2V are separate apically, vein Cu_2 is confluent with the submarginal vein in the apical half of the wing, and vein Cu_1 is separate from vein M_{3+4} (Cu_1 appears branched) apically. This venation is found in Notus, Dicranoneura, Dikraneura, and Parallaxis, but is not considered to indicate close relationship between these genera.

In the remainder of the genera, veins 1V and 2V are fused (except in Hybla), an occurrence which is unknown in any other Western Hemisphere Cicadeliidae except in the closely related tribe Erythroneurini, which conceivably arose from dikraneurine stock. Coincident with the fusion of vannal veins, vein Cu_2 has migrated to a more basal position, resulting in a strengthening of the area of the hind wing weakened by the fusion of vannal veins. The fusion of vannal veins possibly arose twice in the Dikraneurini -- once in the line of development leading to Typhlocybella (which appears closely related to Parallaxis), and again in the line leading to the Dikrella complex of genera (discussed below). Extreme reduction in hind wings with retention of both vannal veins is found only in the curious genus Hybla.

Further specialization of the wings, through reduction, occurs in the fusion of the apex of vein Cu_1 with vein M_{3+4} in Idona, Typhlocybella, and Hybla, genera which have too little else in common to validate this as a criterion of close relationship.

In each of the major groups mentioned above: those genera with two vannal veins and those with a single vannal vein, genera occur which lack a preapical lobe in the style. In the

more generalized group (the retainers of both vannal veins), Dicranoneura and Notus exhibit this phenomenon. Whether the preapical lobe has been lost in these two genera, or whether it has never been present, is a matter for conjecture. Both of the genera possess curious additional morphological features. Dicranoneura has a membranous connective, a feature not found in other dikraneurine genera, but found in the more primitive Alebrini. Dicranoneura possesses, also, a thecate aedeagus. Notus, in addition to the unspecialized venation of the hind wings, has a paired ejaculatory duct, and a style broadly rounded apically and suggesting a primitive condition antedating that of a mesal expansion. However, the condition of both the style and the ejaculatory duct could be derived.

In the group of genera which have only a single vannal vein, Sarascarta, Buritia, and Saranella have styles which lack a preapical lobe. The reduced preapical lobe in Neodikrella (plate 24, fig. 64) suggests a possible loss of that structure in these genera, for the form of the styles and the connective in Neodikrella suggest an affinity with Sarascarta (plate 24, fig. 65).

The remainder of the genera form a complex already referred to as the "Dikrella complex". Included are Dikrella, Alconeura, Donidea, Kidrella, Endoxoneura, Kunzeana, Dikrellidia and Idona.

Hybla stands alone among the genera which retain both vannal veins, with a great reduction in venation of the hind wing, but with an unspecialized style.

The venation of the fore wings is quite plastic. There is a pronounced polyphyletic tendency for the third apical cell of the forewing to become petiolate. The form of the third apical cell is variable, occasionally, even within genera. Occasionally the venation of the fore wing is of value taxonomically, as in Kunzeana.

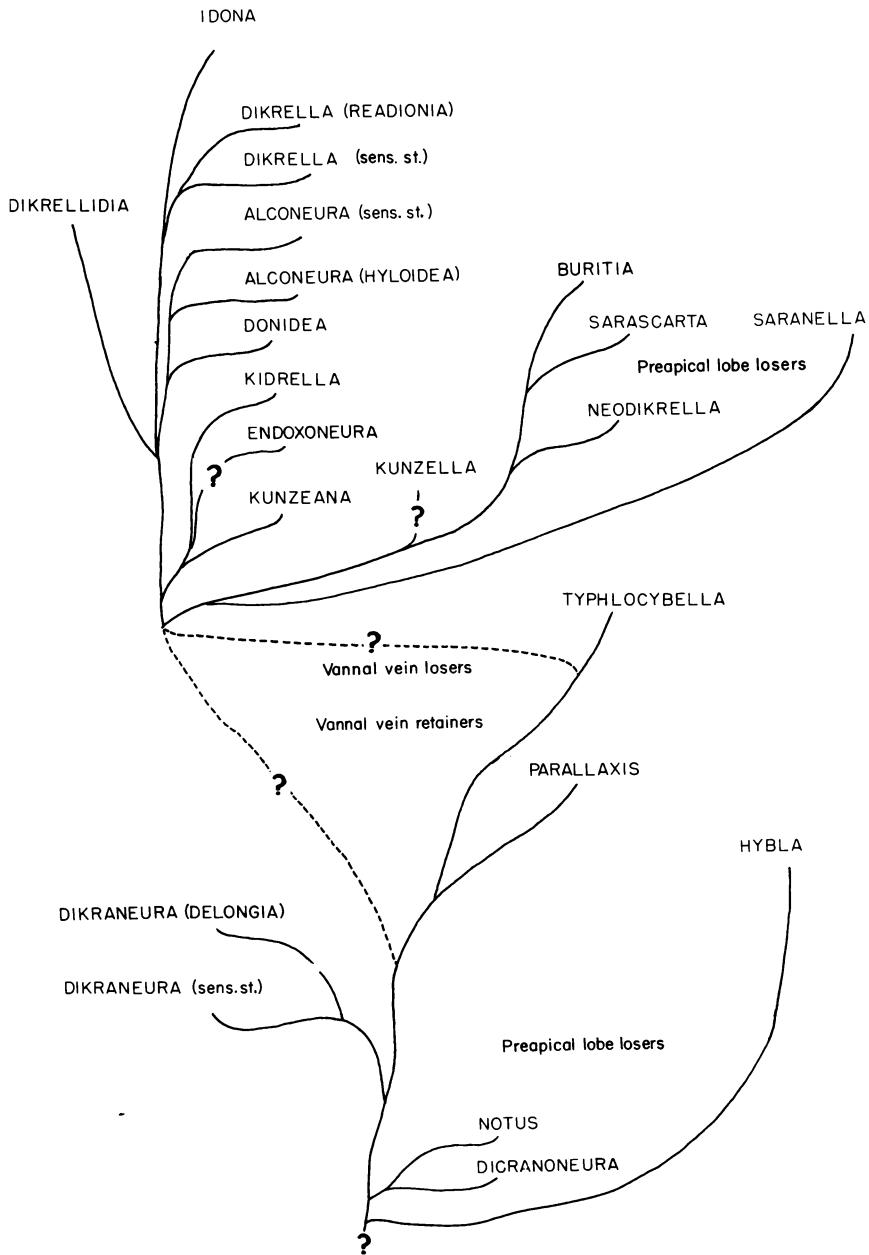


Fig. 1. Suggested relationships in Dikraneurini (the lines should be interpreted to have depth).

KEY TO GENERA AND SUBGENERA OF DIKRANEURINI

1. Hind wing with vannal veins separate apically (plate 2, fig. 5) ----- 2
- Hind wing with vannal veins fused throughout their length (plate 18, fig. 49a) ----- 6
2. Male plates forcipate (plate 15, fig. 41); aedeagus thecate (plate 14, fig. 40e); connective membranous --- Dicranoneura
- Male plates not forcipate; aedeagus not thecate; connective sclerotized ----- 3
3. Male ninth sternum large, quadrate, length equalling or exceeding width; aedeagus with paired gonoducts; style apex without preapical lobe and apical extension, rounded (plate 15, fig. 42) ----- Notus
- Male ninth sternum not quadrate, broader than long; style apex with distinct preapical lobe and apical extension --- 4
4. All apical cells of fore wing conspicuously broadened to wing margin; third apical cell embracing entire wing apex (plate 17, fig. 47b) ----- Parallexis
- All apical cells of fore wing with margins parallel; third apical cell not embracing entire wing apex (plate 16, fig. 44b) ----- Dikraneura--5

5. Vein Cu_2 of hind wing confluent with submarginal vein at point opposite vein m-cu; pygofer hooks present; connective U-shaped; preatrium poorly developed; inner apical vein of fore wing attaining wing margin (fig. 43, 44) -----

----- subg. Dikraneura

Vein Cu_2 of hind wing confluent with submarginal vein at point basad of vein m-cu; connective not U-shaped; preatrium well-developed; inner apical vein of fore wing frequently not attaining wing margin (fig. 45) ----- subg. Delongia

6. Hind wing with vein Cu_1 appearing branched (plate 18, fig. 49a) ----- 7

Hind wing with vein Cu_1 appearing unbranched (plate 22, fig. 52a) ----- 20

7. Fore wing with second apical cell elongate, slender, narrower than either adjoining apical cell (plate 18, fig. 49b) --- 8

Fore wing with second apical cell of various shapes, but if elongate and slender, then exceeding in width either first or third apical cells ----- 10

8. Connective Y-shaped, its apex extending more distad than style apex; mesal apical extension of style more than one-third length of that portion of style from connective to hind margin of preapical lobe; fore wing with second apical cell constricted at apex (fig. 63, 64) ----- Neodikrella

Connective Y-shaped or not, but with style apex always exceeding apex of connective; mesal apical extension of style less than one-third length of style from connective to hind margin of preapical lobe; fore wing with second apical cell broadened apically (fig. 49, 52) ----- 9

9. Connective Y- or T-shaped; aedeagal apodeme of two conspicuous caliperate arms (plate 18, fig. 51) -- Kidrella

Connective broadly U-shaped; dorsal aedeagal apodeme a transverse vertical plate, or if with conspicuous arms, then arms parallel or divergent, not caliperate -----
----- Kunzeana

10. Connective Y-shaped, the "stem" much longer than the "arms" and extending distad farther than the style apex; styles caliperate, without preapical lobes (plate 24, fig. 65d) --
----- Sarascarta

Connective Y-shaped or not, if Y-shaped, then "stem" subequal in length to "arms", rarely extending distad beyond style apex; styles not caliperate, with or without preapical lobes ----- 11

11. Style apex with preapical lobe, with somewhat randomly arranged elongate fine setae extending from preapical lobe over apical extension uninterruptedly, or on apical extension alone and wanting on preapical lobe (fig. 54h, 55d, 56g) ----- Alconeura--12

Style with or without preapical lobe; if present, then setae absent, or present and shorter and occurring in groups, not extending from posterior lobe over apical extension ----- 13

12. Form not extremely depressed dorsoventrally -----
----- subg. Alconeura

Form extremely depressed dorsoventrally -----
----- subg. Hylcidea

13. Style elongate, slender, without preapical lobe or apical extension, with conspicuous ventrolateral basal lamella (plate 25, fig. 67d); fore wing with third apical cell stalked ----- Saranella

Style form varied, if elongate and slender, then without basal lamella; fore wing with third apical cell stalked or not ----- 14

14. Fore wing with cells R and M extending distad to point nearly opposite apices of inner and outer apical cells; second and third apical cells with apical width equalling or exceeding length (plate 19, fig. 53b) -----
----- Denidea

Fore wing with cells R and M not extending distad to point nearly opposite apices of inner and outer apical cells; apical width of second or third or both apical cells less than respective length ----- 15

- 15. Style sickle-shaped in lateral aspect, with few small setae near base of curved portion (plate 25, fig. 66d) -----
----- Buritia

- Style not sickle-shaped in lateral aspect, without setae near base ----- 16

- 16. Style short, very broad, with few long setae on apical extension; apex of connective exceeding style apex (plate 18, fig. 50d) ----- Endoxoneura

- Style apex greatly exceeding apex of connective ----- 17

- 17. Style with conspicuous preapical lobe, not abruptly hooked at apex (plate 21, fig. 57g); pygofer hooks posterodorsal in origin or absent ----- 18

- Style without conspicuous preapical lobe, slender throughout, abruptly hooked at apex (plate 23, fig. 62d); pygofer hooks ventral in origin ----- Kunzella

- 18. Anal hooks present; aedeagal shaft with dorsal process arising from base (plate 22, fig. 60e) -- Dikrellidia

- Anal hooks absent; aedeagal shaft without dorsal process arising from base ----- Dikrella ----- 19

- 19. Genital capsule not dorsoventrally flattened; male plates contiguous in unmacerated specimens, not exposing aedeagus between their mesal margins at their bases -----
----- subg. Dikrella

Genital capsule dorsoventrally flattened; male plates not contiguous basally in unmacerated specimens, exposing aedeagus between their mesal margins at their bases (plate 22, fig. 58f) ----- subg. Readonia

20. Hind wing with submarginal vein present at wing apex; third apical cell of fore wing not embracing entire wing apex --- 21

Hind wing with submarginal vein absent at apex; third apical cell of fore wing embracing entire wing apex (plate 17, fig. 46a,b) ----- Typhlocybella

21. Pygofer hooks usually present; apical extension of style with setae ----- 22

Pygofer hooks present or absent; apical extension of style without setae ----- Idona

22. Pygofer hooks paired -----Endoxneura

Pygofer hooks single or absent -----Alconeura (Hylcoidea)

Genus Dicranoneura Douglas

(Pl. 14, fig. 40; pl. 15, fig. 41)

Dicranoneura Douglas. Ent. Mo. Mag. 12: 27. 1875.

Forcipata DeLong and Caldwell. Ann. Ent. Soc. Am. 29 (1): 70.

1936 (type, Forcipata loca DeL. and Cald., by subsequent designation of DeLong and Caldwell in Ann. Ent. Soc. Am. 35: 49. 1942), new synonymy.

Type of the genus, Cicadula citrinella Zetterstedt, by subsequent designation of Evans (Trans. Roy. Ent. Soc. Lond. 98 (6): 201. 1947).

Hind wings: vein 1V and 2V separate apically; submarginal vein present, extending around wing apex; posterior branch of vein R fused with vein M_{1+2} apically; vein Cu_1 appearing branched apically; vein Cu_2 confluent with submarginal vein at point opposite vein m-cu.

Fore wings: inner apical cell elongate, nearly attaining apical wing margin; second and third apical cells elongate, slender, successively shorter.

Genital capsule: ninth male sternum quadrate, with internal median longitudinal ridge and marginal ridge; plates narrow, forcipate, exposing aedeagus between their mesal margins, each plate with longitudinal row of prominent setae; pygofer hooks wanting; pygofer without distinct group of setae just dorsad of outer basal angle of male plate, with microsetae of variable location interspecifically.

Internal male genitalia: style narrow, gradually tapered to rounded apex, without preapical lobe or apical extension; connective membranous, connected apically with ventral portion of aedeagal theca; aedeagus thecate (except in magna) on basal portion; genital atrium ventrally located.

The head, in dorsal aspect, is slightly produced medially, with the apex rounded. The pronotum is elongate, the lateral margins only slightly divergent posteriorly. The pleural portion of the pronotum is wider than the ocellular area.

In unstained, cleared specimens, it is difficult to distinguish the delicate connective, and the aedeagus appears to be freely suspended in the genital capsule.

The name of this genus has long been considered to be an emendation of Dikraneura. That it may rightfully be considered to be so is open to grave doubt. The first use of the name did not clearly indicate that it was being used as an emendation, although it is quite clear from the original proposal that Douglas did consider it to be a partial synonym of Dikraneura Hardy and Notus Fieber. To the writer there seems as much reason to consider its first use as a separate proposal as to consider it as an emendation or as a substitute name. The names Dikraneura and Dicranoneura involve two separate Greek stems, and the fact that a "two-headed nerve" actually occurs in the hind wing of the species originally included (vein formed by preapical fusion of posterior branch of R with vein M_{1+2} , see figure 40a) suggests the idea that Douglas used the term by design, and not through an effort to emend Dikraneura.

The following species are included in this genus, from the New World. Only females of acclina were available for study.

acclina (DeLong and Caldwell), 1936a: 74 (Forcipata), new combination

ancantha (DeLong and Caldwell), 1936a: 73 (Forcipata), new combination

lobata (Beamer), 1938d: 229 (Forcipata), new combination

loca (DeLong and Caldwell), 1936a: 71 (Forcipata), new combination

magna (DeLong and Caldwell), 1936a: 71 (Forcipata), new combination

onloensis (DeLong and Caldwell), 1936a: 73 (Forcipata), new combination

ortha (DeLong and Caldwell), 1936a: 75 (Forcipata), new combination

sicula (DeLong and Caldwell), 1936a: 72 (Forcipata), new combination
triquetra (DeLong and Caldwell), 1936a: 72 (Forcipata), new
combination

Genus Notus Fieber

(Pl. 15, fig. 42)

Notus Fieber. Verh. Zool. Bot. Ges. Wien 16: 507. 1866.

Dikraneura (Curta) DeLong and Caldwell. Proc. Ent. Soc. Wash. 39
(2): 30. 1937.

Type of the genus, Cicada flavipennis Zetterstedt, by subsequent designation of McAtee (Proc. Zool. Soc. Lond.: 114. 1934).

Hind wings: vein 1V branching from vein 2V near its midpoint; submarginal vein present, extending around wing apex, beyond apex of vein "R₄M" then basad along costal margin; vein Cu₁ appearing branched apically; vein Cu₂ confluent with submarginal vein at point opposite vein m-cu.

Fore wings: inner apical cell elongate, nearly attaining wing apex; third apical cell frequently wider than outer apical cell; outer apical cell frequently open basally; inner apical vein variable, attaining wing margin in some specimens, represented by spur in others.

Genital capsule: male ninth sternum as long as or longer than broad; plates short, strongly curved mesad, overlapping apically, with oblique row of macrosetae and with subterminal spine; pygofer without distinct group of setae just dorsad of outer basal angle of male plate; pygofer nook wanting; female seventh sternum interrupted medially, exposing underlying membrane.

Internal male genitalia: style without preapical lobe or apical extension, its apex broadly rounded; connective U-shaped in broad aspect; preatrium long; shaft and gonoducts paired.

The species of this genus are similar in general appearance to Dicranoneura and Dikraneura. In dorsal aspect, the head is produced medially, with the apex rounded or angular. The head, including the eyes, is broader than the pronotum. The pronotum is elongate, its lateral margins scarcely divergent posteriorly. In lateral aspect, the line of the face is divergent from the contour of the dorsum. The width of the pleural portion of the pronotum is equal to or greater than the width of the ocellocular area.

The following species from the Western Hemisphere have been studied and are included here.

alta (DeLong and Caldwell), 1937a: 31 (Dikraneura (Curta))

sitka (DeLong and Caldwell), 1937a: 31 (Dikraneura (Curta))

Genus Dikraneura Hardy

Dikraneura Hardy. Trans. Tyneside Nat. Field Club 1: 423. 1850.

Chloroneura Walsh. Prairie Farmer, New Series 10 (10): 148. 1862

(Type, Chloroneura abnormis Walsh, by subsequent designation of McAtee in Proc. Zool. Soc. Lond. : 97. 1934).

Dicraneura auctt. (emendation of Dikraneura Hardy).

Dikraneura (Notus) Fieber of DeLong and Caldwell. Proc. Ent. Soc. Wash. 39 (2): 22. 1937.

Type of the genus, Dikraneura variata Hardy, by monotypy.

Hind wings: vein 1V branching from vein 2V near its mid-length; submarginal vein extending around wing apex beyond apex of vein "R+M" then basad along costal margin; vein Cu_1 appearing branched apically; vein Cu_2 confluent with submarginal vein usually at point opposite vein m-cu.

Fore wings: first, second, and third apical cells much longer than broad, successively shorter towards radial margin; outer apical cell elongate, slender, nearly attaining wing apex.

Genital capsule: male plate, in ventral aspect, triangular, with oblique row of macrosetae extending to apex in some species, less extensive in others; pygofer with oblique row of setae along or parallel to posterodorsal margin, and with microsetae variously arranged; with or without pygofer hooks; anal hooks wanting.

Internal male genitalia: style short, with extremely broad preapical lobe which is frequently rolled dorsad, and with short mesal apical extension sharply rounded at apex; connective U- or Y-shaped; aedeagus with or without preatrium and with or without processes on shaft.

Erytaria Fieber has been placed in synonymy with this genus by previous workers. It is not listed here as a synonym of Dikraneura because a study of its genotype, Cicada aureola Fallén, suggests the possibility that it and its European allies with short apical cells in the fore wing may represent a distinct segregate.

Liguropia menozzii Haupt, 1930, which is a synonym of Dikraneura juniperi Letnierry, 1876, and which is the type of Liguropia Haupt has not been studied by the writer, and hence this name is not placed in synonymy with Dikraneura Hardy at

this time. Ribaut's (1936) figures of this species suggest that it might well be segregated from Dikraneura.

Dikraneura subgenus Dikraneura Hardy

(Pl. 15, fig. 43; pl. 16, fig. 44)

See references under generic heading for synonymy.

Type of the subgenus, Dikraneura variata Hardy, by monotypy.

Hind wings: as in generic description; vein Cu_2 is always confluent with submarginal vein at point opposite vein m-cu.

Fore wings: as in generic description; apical veins complete, not represented by spurs.

Genital capsule: male plate with oblique row of macrosetae extending nearly to apex, or less extensive; pygofer with hook arising from near middle of posterior margin and extending caudad or mesad, or if hook not distinctly produced, then posterior margin of pygofer thickened and heavily sclerotized, posterodorsal margin with group of small setae basad of pygofer hook, microsetae frequently present, arranged irregularly over disc.

Internal male genitalia: connective U-shaped in vertical plane at right angles to long axis of styles, each of the arms giving rise to a dorsally-directed short process; aedeagus usually without preatrium, with shaft processes usually present; otherwise as in generic description.

The species included here are elongate and slender, and some shade of green or yellow, occasionally marked with red or rufous. The head is well produced and angulate. The median length of the pronotum greatly exceeds the median length of the head. In lateral aspect, the contour of the face is sharply divergent from the line of the dorsum. The pleural portion of

the pronotum is usually narrow, not greatly exceeding in width the ocellocular area. Ocelli are absent.

The subgenus is Holarctic and Sonoran in distribution. The following species from the Western Hemisphere have been studied and are included here:

- abnormis (Walsh), 1864a: 316 (Chloroneura)
- absenta DeLong and Caldwell, 1937a: 28
- angustata Ball and DeLong, 1925a: 328
- arcta DeLong and Caldwell, 1937a: 29
- arizona DeLong and Caldwell, 1937a: 26
- carneola (Stål), 1858e: 196 (Typhlocyba)
- communis (Gillette), 1898a: 718 (Dicraneura)
- hungerfordi Lawson, 1930e: 39
- latacephala Beamer, 1943a: 57
- mali (Provancher), 1890a: 298 (Erythroneura)
- retusa Beamer, 1943a: 55
- robusta Lawson, 1930e: 41
- rufula (Gillette), 1898a: 720 (Dicraneura)
- serrata DeLong and Caldwell, 1937a: 24
- torta DeLong and Caldwell, 1937a: 25
- ungulata Beamer, 1943a: 55
- urbana Ball and DeLong, 1925a: 329

Dicraneura subgenus Delongia, nov.

(Pl. 16, fig. 45)

Type of the subgenus, Dicraneura luna DeLong and Caldwell.

Hind wings: venation as in typical subgenus, but vein C_ug is confluent with submarginal vein basad of vein m-cu.

Fore wings: apical portion of wing as in typical subgenus, but both inner and outer apical veins usually reduced to spurs of variable length, both frequently failing to attain wing margin.

Genital capsule: male plate much as in generic description, but without macrosetae over apical half; pygofer without hook or thickening on posterior margin, posterior margin truncate, with oblique row of submarginal macrosetae basad of posterodorsal margin, and few microsetae along posterior margin and in group on disc dorsad of outer basal angle of male plate.

Internal male genitalia: style as in typical subgenus; connective T-shaped in ventral aspect, the aedeagal articulation subterminal; preatrium distinct, the atrium occurring at end of basal third of length of aedeagus.

The head, including the eyes, is broader than the pronotum, greatly produced medially, and subangulate at apex. In lateral aspect, the crown is sharply rounded to the smoothly convex face. The pronotum is strongly convex anteriorly and has very short lateral margins. The pleural portion of the pronotum is narrower than the ocellocular area.

Only the subgenotype, a Sonoran species, is known.
luna DeLong and Caldwell, 1937a: 24

Genus Parallaxis McAtee

(Pl. 16, fig. 46, pl. 17, fig. 47)

Parallaxis McAtee. Journ. N. Y. Ent. Soc. 34: 154. 1926.

Erythria Fieber of Baker, in part, Inv. Pac. 1: 3. 1903.

Type of the genus, Parallaxis vacillans McAtee, which is a synonym of Erythria Donaldsoni Baker, by original designation.

Hind wings: vein 1V present; vein 2V very poorly developed; submarginal vein present, extending around wing apex beyond apex of vein "R+M" thence basad along costal margin; vein Cu₁ appearing branched apically, both of the apparent branches attaining submarginal vein basad of wing apex; vein Cu₂ confluent with submarginal vein near midlength of wing, much basad of vein m-cu.

Fore wings: bases of first and second apical cells obliquely angulate; together forming an oblique jagged line from commissural margin to inner corner of third apical cell; third apical cell sessile, embracing wing apex; outer apical cell trapezoidal, not attaining wing apex; cells R and M broadened anteapically, occasionally with broadened portions cut off by adventitious cross veins to from anteapical cells, or partially cut off by vestigial adventitious cross veins.

Genital capsule: male plate, in ventral aspect with oblique single row of macrosetae over basal half of disc, in lateral aspect with number of small submarginal setae parallel to lateral margin over basal half, setae of apical half various; pygofer in lateral aspect with small group of microsetae just dorsad of outer basal angle of male plate, a small group of submarginal macrosetae basad of posterodorsal margin, and occasionally smaller setae posterodorsad of these; pygofer hook present or absent, usually posterodorsal in origin when present, weak or strong, occasionally bifid.

Internal male genitalia: style with conspicuous preapical lobe and apical extension, the latter elongate and rounded apically, or short and obliquely truncate, the aedeagal articulation variable interspecifically; aedeagus with preatrium

well-developed or short, dorsal apodeme well-developed, aedeagal processes present at base or more distad on shaft.

The insect included here are usually predominantly dark in color, with a heavily sclerotized abdomen. The color of the dorsum is usually mottled green or yellowish, but may be gray or gray marked with brick red. The veins bordering the apical and preapical cells (when present) are conspicuously pale. The head, in dorsal aspect, varies from nearly parallel-margined to distinctly produced medially. The face, in profile, is smoothly convex. Ocelli are wanting. The pronotum has short lateral margins which are divergent posteriorly and a rectilinear posterior margin. The width of the pleural portion of the pronotum is subequal to the width of the ocellocular area.

The writer has examined the type series of Erythria Donaldsoni Baker. The six specimens are in the Pomona College Collection, were collected by Baker, and are topotypic (Managua, Nicaragua). A female specimen from the series is here designated lectotype.

Six specimens of Erythria Guzmani Baker, all topotypic, from the Pomona College Collection, are presumed to be the type series, but like the above, did not bear type labels. One of the series, a male (San Marcos, Nicaragua) is here designated lectotype.

The type of Typhlocyba permunda Stål was examined through the kindness of Dr. R. Malaise of the Riksmuseum of Natural History in Stockholm.

The genus is Neotropical in distribution.

donaldsoni (Baker), 1903c: 4 (Erythria), new combination

facillans McAtee, 1926b: 154, new synonymy

guzmani (Baker), 1903c: 4 (Erythria), new combination

glabrata McAtee, 1926b: 157, new synonymy

ornata Osborn, 1928a: 266

pernanda (Stål), 1882e: 56 (Typhlocyba)

repersa McAtee, 1926b: 158

tessellata McAtee, 1926b: 155

Genus Typhlocybella Baker

(Pl. 17, fig. 48)

Typhlocybella Baker. Invertebrata Pacifica 1: 3. 1903.

Type of the genus, Typhlocybella minima Baker, by monotypy.

Hind wings: vannal veins completely fused; submarginal vein absent at wing apex; posterior branch of R fused with vein M₁₊₂ apically, the fusion vein not attaining the wing apex; apex of vein Cu₁ fused with apical portion of vein M₃₊₄ so that vein Cu₁ appears unbranched apically; vein Cu₂ confluent with submarginal vein in basal half of wing.

Fore wings: third apical cell short, triangular, petiolate, embracing entire wing apex; bases of first and second apical cells together forming an irregular oblique line from commissural margin to base of petiole of third apical cell.

Genital capsule: plates finely pilose, with few basal macrosetae; pygofer with subterminal row of several macrosetae, and numerous irregularly arranged microsetae; apex of pygofer, in lateral view, occasionally with an emargination.

Internal male genitalia: style with single median elongate tapering apical extension, lacking hairs or setae; connective somewhat U-shaped with apex turned dorsad, the aedeagal articu-

lation subterminal; preatrium short; aedeagal shaft flattened laterally, with pair of prominent processes separating from shaft subapically and extending dorsolaterally and single median dorsal apical process overhanging gonopore; dorsal aedeagal apodeme large.

The species are small with a subconically produced head. The head, including the eyes, is slightly wider than the pronotum. The pronotum is scarcely emarginate posteriorly. In profile, the line of the face is sharply divergent from the line of the dorsum. The margin between crown and face is rounded. Specimens are dull yellowish green, occasionally with darker markings.

The genus has a wide Neotropical distribution.

In addition to the species listed below, an undescribed species has been studied:

minima Baker, 1903b: 3

Genus Kunzeana Oman

(Pl. 18, fig. 49)

Kunzeana Oman. Mem. Ent. Soc. Wash. No. 3: 83. 1949

Type of the genus, Dikraneura kunzei Gillette, by original designation.

Hind wings: vannal veins completely fused; submarginal vein present, extending around wing apex beyond apex of vein "R+M" then basad along costal margin; veins Cu_1 and M_{3+4} separate apically (Cu_1 appearing branched apically); vein Cu_2 confluent with submarginal vein in basal half of wing, much basad of vein m-cu.

Fore wings: length of first, second, and third apical cells somewhat variable, their bases usually forming an irregular transverse line; second apical cell distinctly narrower than either adjoining apical cell; outer apical cell with length greatly exceeding width, apex not attaining wing apex; cells R and M with relative widths varying between species.

Genital capsule: style, in dorsal aspect, with single median apical extension; in broad aspect with preapical lobe not sharply delimited, tapering to apical extension, provided with few setae on tapered portion; connective broadly U-shaped; edeagus with dorsal apodeme well-developed, strongly sclerotized, occurring as a superior flattened plate, or as an H-shaped superstructure in anterior aspect, the dorsal arms always conspicuous, atrial processes present or absent, simple or branched when present, shaft processes present or absent, occasionally branched when present; preatrium wanting.

The species included here are predominantly dull green in color, typically with the crown of the head, the narrow anterior portion of the pronotum, and the scutellum partly or entirely paler in contrast. In profile, the contour of the lower part of the face is usually subparallel to the line of the dorsum.

Two specimens of Erythria Deschoni Baker, apparently the type series, although they did not bear type labels, were studied from the Pomona College collection. One of the specimens had the abdomen missing, the other was a female. Both of the specimens lacked wings. The female specimen is here designated lectotype.

The genus is Sonoran and Neotropical in distribution. The species have been reported to feed upon Leguminosae. A number of undescribed species have been examined in addition to the species listed below.

- aurulenta (Lawson), 1930e: 41 (Dikraneura), new combination
benedicti (Beamer), 1943a: 59 (Dikraneura)
curiosa (Beamer), 1943a: 83 (Dikraneura)
deschoni (Baker), 1903c: 5 (Erythria), new combination
furcata (Beamer), 1943a: 62 (Dikraneura)
kunzei (Gillette), 1898a: 721 (Dikraneura)
lenta (McAtee), 1926b: 160 (Dikraneura)
munda (Beamer), 1943a: 62 (Dikraneura)
myersi (McAtee), 1926b: 161 (Dikraneura)
rosea (Osborn), 1928a: 278 (Dikraneura (Hylcoidea)), new combination
salicis (Beamer), 1943a: 63 (Dikraneura)
sandersi (Ball and DeL.) 1925a: 332 (Dikraneura)
tenera (Beamer), 1943a: 61 (Dikraneura)
texana (Beamer), 1943a: 61 (Dikraneura)

Of the species listed above, sandersi and myersi have not been seen by the author. Dr. Oman (1949) is followed, in placing these species in this genus.

Genus Endoxoneura, nov.

(Pl. 18, fig. 50)

Type of the genus, Dikraneura (Hylcoidea) splendidula Osborn.

Hind wings: vannal veins fused; submarginal vein extending around wing apex; apical vein formed by fusion of posterior branch of R and M_{1+2} extending unbranched to submarginal vein near wing apex; vein Cu_1 confluent with submarginal vein at

point proximad of bases of apical cells.¹

¹ The hind wings of the type were fragmentary, and it could not be determined whether the apex of Cu_1 was separate or fused with the apical portion of vein M_{3+4} .

Fore wings: inner and outer apical cells angulate basally, their bases more proximad than bases of second and third apical cells; second and third apical cells equal in length, their bases forming a continuous transverse line.

Genital capsule: male plate with an oblique group of macrosetae and numerous scattered microsetae; pygofer hook posterodorsal in origin and surmounting a more inferior similar hook representing the usual lobe found in this position, the more ventral hook with small group of microsetae; lateral face of pygofer lacking setae.

Internal male genitalia: style short, broad, with median apical conical posteriorly directed extension bearing two elongate setae on lateral face; preapical lobe small, situated near mid-length of that portion of style from connective to apex of broader portion; with few small setae within oblique posterior margin of preapical lobe; connective Y-shaped, its apex exceeding style apices, and turned dorsad, the aedeagal articulation subterminal; aedeagus with preatrium short, dorsal apodeme poorly developed; shaft with two pairs of processes given off near apex; gonopore terminal.

The head, including the eyes, is broader than the pronotum, and triangular in dorsal aspect, produced medially with the apex rounded. The pronotum, in dorsal aspect, is large with lateral margins nearly parallel and posterior margin very shallowly concave. The pleural portion of the pronotum is broader than the ocellocular area. In lateral aspect, the anterior margin of the head is thick. The contour of the face is subparallel to the line of the dorsum.

In structure of the fore wing, connective, styles (including setae), and general form of aedeagus (except apodemes) this genus is similar to Kidrella.

The genotype is Neotropical.
splendidula (Osborn), 1928a: 275 (Dikraneura (Hyloides))

Genus Kidrella, nov.

(Pl. 18, fig. 51; pl. 19, fig. 52)

Type of the genus, Dikraneura santana Beamer.

Hind wings: vannal veins fused; submarginal vein present, extending around wing apex beyond apex of vein "R+M" then basad along costal margin; vein Cu_1 appearing branched apically; vein Cu_2 confluent with submarginal vein near middle of length of wing, much basad of vein m-cu.

Fore wing: inner apical cell much wider than either second or third apical cells; first and second apical cells scarcely wider at apex than at base; third apical cell much wider at apex than at base; first, second and third apical

cells elongate, slender, attaining apical wing margin; outer apical cell trapezoidal, not attaining wing apex; cells R and M subequal in apical width.

Genital capsule: male plate, in lateral aspect, exceeding tip of pygofer, with oblique row of few macrosetae over second fourth, and row of microsetae on disc distad of these to apex of plate, few microsetae near lateral margin of plate near middle of its length; pygofer with posterodorsal margin produced, without a posterior margin; posteroventral margin with few microsetae near its middle; pygofer hook arising internally on posterodorsal portion of disc, extending posterodorsad.

Internal male genitalia: style elongate, slender, with distinct preapical lobe and mesal apical extension obliquely truncate at apex and provided with few setae along extension; connective Y-shaped; aedeagus without preatrium, slender, elongate, with paired processes arising from shaft near base or near apex; apodeme consisting of a pair of caliperate arms arising from atrium.

The line of the face, in lateral aspect, is only slightly divergent from the line of the dorsum. The width of the pleural portion of the pronotum is much greater than the width of the ocellocular area. The crown is shallowly depressed medially, or occasionally with a median slight carina and a consequent slight depression next each lateral margin.

This genus is known only from Arizona and Puerto Rico (an undescribed species).

santana (Beamer), 1936a: 7 (Dikraneura), new combination

Genus Donidea, nov.

(Pl. 19, fig. 53)

Type of the genus, Typhlocyba verticis Baker.

Hind wings: vannal veins fused; submarginal vein present, extending around wing apex, beyond apex of vein "R+M" then basad along costal margin; vein Cu₁ appearing branched apically, not fused apically with apex of vein M₃₊₄; vein Cu₁ confluent with submarginal vein at point much proximal of vein m-cu.

Fore wings: all apical cells subequal in length; apices of cells R and M much distad of bases of inner and outer apical cells; inner and outer apical cells quadrilateral; second apical cell trapezoidal; third apical cell greatly narrowed basally.

Genital capsule: male plate with oblique double row of macrosetae, with numerous dispersed microsetae; pygofer without macrosetae, with cluster of microsetae on posterior lobe; pygofer hook posterodorsal in origin, decurved, exceeding apex of pygofer, lying external to posterior pygofer lobe.

Internal male genitalia: style elongate, with small but distinct preapical lobe and median posteriorly directed

extension bearing one or two setae; connective papilionaceous in outline, apex turned dorsad, the aedeagal articulation subterminal; preatrium short; dorsal aedeagal apodeme laterally compressed, subquadrate, well-developed; shaft with pair of short terminal posteriorly curved tapering processes, and pair of basally-arising tapering processes diverging caudo-laterally from shaft, extending almost to tip.

The head is conically well-produced, its median length approximately equal to that of the pronotum. The crown is convex, the lateral margins convex, in dorsal aspect, to the sharply rounded apex. The width of the head exceeds that of the pronotum. The lateral margins of the pronotum are short and subparallel, the posterior margin shallowly concave. In lateral aspect, the line of the face is almost parallel to the line of the dorsum. The pleural portion of the pronotum is broader than the ocellular area.

A single specimen of the type species has been examined from the Pomona College collection, and compared with the type of Dikraneura (Hylodea) eburnea Osborn.

The genus is known only from its type, a Neotropical species.

verticis (Baker), 1903d: 8 (Typhlocyba), new combination
eburnea (Osborn), 1928a: 276 (Dikraneura (Hylodea))
new synonymy.

Genus Alconeura Ball and DeLong

Alconeura Ball and DeLong. Ann. Ent. Soc. Am. 18: 334. 1925.

Dikraneura (Hylodea) McAtee. Journ. N. Y. Ent. Soc. 34: 162.
1926, new synonymy.

Dikraneuroidea Lawson. Bull. Brook. Ent. Soc. 24(5): 307. 1929,
new synonymy.

Type of the genus, Alconeura rotundata Ball and DeLong,
by original designation.

Hind wings: vannal veins entirely fused; submarginal vein present, extending around wing apex, beyond apex of vein "R+M" then basad along costal margin; apical portion of Cu_1 free or fused with apical portion of vein M_{3+4} (vein Cu_1 appearing branched or unbranched); vein Cu_2 confluent with submarginal vein at point much basad of fusion of posterior branch of R with vein M_{1+2} .

Fore wings: outer apical cell short, its apex not attaining wing apex; third apical cell usually pedunculate, rarely triangular at base or sessile; inner apical cell broader than second apical cell.

Genital capsule: arrangement of setae on male plates greatly varied; pygofer without macrosetae on disc; pygofer hooks present or absent; anal hooks wanting.

Internal male genitalia: style with distinct preapical lobe and apical extension; style apex with numerous elongate fine setae not occurring in close-set groups or tufts; connective and aedeagus of varied form.

Alconeura subgenus Alconeura Ball and DeLong

(Pl. 20, fig. 54)

Alconeura Ball and DeLong. Ann. Ent. Soc. Am. 18: 334. 1925.

Type of the subgenus, Alconeura retundata Ball and DeLong, by original designation.

Mind wings: as in generic description.

Fore wings: inner apical cell broader than second apical cell; second apical cell slender, parallel-margined; third apical cell usually pedunculate, rarely triangular at base or sessile; outer apical cell short, broad, polygonal, not attaining wing apex.

Genital capsule: male plate, in lateral aspect, broad, parallel-margined to near broadly rounded apex, with single or double oblique row of macrosetae, with numerous microsetae; pygofer without distinct group of setae just dorsad of outer basal angle of male plate, with group of small setae along posterior margin; pygofer hooks present and prominent or reduced to heavily sclerotized rudiments, dorsal in origin or arising near middle of posterior margin.

Internal male genitalia: apical extension of style arising from dorsal face; style apex with numerous elongate fine setae somewhat randomly arranged; connective Y-shaped or modified but with Y-shaped thickening; aedeagus with preatrium very short or wanting, shaft usually laterally compressed, without processes or with processes from base of shaft or from ventral portion of atrial rim; aedeagal apodeme well developed.

This subgenus includes small delicate leafhoppers. The head, including the eyes, is narrower than the pronotum. The median length of the crown is usually equal to or greater than the distance between the eyes. The lateral margins of the pronotum are sharply divergent posteriorly. The pleural portion of the pronotum is broader than the ocellocular area. There is nearly always a dark spot in the third or fourth apical cell of the fore wing. The species are variable as to color markings, but a considerable group are pale, marked with orange, and with apical veins edged in black.

Most of the species are Neotropical and Sonoran.

The wings of the type of Dikraneura (Hyalidea) flavida Osborn are so badly damaged that wing characters cannot be verified.

balli Beamer, 1934b: 17

bisagittata (Beamer), 1943a: 63 (Dikraneura), new combination

centrosemae (Osman), 1937d: 568 (Dikraneura), new combination

cornigera Griffith, 1938a: 332

directa Griffith, 1938a: 325

dodonana Beamer, 1934b: 17

dorsalis (DeLong), 1924a: 67

flavida (Osborn), 1928a: 277 (Dikraneura (Hyalidea)), new combination

fulminea Lawson, 1930d: 44

insulae Griffith, 1938a: 325

languida Griffith, 1938a: 330

- lappa Griffith, 1938a: 327
luculenta Griffith, 1938a: 331
macra Griffith, 1938a: 327
necopinata Griffith, 1938a: 318
nudata Ball and DeLong, 1925a: 336
obliquata (Osborn), 1928a: 270 (Dikraneura), new combination
planata Ball and DeLong, 1925a: 337
pseudo-maculata (Baker), 1903d: 8 (Typhlocyba), new combination
pseudo-obliqua (Baker), 1903d: 9 (Typhlocyba), new combination
quadrifasciata Lawson, 1930d: 45
quadrivittata (Gillette), 1898a: 723 (Dicraneura)
rotundata Ball and DeLong, 1925a: 335
santaritana, new name for beameri Griffith, 1936 nec Lawson,
1929
tricolor (Van Duzee), 1914a: 56 (Dicraneura)
unipuncta (Gillette), 1898a: 718 (Dicraneura)

Alconeura subgenus Hyleidea McAtee

(Pl. 20, fig. 55; pl. 21, fig. 56)

Dikraneura (Hyleidea) McAtee. Journ. N. Y. Ent. Soc. 34: 162.
1926.

Dikraneuridea Lawson: Bull. Brook. Ent. Soc. 24(5): 307.
1929.

Type of the subgenus, Dikraneura (Hyleidea) depressa
McAtee, by original designation.

Hind wings: as in generic description.

Fore wings: inner apical cell angulate basally, broader than second apical cell, not attaining wing apex; third apical cell pedunculate; outer apical cell in form of trapezium or subtrapezoidal, its apex not attaining wing apex.

Genital capsule: male plate, in lateral aspect, elongate, greatly exceeding apex of pygofer, with discal macrosetae usually greatly reduced in size, other setae various, frequently with cluster or row of close-set setae along lateral margin, apex usually truncate or even notched; pygofer, in lateral aspect, slender, elongate, without discal macrosetae, posterodorsal margin usually giving rise to short acicular pygofer hook overhanging posterior lobe of pygofer which bears few posteriorly directed microsetae.

Internal male genitalia: style with mesal apical extension, long or short, rounded at apex and bearing setae which are usually numerous and elongate, exceeding style apex, occurring both mesally and laterally on style when few in number; connective triangular to T-shaped with apex turned dorsad and aedeagal articulation subterminal; aedeagus varied, shaft usually laterally compressed.

The species are greatly flattened dorsoventrally. In profile, the line of the face is nearly parallel to the line of the dorsum. The crown of the head is ample, and well-produced medially. The pleural portion of the pronotum is broad, its width more than double that of the ocellocular area.

In addition to the named species, undescribed species have been examined from Mexico, Costa Rica, Cuba, and Peru. *beameri* (Lawson), 1929d: 307 (Dikraneuroidea), new combination
depressa (McAtee), 1926b: 162 (Dikraneura (Hylcoidea)), new combination

Montealegrei (Baker), 1903c: 4 (Erythria), new combination

The type series of Erythria Montealegrei Baker has been examined. It consists of a male and a female specimen from Champerico, Guatemala, and a specimen with the abdomen missing from Managua, Nicaragua. The male, from Champerico, Guatemala is here designated lectotype. The specimens are in the Pomona College Collection.

Genus Dikrella Oman

Dikrella Oman. Mem. Ent. Soc. Wash. No. 3: 83. 1949.

Type of the genus, Dikraneura cockerellii Gillette, by original designation.

Hind wings: vannal veins fused; submarginal vein extending around wing apex, beyond apex of vein "R+M" then basad along costal margin; vein Cu_1 appearing branched apically (its apex not fused with apex of vein M_{3+4}); vein Cu_2 confluent with submarginal vein in basal half of wing, much basad of apparent forking of vein Cu_1 .

Fore wings: first, second, and third apical cells successively shorter; inner apical cell nearly attaining wing apex, broader at base than at apex; second and third apical cells broader at apex than at base, the third rarely stalked; outer apical cell triangular or quadrilateral.

Genital capsules: male plate varied in form, with few macrosetae in an oblique linear arrangement over disc in macerated specimens; pygofer without macrosetae, with few small setae located posterodorsally along margin or sub-marginal; pygofer hook dorsal (along mesal pygofer margin) in origin, or wanting, extending caudad, mesad, or caudo-ventrad when present; anal nooks absent.

Internal male genitalia: style short, with well-developed preapical lobe and mesal apical extension, with few fine setae on posterior margin of preapical lobe, and rarely with group of similar setae located on apical extension; connective triangular, papilionaceous, V-shaped or Y-shaped in form; aedeagus quite variable in form, preatrium usually present, ventral processes paired or unpaired usually present, arising from preatrium, atrium, or shaft.

Dikrella subgenus Dikrella Oman

(Pl. 21, fig. 57)

See reference under generic heading.

Type of the subgenus, Dicraneura cockerellii Gillette, by original designation.

Wings: as in generic description.

Genital capsule: capsule not conspicuously flattened dorsoventrally; male plates, in ventral aspect, with mesal margins contiguous basally in unmacerated specimens, not exposing aedeagus between them, plates without a lateral scale-like extension from lateral margin in ventral aspect,

in macerated specimens; pygofer without posterodorsally directed lobe, with small setae on posterodorsal portion of disc or along posterior margin; pygofer hooks present or absent, when present arising from mesal (dorsal) pygofer margin and extending caudad, mesocaudad, or caudoventrad within capsule wall, in form slender and acicular, rarely ramose.

Internal male genitalia: style with conspicuous preapical lobe and mesal apical extension, preapical broad portion frequently somewhat rolled along both margins, presenting a trough-like appearance in caudal aspect, and with few fine hair-like setae arising from apex of lateral rolled edge, or when style is flatter and not trough-like, from a bulla at lateral angle of preapical lobe, occasionally (cockerelli and an undescribed species) with few hairs in a group on apical extension, but never with continuous array of elongate hairs over preapical lobe and apical extension as in Alconeura; connective typically papilionaceous in outline, but occasionally modified to V- or T-shaped; aedeagus quite varied, with preatrium nearly always present (absent in two undescribed species), with ventral processes usually present and arising from preatrium, atrium or shaft.

The species are extremely small and delicate in form, and pale in color, occasionally marked with red. The apical cells

of the fore wings frequently have clouded portions, but the distinct dark spot so characteristic of Alconeura is usually absent. The head is well-produced medially, with the apex rounded. Its width, including the eyes, is nearly always less than the width of the pronotum. The pleural portion of the pronotum is usually conspicuously broader than the ocellocular area. In lateral aspect, the contour of the face is divergent from the line of the dorsum.

The subgenus is interesting from the standpoint that good specific characters occur in the form of the style apices, and in the form of the connective, as well as the aedeagus. In addition to the species listed below, thirteen undescribed species have been studied.

The subgenus is predominantly Neotropical and Sonoran in distribution, with a few Nearctic representatives.

aegra (Beamer), 1936c: 55 (Dikraneura)

affinis (Osborn), 1928a: 269 (Dikraneura), new combination

albonasa (McAtee), 1926b: 160 (Dikraneura), new combination

californica (Lawson), 1930e: 36 (Dikraneura)

var. imbellis (Lawson), 1930e: 37 (Dikraneura)

nevadensis (Lawson), 1930e: 38 (Dikraneura), new

synonymy

cockerellii (Gillette), 1895a: 14 (Dikraneura)

cruentata (Gillette), 1898a: 717 (Dikraneura)

debilis (McAtee), 1926b: 162 (Dikraneura)

fumida (Osborn), 1938a: 276 (Dikraneura (hyloidea)), new combination

hamar (Del. and Ross), 1950a: 87 (Dikraneura), new combination.

maculata (Gillette), 1898a: 716 (Dikraneura)

mera (Mcatee), 1944a: 76 (Dikraneura)

pusilla (Lawson), 1930e: 37 (Dikraneura)

Of the above, no males were available for study in the cases of mera and the typical variety of californica. Fumida Osborn is placed here because of the great similarity in male genitalia to other species in this subgenus. The type had the wings so badly damaged that the venation could not be discerned.

Dikrella subgenus readionia, nov.

(Pl. 22, fig. 58)

Type of the subgenus, Dikraneura readionis Lawson.

Wings: as in generic description.

Genital capsule: capsule compressed dorsoventrally; male plates, in unmacerated specimens, in ventral aspect, with mesal margins not contiguous at base, the aedeagus visible between their bases, approximate apically; in macerated specimens plate with lateral scale-like excrescence and with two conspicuous macrosetae on disc near lateral margin; pygofer with lobe arising posterodorsally and directed dorsocaudad, with few microsetae on lobe and occasionally on disc of pygofer, pygofer hook arising along dorsal (mesal) margin, extending caudad or mesocaudad, within lateral pygofer wall.

Internal male genitalia: style rolled and trough-like preapically as in typical subgenus, with few elongate fine setae at apex of lateral rolled portion, and occasionally one or two along posterior margin of preapical lobe; mesal apical extension of style slender and usually truncate apically, lacking setae; connective papilionaceous; aedeagus with preatrium well-developed and with single or paired ventral aedeagal processes arising from atrium or shaft.

The species of this subgenus are very similar in appearance to those of the typical subgenus, but are usually larger, and with much longer wings. The lower part of the face, in lateral aspect, is frequently parallel to the line of the dorsum.

The distribution is Neotropical and Sonoran.

This subgenus is dedicated to the late Professor Philip A. Read, who unselfishly devoted much time to the earlier training of the writer, and whose enthusiasm and stimulating interest have ever been a pleasing memory.

cedrelae (Cman), 1937d: 569 (Dikraneura), new combination
readianis (Lawson), 1930e: 39 (Dikraneura), new combination

In addition to the species listed above, a number of undescribed species have been studied.

Genus Idona DeLong

(Pl. 22, fig. 59)

Empoasca (Idona) DeLong. U. S. Dept. Agr. Tech. Bull. 231:
50. 1931.

Type of the genus, Empoasca minuenda Ball, by original designation.

Hind wings: vannal veins fused; submarginal vein extending around wing apex beyond apex of vein "R+M" then basad along costal margin; vein Cu₁ appearing unbranched apically (its apical portion fused with apical portion of vein M₃₊₄); vein Cu₂ confluent with submarginal vein in basal portion of wing, much basad of fusion of posterior branch of vein R with vein M₁₊₂.

Fore wings: inner apical cell larger than other apical cells, scarcely attaining wing apex; second apical cell slender, sessile; third apical cell quadrangular or triangular, frequently petiolate; outer apical cell short, trapezoidal, not attaining wing apex; first, second and third apical cells successively shorter.

Genital capsule: male plate, in ventral view, with sclerotized internal thickening along lateral margin, extending distad for a variable distance forming "shoulder" in lateral margin of a plate at apex of thickened portion (occasionally before its apex), the shoulder bearing one or more stout setae (macerated specimens), the basal portion of the lateral sclerotized thickening connected by a basal transverse internal ridge with style opposite articulation with connective; plate without macrosetae in linear series; pygofer usually with group of small setae located

posterodorsally; pygofer hooks present or absent, posterior or posterodorsal in origin when present, usually simple but occasionally modified (bifid at apex or hairy in appearance).

Internal male genitalia: style with distinct preapical lobe and apical extension from mesal margin, directed posteriorly; style usually trough-like in caudal aspect as in Dikrella; posterior lobe with few fine setae, usually short, rarely long and extending to apex of apical extension of style; connective very variable interspecifically, Y-, U-, or V-shaped, or in the form of a cross bar, the aedeagal articulation subterminal; aedeagus with distinct preatrium; aedeagal shaft laterally compressed; with pair of aedeagal processes arising from preatrium, lower portion of atrial rim, or base of shaft.

The species included here are very small, delicate leafhoppers with diverse color patterns or without color patterns. The head is subconically produced with rounded apex, in dorsal aspect. The contour of the face is quite divergent from the line of the dorsum. The posterior margin of the pronotum tends to be subparallel to the anterior margin, leaving the scutellum broadly exposed.

The neotype of Dikraneura (Hylodea) hyalina Osborn has been studied. It has hind wings with a venation corresponding to that described above. The fore wings are somewhat similar to other species in this genus, except

that the third apical cell is not narrowed basally. The fore wings are subfalcate apically. It seems best to include this species here, provisionally, until males can be obtained for study. Unfortunately, its inclusion here forces the renaming of hyalina (Beamer), which is a secondary nomonym.

The genus is represented by a number of species in addition to the described species listed below. In distribution it is Neotropical and Sonoran.

aperta (Beamer), 1943a: 58 (Dikraneura), new combination
beameri, new name for hyalina (Beamer), 1943a: 58 nec
Osborn, 1928.

hyalina (Osborn), 1928a: 276 (Dikraneura (hyloidea)), new
combination

minuenda (Ball), 1921a: 23 (Empoasca)

rubens (Beamer), 1934b: 16 (Dikraneura), new combination

sexmaculata (DeLong), in Wolcott, 1923b: 270

Genus Dikrellidia, nov.

(Pl. 2, fig. 8; Pl. 22, fig. 60; Pl. 23, fig. 61)

Type of the genus, Dikraneura bilineata Osborn.

Hind wings: vannal veins fused; submarginal vein present, extending around wing apex beyond apex of vein "R+M" then basad along costal margin; vein Cu_1 appearing branched apically (its apical portion not fused with apical portion of vein M_{3+4}); vein Cu_2 confluent with submarginal vein in basal half of wing, much basad of vein m-cu.

Fore wings: inner and outer apical cells trapezoidal, the greatest width of each equal to or exceeding combined width of second and third apical cells at their bases; second apical cell longer than third; preapical width of cell R exceeding adjacent width of cell M.

Genital capsule: male plate with oblique row of macrosetae and dispersed apical microsetae; pygofer surface lacking conspicuous setae; a pair of inverted U-shaped hooks arising as introversions, one on each side, from posterior face of basal portion of anal tube, their lumen broadest posteriorly and readily seen in caudal view.

Internal male genitalia: style elongate, slender, with conspicuous preapical lobe and mesal elongate posteriorly-directed cylindrical extension obliquely truncate apically; connective very shallowly U-shaped, the apex turned dorsad, the aedeagal articulation subterminal; aedeagus with bulbous basal portion giving off pair of ventrolateral elongate terete sinuate processes; atrial rim thickly sclerotized and giving off single dorsal posteriorly-directed conical cuspidate apodeme which is curved distally.

The head is well-produced medially, the apex of the crown angular in dorsal aspect. The median length of the crown greatly exceeds the width between the eyes. The width of the head, including the eyes, exceeds the width of the pronotum. The pronotum is short, with lateral margins distinctly divergent posteriorly and the posterior margin

shallowly emarginate. In lateral aspect, the face is smoothly and slightly convex, and divergent from the line of the dorsum. The pleural portion of the pronotum is much broader than the ocellocular area.

Only the genotype, a Bolivian species, is known.
bilineata (Osborn), 1928a: 270 (Dikraneura), new combination

Genus Kunzella, nov.

(Pl. 23, fig. 62)

Type of the genus, Dikraneura marginella Baker.

Hind wings: vannal veins fused; submarginal vein present, extending around wing apex, beyond apex of vein "R+M" then basad along costal margin; vein Cu_1 appearing branched apically (its apical portion not fused with apical portion of vein M_{3+4}); vein Cu_2 confluent with submarginal vein in basal half of wing, much basad of vein m-cu.

Fore wings: apical venation quite variable between species; inner apical cell rectilinear or angulate basally; bases of second, third, and fourth apical cells often forming a slightly oblique line; outer apical cell elongate and slender or short and nearly semicircular, not attaining wing apex.

Genital capsule: male plate with oblique group of macrosetae near base and numerous dispersed microsetae; pygofer without distinct macrosetae; pygofer hook arising from internal part of lower pygofer wall, extending posterodorsad.

Internal male genitalia: style without preapical lobe, but with apical extension strongly arched in broad aspect and without setae; connective narrow, subtrapezoidal; genital atrium near base of aedeagus, the preatrium short; shaft massive, laterally compressed, with several subterminal processes.

The species are similar in appearance to species of Kunzeana -- dull green, but with contrastingly paler crown, narrow anterior margin of pronotum, and entire scutellum. The head is well-produced medially, the apex subangulate in dorsal aspect. The head, including the eyes, is somewhat narrower than the pronotum. In lateral aspect, the contour of the face is slightly convex, and divergent from the line of the dorsum. The pleural portion of the pronotum is broader than the ocellocular area. The apical cells of the fore wing are subhyaline.

The distribution is Neotropical. One undescribed species has been studied.

marginella (Baker), 1925a: 160 (Dikraneura), new combination
russea (McAtee), 1926b: 160 (Dikraneura), new combination

Genus Neodikrella, nov.

(Pl. 23, fig. 63; pl. 24, fig. 64)

Type of the genus, Dikraneura (Hyloidea) disconotata Osborn.

Mind wings: vannal veins fused; submarginal vein extending around wing apex beyond apex of vein "R+M" then

basal along costal margin; vein Cu_1 appearing branched apically (its apical portion not fused with apical portion of vein M_{3+4}); vein Cu_2 confluent with submarginal vein in basal half of wing, much basal of vein m-cu.

Fore wings; wing apex falcate; greatest width of inner apical cell exceeding combined width of second and third apical cells; second apical cell narrowed distally.

Genital capsule: male plate with oblique row of macrosetae and numerous scattered microsetae, some short, some elongate and fine; surface of pygofer without macrosetae; pygofer hook elongate, dorsal in origin, extending caudad, overhanging and exceeding narrow posterodorsal caudally directed pygofer lobe.

Internal male genitalia: style with elongate tapering apical extension directed caudad but curved slightly mediad posteriorly; length of apical extension subequal to that segment of style from connective to apical extension; preapical lobe with minute setae; connective Y-shaped, the stem elongate, extending more caudad than style apices, with preapical bulbous enlargement; aedeagus complex, a horseshoe-shaped accessory piece surrounding genital atrium at sides and beneath, the side portions greatly expanded, the ventral portion with an anteriorly directed lobe articulating with connective, a pair of elongate tapering dorsally curved processes arising from lateral expanded portions of

accessory piece, and a second similar pair of processes arising ventrally from basal articular portion and extending parallel to above pair of processes; aedeagal shaft unornamented.

The head is considerably produced before the eyes. In lateral view, the margin between crown and face is not carinate, and the line of the face is subparallel to the line of the dorsum. The pleural portion of the pronotum is broader than the ocellocular area.

disconetata (Osborn), 1928a: 275 (*Dikraneura* (*Hyloidea*)),
new combination

Genus *Sarascarta*, nov.

(Pl. 24, fig. 65)

Type of the genus, *Dikraneura* (*Hyloidea*) *fulva* Osborn.

Hind wings: vannal veins fused; submarginal vein extending around wing apex, beyond apex of vein "R+M" then basad along costal margin; vein Cu_1 appearing branched apically (its apex not fused with apical portion of vein M_{3+4}); vein Cu_1 confluent with submarginal vein in basal half of wing, much basad of vein m-cu.

Fore wings: first three apical cells progressively shorter and narrower; base of inner apical cell angular; outer apical cell open at base.

Genital capsule: male plate with oblique basal group of macrosetae; pygofer without macrosetae, with microsetae on disc; pygofer hook massive, arising posterodorsally with dorsal lightly sclerotized supporting arm.

Internal male genitalia: styles caliperate apically,
sinuately curved laterad basally, then mesad distally,
without apical extension or preapical lobe, with few sub-
apical setae located on outer margin; connective T-shaped,
widened apically, with elongate stem, apex exceeding style
apices; aedeagus laterally compressed, preatrium wanting;
paired ventral atrial processes present or absent.

The head is slightly deflexed. In profile, the line of the face is subparallel to the line of the dorsum. The pleural portion of the pronotum is subequal in width to the ocellular area. The pronotum is broadly emarginate posteriorly, leaving the scutellum broadly exposed.

The fore wings of both available specimens of the genotype were coriaceous to the degree that the venation could not be ascertained. The venation figured is that of a single undescribed Bolivian specimen from the U. S. National Museum collection.

In addition to the Bolivian specimen mentioned above, a second undescribed species from Argentina has been examined, and a third from Puerto Rico.
fulva (Osborn), 1928a: 277 (Dikraneura (Hyleidea)), new combination

Genus Buritia, nov.

(Pl. 25, fig. 66)

Type of the genus, Dikraneura lepida McAtee.

hind wings: vannal veins fused; submarginal vein extending around wing apex beyond apex of vein "R+M" then basad along costal margin; vein Cu_1 appearing branched apically (its apical portion not fused with apical portion of vein M_{3+4}); vein Cu_2 confluent with submarginal vein much basad of vein $m-cu_1$.

Fore wings: inner apical cell trapezoidal, its apex not attaining wing apex; second apical cell angular at base, almost parallel margined, slightly longer at apex than at base; third apical cell triangular, embracing most of wing apex; outer apical cell nearly triangular, its apex not attaining wing apex.

Genital capsule: male plate, in ventral aspect, broad at base, gradually narrowed on outer margin over apical three-fourths to sharply rounded apex, with row of macrosetae along lateral margin over basal two-thirds; in lateral aspect, plate conspicuously flat, with apex turned sharply dorsad; pygofer, in lateral aspect short, with elongate parallel-margined projection from middle of posterior margin and more heavily sclerotized hook immediately ventrad of this, disc without macrosetae, with few irregularly arranged microsetae.

Internal male genitalia: style elongate, slender, gradually tapered to acute apex, without preapical lobe or apical extension, in lateral aspect with apical portion sickle-shaped, curved sharply dorsad near articulation with

connective, then gradually ventrad towards apex, with few small setae on ventral margin near beginning of curved portion; connective broadly U-shaped with pair of dorsal preapical projections, the aedeagal articulation subterminal; aedeagus without processes, with well-developed preatrium, shaft dorsoventrally (anteroposteriorly) compressed; dorsal apodeme well developed, branched, each branch with an anterior and a posterior process.

The head is well-produced, the median length of the crown slightly less than the distance between the eyes. The width of the head, including the eyes, is slightly greater than the width of the pronotum. The pronotum is much longer than the head, with lateral margins nearly parallel and posterior margin nearly straight. In lateral aspect, the surface of the crown and the pronotum form a continuous declivent surface. The anterior margin of the head is thick, and the line of the face flat, not greatly divergent from the line of the dorsum. The pleural portion of the pronotum is subequal in width to the ocellocular area.

The genus is named for the settlement of Buriti, in Mato Grosso, Brazil, which is near the collecting site of many of the known South American leafhoppers which bear the locality label, "Chapada, Brazil", according to Dr. John Lane, of the University of São Paulo.

lepida (McAtee), 1926b: 161 (Dikraneura), new combination

Genus Saranella, nov.

(Pl. 25, fig. 67; pl. 26, fig. 68)

Type of the genus, Dikraneura (Hyloidea) micronotata Osborn.

hind wings: vannal veins fused; submarginal vein extending around wing apex, beyond apex of vein "R+M" then basad along costal margin; vein Cu₁ appearing branched apically (its apical portion not fused with apical portion of vein M₃₊₄); vein Cu₂ confluent with submarginal vein in proximal half of wing, much basad of vein m-cu.

Fore wings: greatest width of inner apical cell subequal to combined widths of second and third apical cells; inner and outer apical cells broad basally; second apical cell with lateral margins sinuate and subparallel; third apical cell pedunculate; pattern formed by bases of apical cells transverse, bowed caudad at caudal margins of cells R and M.

Genital capsule: plate with prominent lobe on outer margin before apex and with lateral oblique row of macrosetae; pygofer lacking setae except near origin of pygofer hook; pygofer hook arising internally on posterodorsal lobe, in dorsal aspect the two hooks elongate, slender, crossed.

Internal male genitalia: style elongate, slender, parallel-margined with slightly decurved acute tip, lacking apical extension but with posterolaterally directed flat basal truncate extension arising opposite articulation with

connective and connected with outer basal angle of male plate;
style without macrosetae; connective Y-shaped with apex
turned dorsad, the aedeagal articulation subterminal; aedeagus
simple, without processes; preatrium short.

The crown of the head and the disc of the pronotum
form a smoothly convex surface. The face, in profile, is
flattened, its contour nearly parallel to that of the dor-
sum. The pronotum is scarcely emarginate behind. The
pleural portion of the pronotum is narrower than the
occelocular area.

micronotata (Osborn), 1928a: 278 (Dixraneura (Hylloidea), new
combination

Genus Hybla McAtee

(Pl. 26, fig. 69)

Hybla McAtee. Journ. Dept. Agr. P. R. 16(2): 119. 1932.

Type of the genus, Hybla maculata McAtee, by original
designation.

Hind wings: vein 1V branching from vein 2V basad of its
midpoint; submarginal vein extending around wing apex beyond
apex of vein "R+M" then basad along costal margin; apical
portion of vein Cu₁ free, not connected at all with any
portion of vein M₃₊₄ which does not occur as a separate
vein; vein Cu₂ confluent with submarginal vein in basal
half of wing.

Fore wings: first, second, and third apical cells successively shorter, slender, narrow, each narrower than outer apical cell; outer apical cell open at base, its apex almost attaining wing apex.

Genital capsule: male plate, in ventral aspect, slender, gradually tapering from base to sharply rounded apex; in lateral aspect exceeding apex of pygofer; with oblique row of macrosetae over basal half of plate near lateral margin and marginal row of smaller setae on lateral margin near base; pygofer slender, posterodorsal margin extended caudad in digitate process which is not differentially sclerotized; disc of pygofer with few small microsetae.

Internal male genitalia: style, in dorsal aspect, elongate, slender, gradually curved posterolaterad in apical half to extreme apex which is abruptly curved laterad, inner margin with slight preapical prominence, terminal margin obliquely truncate; connective Y-shaped, the apex turned dorsad, the aedeagal articulation subterminal anterior portion with median ventral attachment to venter of ninth segment; aedeagus slender, elongate, with recurved slender apical process bifid at tip and pair of retrorse processes arising near preapical gonopore on posterior (ventral) margin; preatrium wanting; apodeme slender, distinct.

The leafhoppers have a well-produced head, with the median length of the crown subequal to the width between the eyes, in the males, and to the median length of the pronotum. In dorsal aspect, the anterior margin of the

crown is bluntly angulate. The head, including the eyes, is broader than the pronotum. The pronotum is broader than long. In lateral aspect, the contour of the face is subparallel to the line of the dorsum. The pleural portion of the pronotum is much broader than the ocellocular area.

The genus is known only from the genotype, a Puerto Rican species.

maculata McAtee, 1932b: 119.

TRIBE ERYTHRONEURINI, NOV.

In the tribe Erythroneurini are placed all those Typhlocybinae in which the vannal veins are fused, Cu_1 appears branched apically (its apical portion not fused with the apical portion of vein M_{3+4}), Cu_2 is confluent with the submarginal vein in the basal half of the wing, and in which the style apices are in one of two forms of development; first, a single flattened apical extension which is truncate apically (Pl. 3, fig. 9), and second a condition in which a second extension has developed from the outer apex of the first extension (Pl. 3, figs. 10-15). In the second condition, the mesal apex of the first extension is represented by the "heel".

In the present classification, all those leafhoppers with a single broad extension of the style apex are placed in the genus Zygina. This genus is a complex of considerable

size and wide distribution and is doubtless destined to undergo considerable subdivision.

In the Western Hemisphere, species of Zygina, hitherto referred to as the "Western obliqua group" of the genus Erythroneura, are known to occur from northern California and Colorado to Central America. The writer has examined specimens of an undescribed species from Argentina. Matsumura has described species from the Orient, and while not too much weight can be attached to the generic placement, his figures for the wings (1931b) suggest an accurate placement. Erythroneura zealandica Myers from New Zealand has been examined and found to belong to the Zygina complex as defined above.

In both Europe and North America, species of a diversity of form will be placed in the genus Zygina as here defined. Some of the species are large and robust, as the secnothana group of North America, and Ribaut's (1936b) lunaris group of Europe; while some from the Palaearctic fauna and some from the Nearctic fauna are as small and delicate in appearance as true Erythroneura. Most of the Western Hemisphere forms possess two pygofer hooks on each side of the pygofer, one arising from the dorsal (mesal) margin, the other from the posteroventral margin, and in this respect they are distinct from other Zygina species examined.

In Europe, the gap sundering Zygina from Erythroneura is a narrow one. The European Erythroneura of the (parvula) = ribauti group of Ribaut (1936b) approaches a condition which may have given rise to Erythroneura (sens. lat.). In the ribauti group, the style apices are distinctly modified through the incorporation of what is believed to be a second apical extension (although the writer was not able to distinguish a clear line of demarcation between first and second extensions in E. ribauti, the only species available for study from this group). Species of this group are robust, with the general facies of some European Zygina and Nearctic Zygina of the ceonothana group. The pygofer of E. ribauti has a "jointed" pygofer hook identical with Nearctic Erythroneura of the obliqua group, and the relationship is further strengthened by the occurrence of a basal ventral, aedeagal membrane-like expansion so characteristic of the Nearctic obliqua group.

The second apical extension of the style, the presence of which distinguishes Erythroneura from Zygina, in general, appears to be an extremely plastic feature interspecifically in Nearctic Erythroneura. It appears to be constant in form in the Palaearctic flammigera group of Ribaut, where it appears as a small rounded lobe. There is a possibility that Erythroneura, as here defined, will eventually come to be known to be as complex as Zygina. The North American fauna has long been known to have four closely

related groups. The flavivigera group appears quite distinct, as does the sineti group from Europe, and is worthy at least of subgeneric rank. A paratype of Zygina lubiae China, from Sudan, the only African form studied, was dissected and found to have a very bizarre second apical extension of the style, quite distinct from anything seen in Palaearctic and Nearctic forms.

The writer has refrained from naming the Western Hemisphere Zygina, in spite of their distinctness from the genotype, because not enough material was available from the Orient to establish discontinuity in variation.

The possible origin of the tribe is obscure. The writer has thought two hypotheses worthy of consideration. The first of these would postulate an independent origin from the Alebrini, perhaps from Habralebra-like ancestors. The extension of the style apex of an Ecuadorean species of Habralebra suggests a possible origin of the style pattern found in Zygina. An acceptance of such an idea would necessitate an assumption that a tremendous amount of parallel evolution in venation of the hind wings has occurred in the Erythroneurini and Dikraneurini.

The second, more plausible, possibility is that of an origin somewhere in dikraneurine stock, probably among the more specialized Dikraneurini where a single apical extension

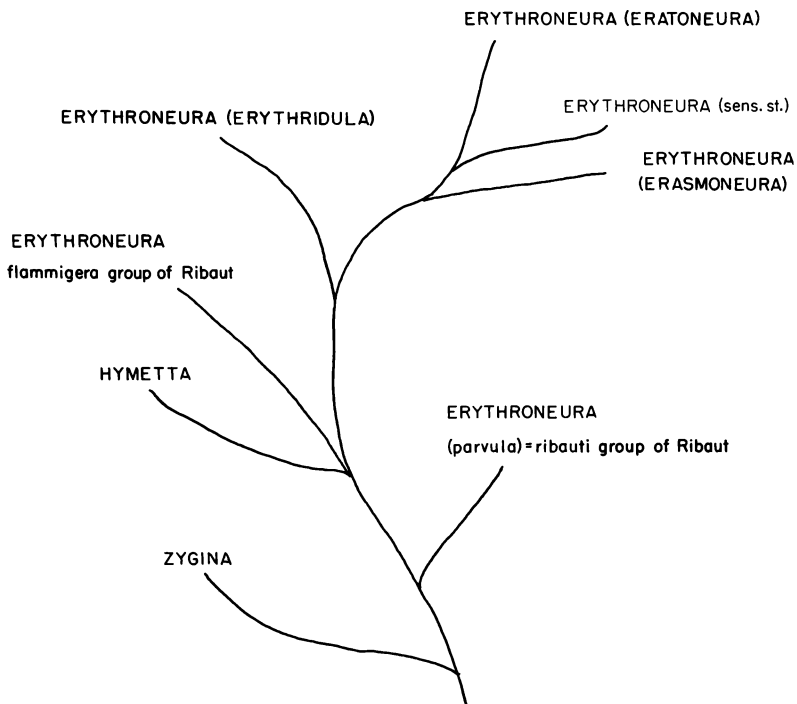


Fig. 2. Suggested relationships in Erythroneurini (the lines should be interpreted as having depth).

of the style, the fusion of vannal veins, the loss of the submarginal vein at the wing apex, and the migration of vein C_ug towards the base of the wing were already established.

The relationships which have suggested themselves as a result of morphological studies in the group are presented in "tree" form in the accompanying figure (text figure 2).

KEY TO GENERA AND SUBGENERA OF ERYTHRONEURINI

1. Style apex with single apical extension broad and truncate apically (plate 3, fig. 9) ----- Zygina
 Style apex with second extension or lobe of diverse forms developed from broad truncate first extension; "heel" present on style (plate 3, figs. 10-15) ----- 2
2. Second apical cell of fore wing conspicuously broadened at apex (plate 27, fig. 72b) ----- Hymetta
 Second apical cell of fore wing narrow throughout -----
 ----- Erythroneura ---3
3. Base of inner apical cell of fore wing transverse (plate 28, fig. 74b); pygofer hooks C-shaped (except in tectia) or modified C-shaped, the ventral arm of the C elongate or bifid (plate 27, figs. 73c,f; plate 28, fig. 74g) ---
 ----- E. (Erythroneura)
 Base of inner apical cell of fore wing oblique or angulate (plate 28, figs. 75b, 76b; plate 29, fig. 78b); pygofer hooks not C-shaped ----- 4
4. Base of inner apical cell of fore wing oblique and angulate at confluence of vein Cu (plate 28, fig. 75b); pygofer hooks with narrow, basal, lightly-sclerotized joint-like region (except in tectia); pygofer with distinct group of setae just dorsad of outer basal angle of male plate (plate 28, fig. 75c)----- E. (Erasmoneura)

Base of inner apical cell of fore wing oblique but not angulate at confluence of vein Cu (plate 26, fig. 76b; plate 29, fig. 78b); pygofer hooks without a narrow, joint-like basal portion, or if such a joint is present (plate 29, fig. 77f), then group of setae on pygofer just dorsad of outer basal angle of male plate is weak or vestigial (plate 29, fig. 77c) ----- 5

5. Cu of fore wing confluent with base of inner apical cell near its outer basal angle (plate 29, fig. 78b); pygofer hooks slender and elongate, simple or bifid, without a basal, lightly-sclerotized joint-like portion; pygofer with distinct group of setae just dorsad of outer basal angle of male plate (plate 29, fig. 78c); inner apical cell of fore wing usually with dark spot in base -----
----- E. (Eratoneura)

Cu of fore wing confluent with base of inner apical cell at point considerably mesad of its outer basal angle (plate 28, fig. 76b); pygofer hooks short, suspiculate, with basal lightly-sclerotized joint-like portion near their origin on mesal pygofer margin (plate 29, fig. 77f); group of vestigial setae (filiform under high magnification) on pygofer just dorsad of outer basal angle of male plate (plate 29, fig. 77c); inner apical cell of fore wing usually without a basal dark spot -----
----- E. (Erythrídula)

Genus Zygina Fieber

(Pl. 3, fig. 9; pl. 26, fig. 70; pl. 27, fig. 71)

Zygina Fieber. Verh. Zool. Bot. Ges. Wien. 16: 509, 1866.

Idia Fieber (nec Hübner). loc. cit. (type, Typlocyba scutellaris Her.-Sch. (monobasic, the other included species being a synonym)).

Zyginidia Haupt (new name for Idia Fieber). Zool. Jahrb.

(Abt. Syst.) 58: 268. 1929 (type, Typlocyba scutellaris Her.-Sch., by original designation).

Erythroneura Fitch, in part, of authors.

Type of the genus, Typlocyba nivea Mulsant and Rey (monobasic).

Hind wings: vannal veins fused; submarginal vein absent at wing apex, confluent with apex of vein Cu_1 apically; posterior branch of R fused with vein M_{1+2} ; vein Cu_2 confluent with submarginal vein in basal half of wing.

Fore wings: inner apical cell with base oblique to obliquely angulate, more proximal than base of second apical cell; second apical cell much narrower than either adjoining apical cell; third apical cell broad; outer apical cell short and small, not attaining wing apex.

Genital capsule: male plate, in ventral aspect, with oblique row of few microsetae over basal portion, in lateral aspect with submarginal row of microsetae, often stout; pygofer, in lateral aspect, lacking macrosetae, with microsetae variously arranged, frequently with distinct group of microsetae on disc dorsad of outer basal angle of male plate

er dorsad of basal portion of lateral margin of male plate; pygofer hooks present, arising dorsally from the mesal margin; or ventrally from the posteroventral margin, or both (both usually present in Western Hemisphere species).

Internal male genitalia: style with distinct preapical lobe and single truncate flat apical extension, without second apical extension (except in *xiperi*); connective U- or V-shaped, occasionally papilionaceous in form; aedeagus of varied form and with varied processes or without processes.

As pointed out earlier in the discussion under the tribal heading, the genus, as it now stands, is a large complex. The species are greatly variable in shape, from broad and robust to narrow and delicate. They are greatly variable in color markings. In *Z. xiperi*, the style exhibits a second extension, which from its form, is believed to be of origin independent from that which led to *Erythroneura*.

Oman (1949) has already pointed out that the North American species are capable of subdivision.

The following key will separate the Western Hemisphere species groups. An undescribed Argentine species belongs to the *ceonethana* group.

Key to Groups of Western Hemisphere Zygina

Broad robust leafhoppers; head in dorsal aspect with anterior margin broadly rounded, with two conspicuous black spots on crown; pleural portion of pronotum narrower than ocellular area ----- *ceonethana* group

Less broad and robust; head more produced medially;
spots on crown wanting or less pronounced; pleural portion
of pronotum broader than ocellular area ----- ritana group

Ceonothana group

abluta (McAtee), 1924d: 132 (Erythroneura), new combination
apacha (Baker), 1925b: 537 (Erythroneura), new combination
arida (Beamer), 1937b: 31 (Erythroneura), new combination
balli (Beamer), 1932i: 125 (Erythroneura), new combination
bimaculata (Baker), 1903d: 9 (Typhlocyba), new combination
ceonothana (Beamer), 1934c: 287 (Erythroneura), new combination
davisi (Beamer), 1934d: 96 (Erythroneura), new combination
huachucana (Beamer), 1934c: 287 (Erythroneura), new combination
penapacha (Beamer), 1941a: 18 (Erythroneura), new combination
quadricornis (Beamer), 1930b: 431 (Erythroneura), new com-
bination

Ritana group

ales (Beamer), 1932i: 124 (Erythroneura), new combination
aprica (McAtee), 1924d: 132 (Erythroneura), new combination
aucta (McAtee), 1920a: 279 (Erythroneura), new combination
bilocularis (Van Duzee), 1924a: 233 (Erythroneura), new
combination
canyonensis (Beamer), 1929b: 120 (Erythroneura), new com-
bination
casta (Beamer), 1929b: 118 (Erythroneura), new combination

cimarroni (Beamer), 1929b: 119 (Erythroneura), new combination
cornigera (Beamer), 1937b: 31 (Erythroneura), new combination
dentata (Gillette), 1898a: 765 (Typhlocyba), new combination
erosa (McAtee), 1924c: 36 (Erythroneura), new combination
grandis (Beamer), 1929b: 127 (Erythroneura), new combination
illinoisensis (Gillette), 1898a: 758 (Typhlocyba), new combination

ination

inclita (Beamer), 1934a: 44 (Erythroneura), new combination
inornata (McAtee), 1924a: 132 (Erythroneura), new combination
kiperi (Beamer), 1929b: 124 (Erythroneura), new combination
merita (Beamer), 1932i: 127 (Erythroneura), new combination
milleri (Beamer), 1929b: 125 (Erythroneura), new combination
nicholi (Beamer), 1927a: 30 (Erythroneura), new combination
novella (Anull and Auten), 1938a: 536 (Erythroneura), new combination

ination

obscura (Beamer), 1929b: 117 (Erythroneura), new combination
oculata (McAtee), 1924a: 39 (Erythroneura), new combination
pallenta (Beamer), 1929b: 117 (Erythroneura), new combination
pinalensis (Beamer), 1929b: 119 (Erythroneura), new combination
ritana (Beamer), 1934c: 286 (Erythroneura), new combination
rubicunda (Beamer), 1929b: 126 (Erythroneura), new combination
tergemina (Van Duzee), 1924a: 235 (Erythroneura), new combination

ination

ternaria (Van Duzee), 1924a: 232 (Erythroneura), new combination

ination

triceroprocta (Beamer), 1929b: 118 (Erythroneura), new combination

tricolor (Beamer), 1929b: 124 (Erythroneura), new combination

tripunctata (Beamer), 1929b: 124 (Erythroneura), new combination

unicolor (Beamer), 1929b: 120 (Erythroneura), new combination

utahna (Beamer), 1937b: 32 (Erythroneura), new combination

The following species of Zygina have not been studied, and cannot, therefore, be placed in the appropriate grouping above.

agnata (Knull and Auten), 1938a: 537 (Erythroneura), new combination

arizonica (Knull and Auten), 1938a: 536 (Erythroneura), new combination

blanda (Knull and Auten), 1938a: 538 (Erythroneura), new combination

modula (Knull and Auten), 1938a: 535 (Erythroneura), new combination

mundana (Knull and Auten), 1938a: 534 (Erythroneura), new combination

nuda (Knull and Auten), 1938a: 538 (Erythroneura), new combination

sola (Knull and Auten), 1938a: 534 (Erythroneura), new combination

spectabilis (Knull and Auten), 1938a: 533 (Erythroneura), new combination

Genus Hymetta McAtee

(Pl. 27, fig. 72)

Hymetta McAtee. Proc. Biol. Soc. Wash. 32: 121. 1919.

Type of the genus, Tettigonia trifasciata Say, by original designation.

Hind wings: as in Zygina.

Fore wings: inner apical cell broader at base than second or third apical cells, its base oblique or obliquely angulate; second apical cell conspicuously wider at apex than at base; third apical cell widened apically; outer apical cell short, trapezoidal, not attaining wing margin.

Genital capsule: male plate, in ventral aspect, narrowed on lateral margin near middle its length, apex rounded, with oblique row of few macrosetae over disc laterally on basal portion; in lateral aspect, plate with submarginal irregular row of microsetae parallel to lateral margin, and with number of irregularly arranged microsetae over distal half; pygofer, in lateral aspect, with group of small setae dorsad of outer basal angle of male plate, few smaller setae cephalad of posterior margin, and irregularly arranged microsetae; pygofer hook short, arising from mesal pygofer margin, extending mesad free from pygofer wall through most its length, its base without a joint-like lightly-sclerotized portion.

Internal male genitalia: style with broad conspicuous preapical lobe and apical foot-like extension, the "toe" apparently formed by a small second extension, preapical lobe with small group of discal microsetae; connective short, Y-shaped with stem turned dorsad, the aedeagal articulation subterminal; aedeagus with well developed preatrium, shaft surmounting and roughly parallel to pair of more ventral preatrial processes.

The species are robust. In dorsal aspect, the head including the eyes is narrower than the pronotum, and well-produced medially to the rounded apex of the crown. The lateral margins of the pronotum are divergent posteriorly, and the posterior margin is shallowly concave. In lateral aspect, the line of the face is smoothly convex, and divergent from the line of the dorsum. The pleural portion of the pronotum is broader than the ocellocular area. The scutellum, in lateral aspect, is elevated posteriorly, a character which has been overemphasized heretofore, for its use in a key frequently leads to erroneous results. The species are beautifully marked with dusky bands on a cream-colored background and frequently with orange to red spots. The identity of the species is in a state of confusion, at present, and a revision is greatly needed.

This genus is closely related to Erythronere, and has a distribution which is primarily Nearctic.

antnisma McAtee, 1915a: 123.

arizoniana Fairbairn, 1928a: 90

balteata McAtee, 1915a: 123

distincta Fairbairn, 1928a: 87, new synonymy

kansasensis Fairbairn, 1928a: 90

trifasciata (Say), 1825a: 343 (Tettigonia) (fide Oman)

Genus Erythroneura Fitch

Erythroneura Fitch. Ann. Rep. N. Y. St. Cab. Nat. Hist.: 62.

1851.

Type of the genus, Erythroneura tricincta Fitch, by subsequent designation of Oshanin, 1912.

Hind wings: as in Zygina.

Fore wings: base of inner apical cell oblique, angulate, or transverse; vein Cu confluent with base of inner apical cell at a point varying from its center to its outer extremity; second apical cell narrow, with sides subparallel; third apical cell usually quadrilateral, rarely triangular; outer apical cell not attaining wing apex; bases of apical cells forming a variable pattern, together appearing nearly as a transverse line, a jagged diagonal line, or a line concave at its mid-length.

Genital capsule: plate with oblique row of macrosetae; pygofer with group of setae dorsad of outer basal angle of male plate, more or less distinct; pygofer hook arising from

mesal pygofer margin, greatly variable in form.

Internal male genitalia: style with second apical extension always present; second apical extension of extremely variable form interspecifically; connective U-shaped or V-shaped with the apex turned dorsad, the aedeagal articulation usually subterminal; aedeagal form varied.

As the genus now stands, it is of inconvenient size. Probably the reason it has not been subdivided heretofore is that careful study reveals such a bewildering array of variations and intergrades as to render its separation into discontinuous groups exceedingly difficult. In the opinion of the writer, with the exception of the forms which have been relegated to Zygina, it is as it has been considered to date -- a very large complex of closely related species.

For years, the group has been subdivided into groups of species on the basis of the form of the base of the inner apical cell of the fore wing. Beamer (1936) has pointed out that this character is subject to some variation within species, and is not infallible. Nevertheless, after considerable study, it appears likely that the groups of species based on this character are probably more natural than several other possible groupings, and more clear-cut. Some supporting characters have been found for these groups, and they are retained here, as subgenera.

The subgenera permit further subdivision, but the resulting groups leave much doubt as to whether natural relationships result.

Erythroneura subgenus Erythroneura Fitch

(Pl. 27, fig. 73; pl. 28, fig. 74)

See reference under generic heading.

Type of the subgenus, Erythroneura tricincta Fitch, by subsequent designation of Oshanin, 1912.

Hind wings: as in generic description.

Fore wings: bases of apical cells forming a transverse line which may be irregular; base of inner apical cell transverse, seldom oblique, apex of vein Cu confluent with base of inner apical cell at or near its outer basal angle.

Genital capsule: pygofer with a distinct group of setae just dorsad of outer basal angle of male plate; pygofer hooks C-shaped, the dorsal arm of the hook formed by a gradual increase in sclerotization of the mesal pygofer margin, lacking a thinner, weakened basal "joint", occasionally with ventral arm greatly elongate or bifid (dorsal arm wanting in tacita).

Internal male genitalia: aedeagus variable in form, in some species with elongate preatrium bearing paired processes and with short dorsoventrally flattened shaft; in other species preatrium short or wanting and the shaft cylindrical and with or without processes; other characters as in generic description.

It is possible to further subdivide the subgenus on the basis of the shape of the aedeagus, the shape of the style, and the form of the pygofer hook. Most such groupings reveal intergrades.

In the list of species which follows, these species which have not been studied by the writer are indicated by an asterisk:

- aclys McAtee, 1920a: 290
- acuticephala Robinson, 1924a: 61
- amanda McAtee, 1920a: 319
- ancora Beamer, 1929b: 122
- anfracta Beamer, 1929b: 123
- asa Robinson, 1924c: 291
- beameri Robinson, 1924a: 61
- bidens McAtee, 1924c: 39
- bistrata McAtee, 1920a: 305
- caetra McAtee, 1924d: 133
- calycula McAtee, 1920a: 308
- cancellata McAtee, 1920a: 320
- coloradensis (Gillette), 1892a: 16 (Typhlocyba)
- comes (Say), 1815a: 343 (Tettigonia)
- compta McAtee, 1920a: 318
- corni Robinson, 1924a: 60
- cymbium McAtee, 1920a: 310
- delicata McAtee, 1920a: 317

diva McAtee, 1920a: 308
elegans McAtee, 1920a: 315
elegantula Osborn, 1928a: 289
festiva Beamer, 1938a: 290
fraxa Robinson, 1924c: 292
gilensis Beamer, 1929b: 123
infuscata (Gillette), 1898a: 764 (Typhlocyba)
integra McAtee, 1920a: 309
kanwaka Robinson, 1924c: 292
kennedyi Knull, 1945a: 109
nudata McAtee, 1920a: 316
*octonotata Walsh, 1862a: 149
omaska Robinson, 1924a: 62
ontari Robinson, 1924a: 60
palimpsesta McAtee, 1924e: 43
pontifex McAtee, 1926c: 136
prima Beamer, 1938a: 283
prosa Johnson, 1935a: 108
reflecta McAtee, 1924e: 43
rosa Robinson, 1924a: 58
rubra (Gillette), 1898a: 764 (Typhlocyba)
rubrella McAtee, 1920a: 316
tacita Beamer 1938a: 293
tricincta Fitch, 1851a: 63
vaga Johnson, 1934a: 260
vagabunda Knull, 1945a: 109

vitifex Fitch, 1856a: 392

vitis (Harris), 1831a: 43 (Tettigonia) (fide Oman)

ziczac Walsh 1862a: 149

Erythroneura subgenus Erasacneura, nov.

(Pl. 28, fig. 75)

Type of the subgenus, Erythroneura vulnerata Fitch.

Hind wings: As in Zygrina.

Fore wings: as in subgenus Erythroneura, but base of inner apical cell angulate, rarely rectilinear and transverse; Cu confluent with base of inner apical cell near its midpoint.

Genital capsule; pygofer with distinct group of setae just dorsad of outer basal angle of male plate; pygofer hook simple or bifid, with basal lightly-sclerotized joint-like portion (except in tecta); other characters as in generic description.

Internal male genitalia: style with second apical extension obvious, greatly variable in form inter-specifically; aegeagal shaft extremely snort, with various processes; preatrium usually trough-like in form; aedeagal connections to pygofer hooks very strong, even in macerated specimens.

This is the "vulnerata" group of authors. Its affinities are enigmatic. The pygofer hooks and their

strong connections to the aedeagus are suggestive of subgenus Erythrídula, whereas the reduction in the length of the shaft of the aedeagus is suggestive of the condition found in the subgenus Eratoneura.

A list of Western Hemisphere species follows. All of the species listed are Nearctic. All have been studied by the writer.

- atrata Johnson, 1935a: 87
bicolorata Beamer, 1937a: 11
bipentagona Beamer, 1937a: 31
caerula Beamer, 1937a: 10
calva Beamer, 1946a: 22
carbonata McAtee, 1920a: 289
fulmina McAtee, 1920a: 274
mixta Beamer, 1932j: 163
nigerrima McAtee, 1920a: 275
nigra (Gillette), 1858a: 765 (Typhlocyba)
rubricata (Van Duzee), 1908a: 229 (Typhlocyba)
tectata McAtee, 1920a: 288
variabilis Beamer, 1929b: 126
vulnerata Fitch, 1851a: 61

Erythroneura subgenus Erythrídula, nov.

(Pl. 28, fig. 76; pl. 29, fig. 77)

Type of the subgenus, Tettigonia obliqua Say.

Hind wings: as in Zygina.

Fore wings: as in subgenus Erythroneura, but base of inner apical cell oblique, and Cu confluent with base of inner apical cell at point near middle its length.

Genital capsule: pygofer with indistinct group of microsetae just dorsad of outer basal angle of male plate, the setae visible only under very high magnification and not conspicuously differentiated from other similar setae on pygofer; pygofer hook short and cuspidate, dorsal in origin, not arising as uniform increase in sclerotization, with basal lightly-sclerotized articular area appearing as joint at dorsal basal portion of hook, ventral base of hook joined to dorsal aedeagal apodeme by strong connections frequently visible even in cleared specimens.

Internal male genitalia: style with second apical extension of form greatly variable interspecifically (and occasionally intraspecifically); connective V-shaped, its apex turned dorsad, the aedeagal articulation subterminal; aedeagus variable in form, the basal portion usually broadly expanded just distad of articulation with connective, the expansion rarely wanting, shaft never thecate, usually with paired processes arising at or near its base and these separate from, completely joined to, or partially joined to shaft.

It is possible to subdivide the subgenus on the basis of the style apices (but these are extremely variable structures between species, and Beamer and Griffith (1935a)

have shown one instance of intraspecific variation), or on the basis of the form of the base of the aedeagus, or on the basis of the form of the shaft. It is open to question whether such subdivisions would be natural ones, and they seem undesirable until they can be supported by more biological data than now exist.

In the following list of species, those not studied have been prefixed with an asterisk. All of the listed species are Nearctic.

- *abellae McAtee, 1920a: 265
- accurata Beamer, 1934b: 18
- acicularis Beamer, 1932i: 126
- *ador McAtee, 1918b: 361
- aenea Beamer, 1930b: 436
- afflicta Beamer, 1935a: 101
- alata (?) Knull, 1946a: 45
- albescens Beamer, 1930b: 443
- *alternata Johnson, 1935a: 72
- amabilis McAtee, 1924d: 132
- angularis Beamer, 1930b: 447
- *anomala Knull, 1946a: 46
- apta Beamer, 1935a: 102
- aspera Beamer and Griffith, 1935a: 18
- atrimucronata Beamer, 1930b: 424
- autenae Johnson, 1935a: 73

- bicornis Beamer, 1930b: 450
bitincta McAtee, 1928e: 130
brundusa Hob. 1924b: 155
*caldwelli Johnson, 1935a: 69
cauta Beamer, 1935a: 100
cavena Auten and Johnson, 1936a: 61
*celebrata Johnson, 1935a: 82
clavata (DeLong), 1916a: 105 (Tynphlocyba)
coarctata Beamer, 1935b: 436
*complicata Johnson, 1935a: 87
*contrastata Auten and Johnson, 1936a: 62
cornipes Beamer, 1930b: 449
cotidiana Beamer, 1930b: 433
*crataegi Johnson, 1936a: 61
crevecoeurii (Gillette), 1898a: 767 (Tynphlocyba)
cruciformis Beamer, 1930b: 443
cuneata Beamer, 1930b: 433
*decorata Auten and Johnson, 1936a: 63
difficilis Beamer, 1930b: 434
*divisa McAtee, 1924c: 37
dolosus Beamer and Griffith, 1935a: 19
dowellii Beamer, 1932b: 62
electa McAtee, 1920a: 282
eluta McAtee, 1920a: 277
extima Beamer, 1939a: 25
*extrema Auten and Johnson, 1936a: 64
falcata Beamer, 1930b: 432

- **fragilis* Johnson, 1935a: 93
- fumida* (Gillette), 1898a: 758 (Typhlocyba)
- funesta* Beamer, 1930b: 441
- furcillata* Beamer, 1930b: 452
- gleditsia* Beamer, 1930b: 437
- hamata* Beamer, 1930b: 446
- harpax* Beamer, 1930b: 432
- iconica* McAtee, 1920a: 287
- idonea* Beamer, 1935a: 100
- **inconspicua* Johnson, 1935a: 90
- insigna* Beamer and Griffith, 1935a: 17
- **intricata* Johnson, 1935a: 86
- jocosa* Beamer, 1935a: 101
- juglandis* Knull and Auten, 1936a: 532
- juncea* Beamer, 1937a: 10
- kansa* Robinson 1924a: 58
- latapex* Beamer, 1930b: 447
- lawsoniana* Baker, 1926a: 347
- **lusoria* Van Duzee, 1924a: 234
- magnacalx* Beamer, 1930b: 451
- malleiformis* Beamer, 1930b: 449
- mansueta* Beamer, 1935a: 98
- **minima* Johnson, 1935a: 92
- **minuta* Johnson, 1935a: 93
- modica* Beamer, 1930b: 448

- nava Beamer, 1935a: 102
- nitida Beamer, 1935a: 103
- noeva (Gillette), 1898a: 757 (Typhlocyba)
- *nondescripta Johnson, 1935a: 92
- obliqua (Say), 1825a: 342
- obvia Beamer, 1930b: 439
- ohioensis Knull, 1946a: 108
- parvispicata Beamer, 1930b: 435
- penelutea Beamer, 1930b: 427
- penanoeva Beamer, 1930b: 438
- penobliqua Beamer, 1930b: 455
- perita Beamer, 1935a: 99
- plena Beamer, 1930b: 442
- *ponderosa Auten and Johnson, 1936a: 62
- *praecisa Knull, 1946a: 46
- quadrata Beamer, 1930b: 435
- *repleta Johnson, 1936a: 78
- rubens Beamer, 1930b: 439
- rubrataeniensis Beamer, 1930b: 440
- rubroscuta (Gillette), 1896a: 755 (Typhlocyba)
- rubrotincta Johnson, 1935a: 91
- rufostigmata Beamer, 1930b: 429
- sagittata Beamer, 1930b: 440
- scissa Beamer, 1930b: 446
- *scytha Auten and Johnson, 1936a: 61
- *sincera Johnson, 1935a: 94
- *sinua Johnson, 1935a: 82

- spatulata Beamer, 1930b: 444
- *spearca Auten and Johnson, 1936b: 818
- stolata McAtee, 1920a: 279
- *stulta Auten and Johnson, 1936a: 64
- *stylata Johnson, 1905a: 78
- tenebrosa Knull, 1946a: 48
- tenuispica Beamer, 1930b: 444
- torva Beamer, 1935a: 98
- tridens Beamer, 1930b: 450
- unicuspidis Beamer, 1930b: 452
- *varia McAtee, 1920a: 287
- victorialis (?) Knull, 1946a: 49
- vinaria Beamer, 1930b: 426
- volucris Beamer, 1930b: 445
- xanthocephala Robinson, 1924d: 220

Erythroneura subgenus Kratoneura, nov.

(Pl. 29, fig. 78)

Type of the subgenus, Erythroneura dira Beamer.

Hind wings: as in Zygina.

Fore wings: base of inner apical cell varying from nearly transverse to oblique or subangulate, but most often oblique; vein Cu attaining base of inner apical cell near outer basal angle of cell, occasionally at point more mesad; otherwise as in subgenus Erythroneura.

Genital capsule: pygofer with distinct group of setae just dorsad of outer basal angle of male plate; pygofer hook simple or bifid, usually long and slender, arising as gradual thickening of mesal pygofer margin, without a basal, lightly-sclerotized joint-like portion; other features as in typical subgenus.

Internal male genitalia: style apex of various forms, but always with the second apical extension present; connective V-shaped with apex turned dorsad, the aedeagal articulation subterminal; aedeagal preatrium elongate and shaft short (except in ballista and hartii), usually cylindrical and with rugae or minute verrucose projections; aedeagus usually without processes either on preatrium or on shaft.

The species included here appear more robust than those of other subgenera, and most of them possess a dark spot in the base of the inner apical cell of the fore wing. They constitute what has been called the "maculata group" of Erythroneura. E. maculata has not been selected as the type because in some respects it is not typical of the group.

The subgenus, as characterized above, permits further subdivision on the basis of the form of the aedeagus. As pointed out in the above description, the aedeagal shaft is typically warty, or at least rugose, a peculiar development which does not occur in allied

groups. Moreover, this modification of the aedeagal shaft is associated usually with the lack of paired processes so frequently associated (often partially fused) with the shaft in subgenus Erythridula. It seems probable, from a study of the shaft in lateral view, under high magnification, in prepared slides, that these ventrolateral processes have entered into the constitution of the verrucose portion. The structure of the shaft of Erythroneura (Eratoneura) nevadensis (plate 29, fig. 78f) suggests that a complicating feature occurs. In this species, the two typical ventrolateral processes are expanded and flat, while arising dorsad of the base of the shaft is a flat hood-like unpaired process which bears prominences typical of those which cover the shaft, or partially cover it, in most other species of the subgenus. The dorsal "hood" and the ventrolateral flat processes are fused laterad of the base of the shaft, so that the shaft, in lateral view, appears partially enclosed by one dorsal and two ventral processes, but not entirely enclosed, except for a very short basal portion. The unenclosed portion of the shaft lacks rugae or minute verrucae. Many other species, in which the shaft is verrucose or rugose, in lateral view, exhibit a gonoduct in which the outline is complicated basally in a manner suggestive of a line of fusion such as

might exist if the three processes of nevadensis were more intimately fused. If this is true, the shaft is thecate in such species.

The relationship of the processes of nevadensis to the rugose shaft without processes presents a fascinating problem, the solution of which cannot be undertaken here. One group of species, here designated the crinita group, possesses processes plus a rugose or verrucose shaft. In all of the species of the crinita group, the position or the origin of the processes suggests that they have arisen independently and are not the homologues of the ventro-lateral processes of nevadensis. Such species undoubtedly represent an unnatural group and are placed together here merely for taxonomic convenience.

A second subdivision is founded on a group of species which have an aedeagal shaft which lacks ornamentation of the sort found in the more typical members of the group. It is here designated the noncuspidis group, and like the preceding, probably does not represent closely related species, although marra, gillettei, maculata, and non-cuspidis have many features in common.

In the species lists which follow, those species not studied by the author have been prefixed with an asterisk.

Dira group

- abjecta Beamer, 1931d: 288
accola McAtee, 1920a: 299
aculeata Beamer, 1932g: 161
adunca Beamer, 1932c: 46
aesculi Beamer, 1932c: 46
affinis Fitch, 1851a: 63 (fide Oman)
ardens McAtee, 1920a: 299
arta Beamer, 1931d: 287
basilaris (Say), 1825a: 344 (Tettigonia)
bella McAtee, 1920a: 300
bifida Beamer, 1931a: 134
bigemina McAtee, 1920a: 300
biramosa Beamer, 1941a: 18
bispinosa Beamer, 1931b: 241
brevipes Beamer, 1931a: 133
calamitosa Beamer, 1931b: 241
californica Beamer, 1932f: 143
campora Robinson, 1924a: 59
carmini Beamer, 1929b: 121
certa Beamer, 1932g: 159
clara Beamer, 1932g: 161
clavipes Beamer, 1931c: 289
conclsa Beamer, 1931d: 286
confirmata McAtee, 1924c: 37
consusta Beamer, 1932d: 71

contracta Beamer, 1931a: 130
*corylorubra Knull, 1945a: 108
curta Beamer, 1932e: 86
curvata Beamer, 1931a: 132
delongi Knull and Auten, 1937a: 574
dira Beamer, 1931d: 286
*direpta Knull, 1949a: 125
dumosa Beamer, 1932a: 13
*era McAtee, 1920a: 299
externa Beamer, 1931d: 289
facota Beamer, 1932d: 70
firma Beamer, 1932a: 12
*flexibilis Knull, 1949a: 122
forfex Beamer, 1932e: 82
gemina McAtee, 1920a: 301
hyalina Knull and Auten, 1937a: 575
*gymac robinson, 1924a: 60
immota Beamer, 1932a: 16
impar Beamer, 1931a: 133
incondita Beamer, 1932a: 16
inepta Beamer, 1932g: 162
ingrata Beamer, 1932g: 160
interna Beamer, 1931d: 285
knighti Beamer, 1932e: 87
lawsoni Robinson, 1924a: 59

lenta Beamer, 1932e: 82
ligata McAtee, 1920a: 301
linea Beamer, 1932c: 47
*luculenta Knull, 1949a: 124
lunata McAtee, 1924e: 41
macra Beamer, 1932a: 15
*malaca Knull, 1949a: 126
manus Beamer 1932e: 83
mensa Beamer, 1931d: 287
minor Beamer 1932e: 84
mira Beamer, 1932c: 45
mirifica Beamer, 1932g: 159
misera Beamer, 1932g: 158
morgani (DeLong), 1916a: 104 (Typhlocyba)
nevadensis Beamer, 1932d: 72
nigriventer Beamer, 1931a: 134
omani Beamer, 1930a: 49
opulenta Beamer, 1932c: 48
parallela McAtee, 1924c: 38
parva Beamer, 1932d: 70
parvipes Beamer, 1931b: 242
penesica Beamer, 1931c: 269
*perplexa Knull, 1944b: 123
propria Beamer, 1932a: 13
pyra McAtee, 1924d: 133
restricta Beamer, 1932c: 45

retusa Beamer, 1932c: 48
rotunda Beamer, 1931d: 288
rubranotata Beamer, 1927a: 30
rubraza Robinson, 1924c: 291
septima Beamer, 1927a: 30
*severini Knull, 1949a: 125
solita Beamer, 1932a: 14
spinifera Beamer, 1931b: 240
stephensoni Beamer, 1931a: 130
*stupkaorum Knull, 1945a: 104
tantilla Beamer, 1931d: 285
teres Beamer, 1931c: 288
torella Robinson, 1924b: 156
*trautmanae Knull, 1945a: 104
triangulata Beamer, 1931b: 240
trivittata Robinson, 1924a: 59
turgida Beamer, 1931b: 243
uncinata Beamer, 1931b: 242
ungulata Beamer, 1932d: 69
unica Beamer, 1932e: 83
univittata Robinson, 1924b: 156
usitata Beamer, 1932a: 14
*uvaldeana Knull, 1949a: 125
zioni Beamer, 1932d: 71

Crinita group

- crinita Beamer, 1932e: 85
geronimoi Knull, 1945a: 108
osborni (DeLong), 1916a: 103 (Typhlocyba)
paraesculi Knull, 1945a: 106
sancta Beamer, 1932a: 15
texana Beamer, 1929b: 121

Noncuspidis group

- andersoni Beamer, 1932a: 86
ballista Beamer, 1932e: 84
gillettei Beamer, 1931a: 128
hartii (Gillette), 1898a: 754 (Typhlocyba)
*hymettana Knull, 1949a: 124
lata Beamer, 1932e: 86
maculata (Gillette), 1898a: 764 (Typhlocyba)
marra Beamer, 1932g: 160
noncuspidis Beamer, 1931a: 128
penerostrata Beamer, 1932e: 85
rostrata Beamer, 1931c: 270
separate Beamer, 1932a: 12

The following species have not been studied, and could not
bbe placed in the above groups from figures or descriptions.

- *compressa Knull and Auten, 1937a: 573
*continua Knull and Auten, 1937a: 578
*dimidiata Knull, 1949a: 122
*distincta Knull and Auten, 1937a: 572

*pallida Knull and Auten, 1937a: 573

*prolixa Knull, 1949a: 126

*ventura Knull and Auten, 1937a: 577

*vittata Knull and Auten, 1937a: 577

TRIBE TYPHLOCYBINI

The leafhoppers of this group have hind wings in which the veins 1V and 2V are separate apically. The posterior branch of R is distinct and separate in some groups, combined with vein M_{1+2} in others, but this character is not believed to be a salient one (it would cleave the Typlocyba complex from the Eupteryx complex, and these appear closely related in other characteristics). The submarginal vein is present or absent at the wing apex, and when present, it never extends beyond the apex of the outermost longitudinal vein whether the latter be the posterior branch of R or the fusion vein "R+M".

The apical venation of the fore wings appears to offer but slight basis for establishing relationships between genera:

The pygofer is quite varied, frequently possessing macrosetae on the disc, and frequently with pygofer hooks, and these are often ventral in origin. The occurrence of macrosetae in uniseriate groups on the male plates occurs rarely.

The style typically lacks a preapical lobe or apical extension. Usually it is slender, tubular, and tapering, and usually possesses ungrouped setae along its length. Occasionally, a deltoid preapical protruberance occurs on the mesal margin of the style which superficially resembles the "heel" of the higher Erythroneurini, but which is probably unrelated to that structure, except for a possible functional relationship.

The aedeagus is quite varied in form. Frequently it is composed of a long preatrium and a short shaft. Various processes occur on it, and these are occasionally complex to the degree that they appear bizarre.

Several distinct complexes occur within the tribe, one about the genus Eupteryx, a complex which is characterized by the lack of the submarginal vein at the wing apex, and the frequent occurrence of complex aedeagal modifications. A second complex occurs about Empoasca, with a characteristic venation in the hind wing. A third complex occurs about the genus Joruma, and this one comprises the tribe Jerumini of McAtee. It appears no more worthy of tribal recognition than do either of the above complexes.

The writer can offer no suggestions as to the possible origin of the Typhlocybini. The group appears only distantly related to the Erythroneurini and the Dikraneurini. The Alebrini are insufficiently known, at this time, to form

a conception of possible relationship to the Typhlocybini.

KEY TO GENERA AND SUBGENERA OF TYPHLOCYBINI

- 1. Hind wing with submarginal vein absent at wing apex
(plate 28, fig. 74a) ----- 2
- Hind wing with submarginal vein present at wing apex
(plate 34, fig. 90a) ----- 9
- 2. Hind wing with posterior branch of R not fused with
apical portion of vein M_{1+2} (vein "R+M" does not
occur) (plate 30, fig. 79a) ----- 3
- Hind wing with posterior branch of R fused with apical
portion of vein M_{1+2} (vein "R+M" present) (plate 33,
fig. 86b) ----- 6
- 3. Aedeagus asymmetrical, with an unpaired looped process
(plate 30, fig. 79e) ----- Eupterella
- Aedeagus symmetrical, without a looped process ----- 4
- 4. Pygofer, in lateral view, with ventrad-directed process;
concave margin of style lacking setae; male plate with
several macrosetae (plate 30, figs. 80c,d,e) -----
- ***----- Eupteroidea
- Pygofer, in lateral view, with or without processes, if
present, then not directed ventrad; concave margin of
style with setae; male plate with or without several
macrosetae ----- 5

5. Apex of fore wing much narrower than discal portion;
 lower part of face, in profile, subparallel to line of
 dorsum; aedeagal apodeme, in caudal aspect, with opening;
 species robust ----- Eurhadina

Apex of fore wing not much narrower than discal portion;
 lower part of face, in profile, sharply divergent from
 line of dorsum; aedeagal apodeme, in caudal aspect,
 without an opening; species slender ----- Eupteryx

6. Crown with median length nearly or entirely equal to
 median length of pronotum; ocelli present; pygofer
 without group of macrosetae near outer basal angle of
 male plate (plate 32, fig. 85c) ----- Henribautia

Crown with median length much less than median length
 of pronotum; ocelli rarely present; pygofer with macro-
 setae near outer basal angle of male plate (plate 33,
 fig. 86c) (exception: gillettei group of Typhlocyba) ---- 7

7. Aedeagal shaft a flattened membranous structure
 occurring between a pair of arms formed by longer
 forcipate atrial processes (plate 33, fig. 86e)-----
 ----- Ossiannilssonina

Aedeagal shaft strongly sclerotized, not so enclosed ---- 8

8. Mesal margin of style with distinct preapical angular protruberance (plate 33, fig. 87e) ----- Ribautiana

Mesal margin of style without preapical angular protruberance, or if present then scarcely developed (plate 34, fig. 89d) ----- Typloeyba

9. Hind wing with posterior branch of R not fused with apical portion of vein M_{1+2} (vein "R+M" does not occur) (plate 34, fig. 90a; plate 35, fig. 91a) ----- 10

Hind wing with posterior branch of R fused with apical portion of vein M_{1+2} (vein "R+M" does occur) (plate 36, fig. 94a) ----- 13

10. Hind wing with submarginal vein confluent with apex of posterior branch of R (plate 34, fig. 90a)---- Eualebra

Hind wing with submarginal vein confluent with apex of vein M_{1+2} (plate 35, fig. 91a) ----- 11

11. Style slender, elongate, gradually curved posterolaterad, or caliperate in dorsal aspect (plate 35, fig. 91d)-----

----- Joruma--12

Style massive, short, strongly curved mesad at apex (plate 36, fig. 93d) ----- Meojoruma

- 12. Style, in dorsal aspect, with laterally-directed prominent spine along its length (plate 35, fig. 92d)--

----- subg. Jorunidea

Style, in dorsal aspect, without laterally-directed spine (seta or setae present) ----- subg. Joruna

- 13. Hind wing with fusion of posterior branch of R with veins M_{1+2} occurring much proximad of distal third of wing (plate 36, fig. 94a) ----- Paulomanus

Hind wing with fusion of posterior branch of R with vein M_{1+2} in distal third of wing (plate 38, fig. 97a)-- 14

- 14. Pygofer processes arising on posterior pygofer margin; aedeagus grossly ornamented ----- Beamerella

Pygofer processes arising ventrally on pygofer; aedeagus not ornamented-----Empoasca

Genus Eupterella DeLong and Ruppel

(Pl. 30, fig. 79)

Eupterella DeLong and Ruppel. Ohio Journ. Sci. 50:239. 1950.

Type of the genus, Eupterella mexicana DeLong and Ruppel, by original designation.

Hind wings: submarginal vein wanting at wing apex, fused preapically with apical portion of vein Cu_1 , the portion of vein Cu_1 basad of the fusion appearing as a

cross vein; posterior branch of R, vein M_{1+2} , and vein M_{3+4} separate apically; vein Cu_2 confluent with submarginal vein at a point much basad of vein m-cu; vein 1V branching from vein 2V near its base.

Fore wings: inner and outer apical cells short, broad, both failing to attain wing apex, contingent at their mesal margins; third apical cell petiolate with its apex subtending a swollen outer portion of wing apex which usually appears somewhat falcate as a result.

Genital capsule: male plate gradually narrowed on outer margin beginning at point distad of middle its length, apex turned dorsad, with single discal macroseta on plate near base and with several poorly developed microsetae irregularly arranged; pygofer, in lateral aspect, without distinct group of isolated setae just dorsad of outer basal angle of plate, disc with numerous irregularly arranged microsetae and a row of these on posterior margin; pygofer hooks wanting; anal hooks wanting; length of ninth sternum much less than half length of male plate.

Internal male genitalia: style, in broad aspect, smoothly curved posterolaterad towards apex, with blunt pre-apical angular protruberance on mesal margin, without setae; connective T-shaped or in the form of a trapezium, the aedeagal articulation usually subterminal; aedeagus with shaft very short and with large looped process on right

side arising from atrium and greatly exceeding apex of shaft,
the apex of the process directed dorsad; preatrium wanting.

The leafhoppers placed here are fairly robust, with a triangular well-produced head. The head, including the eyes, is narrower than the pronotum, with the disc of the crown convex. The pronotum is short and slightly emarginate posteriorly. The face, in profile, is smoothly convex, with its contour divergent from the line of the dorsum. The pleural portion of the pronotum is broader than the ocellular area. The species are variously marked with orange, black, and brown.

As far as is known, the genus is Sonoran in distribution.

In the list of species, those not studied are prefixed with an asterisk.

acuminata DeLong and Ruppel, 1950a: 239

*bicolor DeLong and Ruppel, 1950a: 242

frigida DeLong and Ruppel, 1950a: 240

*gladia DeLong and Ruppel, 1950a: 240

huachucae (Lawson), 1930a: 135 (Eupteryx)

mexicana DeLong and Ruppel, 1950a: 239

Genus Euptercidea, nov.

(Pl. 30, fig. 80; pl. 31, fig. 81)

Type of the genus, Typhlocyba stellulata Burmeister.

Hind wings: as in genus Eupterella, but separation of the vannal veins occurring near their mid-length.

Fore wings: inner apical cell short, not attaining wing apex, nearly triangular; second apical cell sessile at base, very broad apically; third apical cell long-petiolate, its apex subtending an enlargement of the outer portion of the apical wing margin, the apex of the wing thus appearing falcate as in Eupterella; outer apical cell large, trapezoidal, not attaining wing apex, and not in contact with inner apical cell at its mesal margin.

Genital capsule: male plate, in ventral aspect, with longitudinal row of about five macrosetae near to and parallel to lateral margin over slightly more than basal half of length, lateral and mesal margins nearly parallel to just before apex where lateral margin converges sharply and convexly towards mesal margin; in lateral aspect, plate slightly exceeding pygofer, with apex turned sharply dorsad and bearing few small setae, a very few microsetae over disc and few in row along lateral margin on apical half; pygofer, in lateral aspect with microsetae dispersed over disc and along base of posteroventral margin, without group of macrosetae near inner basal angle of male plate, posterior margin elongate, not inrolled, clothed with scale-like excrescences throughout its length and with row of setae dorsally, the scales extending down over ventrad-directed process; length of ninth sternum less than half length of plate.

Internal male genitalia: style very long, slender, tapering, gradually curved posterolaterad in basal two-thirds, the apical third acicular and turned sharply laterad, inner margin without preapical angular protruberance, with few widely-spaced alveoli near middle its length, outer margin lacking setae and alveoli; connective broadly T-shaped, the apex not turned dorsad, the aedeagal articulation terminal; aedeagus without preatrium, with well-developed dorsal apodeme, shaft flattened antero-posteriorly with paired preapical pointed processes extending slightly posterodorsad along shaft, each with extremely slender basal retrorse process, and extreme apex of shaft with pair of flattened flange-like processes extending posterolaterad.

In dorsal aspect, the head including the eyes is much narrower than the pronotum and somewhat produced medially, but with the apex rounded. The pronotum is much longer than the head, with lateral margins sharply divergent posteriorly, and the posterior margin scarcely emarginate. In profile, the contour of the face, below the antennae, is plane to slightly concave and divergent from the line of the dorsum. The pleural portion of the pronotum is very broad, several times the width of the ocellocular area. Female sternite VII is strongly produced and keeled medially.

Ribaut (1936b) has already called attention to the distinctness of this species. Included is only the genotype, a Palaerctic species with a limited Nearctic distribution.

stellulata (Burmeister), 1841a: pl. 13 (Typhlocyba)

(vide Oman)

Genus Eurhadina Haupt

(Pl. 31, fig. 82)

Eurhadina Haupt. Zool. Jahrb. Syst. 58: 269. 1929.

Type of the genus, Cicada pulchella Fallen, by original designation.

Hind wings: as in genus Eupteroidea.

Fore wings: venation as in Eupteroidea, but inner apical vein somewhat variable in origin, usually occurring as continuation of vein M, but often arising more mesad along apex of cell M, and occasionally more laterad, at or near apex of cell R, the venation then approaching that of Eupterella; wing gradually narrowed on outer margin from expanded discal portion to conspicuously narrower smoothly rounded apex.

Genital capsule: capsule elongate, slender; male plate, in ventral aspect, with outer margin nearly straight, curved slightly posterolaterad apically, mesal margin gradually convergent towards outer margin apically, outer

margin with broad, preapical triangular projection; in lateral aspect, plate exceeding apex of pygofer, with single discal macroseta on basal half, several close-set small setae at apex, and few small dispersed discal microsetae; pygofer, in lateral aspect, with posterior margin produced in rounded lobe, with row of small setae along posterodorsal margin and numerous microsetae on disc, without distinct group of setae just dorsad of outer basal angle of male plate; posterior margin not inrolled and differentially sclerotized; length of ninth sternum more than half length of male plate.

Internal male genitalia: style elongate, slender, curved gradually dorsad towards apex, without preapical angular protruberance, extreme apex slightly curved laterad, with row of widely spaced setae along dorsal margin; connective Y-shaped and with Y-shaped thickening, not curved dorsad apically, the aedeagal articulation terminal; aedeagus strongly recurved, preatrium wanting; shaft with two pairs of branched apical processes but none along length; dorsal apodeme well-developed, in caudal aspect with an opening near its summit.

The leafhoppers included here appear robust, in dorsal aspect, as a result of the broadened discal portion of the fore wings. The head, including the eyes, is narrower than the pronotum, and is well-produced

medially, in dorsal aspect with the anterior margin broadly rounded. The pronotum is much longer than the head, with lateral margins divergent posteriorly and with the posterior margin scarcely emarginate. In profile, the line of the dorsum is gradually declivent anterior to the disc of the pronotum. The face is angulate, the contour of its lower portion nearly parallel to the line of the dorsum. The pleural portion of the pronotum is very much broader than the ocellocular area.

One species, the first of those listed below, has been taken in Massachusetts, but males from this locality appear to be rare in North American collections. A single male with genitalia corresponding to Ribaut's figures of concinna had fore wings with a venation much similar to that of Eupterella. The second species listed below is known from a single specimen taken in Long Island. The specimen is in the United States National Museum collection.

concinna (Germar), 1831a: 12 (Tettigonia) (fide Oman)
Loewi (Then), 1886a: 54 (Eupteryx)

Genus Eupteryx Curtis

(Pl. 31, fig. 83; pl. 32, fig. 84)

Eupteryx Curtis. Ent. Mag. 1:192. 1833.

Type of the genus, Cicada picta Fabricius, 1806, which is a synonym of Cicada atropunctata Goetze, 1778.

Hind wings: venation as in genus Eupteroidea.

Fore wings: inner and outer apical cells not attaining wing apex; second apical cell much broader at apex than at base; third apical cell petiolate; inner apical vein arising from cell R or M.

Genital capsule: male plate, in ventral aspect, broad basally, gradually narrowed on outer margin to rounded apex, chaetotaxy various, a single macroseta near inner basal angle of male plate or more distad on disc, a single oblique row of macrosetae, or an oblique double row; in lateral aspect, plate often with poorly-developed submarginal row of microsetae parallel to lateral margin; pygofer, in lateral aspect, well-produced, with discoid cluster of macrosetae just dorsal of outer basal angle of male plate and with numerous microsetae irregularly scattered over posterior half of disc, posterior margin rolled mesad and sclerotized heavily, the intolled margin often modified to form pygofer hook extending above upper pygofer margin, or not extending so far but sclerotized so as to appear as internal pygofer process; length of ninth sternum nearly half length of male plate.

Internal male genitalia: style elongate, curved smoothly laterad through most its length, with preapical deltoid-protruberance on mesal margin, with small setae extending laterad along outer margin and few alveoli along

inner margin, both anterior to deltoid protruberance; connective much shorter than style, Y-shaped or triangular, its apex usually turned dorsad and the aedeagal articulation subterminal; aedeagus typically with pair of apical processes, lacking atrial processes; preatrium short or wanting.

The head, in dorsal aspect, is distinctly produced medially, and varies from nearly deltoid with the apex rounded, to smoothly curved on the anterior margin. The head is usually narrower than the pronotum. In lateral aspect, the contour of the face is smoothly convex. The pleural portion of the pronotum is wider than the ocellular area. The pronotum is longer than the head, with lateral margins divergent posteriorly and with posterior margin rectilinear or very shallowly emarginate.

As here restricted, the genus includes the aurata, artemesiae, urticae, melissae, and vittata groups of Ribaut, in addition to the North American furcata group which appears distinct from the Palaearctic species studied. The venation of the fore wing of the melissae group differs from that of the vittata group in that in the former the inner apical vein arises from cell R instead of from cell M. In the furcata group, the pygofer hook extends beyond the pygofer margin.

The distribution of the genus is problematical. It is at least Holarctic. The author does not know whether species from Queensland described by Kirkaldy, from India by Distant, and from Japan by Matsumura, are congeneric with this or with allied genera treated here.

In the list of species below, vanduzeei could not be placed, because no males were found among the rather large number of specimens examined. Perhaps males of this species do not occur. No males of juvenis were available for study.

Vittata group

artemesiae (Kirschbaum), 1868b: 190 (Tynphlocyba) (fide Oman)

Furcata group

clavalis McAtee, 1919c: 185

flavoscuta Gillette, 1898a: 749

furcata (Beamer), 1943b: 133 (Tynphlocyba), new combination

nigra Osborn, 1905c: 543

Melissae group

melissae Curtis, 1837d: 640 (fide Oman)

Species incertae sedis

juvenis McAtee, 1919c: 186

vanduzeei Gillette, 1898a: 748

Genus henribautia Young and Christian, nov.

(Pl. 32, fig. 85)

Type of the genus, Typhlocyba nigricephala Beamer.

hind wings: vein 1V branching from vein 2V near its midlength; submarginal vein absent at wing apex; posterior branch of R fused with apical portion of vein M_{1+2} ; otherwise as in genus Eupterella.

Fore wings: inner and outer apical cells short, not attaining wing apex; second apical cell much broader at apex than at base; third apical cell petiolate; wing apex somewhat oblique.

Genital capsule: male plate, in ventral aspect, broadened on basal half, abruptly narrowed near middle of length to narrow upturned apex; in lateral aspect with single macroseta near outer basal angle of male plate, and few small setae on apical half; pygofer, in lateral aspect, with large group of microsetae on ventral half of disc, completely without macrosetae, with posteroventral margin slightly expanded, without pygofer hooks, posterior margin not inrolled nor differentially sclerotized, postero-dorsal margin with or without row of small setae; anal hooks wanting.

Internal male genitalia: style narrow, gradually tapered and curved laterad on apical half, with preapical triangular protruberance in inner margin, with one or few setae on outer and several alveoli on inner margin near

middle of length; connective Y-shaped, the stem broad, with median dorsal keel extending distad over aedeagal articulating surface, the aedeagal articulation thus subterminal; aedeagus without preatrium, dorsal apodeme simple, well-developed, shaft slender, elongate, with paired apical processes.

The head is well-produced medially, and conical, the median length of the crown greatly exceeding the length next the eye. The head is nearly, or quite, as long as the pronotum. The pronotum is broader than the head, the lateral margins divergent posteriorly, the posterior margin scarcely emarginate. In lateral aspect, the crown is sharply rounded to the slightly convex face, the contour of which is divergent from the line of the dorsum. The pleural portion of the pronotum is much broader than the ocellocular area. Ocelli are present, situated on the margin between crown and face, and not near the compound eyes.

This genus is named in honor of Dr. Henri Ribaut, whose excellent work on the French fauna has served as a stimulus to other workers in the field.

Three species have been examined which belong to this genus, one species of which is undescribed. The known distribution is Sonoran.

hubbardi (McAtee), 1924c: 35 (Erytaroneura), new combination

nigricephala (Beamer), 1943b: 132 (Typhlocyba), new combination

Genus Ossiannilssonia Young and Christian, nov.

(Pl. 33, fig. 66)

Type of the genus, Typhlocyba berenice McAtee.

Hind wings: as in genus Henribautia.

Fore wings: as in genus Henribautia, but with the apices smoothly rounded.

Genital capsule: male plate, in ventral aspect, gradually narrowed on outer margin towards apex, occasionally with small lobe on lateral margin before apex, never with oblique row of macrosetae, and without a single macroseta near outer basal angle of male plate (except in sexnotata), with microsetae irregularly arranged; pygofer, in lateral aspect, with posterior margin distinct, not rounded to posteroventral margin, rectilinear in form; pygofer wall frequently with sclerotized bars occurring within the limits of the pygofer proper, or prolonged posterodorsally or posteriorly as short pygofer hooks; a group of macrosetae usually present on pygofer just dorsad of outer basal angle of male plate, a row of small setae located

posterodorsally, and a row of microsetae on disc extending dorsocaudad from the group of macrosetae; anal hooks wanting.

Internal male genitalia: style elongate, slender, gradually curved laterad or dorsolaterad apically, without triangular preapical projection on inner margin (present on outer margin in flavomarginata) with elongate slender setae on outer margin and almost always with few alveoli on inner margin; connective triangular or Y-shaped; aedeagus with preatrium distinct, aedeagal apodeme short, well-developed or not, shaft occurring as flattened membranous structure included between basal portions of a pair of forcipate atrial processes which are branched or not.

In dorsal aspect, the head, including the eyes, is narrower than the pronotum, and only slightly produced medially to the rounded anterior margin, the median length of the crown not greatly exceeding the length next the eye. The pronotum is short, but much longer than the head, with lateral margins greatly divergent posteriorly, and with the posterior margin shallowly concave. In lateral aspect, the face is strongly convex to slightly below the antennal insertions, then slightly convex to the tip of the clypeus. The width of the

pleural portion of the pronotum greatly exceeds the width of the ocellular area. Ocelli are present or absent, when present, situated on the rounded margin between crown and face, and nearer the eyes than to each other. The species are usually pale in color, with dark markings before the bases of the apical cells, but with dark markings occasionally more extensive. The color markings are red in a few species.

This genus is related to the cruenta group of Typhlocyba of Ribaut (1936). It is also closely related to the rosae group of Typhlocyba. It is named in honor of Dr. Frej Ossiannilsson, of Uppsala, Sweden, who has contributed much to our knowledge of the Homoptera.

A list of included species follows. The genitalia of the type of clymene were partly missing, and no conclusions could be drawn from their examination, but the species is placed here on the basis of McAtee's figures. The type of eurvige was in slightly better condition, but the membraneous portion of the shaft of the aedeagus could not be seen. The type was the only male available for this study. The species prefixed with a single asterisk have not been studied. No male of duplicata was available at the time of this study.

antigone (McAtee), 1926a: 35 (Typhlocyba), new combination
appendiculata (Malloch), 1920a: 95 (Typhlocyba), new combination

berenice (McAtee), 1926a: 38 (Typhlocyba), new combination

clymene (McAtee), 1926a: 36 (Typhlocyba), new combination

danae (McAtee), 1926a: 37 (Typhlocyba), new combination

duplicata (McAtee), 1926a: 16 (Typhlocyba), new combination

eurydice (McAtee), 1926a: 37 (Typhlocyba), new combination

flavomarginata (Gillette and Baker), 1895a: 111 (Typhlocyba),
new combination

hermione (McAtee), 1926a: 38 (Typhlocyba), new combination

*hinei (Knull), 1944a: 272 (Typhlocyba), new combination

nicarete (McAtee), 1926a: 36 (Typhlocyba), new combination

phryne (McAtee), 1926a: 34 (Typhlocyba), new combination

quadrata (DeLong and Johnson), 1936a: 102 (Typhlocyba),
new combination

*serrula (Ross and DeLong), 1949a: 118 (Typhlocyba), new
combination

sexnotata (Van Duzee), 1914a: 57 (Empoza), new combination

troza (Ross and DeLong), 1949a: 117 (Typhlocyba), new
combination

tunicarubra (Gillette), 1898a: 752 (Typhlocyba), new
combination

Genus Ribautiana Zakhvatkin¹

(Pl. 33, fig. 87)

Ribautiana Zakhvatkin. Rev. Ent. URSS 1945 (3-4): 113. 1947.

Type of the genus, Cicada ulmi L., by original designation.

hind wings: as in genus Henribautia.

Fore wings: as in genus Henribautia, but with the apices smoothly rounded.

Genital capsule: male plate, in ventral aspect, abruptly narrowed near middle its length, to narrow upturned divergent apex, with single macroseta near outer basal angle, and two smaller setae near lateral margin near middle of plate; in lateral aspect with a number of scattered microsetae, some of them tending to form a submarginal row along lateral margin; pygofer, in lateral aspect, with group of macrosetae just dorsad of outer basal angle of male plate, and with numerous microsetae in region caudad and dorsad of these, posterior margin scarcely inrolled, not differentially sclerotized, posterior margin not well-differentiated, merging with ventral margin; pygofer hooks wanting; anal hooks wanting.

Internal male genitalia: style elongate, slender, gradually tapering and curved laterad or dorsad towards apex, the inner margin with preapical triangular protruberance; outer margin with few long setae and inner margin

1 To be considered as a joint effort of Young, David A., Jr. and Christian, Paul J.

with several alveoli; connective Y-shaped or triangular, the aedeagal articulation terminal or subterminal; aedeagus without preatrium, aedeagal apodeme well-developed, simple, atrial processes or basal shaft processes present, and one or more pairs of processes more distad on the elongate shaft.

The head, in dorsal aspect, is narrower than the pronotum, and scarcely produced, its median length not greatly exceeding the length next the eye. The anterior margin of the crown is smoothly rounded. The pronotum is short, with lateral margins greatly divergent posteriorly, and with the posterior margin shallowly emarginate. In profile, the contour of the face is convex and divergent from the line of the dorsum. The width of the pleural portion of the pronotum greatly exceeds the width of the ocellocular area. Ocelli are absent. All of the species have dark markings at the apices of the veins which form the distal margins of the inner and outer apical cells of the fore wings.

The genus has a Holarctic distribution. The following Nearctic species are included. Those species prefixed with an asterisk had not been studied at the time of writing. No Nearctic specimens of tenerrima have been seen.

- foliosa (Knull), 1945a: 104 (Typhlocyba), new combination
luculla (Medler), 1942a: 139 (Typhlocyba), new combination
*piscator (McAtee), 1928a: 7 (Typhlocyba), new combination
*sciotoensis (Knull), 1945a: 103 (Typhlocyba), new combination
 bination
surda (DeLong and Johnson), 1936a: 101. (Typhlocyba), new
 combination
tenerrima (Herrich-Schaeffer), 1834b: No. 10a (vide Oman)
ulmi (Linnaeus), 1758a: 439 (Cicada)
unca (McAtee), 1928a: 8 (Typhlocyba), new combination

Genus Typhlocyba Germar¹

(Pl. 33, fig. 88; pl. 34, fig. 89)

Typhlocyba Germar. In Silbermann's Rev. Ent. 1: 180. 1833.

Eupoia Fitch. Ann. Rep. N. Y. St. Cab. Nat. Hist.: 63. 1851

(type, Eupoia querci Fitch, 1851, by subsequent designation of Van Duzee (Check List Hemip.: 77. 1916)).

Anomia Fieber. Verh. Zool. Bot. Ges. Wien 16: 509. 1866.

(type, Cicada quercus Fabricius, 1794, by subsequent designation of Evans (Trans. Roy. Ent. Soc. Lond. 98: 200. 1947)).

Edwardsiana Zakhvatkin. Rev. Russe d'Ent. 23: 262. 1929

(type, Cicada rosae Linnaeus, by original designation).

Type of the genus, Cicada quercus Fabricius, by subsequent designation of Woodworth, 1889.

¹ To be considered a joint effort of Young, David A., Jr. and Christian, Paul J.

Hind wings: as in genus Henribautia.

Fore wings: as in genus Henribautia, but with apices smoothly rounded.

Genital capsule: male plate gradually curved dorsad apically, with single macroseta near outer basal angle, and submarginal row of microsetae parallel to lateral margin near middle of its length, occasionally extending over apical half of length, with few other irregularly arranged microsetae; pygofer, in lateral aspect, of various forms, with or without sclerotized bar-like thickenings which when present may or may not be extended as posterior or posterodorsal pygofer processes, with posteroventral margin occasionally inrolled, often with group of macrosetae just dorsad of outer basal angle of male plate, almost always with group of small submarginal setae along posterodorsal margin and with numerous microsetae arranged over disc.

Internal male genitalia: style elongate, slender, usually either smoothly curved laterad or dorsad apically, or with apex abruptly curved laterad and appearing setiform in dorsal aspect (style sinuous in aureotecta and rubio-sellata), with mesal preapical protruberance poorly developed or absent in broad aspect (which may be dorsal or caudal); style with setae in various arrangements; connective massive, the aedeagal articulation subterminal; aedeagus

with preatrium well-developed or not, apodeme usually well-developed, shaft varied; with paired ventral processes arising from atrium or base of shaft, or with two pairs of apical processes (one pair in tortosa, niobe and lan-cifer), and occasionally with dorsal processes along length of shaft.

The species, for the most part, are slender and delicate in appearance. In dorsal aspect, the head is narrower than the pronotum, and longer medially than next the eye. The anterior margin of the crown is broadly rounded. The pronotum is short and broad, with the lateral margins strongly divergent posteriorly and the posterior margin smoothly, shallowly concave. In profile, the contour of the face is smoothly convex (except in querci and some related species, where the clypellus is often conspicuously gibbous), and divergent from the line of the dorsum. The pleural portion of the pronotum is much broader than the ocellocular area. The color is usually pale white or yellow, occasionally with darker markings.

In genital structure, the group is heterogeneous, but although groups of species occur with similar genital structure, other species usually occur with an intermediate pattern, so that the array appears too nearly

continuous for further subdivision, even though the magnitude of difference between some of the groups is of the same order as that used, in this treatment, as a basis for segregating species groups, as genera, from this one.

In the list of species which follows, those species not studied at the time of writing are prefixed with an asterisk. There has been some confusion concerning the status of quercif Fitch. It seems probable that Fitch had a mixed population in mind at the time he wrote the original description, which might have led him to append to the original description, the phrase, "sometimes excessively numerous" (on oaks). We know, now, that several species occur on oak. Gillette (1888a) retained the name quercif Fitch and referred to bifasciata Gillette and Baker as a variety of Fitch's species. McAtee (1926a) listed bifasciata Gillette and Baker in synonymy under gillettei Van Duzee, and further indicated in his discussion of the nomenclature of the species, that he considered gillettei Van Duzee, in a sense, as a substitute name for quercif Fitch. The writers are of the opinion, then, that the identity of quercif Fitch already has been fixed, and that since McAtee's rejection of Fitch's name was invalid, then one of the varieties of McAtee's gillettei must be chosen as the typical variety of quercif Fitch. Variety fitchii McAtee has been chosen because it is appropriate from the standpoint of fitting the original description, occurring on oak (although not known to be "excessively numerous"), and of occurring in New York.

- andromache McAtee, 1926a: 32
ariadne McAtee, 1926a: 14
*ariste McAtee, 1926a: 13
arsinoe McAtee, 1926a: 31
*athene McAtee, 1926a: 31
aureotecta (Sanders and DeLong), 1917a: 93 (Empoa)
cassiopeia Knull, 1944a: 269
commisuralis Stal, 1856a: 196 (fide Oman)
crassa DeLong and Johnson, 1936a: 102
cymba McAtee, 1918b: 360
*dorati Ossiannilsson, 1936a: 10
*enascora DeLong and Johnson, 1936a: 103
euphrante McAtee, 1926a: 12
expanda DeLong and Johnson, 1936a: 104
froggatti Baker, 1925b: 537
hockingensis Knull, 1944a: 270
lancifer McAtee, 1926a: 19
melite McAtee, 1926a: 32
modesta Gibson, 1917a: 184
*onexa Knull, 1944a: 270
pomaria McAtee, 1926a: 29
prunicola Edwards, 1914a: 168
putaani Knull 1944a: 269

querci (Fitch), 1851a: 63 (Empoa)

var. querci (Fitch), 1851a: 63 (Empoa)

gillettei var. fitchii McAtee, 1926a: 25, new
synonymy

var. sincera McAtee, 1926a: 25

var. apicata McAtee, 1926a: 25

var. saffrana McAtee, 1926a: 26

var. russeola McAtee, 1926a: 26

var. casta McAtee, 1926a: 26

var. gillettei Van Duzee, 1916a: 77

var. volans McAtee, 1926a: 28

var. scripta McAtee, 1926a: 28

var. venusta McAtee, 1926a: 29

var. sellata McAtee, 1926a: 29

var. vestita McAtee, 1926a: 29

quercus (Fabricius), 1794a: 47 (Cicada)

rosae (Linnaeus), 1758a: 439

rubriocellata Malloch, 1929b: 48

shawneeana Knull, 1944a: 270

*sellisa Ross and DeLong, 1949a: 116

spinosa Seamer, 1943b: 131

surcula DeLong and Johnson, 1936a: 103

tortosa Ross and DeLong, 1949a: 115

Genus Eualebra Baker

(Pl. 34, fig. 90)

Eualebra Baker. Psyche 8: 402. 1899.

Type of the genus, Eualebra smithii Baker, by original designation.

Hind wings: vein 1V branching from vein 2V basad of its midpoint; submarginal vein present, extending around wing apex and confluent with apex of posterior branch of R; posterior branch of vein R not fused with apical portion of vein M_{1+2} ; apical portion of vein Cu_1 not fused with apical portion of vein M_{3+4} (vein Cu_1 appears branched apically); vein Cu_2 confluent with submarginal vein at point nearly opposite vein m-cu.

Fore wings: wing broad, short; inner and outer apical cells not attaining wing apex; all apical cells sessile; second and third apical cells much broader at apex than at base; preapical (greatest) widths of cells R and M subequal.

Genital capsule: plates short, but greatly exceeding short pygofer; plate, in ventral aspect, broad, nearly parallel-margined to apex which is very bluntly angulate in macerated specimens, with numerous macrosetae on disc laterally; pygofer, in lateral aspect, without setae, posterior margin smoothly convex; pygofer arising internally on pygofer wall, extending mesad short distance, then curved sharply anteroventrad then gradually dorsad and mesad, the apical half bisinuate.

Internal male genitalia: style slender, snort, slightly curved mesad, gradually tapered to acute apex, with few alveoli on apical half, and one or several minute setae; connective U-shaped, each arm giving off a dorsal projection; aedeagus snort, simple, laterally compressed; preatrium and dorsal apodeme snort but distinct.

In form, these insects are broad and flat. The head is well-produced medially, the median length nearly equal to the width between the eyes, and only slightly less than the median length of the pronotum. The width of the head, including the eyes, is less than the width of the pronotum. The margin of the crown, in dorsal aspect, extends straight anteriorly a snort distance before each eye, the apex broadly paraboloid. The pronotum is snort and broad, the lateral margins divergent posteriorly, the posterior margin rectilinear. In lateral aspect, the face and crown are depressed, the contour of the face nearly parallel to the line of the dorsum. The pleural portion of the pronotum is much broader than the ocellocular area.

The species are white or yellowish marked with dark, red, or orange. The veins at the apex of the fore wings are pink.

reticulata (Osborn), 1928a: 279 (Dikraneura (Hylcoidea)),

new combination

smithi Baker, 1899b: 402

The holotype of Eualebra notata Baker, a female, from the Pomona College collection, has been examined and provided with a type label. The wing apices are damaged. The specimen has fused vannal veins, and probably should be placed in the Dikraneurini.

Genus Joruma McAtee

Joruma McAtee. Fla. Ent. 8: 34. 1924

Joruma (Jorumella) McAtee. Proc. Zool. Soc. Lond. 1934: 113

(type, Joruma ascripta McAtee, by original designation).

Type of the genus, Joruma pisca McAtee, by original designation.

Hind wings: vannal veins separate apically; submarginal vein extending around wing apex to apex of vein M_{1+2} with which it is confluent; posterior branch of R occurring as short spur, not confluent with apical portion of vein M_{1+2} ; vein Cu_1 confluent with apical portion of vein M_{3+4} (vein Cu_1 appears unbranched apically); vein Cu_2 confluent with submarginal vein in basal half of wing.

Fore wings: inner apical cell broad and angulate at base, the pointed apex not attaining the wing apex; second and third apical cells sessile, narrower at base than at apex and gradually widened apically, the combined apices subtending the wing apex; second apical cell slightly longer than third; outer apical cell nearly always open basally.

Genital capsule: male plate elongate, exceeding apex of pygofer, with uniseriate macrosetae present; pygofer nearly always without setae arranged in groups; pygofer hooks nearly always wanting; anal hooks present.

Internal male genitalia: style elongate, slender; connective triangular or Y-shaped; aedeagus with or without processes, preatrium present or absent.

Joruma subgenus Joruma McAtee

(Pl. 35, fig. 91)

Joruma McAtee. Fla. Ent. 8: 54. 1924.

Joruma (Jorumella) McAtee. Proc. Zool. Soc. Lond. 1934: 113
(type, Joruma ascripta McAtee, by original designation).

Type of the subgenus, Joruma pisca McAtee, by original designation.

Wings: as in generic description.

Genital capsule: male plate, in lateral aspect usually very long and slender, greatly exceeding apex of pygofer, with uniseriate macrosetae extending nearly throughout length of plate or occurring in much shorter row, macrosetae usually present and variously arranged; pygofer with posterodorsal margin somewhat produced, without distinct posterior margin, this merging with ventral margin; pygofer usually without groups of setae on disc (exceptions: proxima and ascripta) usually with very few microsetae irregular in position; pygofer hooks wanting except in a single undescribed species;

anal hooks well-developed and variable in form between species, occasionally very long, extending ventrad then mesad, their apices crossing.

Internal male genitalia: style, in dorsal aspect, slender, expanded slightly on outer margin from opening of lumen to portion just basad of apex, apex slender, gradually tapered, with few minute denticles on dorsal face, outer margin with one or two setae just before narrowed apical portion, apex greatly exceeding apex of connective; connective a solid plate, broadly triangular, or Y-shaped, with apical notch bearing base of aedeagus; aedeagus usually with preatrium elongate (exception: proxima), with various processes on atrium or shaft, dorsal apodeme not well-differentiated.

The head is well-produced. In dorsal aspect, the median length of the crown usually exceeds the width between the eyes, and is nearly equal to the median length of the pronotum. The pronotum is short, its width greatly exceeding its length, with lateral margins divergent posteriorly and posterior margin shallowly concave. In lateral aspect, the contour of the face is convex, and strongly divergent from the line of the dorsum. The pleural portion of the pronotum is narrow, but broader than the ocellocular area. The crown in lateral aspect is often slightly concave. Ocelli are present.

Although the venation of the hind wings of ascripta and neascripta is distinct from the more typical members of the genus, little can be found to support the separation of these as a separate genus.

The known distribution is primarily Neotropical, with two species known from the Nearctic region.

In the list of species which follows, those species of which only female specimens have been seen by the writer are prefixed with a single asterisk, while those which have not been seen at all are prefixed with a double asterisk.

- albifrons McAtee, 1926b: 166
- ascripta McAtee, 1926b: 167
- **atratura McAtee, 1926b: 170
- *aurata McAtee, 1926b: 168
- *cingulata McAtee, 1926b: 167
- *coccinea McAtee, 1926b: 166
- *ebria McAtee, 1926b: 169
- feminea McAtee, 1926b: 169
- **fumosa Osborn, 1928a: 283
- fuscoclavata Osborn, 1928a: 281
- neascripta Oman, 1937d: 568
- *nigricans Osborn, 1928a: 281
- **peltata McAtee, 1926b: 168
- pisca McAtee, 1924c: 34

proxima McAtee, 1926b: 168

**semenula McAtee, 1926b: 169

**subaurata McAtee, 1926b: 168

Jeruma subgenus Jorumidia, nov.

(Pl. 35, fig. 92)

Type of the subgenus, Jeruma curvata Osborn.

Wings: as in generic description.

Genital capsule: male plate, in ventral aspect, broad at base, narrowed at basal third on outer margin, then slender to apex, with row of few macrosetae in region of narrowing of plate; plate, in lateral aspect, considerably exceeding apex of pygofer and usually with few microsetae in irregular row along lateral margin on posterior half, and few longer microsetae at apex; pygofer with few or without microsetae, without macrosetae; pygofer hooks wanting; anal hooks well-developed.

Internal male genitalia: style slender, gradually tapered to truncate apex, in dorsal aspect with dorsal surface provided with transverse rugae; lateral margin with conspicuous spur directed laterad; connective Y-shaped, the apex with a median dorsal keel overhanging aedeagal articulation; aedeagus with or without preatrium and without processes, dorsal apodeme well-developed, simple, snift gradually curved dorsad.

The species are similar to typical Joruma in appearance.

The known distribution is Neotropical and Senoran.
curvata Osborn, 1928a: 284
minuta Lawson, 1930a: 136

Genus Necjoruma, nov.

(Pl. 36, fig. 93)

Type of the genus, Joruma adusta McAtee.

Wings: as in genus Joruma, but with base of outer apical cell of fore wing distinct.

Genital capsule: male plate, in lateral aspect, very long, very greatly exceeding apex of pygofer, its lateral margin sinuous throughout its length, with discal row of macrosetae over middle third, a dense tuft of very fine long setae extending dorsad near base and numerous irregularly arranged microsetae on disc near base and near apex of plate; pygofer with posterodorsal margin produced, posterior margin short, disc without setae, with single small seta near posteroventral pygofer margin in its upper half; pygofer hooks wanting; anal processes broad, flat.

Internal male genitalia: style short, thick, its apex massive and extending mesad at right angles to long

axis, its extreme tip obliquely truncate, somewhat concave; connective I-shaped, its apex greatly exceeding apices of styles; aedeagus enormous, preatrium distinct, atrial rim heavily sclerotized and giving off a pair of posteriorly directed forcipate processes dorsally and a decurved short apodeme on each side, shaft laterally compressed, with apical median ventral keel and an apical dorsal process shallowly bifurcate at tip.

The head, in dorsal aspect, is short and broadly rounded anteriorly, with anterior and posterior margins subparallel. The median length of the crown is approximately equal to the length next the eye. The width of the head, including the eyes, is much less than the width of the pronotum. The pronotum is short and broad with lateral margins scarcely developed, and with posterior margin straight, not emarginate. In lateral aspect, the contour of the face is convex, and strongly divergent from the line of the dorsum. The pleural portion of the pronotum is narrow, scarcely wider than the ocellular area.

Only the genotype, a Brazilian species, is known. *adusta* (Mcatee), 1924c: 35 (*Joruma*), new combination

Genus Paulomanus, nov.

(Pl. 36, fig. 94: pl. 37, fig. 95)

Type of the genus, Paulomanus cecropiae, n. sp.

Hind wings: vein 1V separating from vein 2V near its base; submarginal vein extending around wing apex and confluent with apex of vein "R₄M"; apical portion of Cu₁ fused with apical portion of vein M₃₊₄ (vein Cu₁ appears unbranched apically); free portion of vein M₃₊₄ occurring near midlength of wing; Cu₂ confluent with submarginal vein in basal half of wing, a pronounced sinus occurring at the point of confluence; wing apex truncate.

Fore wings: inner and outer apical cells elongate, neither attaining wing apex; inner and third apical cells subequal in length; outer apical cell open basally; apical width of cell M greatly exceeding apical width of cell R; cell M extending more distad than cell R.

Genital capsule: male plate expanded dorsad near middle of its length, with smaller lateral lobe beneath expanded portion, the smaller lobe close-set with microsetae, a small group of microsetae ventrad of lateral lobe and another similar group on lateral margin near base and a few small subapical setae on disc; pygofer with distinct posterodorsal lobe, lacking setae except few submarginal microsetae near base of anal tube; pygofer hooks arising from ventral margin of pygofer, extending posterodorsad, slender, cylindrical, tapering to acute tips; anal hooks wanting.

Internal male genitalia: style without preapical lobe or apical extension, apex of outer margin extended laterad, in broad aspect, inner margin forming mesal blunt protruberance, then extended laterad forming a distinct sinuous posterior margin which converges gradually to the outer margin; outer margin with few ciliate preapical hairs; connective Y-shaped, the apex turned dorsad, the aedeagal articulation subterminal; aedeagus with preatrium short, distinct, dorsal apodeme large, with anterior and posterior lobes, flattened laterally; shaft dorsoventrally flattened, keeled laterally, with four retrorse dorsally-arising processes near apex, these extending basad about one-third length of shaft, apex of shaft truncate.

This genus is named in honor of Dr. Paul W. Oman, of the Division of Insect Identification of the United States Department of Agriculture, who was partly responsible for the choice of the subject of this research, and who has cooperated during its progress through numerous helpful suggestions.

Paulomanus oecropiae, n. sp.

Form. Head not greatly produced before eyes, width between eyes less than one-third greater than median length of crown; disc of crown flattened to concave in lateral aspect; width of head, including eyes, exceeding greatest width of pronotum; line of crown forming nearly a right angle with line of face in profile; face broadly convex. Pronotum about one-third longer than median length of crown, subequal in length to scutellum; lateral margins slightly convex and convergent posteriorly; posterior

margin nearly transverse. Wings, genitalia, and genital capsule as in generic description.

Color. Male. Ground color of crown ivory, with an arcuate transverse burnished-orange stripe between the eyes; pronotum sooty black with median longitudinal area of variable width burnished orange to yellow; fore wings opaquely mottled with burnished orange except sooty black costal plaque, a darker spot just posterior to plaque and pair of paler spots in clavus, one near anal angle of wing and one at level of midpoint of clavus, apical third abruptly hyaline, the veins and margin pale yellow except along the fuscous radial edge; face with ivory transverse area between eyes covering basal third, apical two-thirds sooty black except apex of clypellus and genae, yellowish, and a red spot above each antennal base; venter fuscous except paler coxo-femoral joints of hind legs, the pale male plates except their outer basal angles, and the pale legs except for the dark femoral bases, the tarsal claws, and a vague dark area on the hind tibiae. Occasionally males are less well-marked and generally of a paler hue, with pale areas more extensive on the pronotum and fore wings.

Female. Entire dorsum yellowish to white, an arcuate transverse line between eyes on crown, an indefinite

transverse area on anterior disc of pronotum, a basal, a middle and an apical spot in each clavus, three similarly located spots in each corium along the claval suture, a small spot near base of costal plaque, a large spot at base of inner apical cells which occasionally becomes a transverse blotch extending across base of all apical cells, yellow; face and venter entirely straw-yellow except dark tarsal apices.

Described from a series of twenty-five specimens from Summit, Panama Canal Zone, taken on Cecropia (plant host) by M. L. H. Krauss, August 27, 1946 except one female paratype taken in September of the same year. Holotype male, allotype female, seven paratype males and five paratype females in U. S. N. M. collection; six paratype males and five paratype females in the Snow Entomological Collection at Kansas University.

Genus Beamerella, nov.

(Pl. 37, fig. 96)

Type of the genus, Erythroneura tropicalis Osborn.

Hind wings: vein 1V branching from vein 2V near its base; submarginal vein present, extending around wing apex and confluent with apex of vein "R+M"; vein Cu₁ fused with apical portion of vein M₃₊₄ (vein Cu₁ appears unbranched apically); vein Cu₂ confluent with submarginal vein near midlength of wing.

Fore wings: inner apical cell elongate, parallel-sided, its angulate base more proximad than bases of second and third apical cells, its apex attaining wing apex; second and third apical cells elongate, parallel-sided, sessile basally, their bases forming a continuous transverse line; outer apical cell elongate, open basally, not attaining wing apex.

Genital capsule: male plate without a distinct group of macrosetae, with a group of microsetae on basal portion of distal half (concealed by pygofer hook in drawing); pygofer in lateral aspect with posterior margin declivous, lacking conspicuous posterodorsal lobe, with posterior margin broadly thickened to form heavily sclerotized V-shaped bar with apex thickened in transverse plane and bilobed; ventral margin of pygofer overhanging and concealing all but extreme apex of plate in lateral aspect; surface of pygofer lacking setae.

Internal male genitalia: style elongate, slender, without preapical lobe or apical extension, apical portion smoothly curved dorsolaterad and tapered to point, with few macrosetae irregularly arranged on narrowed curved apex and pair of lateral preapical macrosetae; connective triangular with margins concave, with central Y-shaped thickened portion; aedeagal articulation subterminal; aedeagus greatly elongate, narrow, tapering

to acute apex, highly ornamented; a lateral cusp each side near base of dorsal apodeme, its apex directed posterodorsad, a number of setiform excrescences beginning ventrally on shaft just distad of cusps, extending dorsad then ventrad in sinuous curve along length of shaft, ending subapically, extreme apex completely, and dorsal portion of apical two-thirds, adorned with ornamentations similar in appearance to fish-scales, a few smaller scale-like markings on lateroventral portion of shaft before midpoint; aedeagal apodeme well-developed; genital atrium near aedeagal articulation with connective; the preatrium thus very short; gonopore subapical; anal hooks slender, heavily sclerotized, extending ventrad, not intimately associated with pygefer wall.

The genus is known only from the genotype, a Bolivian species. It is a slender leafhopper with the eyes large and the head well-produced medially. The median length of the crown greatly exceeds the distance between the eyes. The disc of the crown is distinctly depressed. The median length of the head is approximately equal to the median length of the pronotum. The lateral margins of the pronotum, in dorsal aspect, are very short, the posterior margin shallowly emarginate. In lateral aspect, the crown is sharply rounded to the face which is convex

and divergent from the line of the dorsum. The width of the pleural portion of the pronotum is greater than the width of the ocellocular area.

The wings were described and illustrated from the holotype of Erythroneura similis Osborn, which is a synonym of the genotype. Intact wings were not found on the holotype or the single paratype of the type species.

To Professor R. H. Beamer, of Kansas University, who has devoted the better part of a lifetime to making contributions and assisting others to make contributions to our knowledge of the Homoptera, this genus is enthusiastically dedicated.

tropicalis (Osborn), 1928a: 288 (Erythroneura), new combination
similis (Osborn), 1928a: 289 (Erythroneura), new
synonymy

Genus Empoasca Walsh

(Pl. 38, fig. 97)

Empoasca Walsh. Prairie Farmer 10 (10): 149. 1862.

Chloria Fieber (nec Schiner 1862). Verh. Zool. Bot. Ges.

Wien 16: 508. 1866.

Kybos Fieber. Verh. Zool. Bot. Ges. Wien 16: 508. 1866.

Chlorita Fieber. Kat. eur. Cic.: 14, 1872 (new name for

Chloria Fieber nec Schiner).

Cybus Douglas. Ent. Mo. Mag. 12:26. 1875

Habata DeLong. U. S. Dept. Agr. Tech. Bull. 231: 32. 1931.

Type of the genus, Empoassa viridescens Walsh, 1862, which is a synonym of Tettigonia fabae Harris, 1841.

Hind wings: vannal veins separate apically; submarginal vein extending around wing apex to apex of vein "R₄M" and confluent with this vein; apex of vein Cu₁ confluent with apical portion of vein M₃₊₄ (vein Cu₁ appears unbranched apically); vein Cu₂ confluent with submarginal vein in basal half of wing.

Fore wings: venation quite variable interspecifically and intraspecifically, often somewhat variable between two wings of same specimen; inner and outer apical cells not attaining wing apex; second and third apical cells sessile, or triangular, or even short-stalked.

Genital capsule: male plate usually well-provided with macrosetae in various arrangements but seldom uniseriate, frequently with numerous microsetae in addition, these occasionally very elongate, thin and delicate, plate often with peg-like setae in addition, these usually occurring near base of plate; pygofer usually without macrosetae, with microsetae variously arranged; pygofer hooks arising from anteroventral pygofer wall, varied in length and form, seldom wanting; anal hooks present and of various forms.

Internal male genitalia: style without preapical lobe or apical extension, usually elongate, slender, gradually tapering and curved posterolaterad, usually provided with setae along length, apical portion serrate on mesal margin in most of described species, extreme apex usually truncate or concave when observed at very high magnifications; connective typically papilionaceous in form; aedeagus with preatrium elongate, shaft usually very short, occasionally with preatrial paired processes or processes from base of shaft.

The head, in dorsal aspect, varied from blunt and parallel-margined to well-produced medially. In lateral aspect, the line of the face is always divergent from the line of the dorsum. The species are usually some shade of yellow or green, occasionally marked with red or chalky white, and occasionally mottled on the dorsum. The writer is indebted to Mr. Paul Christian for the observation that in the paler species of Empoasca -- those which may easily be confused with other typhlocybine genera in gross examination -- the species of Empoasca almost invariably have some green color on the legs, whereas other genera do not, a feature which permits ready recognition in the field.

The genus is a large and difficult one, from a taxonomic standpoint. Approximately one-hundred twenty-five species have been carefully studied in the course of this work. In spite of this, the writer is unwilling to attempt to establish subgenera at this time, for the genus is cosmopolitan and the degree of intergradation between species groups can only be conjectured. It seems apparent that many more species remain to be described from the Western Hemisphere than have been described to date.

Eupoasa represents a highly specialized group of Typhlocybinae, considered from a morphological, and from a biological standpoint. The highly specialized genital structures are almost unique. Reduction in venation of the hind wing has attained a degree surpassed only by Idona and Tynlocybella in the Dikraneurini. Host plant specialization is quite common and many of the hosts are herbaceous.

DeLong (1931b) erected Hebata and Liona as subgenera in addition to the typical subgenus, and recognized subgenus Kybos Fieber. Idona has been placed in the Dikraneurini in the present treatment. The head-shape characters used for the subgenera by DeLong are not very useful criteria. Careful study, at very high magnification, has revealed a slight difference in the shape of the extreme

style apex between the subgenotypes of Empoasca and Hebata, and most of the Nearctic forms examined revealed little in the way of intergrades. But supporting characters could not be found, and in the absence of any evidence that the differences in style apices separate natural groups, and also in view of the torturous technique involved in getting the style apex perfectly oriented, there seems no reason for not abandoning Hebata as a synonym, as Dr. DeLong and his coworkers seem to have concluded since the establishment of Hebata, for this subgenus was not considered in their subsequent work.

The smaragdula group of species, as far as is known, stands well apart from other groups, and may well form a subgenus (Kybos) in a later analysis. The species in this group have styles which bear conspicuous long fine hairs, usually quite numerous, and the apical portion of the style curves gradually laterad. At least one of the apical veins of the fore wing arises from cell R. The species are large.

The confusa group also consists of large species. The styles are straight, not curved laterally at their apices, and do not bear numerous long fine hairs. All of the apical veins of the fore wing arise from cell M.

Ribaut (1936b) has shown that an European group including Cicadula viridula Fallen is distinct, and Zakhvatkin (1946a) has treated this group as a separate genus.

In the following list of species, those not studied by the writer have been prefixed with an asterisk. Certain species which have been available for study nevertheless do not fit into any of the recognized groups. These species are listed, among those not studied by the writer, in a group of species of uncertain position.

Fabae group

- abrupta DeLong, 1931b: 48
- acuminata Wheeler, 1939a: 295
- alboneura Gillette, 1898a: 743
- amara Davidson and DeLong, 1939a: 114
- ancistra Davidson and DeLong, 1939a: 115
- arator Davidson and DeLong, 1940a: 610
- arida DeLong, 1931b: 49
- arta DeLong and Davidson, 1935a: 32
- aspera Gillette and Baker, 1895a: 107
- biarca Davidson and DeLong, 1938a: 92
- bicuspidata Davidson and DeLong, 1938a: 91
- bidens DeLong, 1932c: 397
- bifurcata DeLong, 1931b: 40
- calcara DeLong, 1932c: 398
- calcea DeLong, 1932c: 395

calyxa Oman and Wheeler, 1938a: 140
caverna Davidson and DeLong, 1938a: 93
cerea DeLong, 1931b: 46
chelata DeLong and Davidson, 1936a: 226
coccinea (Fitch), 1851a: 63 (Empoa) (fide Oman)
convergens DeLong and Davidson, 1935a: 30
crepidula Wheeler, 1939a: 294
curvata Poos, 1933a: 177
curvatura Davidson and DeLong, 1938a: 90
decora DeLong and Davidson, 1935a: 33
decurvata Davidson and DeLong, 1938a: 93
delongi Poos, 1933a: 175
delta Wheeler, 1939a: 299
deluda DeLong, 1931b: 46
denaria Van Duzee, 1930a: 148
dentata DeLong and Davidson, 1935a: 30
dilitara DeLong and Davidson, 1935a: 36
ditata DeLong and Caldwell, 1934a: 606
diverta DeLong and Davidson, 1935a: 31
dorethya Davidson and DeLong, 1939a: 111
elongata DeLong, 1931b: 53
erigeron DeLong, 1931b: 46
erythrocephala Wheeler, 1939a: 295
fabae (Harris), 1841a: 166 (Tettigonia) (fide Van Duzee)
fabalis DeLong, 1930a: 92
batatae Poos, 1933a: 176

filamenta DeLong, 1931b: 43
gallura Davidson and DeLong, 1939a: 117
gampsosa Davidson and DeLong, 1939a: 118
kaibaba Davidson and DeLong, 1939a: 115
manda Davidson and DeLong, 1939a: 111
mexicana Gillette, 1898a: 737
neaspersa Oman and Wheeler, 1938a: 138
nigra Gillette and Baker, 1895a: 108
ocala Davidson and DeLong, 1939a: 114
occidentalis DeLong and Davidson, 1935a: 32
oculea (Osborn), 1928a: 268 (*Dikraneura*), new combination
panda DeLong, 1931b: 51
pergrada Davidson and DeLong, 1938a: 93
perlonga Davidson and DeLong, 1938a: 92
plebeia DeLong and Davidson, 1935a: 34
ponderosa DeLong and Davidson, 1935a: 29
radiata Gillette, 1898a: 738
ratio DeLong and Davidson, 1935a: 36
recta DeLong and Caldwell, 1934a: 606
recurvata DeLong, 1931b: 38
rubrarea Wheeler, 1939a: 295
ruficeps Van Duzee, 1917a: 304
sativae Poos, 1933a: 174
similis DeLong and Davidson, 1935a: 37

solana DeLong, 1931b: 50
spiculata Oman and Wheeler, 1938a: 141
taniana Davidson and DeLong, 1939a: 117
tincta DeLong, 1931b: 54
torqua DeLong and Davidson, 1935a: 35
ulusa Davidson and DeLong, 1942a: 105
unca DeLong and Davidson, 1935a: 35
varaspina Oman and Wheeler, 1938a: 141
vastitatis Oman and Wheeler, 1938a: 136
vergena DeLong and Caldwell, 1934a: 607
vernispina Oman and Wheeler, 1938a: 137
xerophila Oman and Wheeler, 1938a: 142

Sparadula GROUP

adunca DeLong, 1931b: 31
aureo-viridis (Uhler), 1877a: 474 (Tynalocoryka)
carsona DeLong and Davidson, 1936a: 229
clypeata Gillette and Baker, 1885a: 106
copula DeLong, 1931b: 27
digita DeLong, 1931b: 26
gelbata DeLong and Davidson, 1936a: 225
grosata DeLong and Davidson, 1936a: 226
incida DeLong, 1931b: 21
jacinta DeLong and Davidson, 1936a: 227
livingstonii Gillette, 1898a: 728
luda Davidson and DeLong, 1936a: 94

obtusa Walsh, 1864a: 317 (fide Oman)
patula DeLong, 1931b: 22
reflexa DeLong, 1932c: 396
rubrafacia DeLong, 1932c: 394
rubrata DeLong and Davidson, 1936a: 226
salicis Wheeler, 1937a: 148
saluta DeLong, 1931b: 24
smaragdula (Fallén), 1806a: 37 (Cicada) (fide Van Duzee)
ziona DeLong and Davidson, 1936a: 227

Confusa group

apata DeLong and Davidson, 1936a: 228
atrolabes Gillette, 1898a: 736
bipunctata (Oshanin), 1871a: 212 (Chlorita) (fide Oman)
confusa DeLong and Davidson, 1936a: 229
maligna (Walsh), 1864a: 317 (Chloroneura) (fide Van Duzee)
obrudens DeLong, 1932c: 393
pergandei Gillette, 1898a: 735
unica Provancher, 1890b: 340

Empoasca species of uncertain position

*aeantha Davidson and DeLong, 1943a: 216
*acodens DeLong, 1931b: 16
*adexa Davidson and DeLong, 1943a: 216
*albolinea Gillette, 1898a: 732
*albonota DeLong, 1931b: 43

- *alboscipita Van Duzee, 1914a: 56
- *amblicantha Oman and Wheeler, 1938a: 140
- *arqua Davidson and DeLong, 1942a: 106
- *aspra Davidson and DeLong, 1943a: 218
- *barbara Hartzell, 1923a: 107
- *bicorna DeLong and Caldwell, 1934a: 604
- *bispinata Davidson and DeLong, 1943a: 216
- *bitubera DeLong, 1932c: 395
- breviceps (Osborn), 1928a: 271 (Dikraneura), new
 combination
- albroides (Osborn), 1928a: 271 (Dikraneura), new
 combination, new synonymy
- *brevidens DeLong in Wolcott, 1923b: 269
- *bulba Davidson and DeLong, 1943a: 218
- *caldwelli Davidson and DeLong, 1943a: 215
- *camara Davidson and DeLong, 1942a: 108
- *canalis (Osborn), 1928a: 282 (Jeruma), new combination
 (according to Dr. Oman)
- *canavalia DeLong, 1932b: 114
- *caraba Davidson and DeLong, 1943a: 214
- *cerata Davidson and DeLong, 1943a: 215
- *chromata Davidson and DeLong, 1942b: 123
- *cothurna Davidson and DeLong, 1943b: 639
- *crocostigmata Davidson and DeLong, 1942b: 124

- *crocovittata Davidson and DeLong, 1942b: 124
- *curveola Oman, 1936a: 40
- *curvexa Davidson and DeLong, 1939a: 110
- *dactylata Davidson and DeLong, 1942b: 126
- *dampfi Davidson and DeLong, 1940a: 608
- *davidsoni DeLong, 1944a: 272
 - decorata Osborn, 1924c: 452
- *denticula Gillette, 1898a: 734
- *diacumanis Davidson and DeLong, 1943b: 638
- *distracta DeLong and Caldwell, 1934a: 607
- *dolonis Oman, 1936a: 39
- *duodens Davidson and DeLong, 1940a: 611
- *ellissae Wheeler, 1937a: 148
- *emarginata Osborn, 1928a: 286
- *ensiformis Oman and Wheeler, 1938a: 142
- *esuma Goding, 1890b: 116
- *excava Davidson and DeLong, 1938a: 94
- *falba DeLong and Davidson, 1935a: 34
 - fasciata (Osborn), 1928a: 273 (Dikraneura), new combination
 - fulvomaculata (Osborn), 1928a: 255 (Alebra), new combination
- *fuscoviridis Oman and Wheeler, 1938a: 147
- *gigantica Davidson and DeLong, 1943a: 220
- *gleditsia DeLong and Davidson, 1936a: 225
- *goodi Davidson and DeLong, 1943a: 220

- *gossypii DeLong, 1932b: 114
- *guatemalana (Osborn), 1928a: 282 (Joruma), new combination
(according to Dr. Oman, unpublished)
- *hama DeLong and Caldwell, 1934a: 605
- *hamata DeLong, 1931b: 43
- *hecta Davidson and DeLong, 1939a: 116
hyalina (Osborn), 1928a: 284 (Joruma), new combination
- *indenta Oman and Wheeler, 1938a: 139
- *ingena Davidson and DeLong, 1942a: 106
- *insularis Oman, 1936a: 40
- *irrita Davidson and DeLong, 1943b: 636
- *junipera DeLong, 1931b: 51
- *nulli Davidson and DeLong, 1939a: 111
- *lata DeLong and Caldwell, 1934a: 606
- *latarca Davidson and DeLong, 1938a: 91
- *lauta Davidson and DeLong, 1942a: 105
- *lineata Baker, 1903d: 7
- *longispina Oman, 1936a: 37
maculosa (Osborn), 1928a: 272 (Dikraneura), new combination
- *madra Davidson and DeLong, 1939a: 116
- *medera DeLong, 1932c: 397
- *mesolinea Davidson and DeLong, 1939a: 114
- *missiona Oman, 1936a: 40
- *morrisoni Hartzell, 1923a: 107

- *necyla Davidson and DeLong, 1939a: 110
- *nema Davidson and DeLong, 1939a: 112
- *obstipa Davidson and DeLong, 1942a: 108
 - olivatula (Osborn), 1928a: 287
- *omani Davidson and DeLong, 1942b: 123
 - ornata (Osborn), 1928a: 283 (Joruma), new combination
- *ornatella, new name
 - ornata Oman, 1936a: 37, new synonymy
- *orthodens Davidson and DeLong, 1938a: 91
- *osborni Hartzell, 1923a: 104
- *pallida Gillette, 1898a: 741
- *pallidula DeLong, 1931b: 42
- *papayae Oman, 1937d: 570
- *pectinata DeLong, 1931b: 16
- *pelecanus Oman and Wheeler, 1938a: 141
- *peregrina Oman, 1936a: 34
- *perelegans Oman, 1936a: 35
- *phaseola Oman, 1936a: 39
- *photophila (Berg), 1879e: 273 (Typhlocyba), new combination
 - picta Osborn, 1924c: 452
 - pictifrons (Osborn), 1928a: 256 (Alebra), new combination
- *pinella Davidson and DeLong, 1939a: 112
- *prona Davidson and DeLong, 1940a: 610
- *pyramidata DeLong and Caldwell, 1934a: 608

- *quintapunctata Davidson and DeLong, 1943b: 638
- *resupina Davidson and DeLong, 1940a: 611
- *rubraza Oman, 1936a: 34
 - rubromaculata Osborn, 1928a: 285
- *rumexa Davidson and DeLong, 1943a: 216
- *sagitta Davidson and DeLong, 1939a: 112
- *salinarum (Berg), 1879e: 274 (Typhlocyba), new combination
- *sanguinea (Gillette and Baker), 1895a: 112 (Typhlocyba)
- *semanta Davidson and DeLong, 1943a: 215
- *serpula Davidson and DeLong, 1943a: 218
- *serrula Davidson and DeLong, 1940a: 608
- *setata DeLong and Davidson, 1936a: 226
- *setigera Oman, 1936a: 37
- *simplex DeLong and Davidson, 1935a: 37
- *sinuata Oman and Wheeler, 1938a: 140
- *snowi Gillette, 1898a: 741
- *sonorana Wheeler, 1940a: 479
- *spira DeLong and Caldwell, 1934a: 605
- *stalsisa Davidson and DeLong, 1943a: 214
- *strangula Davidson and DeLong, 1939a: 113
- *stylata Wheeler, 1940a: 480
- *sublactea Van Duzee, 1917a: 302
- *tectona Davidson and DeLong, 1943b: 639
 - tergata (McAtee), 1926b: 167 (Joruma), new combination

- *thela Davidson and DeLong, 1939a: 113
- *transversa Van Duzee, 1917a: 303
- *trifasciata Gillette, 1898a: 726
- *trifurcata Oman, 1936a: 39
- *trilobata DeLong, 1931b: 17
- *tripunctata Davidson and DeLong, 1943b: 636
- *utrica Davidson and DeLong, 1939a: 117
- *uvalda Davidson and DeLong, 1939a: 115
- *venusta DeLong and Davidson, 1935a: 33
- *vincula DeLong, 1931b: 44
- *zonalis (Osborn), 1928a: 283 (Jeruma), new combination
(according to Dr. Oman, unpublished)

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Plate 1

Fig. 1. A deltocephaline leafhopper, showing the structures of the dorsum.

Fig. 2. A deltocephaline leafhopper, showing the structures of the face.

Fig. 3. A deltocephaline leafhopper, terminus of venter, female, showing structure of the external genitalia.

Fig. 4. A deltocephaline leafhopper, terminus of venter, male, showing the structure of the external male genitalia.

PLATE 1.

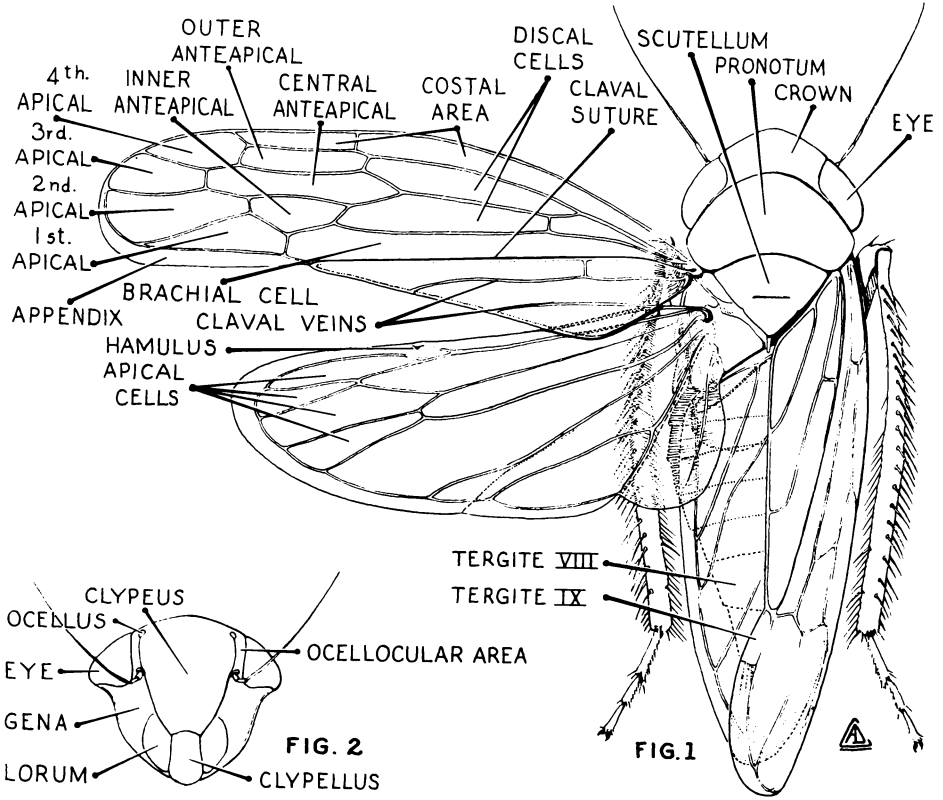


FIG. 2

FIG. 1

FIG. 3

FIG. 4

Plate 2

Fig. 5. A typhlocybine leafhopper, hind wing, showing the wing veins.

Fig. 6. A typhlocybine leafhopper, fore wing, showing some of the veins used in the present classification.

Fig. 7. A hypothetical typhlocybine aedeagus, showing structures used in this classification.

Fig. 8. Dikrellidia bilineata, right style and connective, dorsal aspect (x429), showing structures used in classification.

PLATE 2

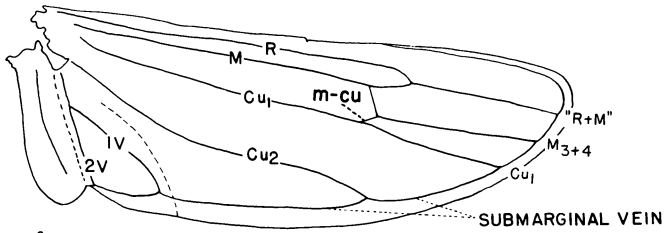


FIG. 5. HIND WING

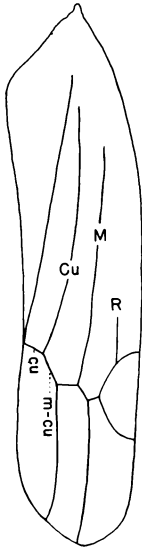


FIG. 6. FORE WING

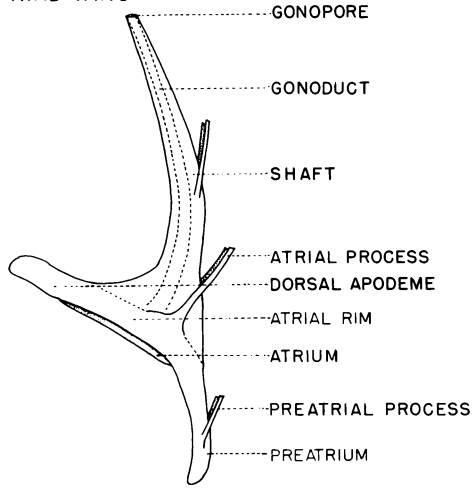


FIG. 7.
AEDEAGUS, SCHEMATIC

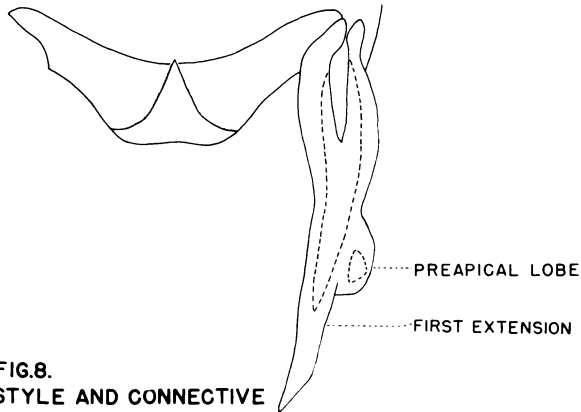


FIG. 8.
STYLE AND CONNECTIVE

Plate 3

Fig. 9. Zygina scutellaris, apex of right style, broad aspect (x429).

Fig. 10. Erytaroneura mansueta, apex of right style, broad (dorsal) aspect (x429).

Fig. 11. E. bifurca, apex of right style, broad (dorsal) aspect (x429).

Fig. 12. E. idonea, apex of right style, broad (dorsal) aspect (x429).

Fig. 13. E. nitida, apex of right style, broad aspect (x429).

Fig. 14. E. aenea, apex of right style, broad (dorsal) aspect (x429).

Fig. 15. E. reflecta, apex of right style, broad (ventral) aspect (x429).

PLATE 3

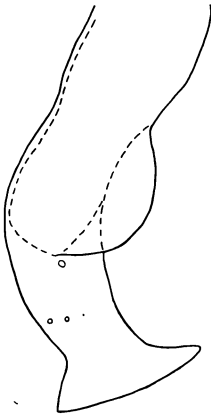


FIG. 9
ZYGINA SCUTELLARIS

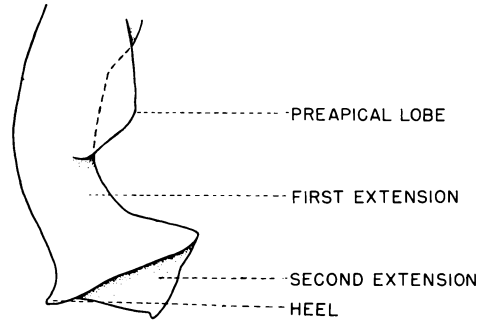


FIG. 10
ERYTHRONEURA MANSUETA

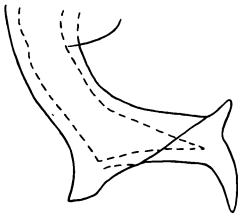


FIG. 11
ERYTHRONEURA
BIFURCA

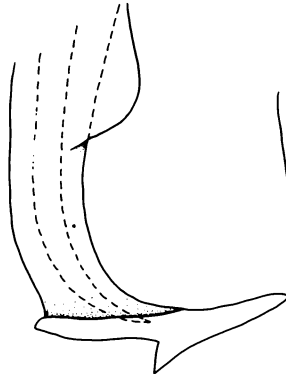


FIG. 12
ERYTHRONEURA
IDONEA

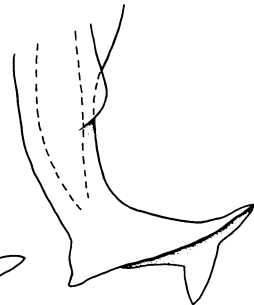


FIG. 13
ERYTHRONEURA
NITIDA

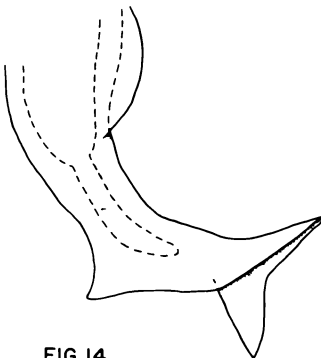


FIG. 14
ERYTHRONEURA AENEA

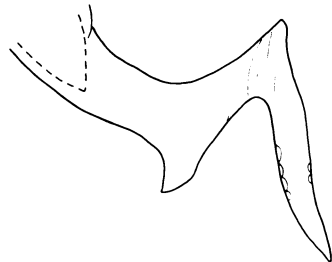


FIG. 15
ERYTHRONEURA REFLECTA

Plate 4.

Fig. 16. Hadralebrea laticeps

C. Type, male genital capsule, lateral aspect (x150)..

D. Type, right style and connective, dorsal aspect (x429).

E. Type, aedeagus lateral aspect (x429)..

Fig. 17. Aphanalebrea unipuncta

A. Hind wing (venation compared with type).

B. Fore wing (venation compared with type).

C. Holotype, male genital capsule, lateral aspect (x150)..

D. Holotype, right style, apical half, dorsal aspect (x429)..

E. Holotype, aedeagus, right lateral aspect (x200)..

PLATE 4

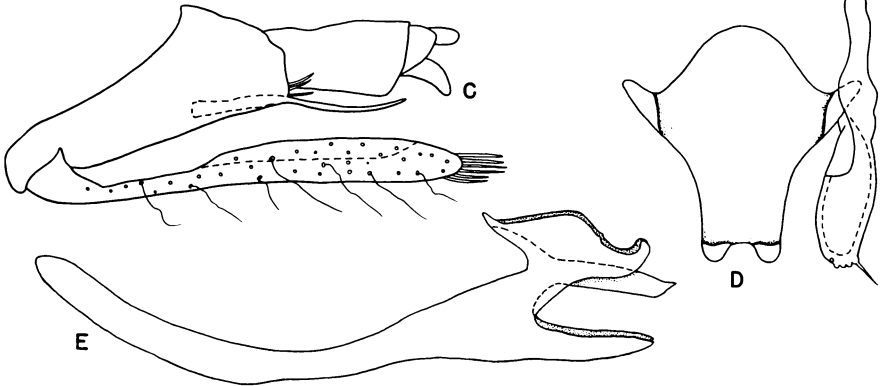


FIG. 16 HADRALEBRA LATICEPS

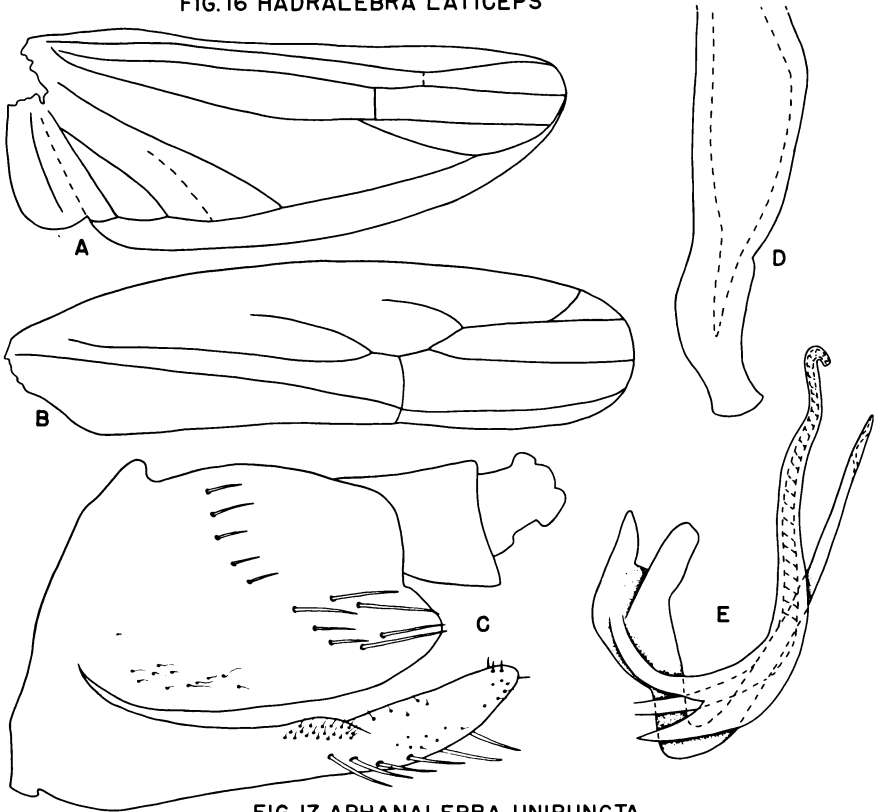


FIG. 17 APHANALEBRA UNIPUNCTA

Plate 5

Fig. 18. Rabela tabebuiae

- A. Hind wing.
- B. Fore wing.
- C. Male genital capsule, lateral aspect,
anal tube not shown (x150).
- D. Right style, apical half, broad aspect
(x429).
- E. Aedeagus, lateral aspect (x429).

Fig. 19. Kallebra ninettae

- B. Fore wing, sketch.
- C. Holotype, male genital capsule, lateral
aspect (x150).
- E. Holotype, aedeagus, lateral aspect (x320).

PLATE 5

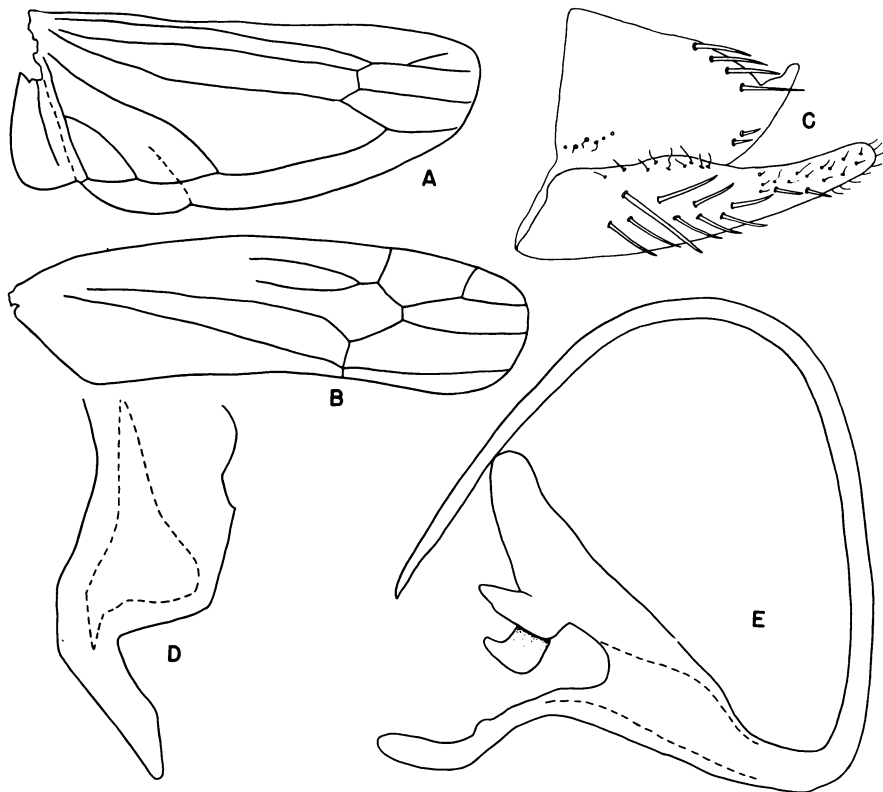


FIG. 18 RABELA TABEBUIAE

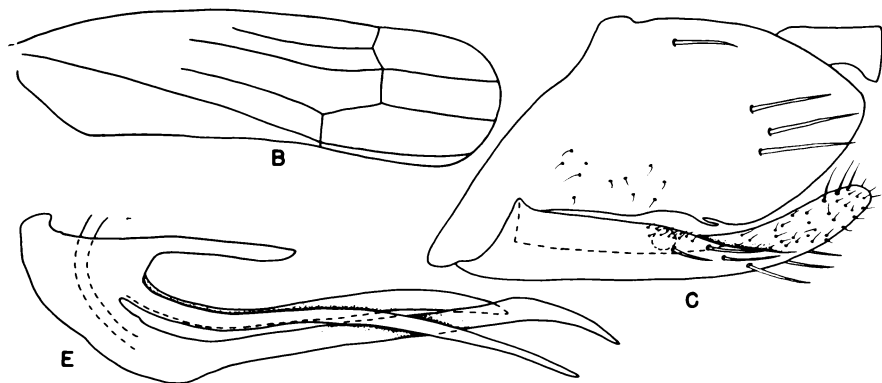


FIG. 19 KALLEBRA NINETTAE

Plate 6

Fig. 20. Kallebra ninettae, holotype, right style, dorsal aspect (x429).

Fig. 21. Orsalebra robusta

A. Holotype, hind wing.

B. Holotype, fore wing.

C. Holotype, male genital capsule, lateral aspect (x150).

D. Holotype, right style, apical third, lateral aspect (x429).

PLATE 6

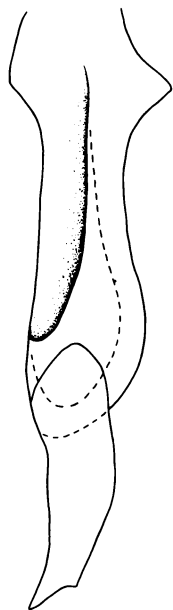


FIG. 20
KALLEBRA
NINETTAE

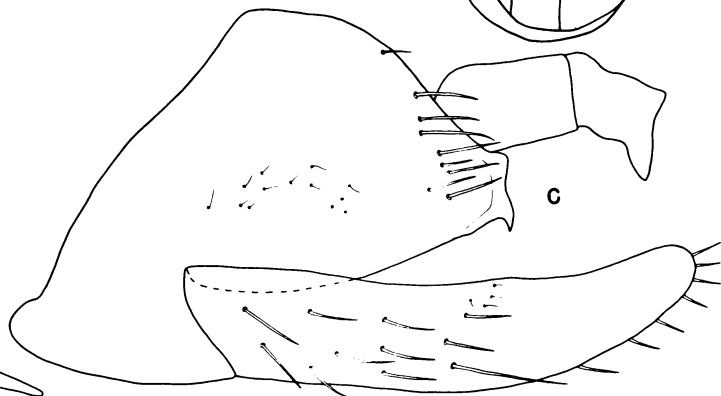
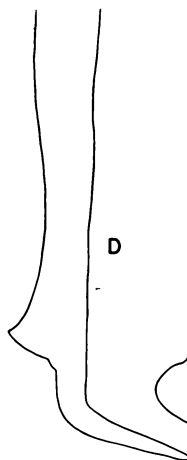
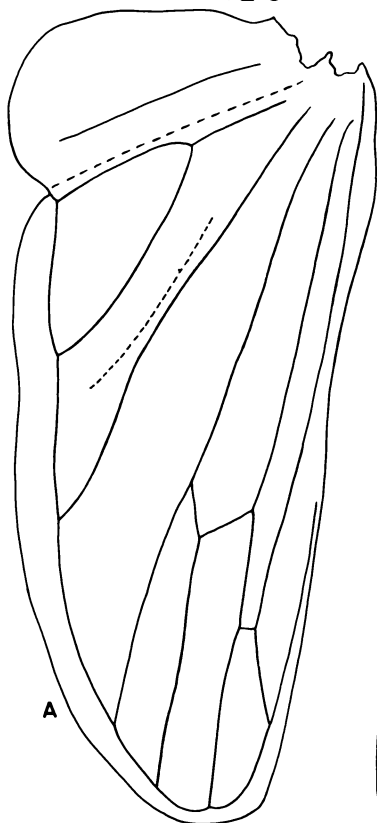


FIG. 21 ORSALEBRA ROBUSTA

Plate 7

Fig. 22. Orsalebra robusta, holotype, aedeagus, lateral aspect (x150).

Fig. 23. Balera pellucida

- A. Hind wing.
- B. Fore wing.
- C. Type, male genital capsule, lateral aspect (150).
- D. Type, right style, entire, broad aspect (x429)..
- E. Type, aedeagus, lateral aspect (x429).

Fig. 24. Diceratalebra sanguinolinea

- D. Right style, dorsal aspect (x429).
- E. Aedeagus, lateral aspect (x429).

PLATE 7

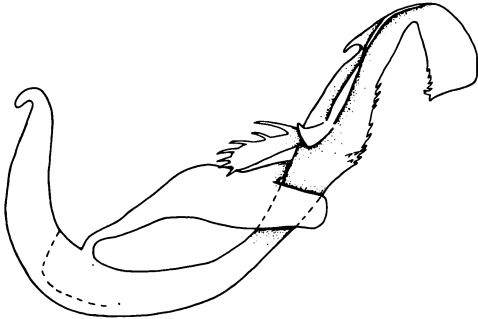


FIG.22
ORSALEBRA ROBUSTA

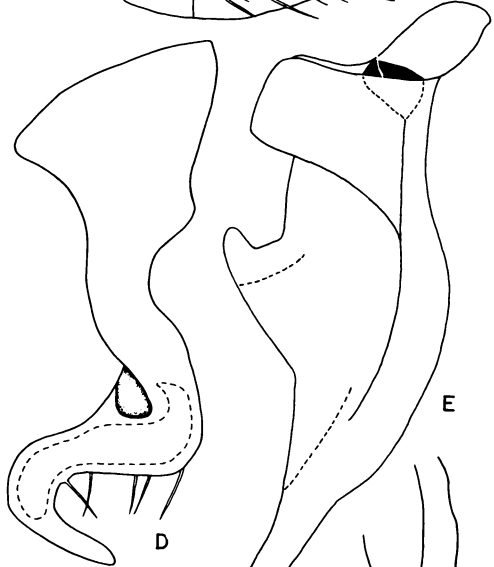
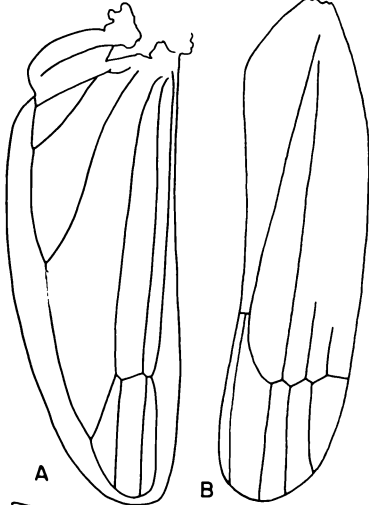
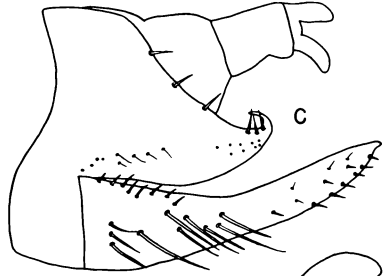


FIG.23
BALERA PELLUCIDA

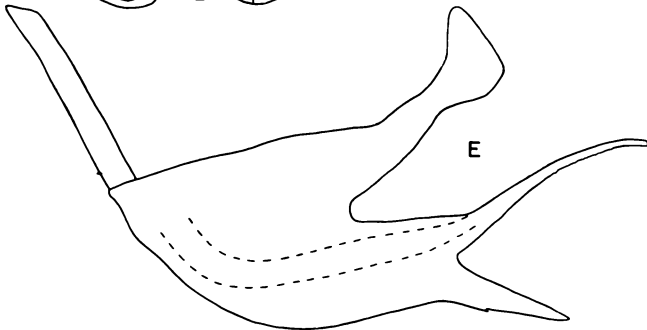


FIG.24 DICERATALEBRA SANGUINOLINEA

Plate 8

Fig. 25. Diceratalebra sanguinolinea

- A. Hind wing.
- B. Fore wing.
- C. Male genital capsule, lateral aspect
(x150)..

Fig. 26. Trypanalebra

- A. Trypanalebra sp., hind wing.
- B. Trypanalebra sp., fore wing.
- C. Trypanalebra sp., male genital capsule,
lateral aspect (x150).
- D. Trypanalebra sp., right style, dorsal
aspect (x429).
- E. Trypanalebra sp., aedeagus, lateral
aspect (x320).

PLATE 8

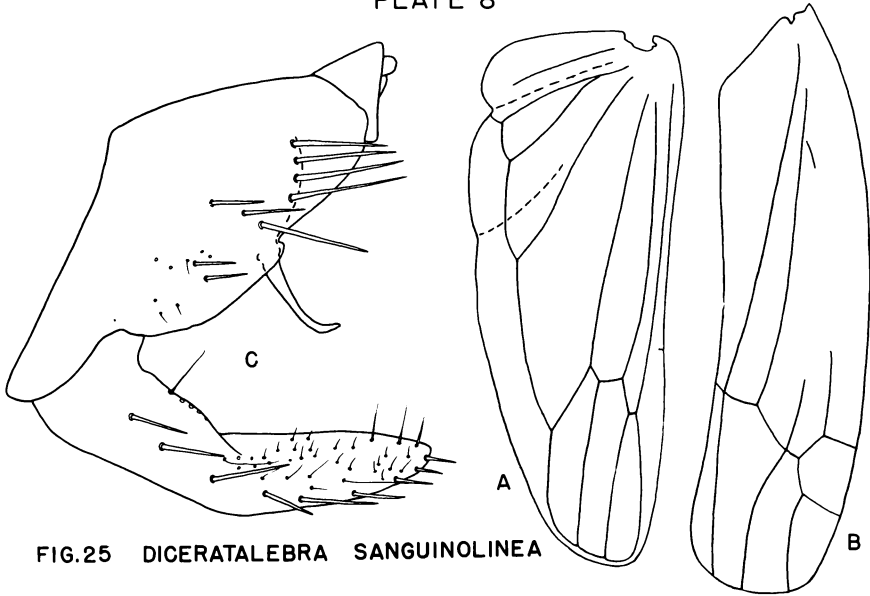


FIG.25 DICERATALEBRA SANGUINOLINEA

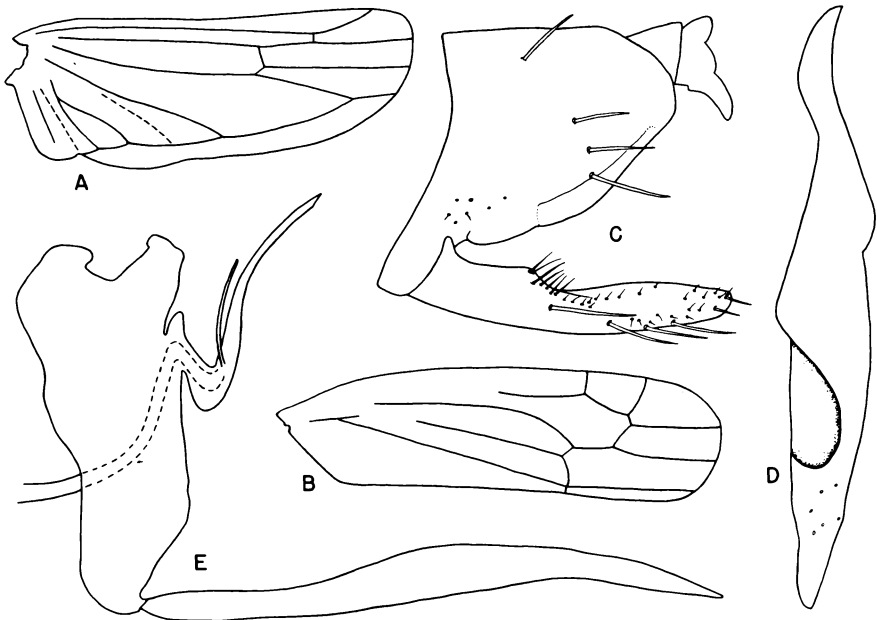


FIG.26 TRYPANALEBRA

Plate 9

Fig. 27. Paralebra

- A. Paralebra sp. near similis, hind wing
(venation compared with type of similis).
- B. Paralebra sp. near similis, fore wing
(venation compared with type of similis).
- C. Paralebra similis, holotype, male
genital capsule, lateral aspect (x150).
- D. Paralebra similis, holotype, right
style, dorsal aspect (x429).
- E. Paralebra similis, holotype, aedeagus,
lateral aspect (x429).
- F. Paralebra similis, paratype, fore wing.

Fig. 28. Alebra albostriella

- B. Fore wing.
- D. Style and connective, dorsal aspect
(x100),

PLATE 9

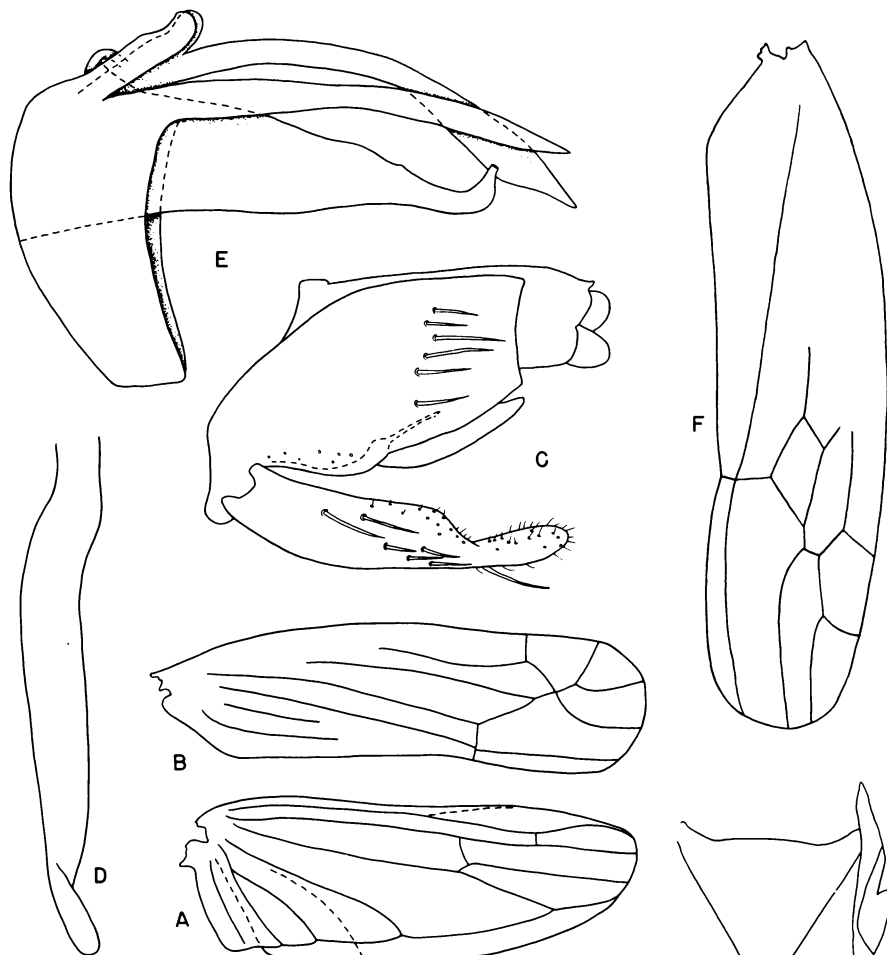


FIG.27 PARALEBREA

28 D

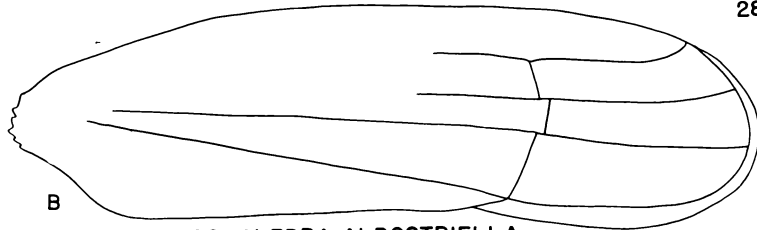


FIG 28 ALEBRA ALBOSTRIELLA

Plate 10

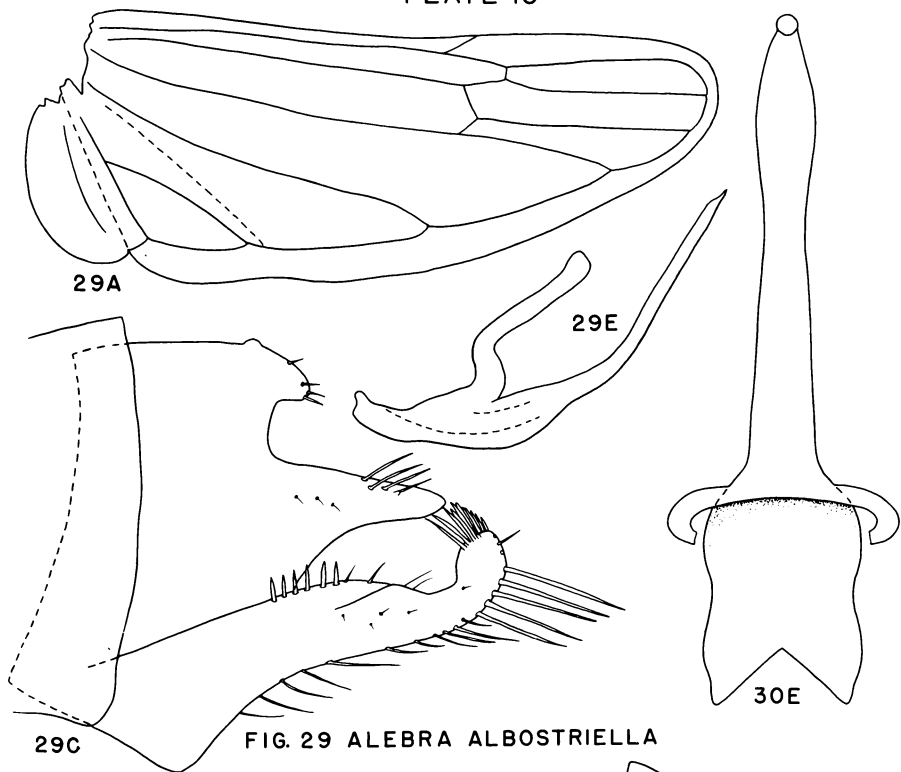
Fig. 29. Alebra albostriella

- A. Hind wing.
- C. Male genital capsule, lateral aspect
anal tube not shown (x150)..
- E. Aedeagus, lateral aspect (x150)..

Fig. 30. Brunerella magnifica

- A. Holotype, hind wing.
- B. Holotype, fore wing.
- D. Holotype, right style, broad aspect
(ventrolateral) (x429)..
- E. Holotype, aedeagus, dorsal aspect (x429).

PLATE 10



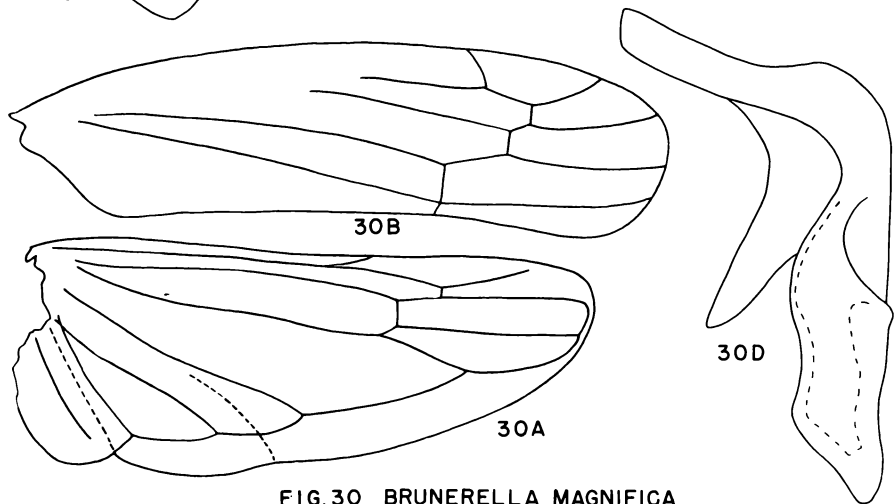
29A

29E

29C

30E

FIG. 29 ALEBRA ALBOSTRIELLA



30B

30A

30D

FIG. 30 BRUNERELLA MAGNIFICA

Plate 11

Fig. 31. Brunerella magnifica, holotype, male genital capsule, lateral aspect (x150).

Fig. 32. Habralebrea nicaraguensis

A. Hind wing.

B. Fore wing.

C. Male genital capsule, lateral aspect (x150).

D. Right style, apical seven-ninths, broad aspect (dorsal) (x429).

E. Aedeagus, lateral aspect (x429).

Fig. 33. Elabra eburneola

D. Right style and connective, dorsal aspect (x429).

E. Aedeagus, lateral and slightly ventral aspect (x320).

PLATE II

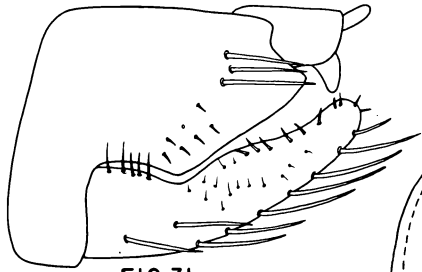
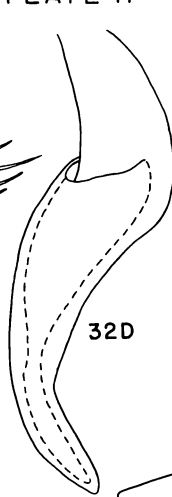
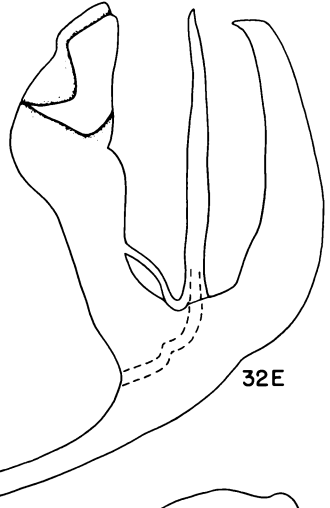


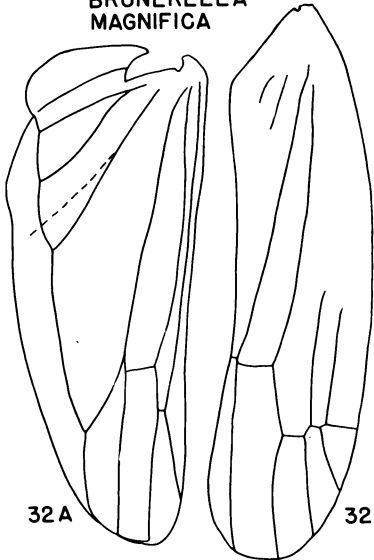
FIG. 31
BRUNERELLA
MAGNIFICA



32D

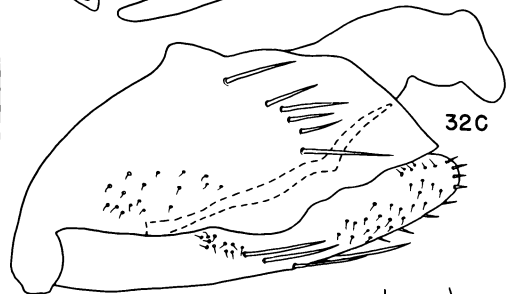


32E



32A

32B

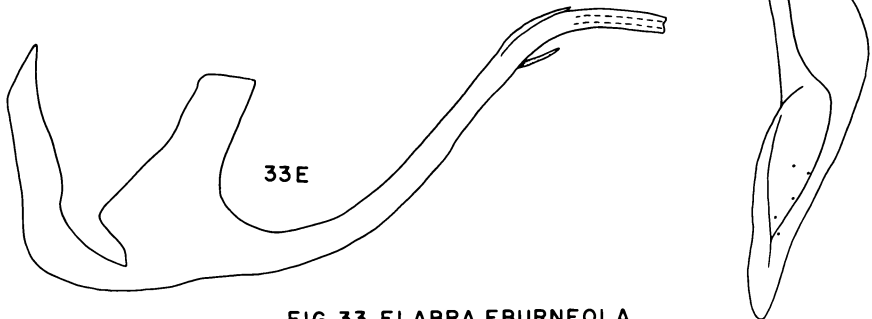


32C

FIG. 32 HABRALEBRA NICARAGUENSIS



33D



33E

FIG. 33 ELABRA EBURNEOLA

Plate 12

Fig. 34. Elabra eburneola

- A. Hind wing.
- B. Fore wing.
- C. Male genital capsule, lateral aspect
(x150).

Fig. 35. Rhabdotalebra octclineata

- A. Hind wing.
- B. Fore wing.
- C. Male genital capsule, lateral aspect,
anal tube not shown (x150).
- D. Right style apex, apical two-thirds,
dorsal aspect (x429).

PLATE 12

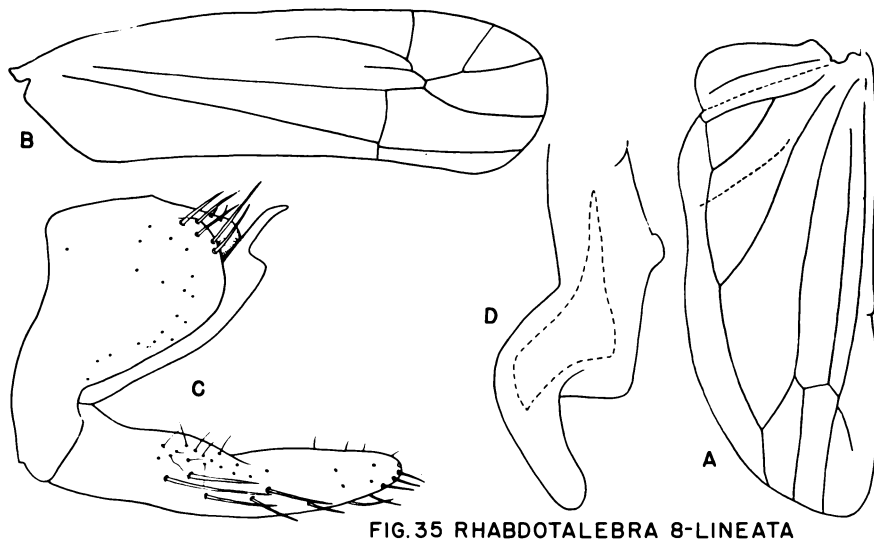
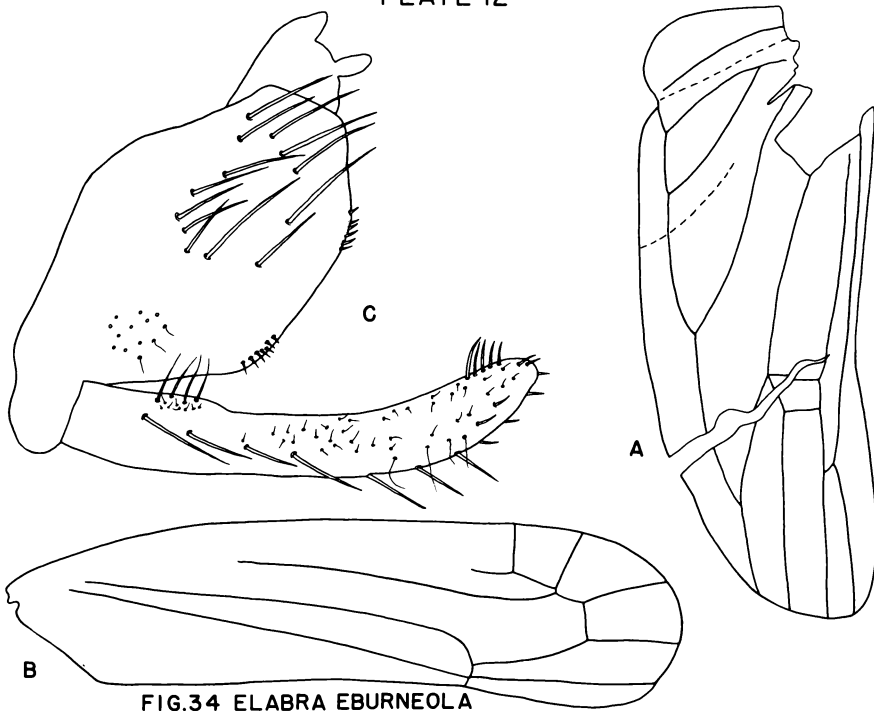


Plate 13

Fig. 36. Rhabdotalebra octolineata, aedeagus, lateral aspect (x429).

Fig. 37. Protalebra

A. Protalebra sp. near curvilinea, hind wing.

B. Protalebra sp. near curvilinea, fore wing.

C. Protalebra curvilinea, holotype, male genital capsule, lateral aspect (x150).

D. Protalebra curvilinea, holotype, right style, apical half, dorsal aspect (x429).

E. Protalebra curvilinea, holotype, aedeagus, lateral aspect (x320).

Fig. 38. Protalebrella brasiliensis, paratype, aedeagus, lateral aspect (x429).

PLATE 13

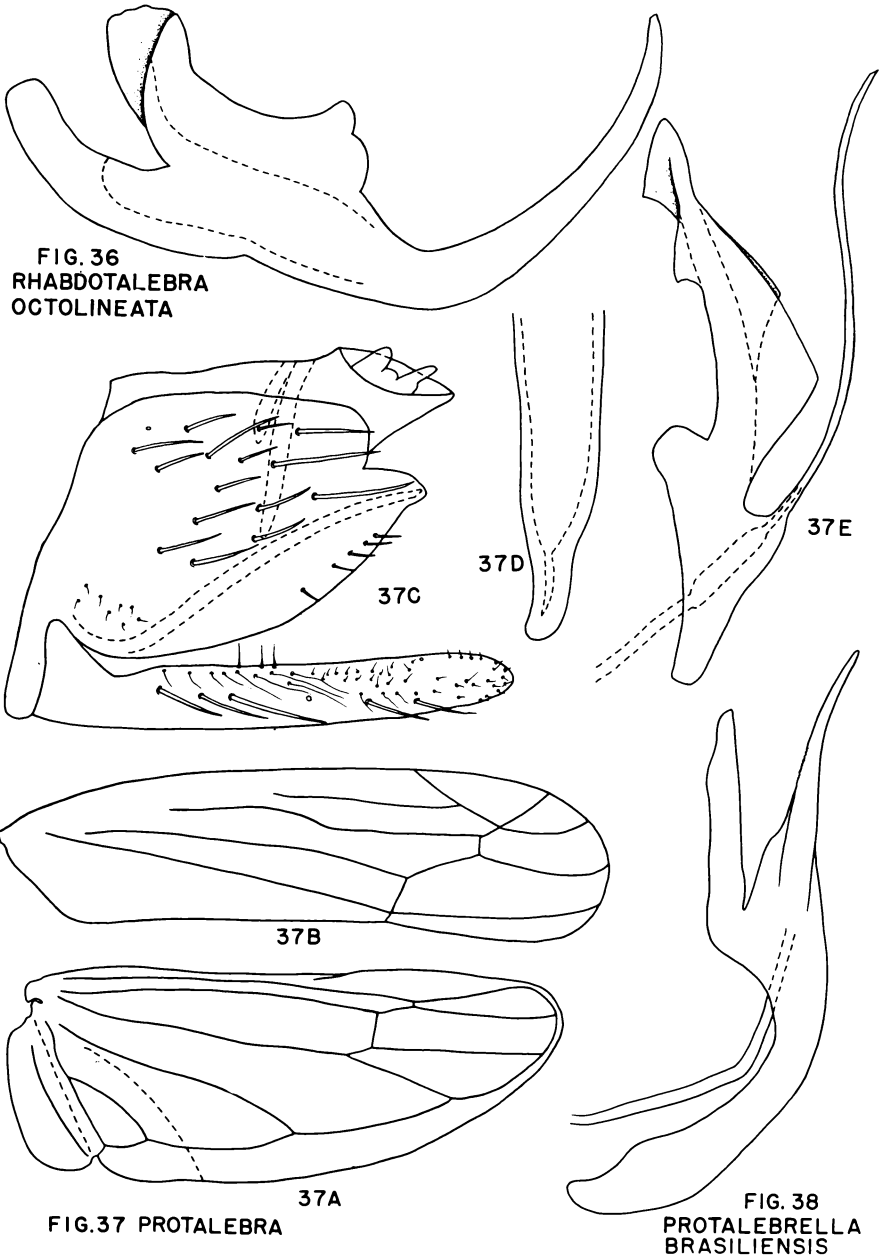


FIG. 36
RHABDOTALEBRA
OCTOLINEATA

FIG. 37 PROTALEBRA

FIG. 38
PROTALEBRELLA
BRASILIENSIS

Plate 14

Fig. 39. Protalebrella brasiliensis

- A. Hind wing.
- B. Fore wing.
- C. Paratype, male genital capsule, lateral aspect (x150).
- D. Paratype, right style (x429).

Fig. 40. Dicranoneura loca

- A. Hind wing.
- B. Fore wing.
- C. Male genital capsule, lateral aspect (x100).
- D. Right style, dorsal aspect (x150).
- E. Aedeagus, lateral aspect (x150).
- F. Male ninth sternum, from within (x100).

PLATE 14

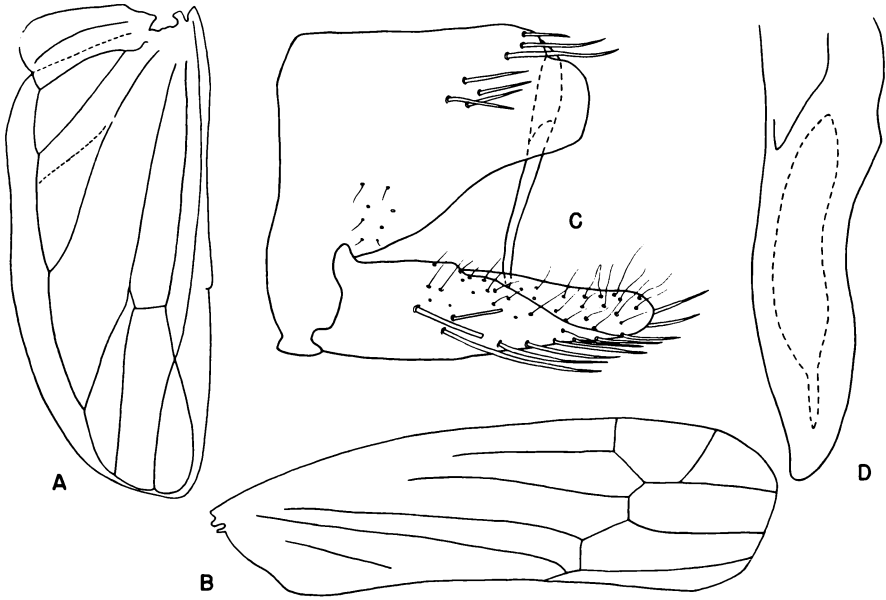


FIG. 39 *PROTALEBRELLA BRASILIENSIS*

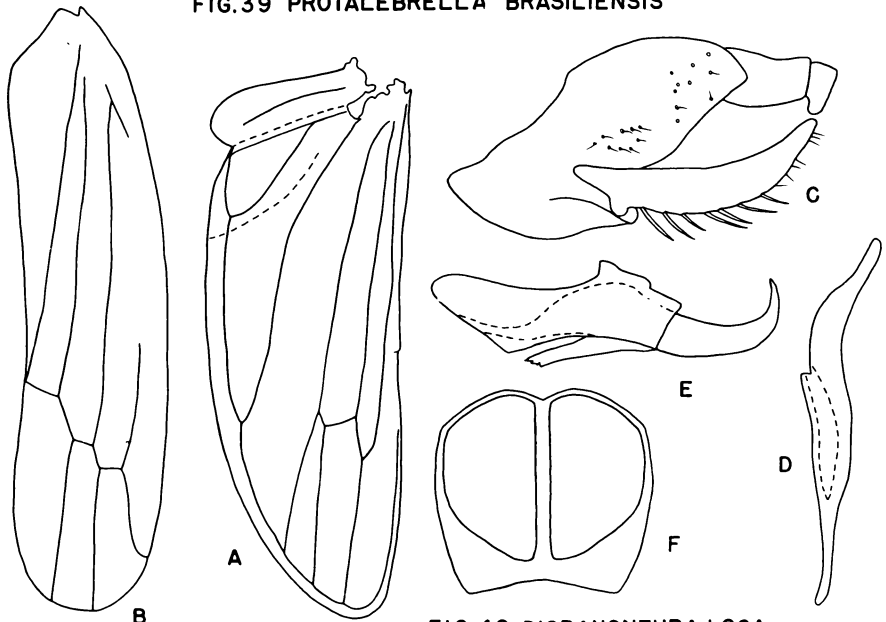


FIG. 40 *DICRANONEURA LOCA*

Plate 15

Fig. 41. Dicranoneura loca, external male genitalia, from unmacerated specimen.

Fig. 42. Notus

A. Notus alta, hind wing.

B. Notus alta, fore wing.

C. Notus flavipennis, male genital capsule, lateral aspect (x100).

D. Notus alta, right style, dorsal aspect (x429),

E. Notus alta, aedeagus, caudal aspect (x150).

F. Notus flavipennis, apex of male abdomen, ventral aspect.

G. Notus flavipennis, apex of female abdomen, ventral aspect.

Fig. 43. Dikraneura variata

C. Male genital capsule, lateral aspect (x150).

E. Aedeagus, lateral aspect (x150).

PLATE 15

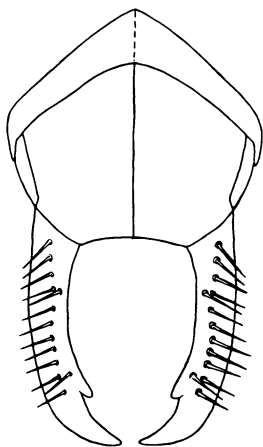
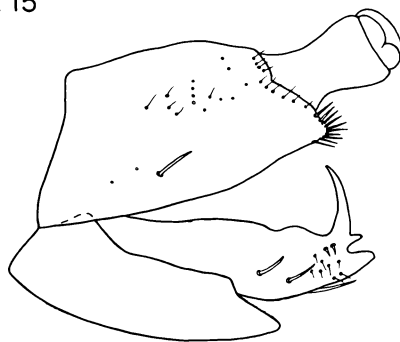


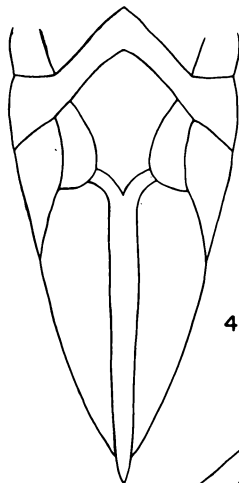
FIG. 41 DICRANONEURA
LOCA



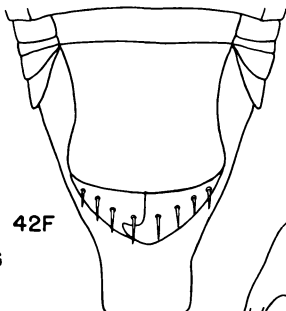
42D



42C

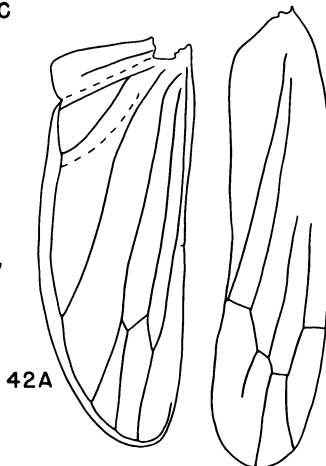


42G



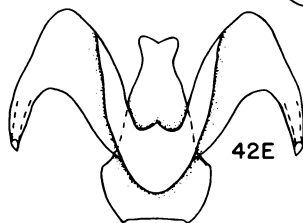
42F

FIG. 42 NOTUS

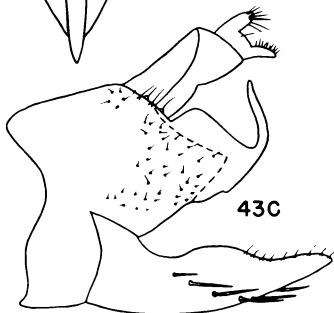


42A

42B



42E



43C



43E

FIG. 43 DIKRANEURA VARIATA

Plate 16

Fig. 44. Dikraneura (Dikraneura) variata

- A. Hind wing.
- B. Fore wing.
- D. Right style, broad aspect (ventral) (x429).
- F. Connective, broad aspect (x429).

Fig. 45. Dikraneura (Delongia) luna

- A. Hind wing.
- B. Fore wing.
- C. Male genital capsule, lateral aspect (x150).

Fig. 46. Parallaxis

- E. Parallaxis Donaldsoni, aedeagus, lateral aspect (x320) (from the holotype of P. vacillans).
- F. Parallaxis sp., fore wing.

PLATE 16

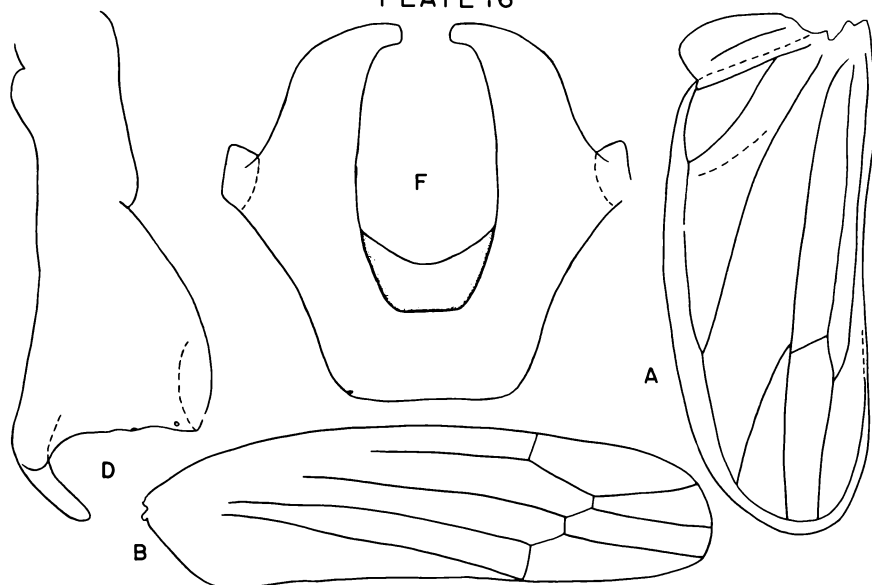


FIG.44 DIKRANEURA VARIATA

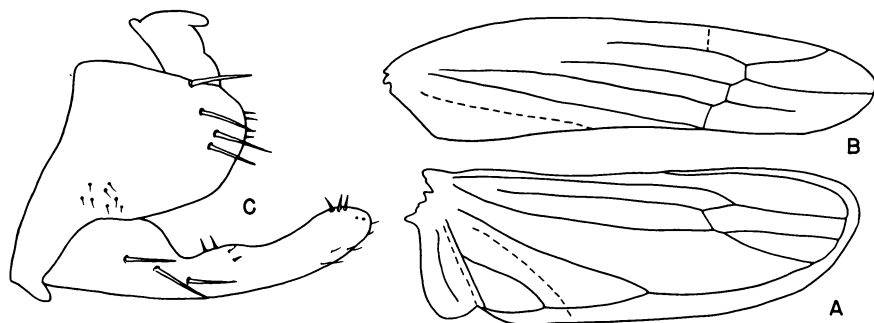


FIG.45 DIKRANEURA LUNA

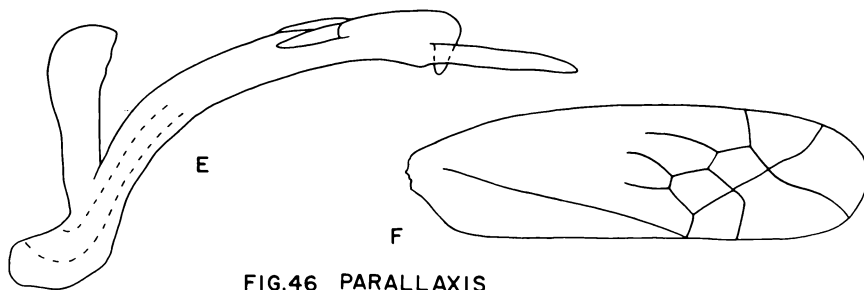


FIG.46 PARALLAXIS

Plate 17

Fig. 47. Parallaxis

- A. Parallaxis Donaldsoni, hind wing.
- B. Parallaxis Donaldsoni, fore wing
(venation compared with type)
- C. Parallaxis sp., male genital capsule,
lateral aspect (x150).
- D. Parallaxis sp., right style, broad
aspect (x429).

Fig. 48. Typhlocybella minima

- A. Hind wing.
- B. Fore wing.
- C. Male genital capsule, lateral aspect
(x200).
- D. Right style, dorsal aspect (x429).
- E. Aedeagus, lateral and slightly ventral
aspect (x429).
- F. Connective and base of aedeagus, dorsal
aspect (x429).

PLATE 17

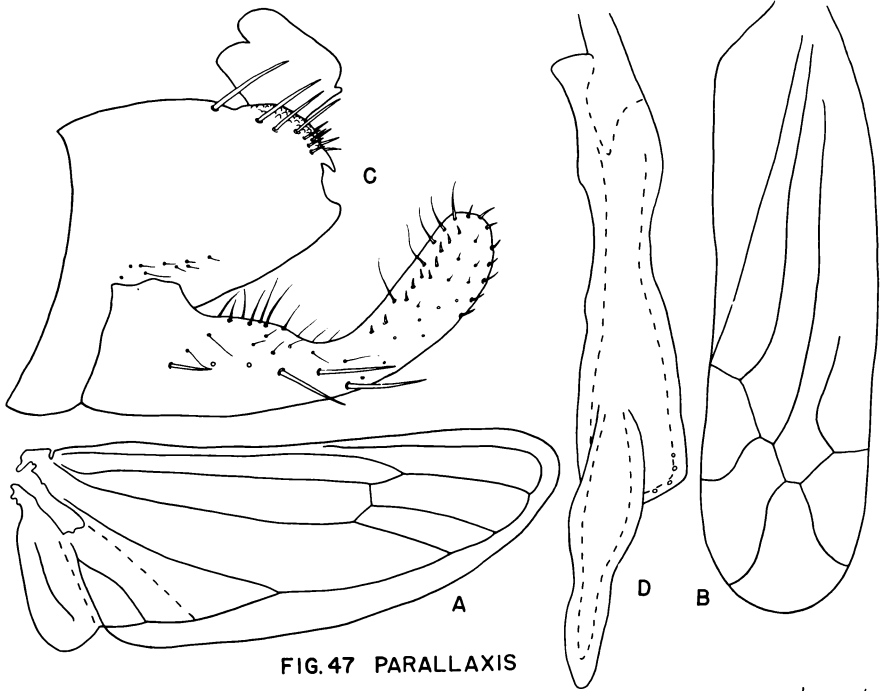


FIG. 47 PARALLAXIS

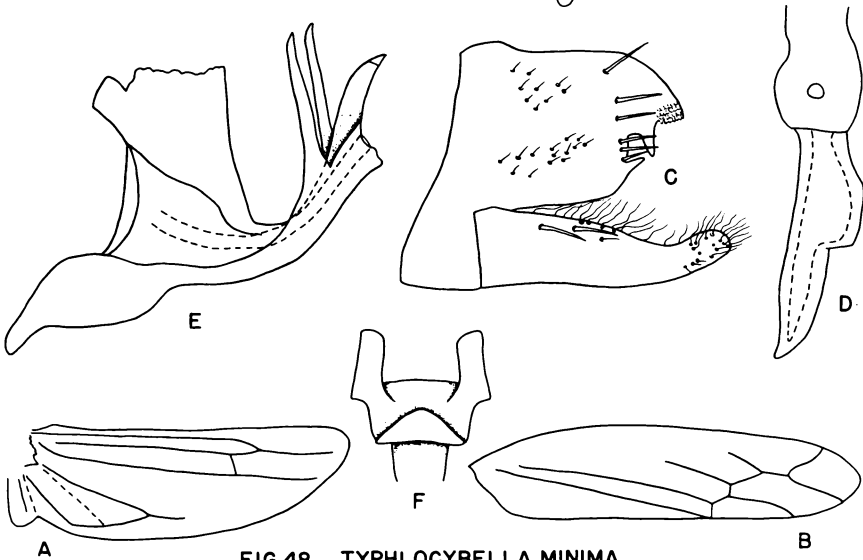


FIG. 48 TYPHLOCYBELLA MINIMA

Plate 18

Fig. 49. Kunzeana kunzei

- A. Hind wing.
- B. Fore wing.
- C. Male genital capsule, lateral aspect (x200).
- D. Right style, dorsal aspect (x429).
- E. Aedeagus, lateral aspect (x429).

Fig. 50. Endoxoneura splendidula

- B. Apex of fore wing, sketch.
- C. Type, male genital capsule, lateral aspect (x150).
- D. Type, right style and connective, dorsal aspect (x429).
- E. Type, aedeagus, ventrolateral aspect (x429).

Fig. 51. Kidrella santana, aedeagus, ventrolateral aspect (x429).

PLATE 18

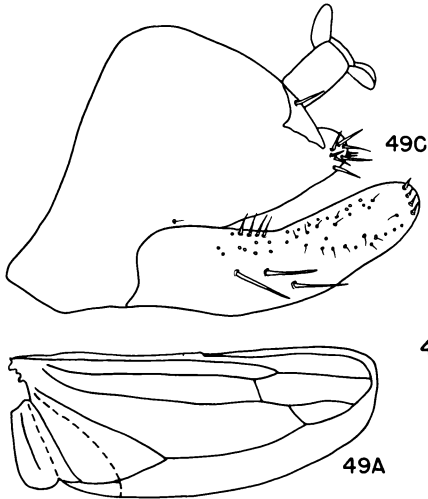


FIG. 49 KUNZEANA KUNZEI

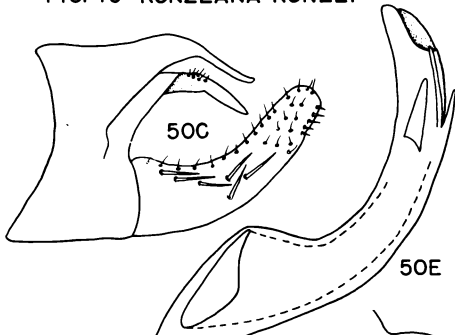
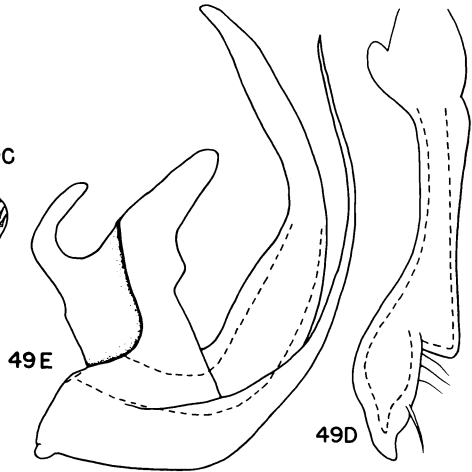


FIG. 50 ENDOXONEURA SPLENDIDULA

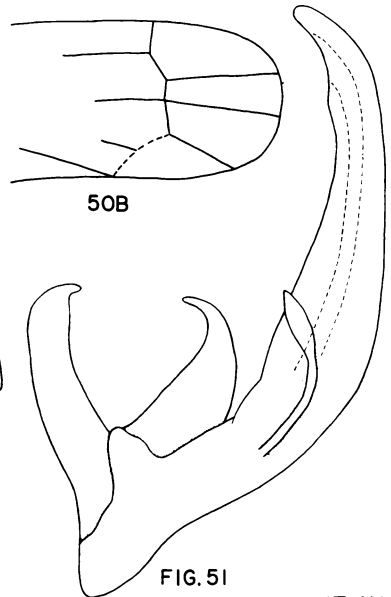
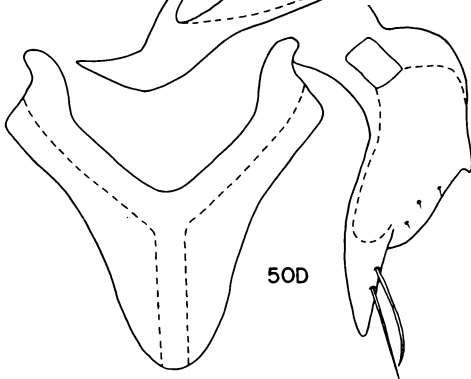
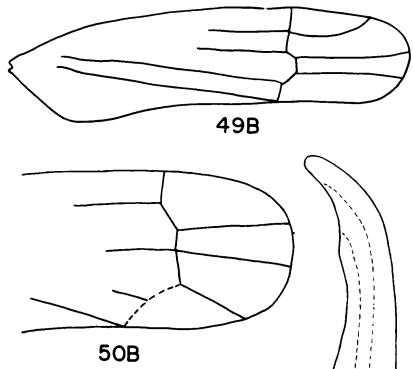


FIG. 51
KIDRELLA SANTANA

Plate 19

Fig. 52. Kidrella santana

- A. Hind wing.
- B. Fore wing.
- C. Male genital capsule, lateral aspect
(x150).
- D. Apex of right style, broad aspect
(ventral) (x429).
- F. Connective, ventral aspect (x429).

Fig. 53. Donidea verticis

- B. Fore wing, sketch.
- C. Male genital capsule, lateral aspect (x150).
- D. Right style, near-dorsal aspect (x429).
- E. Aedeagus, ventrolateral aspect (x429).

PLATE 19

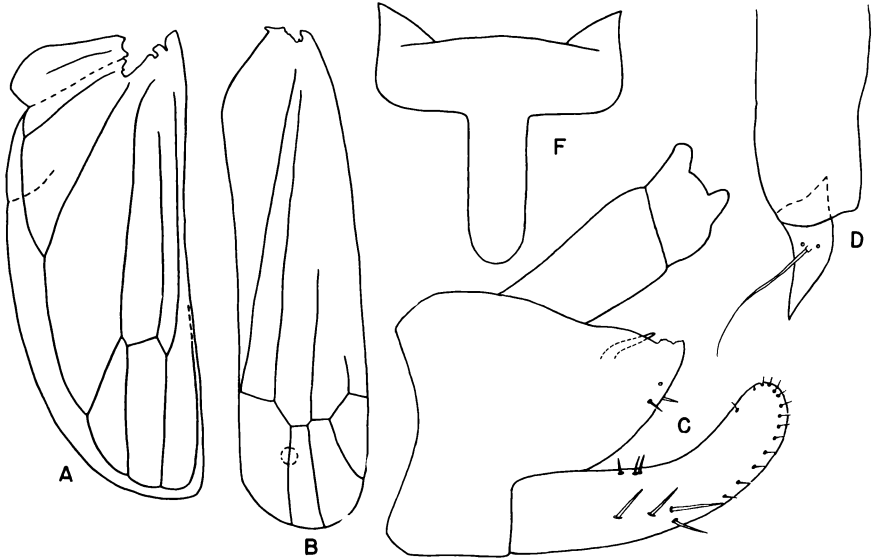


FIG.52 KIDRELLA

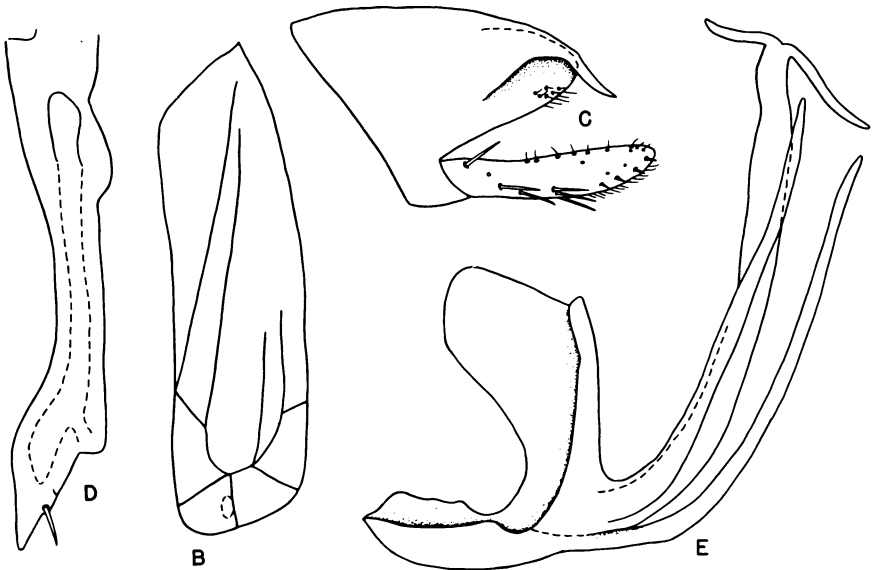


FIG.53 DONIDEA VERTICIS

Plate 20

Fig. 54. Alconeura (Alconeura)

- A. Alconeura rotundata, hind wing.
- B. Alconeura rotundata, fore wing.
- C. Alconeura rotundata, genital capsule,
lateral aspect (x150).
- D. Alconeura rotundata, right style, ven-
tral aspect (x429).
- F. Alconeura dodonana, fore wing.
- G. Alconeura santaritana, fore wing.
- H. Alconeura unipuncta, right style apex,
ventral aspect (x429).

Fig. 55. Alconeura (Hylcidea) depressa

- A. Hind wing.
- B. Fore wing.
- D. Right style, apex, dorsal aspect (x429).
- E. Connective and aedeagus, ventral aspect,
shaft turned slightly laterad (x320).

PLATE 20

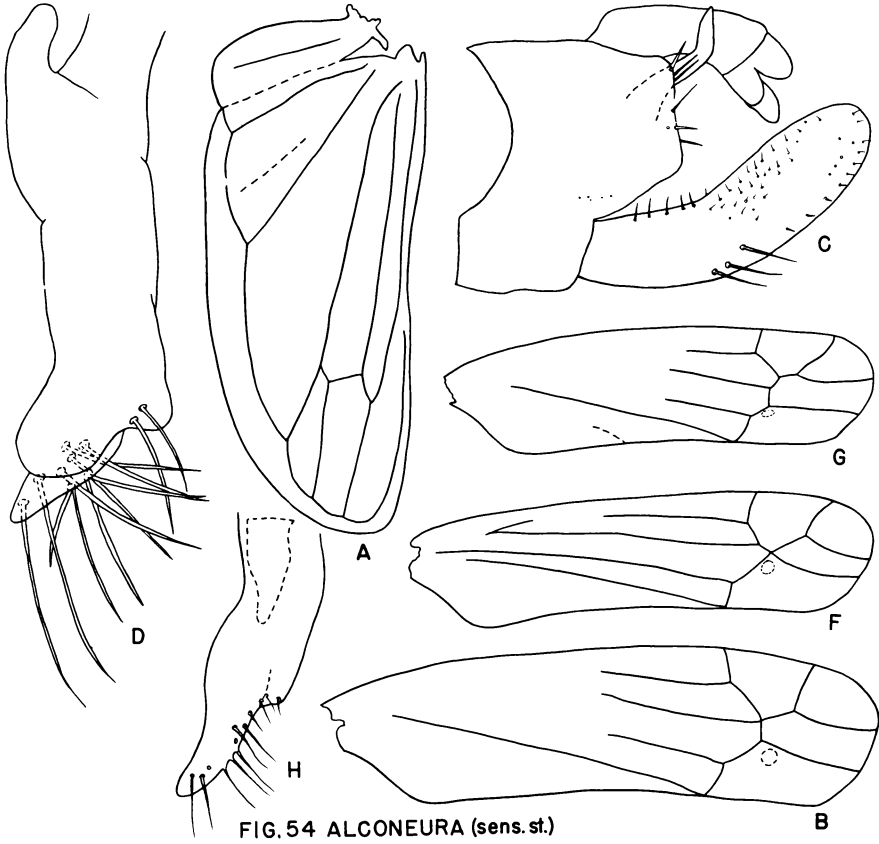


FIG. 54 *ALCONEURA* (sens. st.)

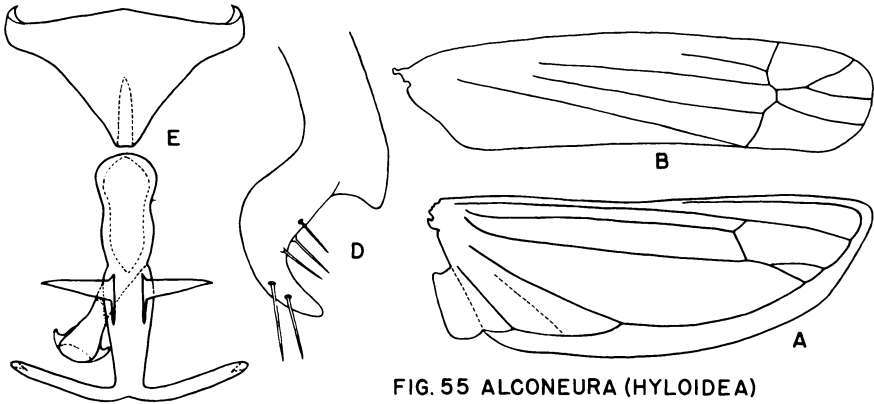


FIG. 55 *ALCONEURA* (HYLOIDEA)

Plate 21

Fig. 56. Alconeura (Hyloidea)

C. Alconeura (Hyloidea) depressa, male genital capsule, lateral aspect (x150).

F. Alconeura (Hyloidea) beameri, male genital capsule, lateral aspect (x150).

G. Alconeura (Hyloidea) beameri, right style, broad aspect (x429).

H. Alconeura (Hyloidea) beameri, aedeagus, lateral aspect (x429).

I. Alconeura (Hyloidea) beameri, hind wing.

J. Alconeura (Hyloidea) beameri, fore wing.

Fig. 57. Dikrella (Dikrella)

A. Dikrella cockerellii, hind wing.

B. Dikrella cockerellii, fore wing.

C. Dikrella cockerellii, male genital capsule, lateral aspect (x150).

D. Dikrella cockerellii, right style, broad aspect (dorsal) (x429).

E. Dikrella cockerellii, aedeagus, lateral aspect (x429).

F. Dikrella cruentata, fore wing.

G. Dikrella californica var. imbellis, right style, dorsal aspect (x429).

PLATE 21

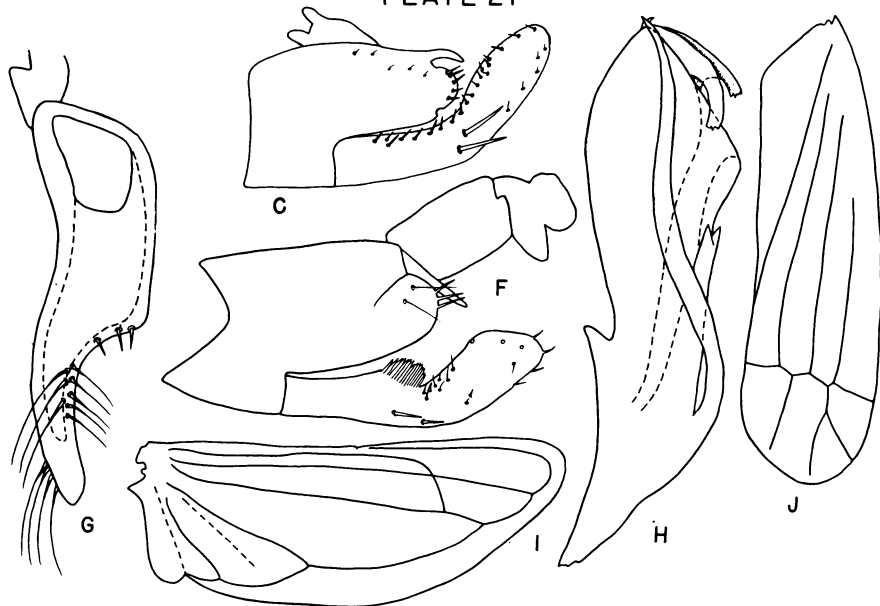


FIG. 56 *ALCONEURA* (HYLOIDEA)

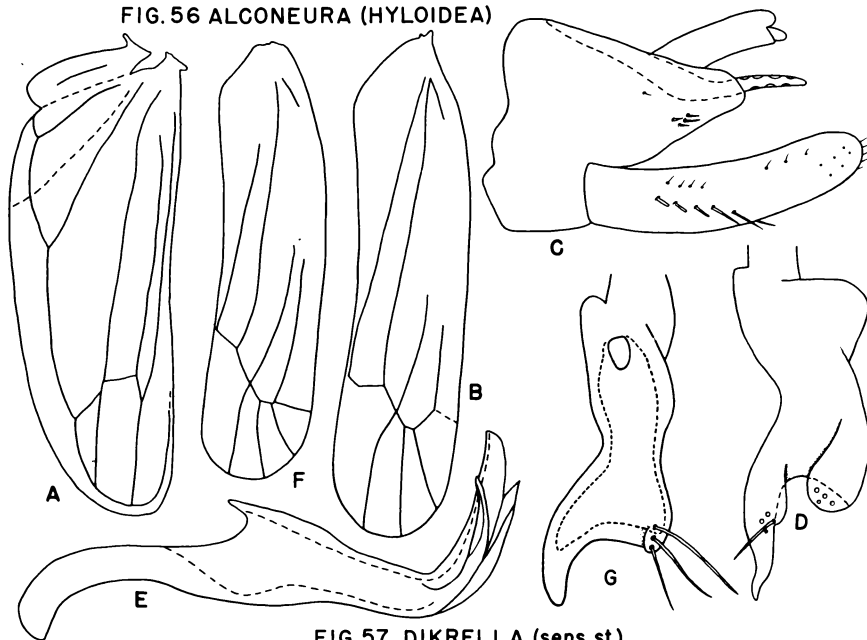


FIG. 57 *DIKRELLA* (sens. st.)

Plate 22

Fig. 58. Dikrella (Readionia) readionis

- C. Male genital capsule, lateral aspect,
anal tube not shown (x150).
- D. Right style, broad aspect (dorsal) (x429).
- E. Aedeagus, lateral aspect (x429).
- F. External male genitalia, unmacerated
specimen.

Fig. 59. Idona minuenda

- A. Hind wing.
- B. Fore wing.
- C. Male genital capsule, lateral aspect
(x150).
- D. Right style apex, dorsal aspect (x429).
- E. Connective and aedeagus, ventral
aspect (x429).

Fig. 60. Dikrellidia bilineata

- C. Holotype, pygofer, lateral aspect (x150).
- D. Holotype, aedeagus, lateral aspect (x429).

PLATE 22

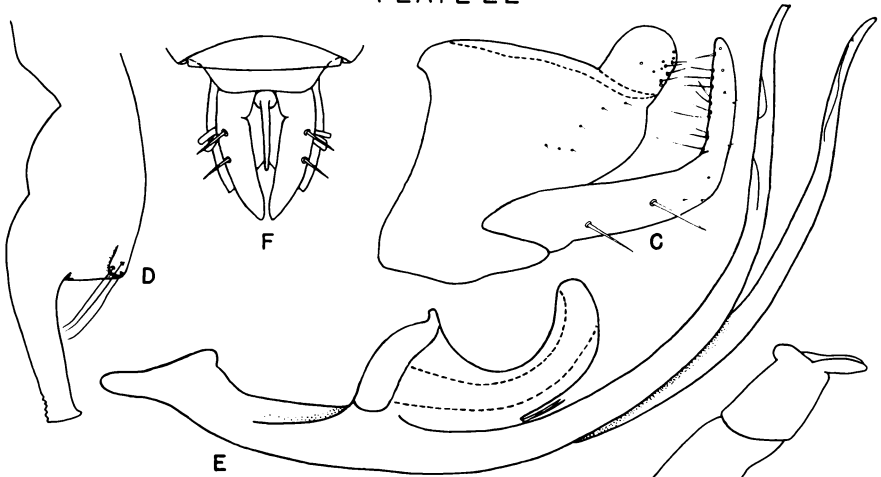


FIG.58 DIKRELLA (READIONIA) READIONIS

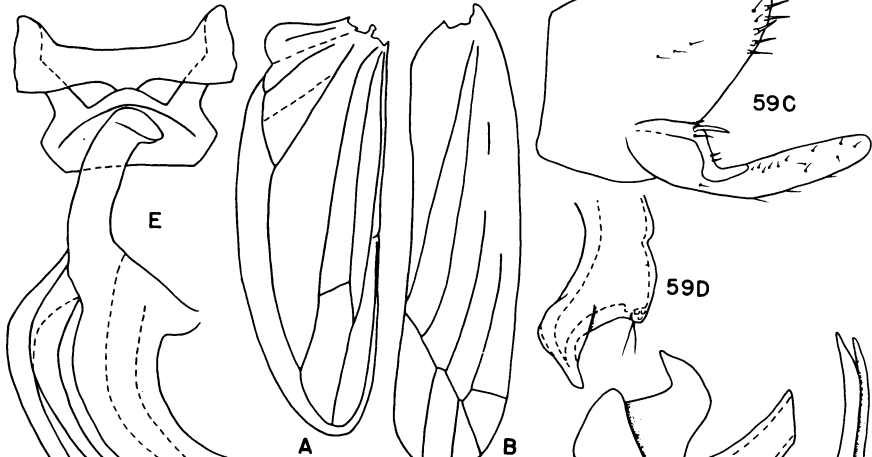


FIG.59 IDONA MINUENDA

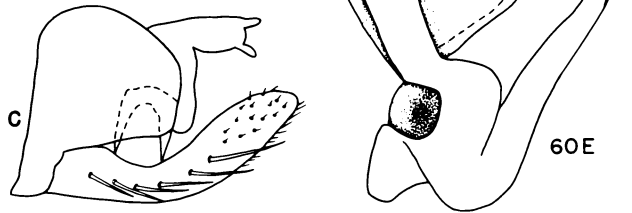


FIG.60 DIKRELLIDIA BILINEATA

Plate 23

Fig. 61. Dikrellidia bilineata

- A. Holotype, hind wing.
- B. Holotype, fore wing.

Fig. 62. Kunzella marginella

- A. Hind wing.
- B. Fore wing.
- C. Male genital capsule, lateral aspect (x150).
- D. Right style, broad aspect (ventral) (x429).
- E. Aedeagus, lateral aspect (x429).

Fig. 63. Neodikrella disconotata

- A. Hind wing.
- B. Fore wing.
- E. Aedeagus, lateral aspect (x429).

PLATE 23

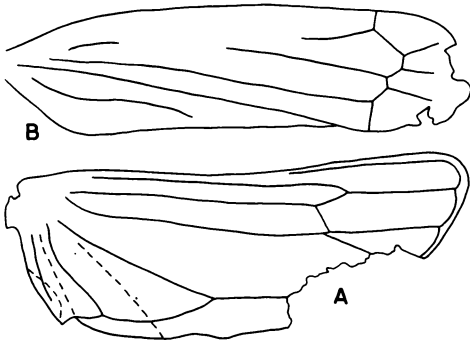


FIG. 61 DIKRELLIDIA BILINEATA

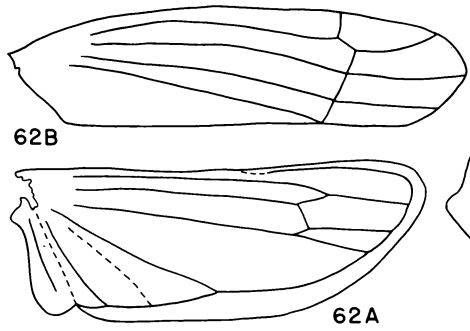
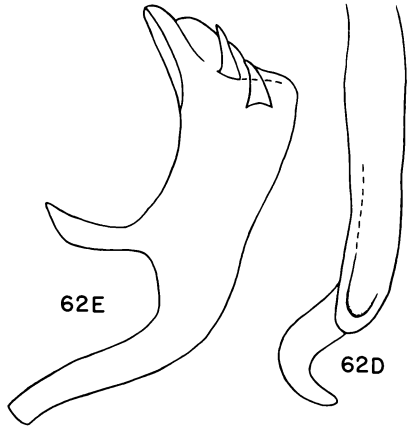


FIG. 62 KUNZELLA MARGINELLA

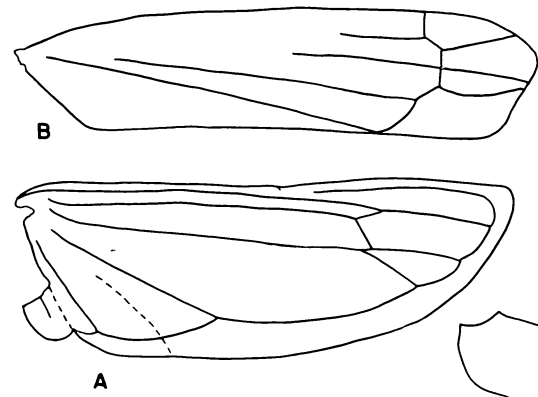
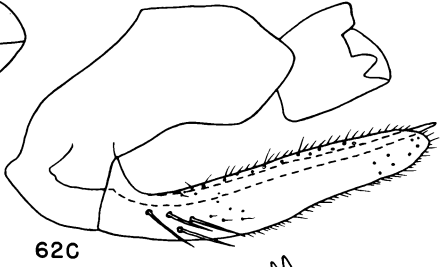


FIG. 63 NEODIKRELLA DISCONOTATA

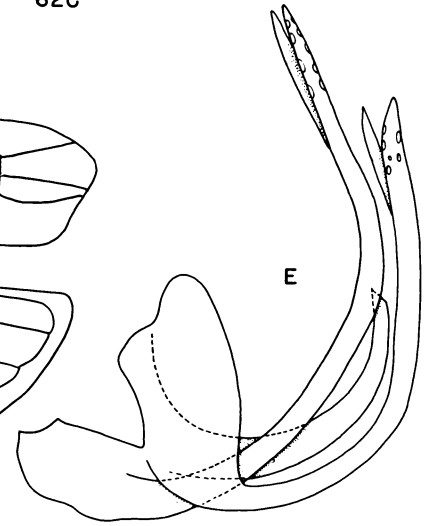


Plate 24

Fig. 64. Neodikrella disconotata

C. Male genital capsule, lateral aspect
(x150).

D. Right style and connective, dorsal
aspect (x429).

Fig. 65. Sarascarta

A. Sarascarta sp., hind wing.

B. Sarascarta sp., fore wing.

C. Sarascarta fulva, male genital capsule,
lateral aspect (x150).

D. Sarascarta fulva, right style and
connective, dorsal aspect (x429).

E. Sarascarta fulva, aedeagus, lateral
aspect (x429).

PLATE 24

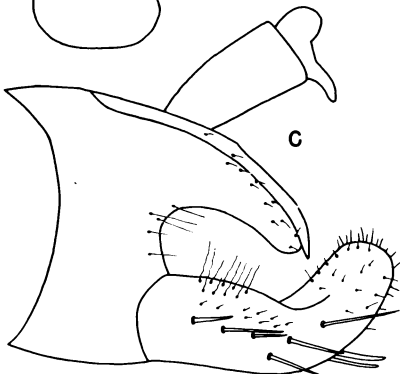
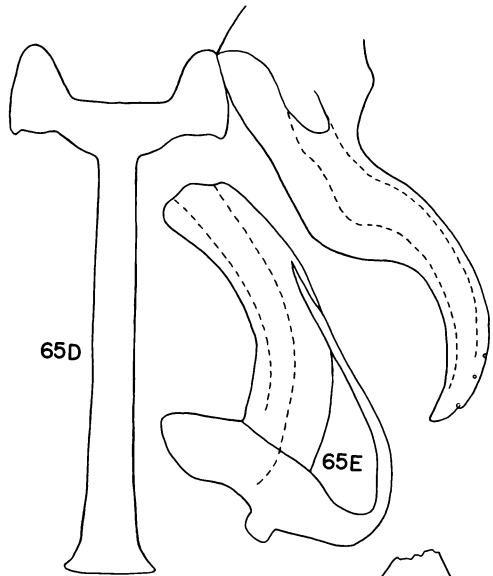
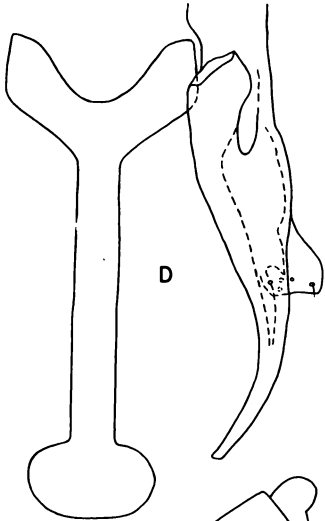


FIG. 64 NEODIKRELLA
DISCONOTATA

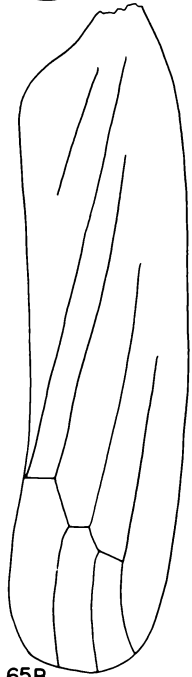
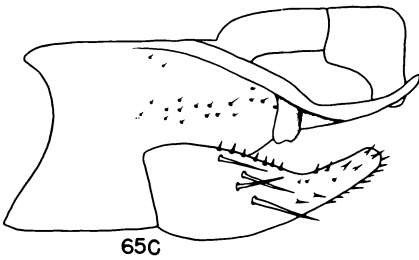


FIG. 65 SARASCARTA

65B

Plate 25

Fig. 66. Buritia lepida

- A. Holotype, hind wing.
- B. Holotype, fore wing.
- C. Holotype, male genital capsule, lateral aspect (x150).
- D. Holotype, right style, lateral aspect (x200).
- E. Holotype, aedeagus, lateral aspect (x429).

Fig. 67. Saranella micronotata

- A. Hind wing.
- B. Fore wing.
- C. Male genital capsule, lateral aspect
anal tube not shown (x150).
- D. Right style and connective, dorsal aspect (x429).
- E. Aedeagus, lateral and slightly ventral aspect (x429).
- G. Genital capsule, ventral aspect (x150),
small setae omitted.

PLATE 25

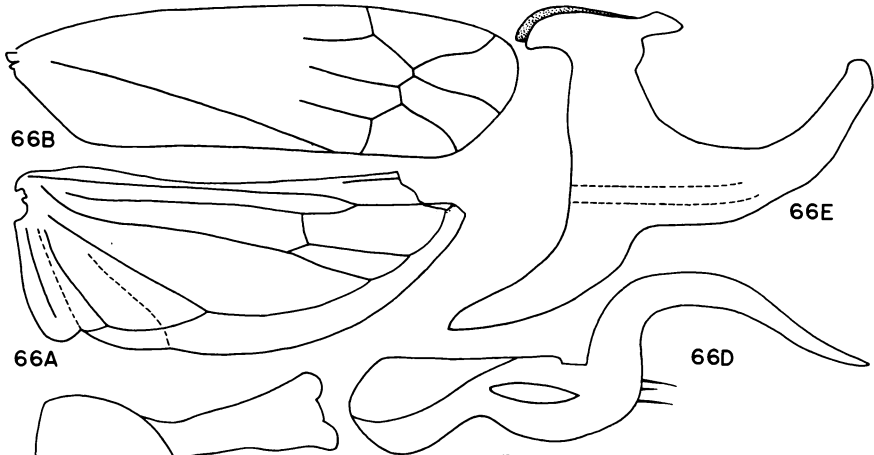


FIG. 66 BURITIA LEPIDA

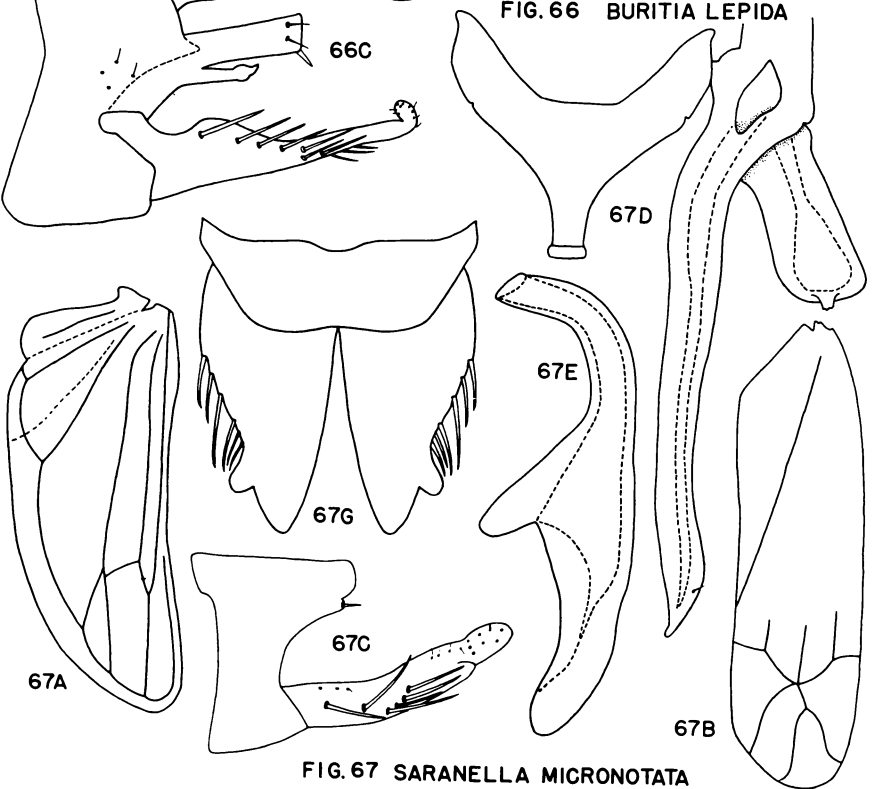


FIG. 67 SARANELLA MICRONOTATA

Plate 26

Fig. 68. Saranelia micronotata, genital capsule,
dorsal aspect (x150).

Fig. 69. Hybla maculata

- A. Paratype, hind wing.
- B. Paratype, fore wing.
- C. Paratype, male genital capsule, lateral
aspect (x150).
- D. Paratype, right style (x429).
- E. Paratype, aedeagus, lateral aspect (x429).

Fig. 70. Zygina nivea

- A. Hind wing.
- B. Fore wing.
- C. Male genital capsule, lateral aspect
(x150).
- D. Aedeagus, lateral and somewhat dorsal
aspect (x429).

PLATE 26

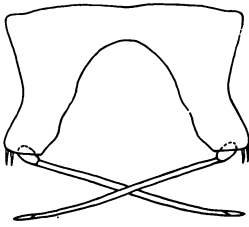
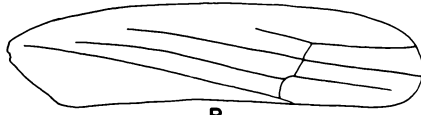
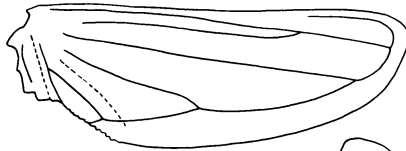


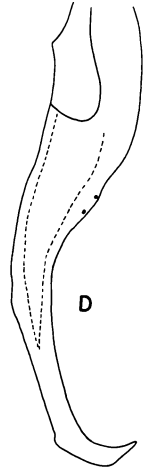
FIG. 68 SARANELLA
MICRONOTATA



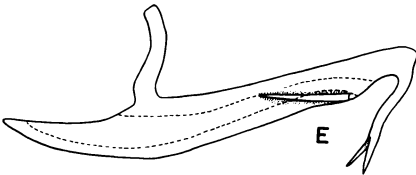
B



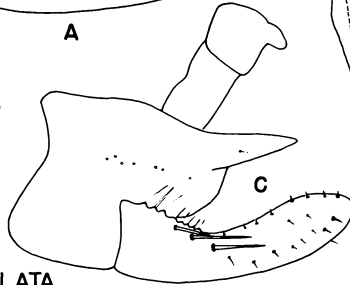
A



D

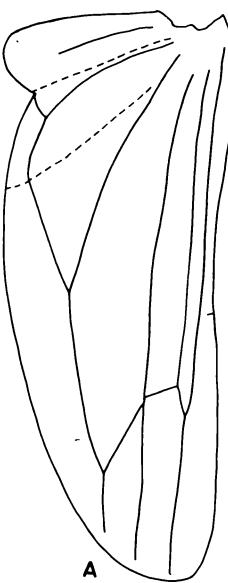


E



C

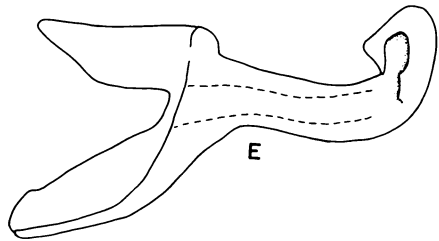
FIG. 69 HYBLA MACULATA



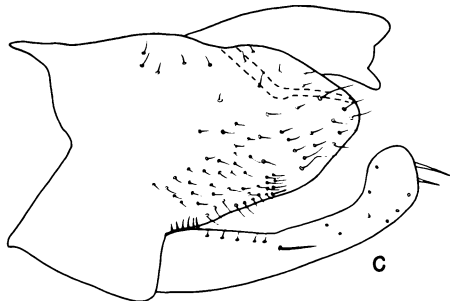
A



B



E



C

FIG. 70 ZYGINA NIVEA

Plate 27

Fig. 71. Zygina

D. Zygina nivea, right style, mesal aspect
(x429).

F. Zygina nivea, connective, dorsal aspect
(x429).

G. Zygina kiperi, right style apex, broad
aspect (x429).

Fig. 72. Hymetta trifasciata

A. Hind wing.

B. Fore wing.

C. Male genital capsule, lateral aspect (x150).

D. Right style, apical half, broad aspect
(x429).

E. Aedeagus, lateral aspect (x429).

F. Connective, ventral aspect, showing line
of attachment of aedeagus (x429).

Fig. 73. Erythroneura tricincta

C. Male genital capsule, lateral aspect
(x150).

F. Pygofer, posterodorsal portion, internal
aspect (x429).

PLATE 27

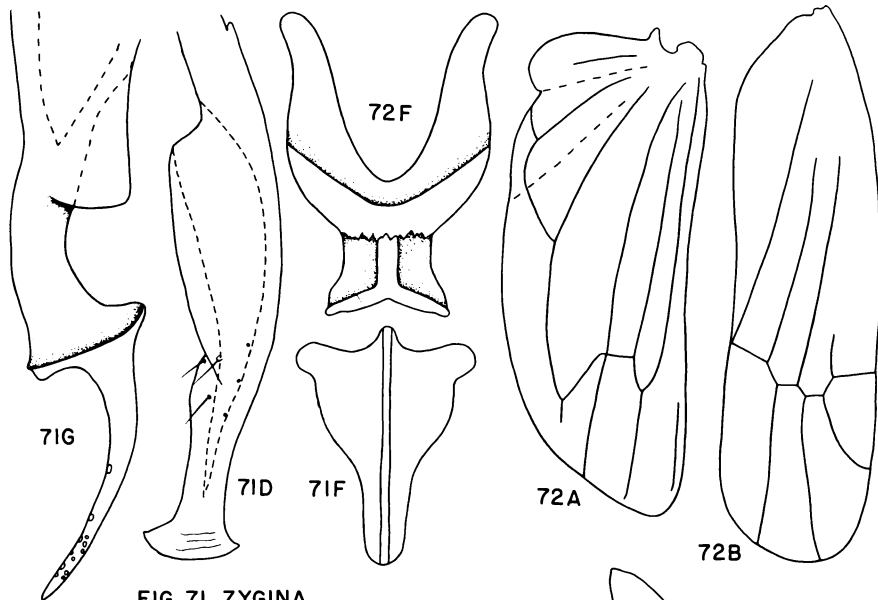


FIG. 71 ZYGINA

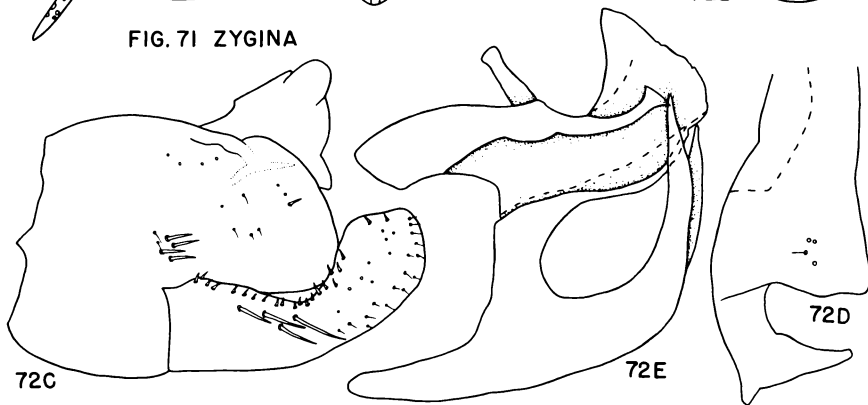


FIG. 72 HYMETTA TRIFASCIATA

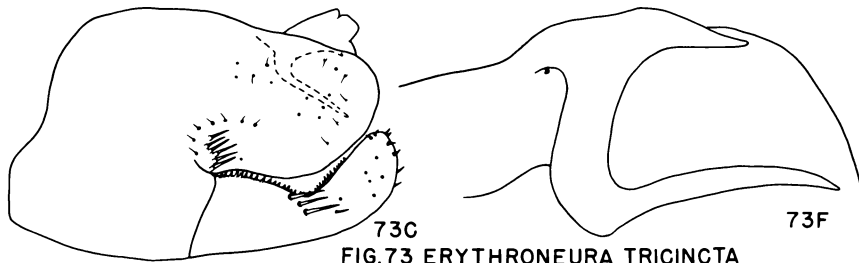


FIG. 73 ERYTHRONEURA TRICINCTA

Plate 28

Fig. 74. Erythroneura (Erythroneura)

- A. Erythroneura tricincta, hind wing.
- B. Erythroneura tricincta, fore wing.
- D. Erythroneura tricincta, right style, apical half, broad aspect (x429).
- E. Erythroneura tricincta, aedeagus, lateral aspect (x429).
- G. Erythroneura kanwakae, pygofer process, broad aspect (x429).

Fig. 75. Erythroneura (Erasmoneura) vulnerata

- B. Fore wing.
- C. Male genital capsule, lateral aspect (x150).
- D. Right style apex, dorsal aspect (x429).
- E. Aedeagus, dorsal aspect (x429).

Fig. 76. Erythroneura (Erythridula) obliqua, fore wing.

PLATE 28

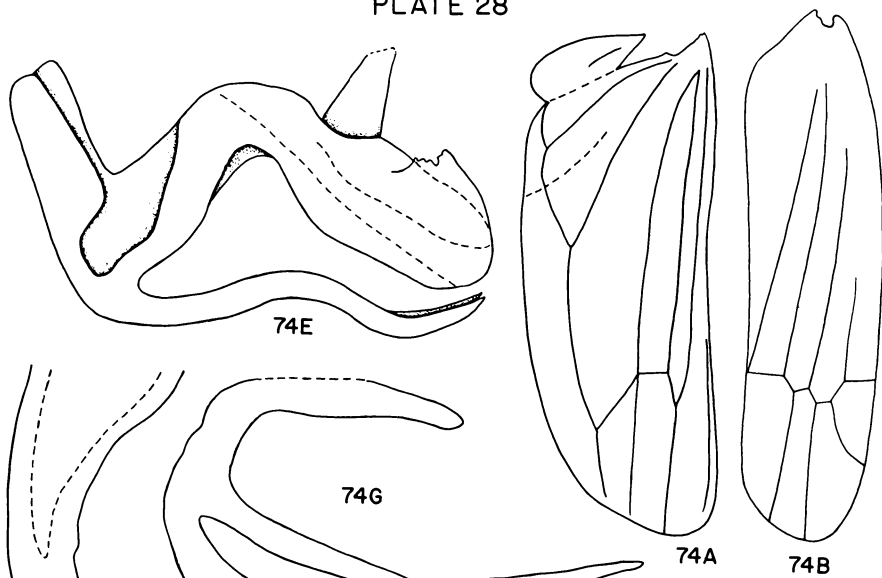
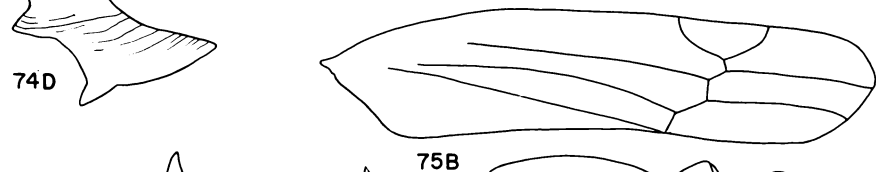


FIG. 74 ERYTHRONEURA (sens. st.)



75B

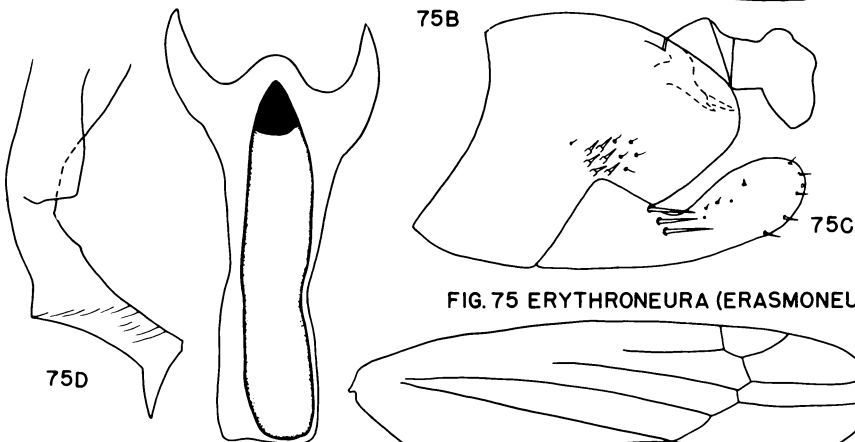


FIG. 75 ERYTHRONEURA (ERASMONEURA)

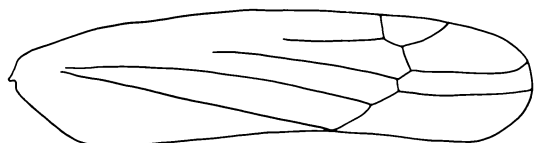


FIG. 76 ERYTHRONEURA (ERYTHRIDULA)

Plate 29

Fig. 77. Erythroneura (Erythridula) obliqua

- C. Male genital capsule, lateral aspect (x150).
- D. Right style apex, broad aspect (x429).
- E. Connective, ventral aspect, and aedeagus, lateral aspect (x320).
- F. Pygofer right half, dorsal aspect (x200).

Fig. 78. Erythroneura (Eratoneura)

- B. Erythroneura dira, fore wing.
- C. Erythroneura dira, holotype, male genital capsule, from balsam mount (x150), anal tube not shown.
- D. Erythroneura dira, holotype, right style apex, ventral aspect (x429).
- E. Erythroneura dira, holotype, aedeagus, lateral aspect, shaft twisted (x429).
- F. Erythroneura nevadensis, aedeagus, ventrolateral aspect (x429).
- G. Erythroneura rotunda, aedeagal shaft, lateral aspect (x429).

PLATE 29

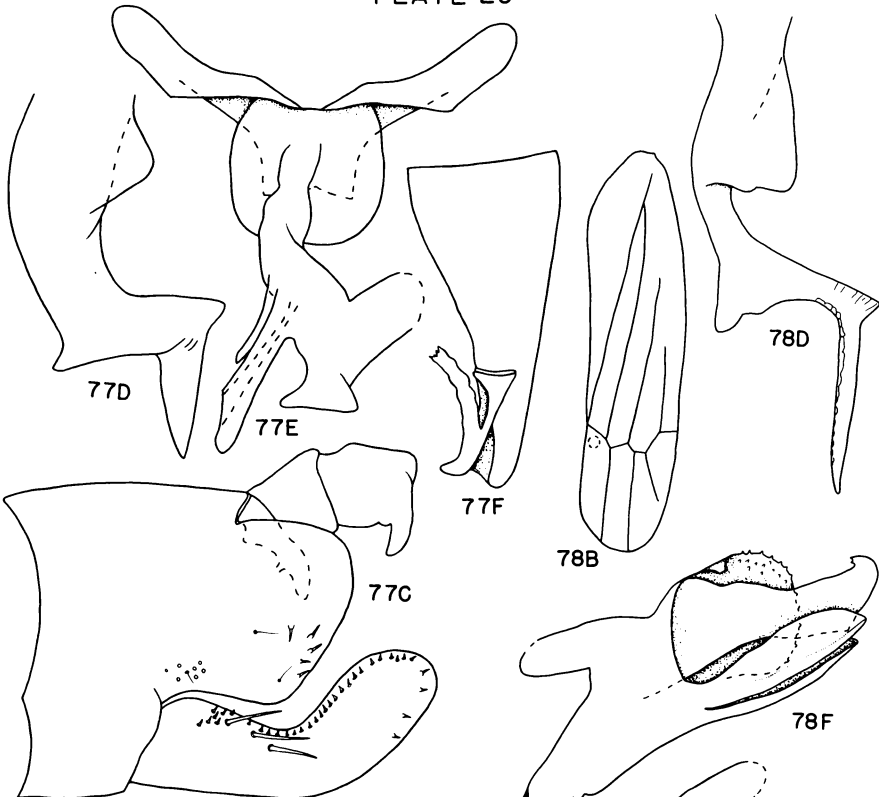


FIG. 77 ERYTHRONEURA (ERYTHRIDULA)

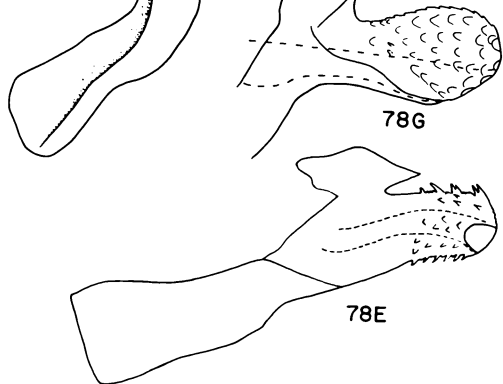
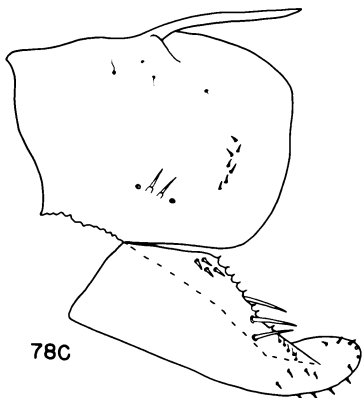


FIG. 78 ERYTHRONEURA (ERATONEURA)

Plate 30

Fig. 79. Eupterella mexicana

- A. Hind wing.
- B. Fore wing.
- C. Paratype, male genital capsule, lateral aspect (x150).
- D. Paratype, right style, broad aspect (x429).
- E. Paratype, aedeagus, left lateral aspect (x215).

Fig. 80. Eupteroidea stellulata

- C. Male genital capsule, lateral aspect, anal tube not shown (x150).
- D. Right style, broad aspect (x200).
- E. Aedeagus, lateral aspect (x200).

PLATE 30

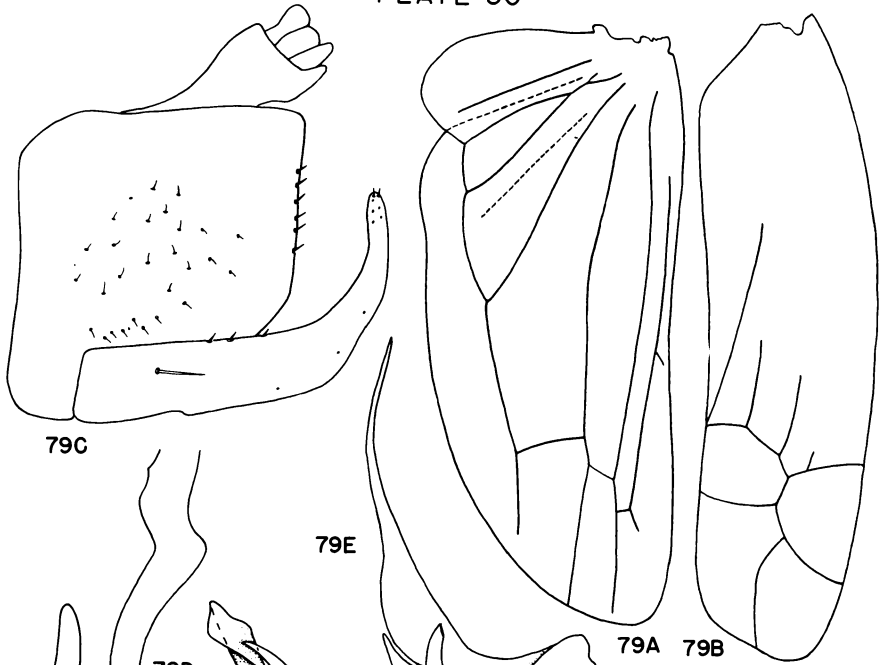


FIG. 79 EUPTERELLA MEXICANA

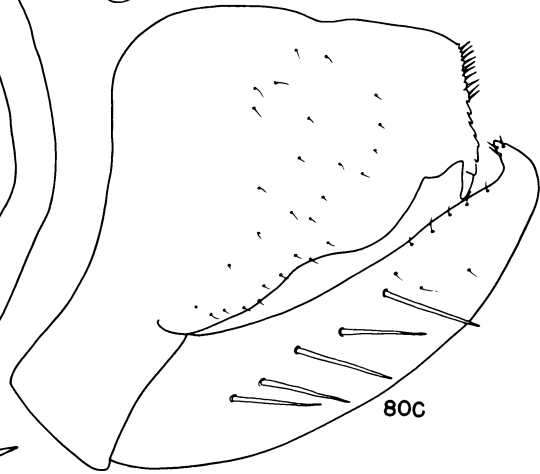
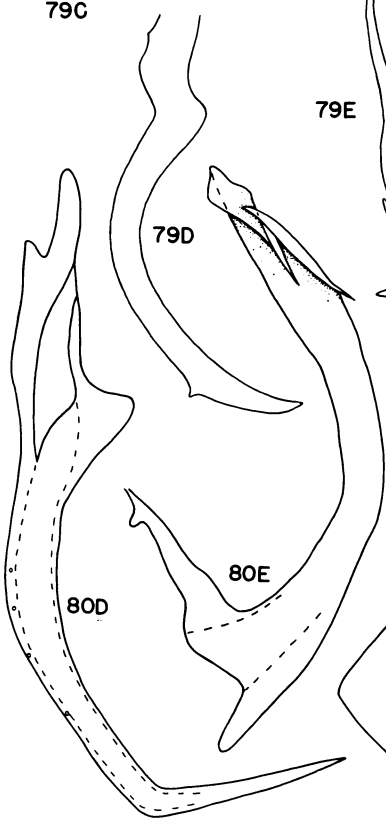


FIG. 80 EUPTEROIDEA STELLULATA

Plate 31

Fig. 81. Eupteroidea stellulata, fore wing,
apical half.

Fig. 82. Eurhadina pulchella

B. Fore wing, apical half.

C. Male genital capsule, lateral aspect
(x150).

D. Right style, lateral aspect, apical
three-fourths (x215).

E. Aedeagus, lateral aspect (x215).

F. Connective, dorsal aspect (x429).

Fig. 83. Eupteryx vittata

B. Fore wing.

C. Male genital capsule, lateral aspect
(x150).

PLATE 31

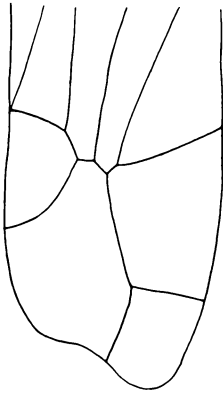


FIG.81 EUPTEROIDEA
STELLULATA

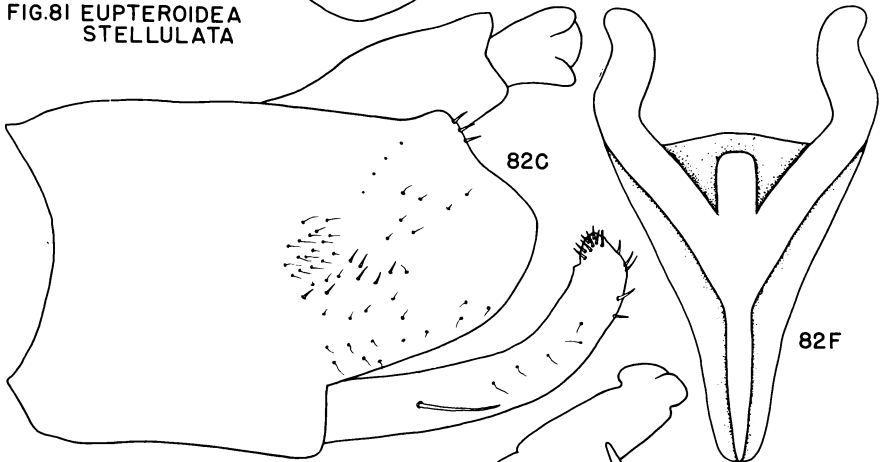
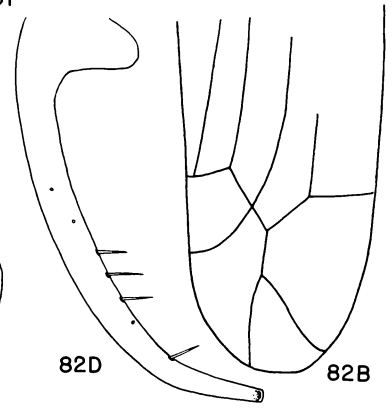
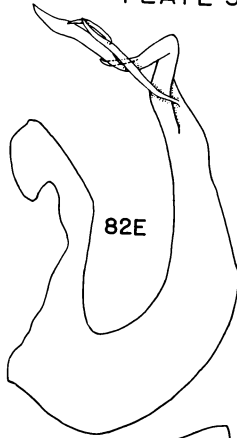


FIG.82 EURHADINA PULCHELLA

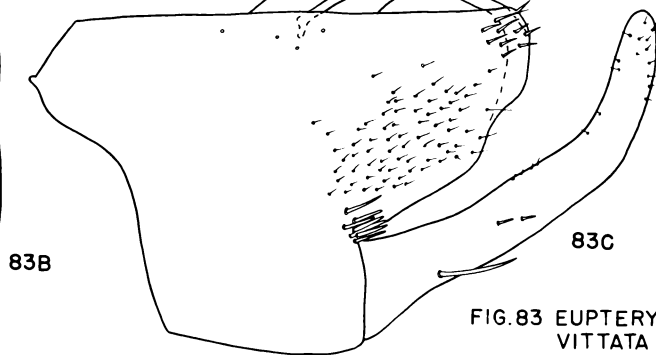
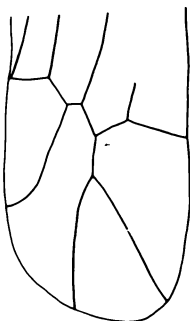


FIG.83 EUPTERYX
VITTATA

Plate 32

Fig. 84. Eupteryx vittata

- D. Right style, broad aspect (x429).
- E. Aedeagus, lateral aspect (x429).
- F. Connective, ventral aspect (x429).

Fig. 85. Henribautia nigricephala

- B. Fore wing.
- C. Paratype, male genital capsule, lateral aspect (x150).
- D. Paratype, right style, entire, dorsal aspect (x429).
- E. Paratype, aedeagus, lateral aspect (x429).

PLATE 32

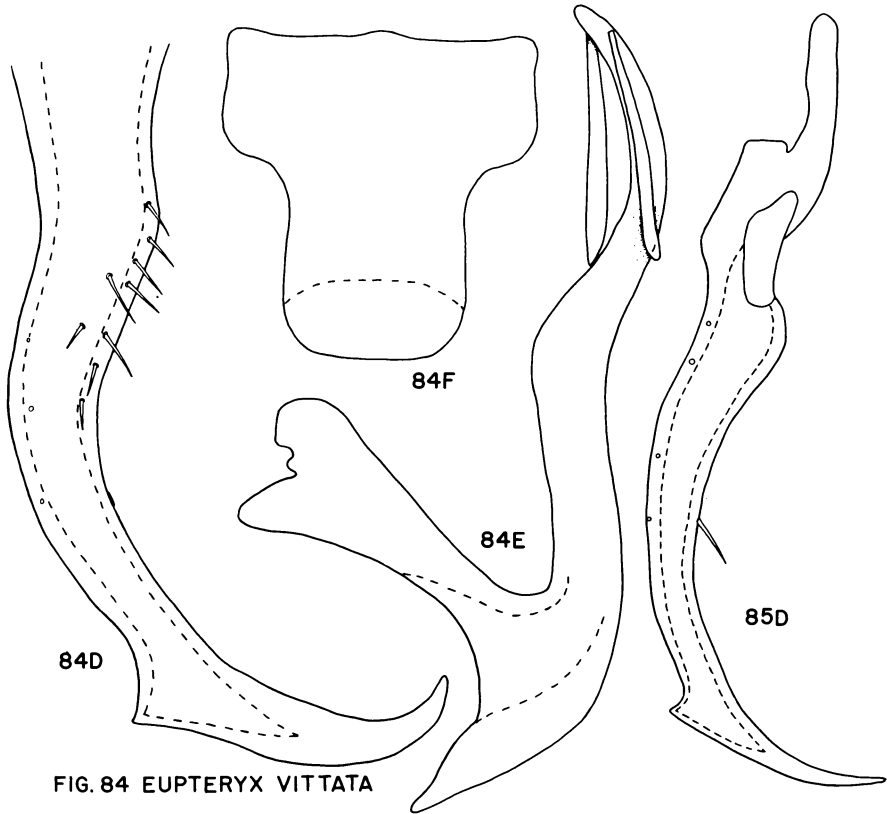


FIG. 84 EUPTERYX VITTATA

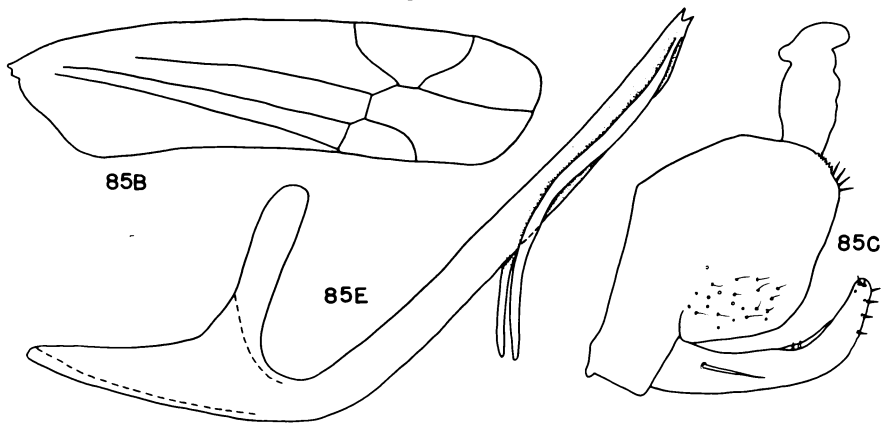


FIG. 85 HENRIBAUTIA NIGRICEPHALA

Plate 33

Fig. 86. Ossiannilsson berenice

C. Male genital capsule, lateral aspect
(x75).

D. Right style, broad aspect (x200).

E. Aedeagus, dorsal aspect (x200).

Fig. 87. Ribautiana ulmi

C. Male genital capsule, lateral aspect
(x75).

D. Right style, apical ten-thirteenths,
broad aspect (x429).

E. Aedeagus, lateral aspect (x320).

Fig. 88. Typhlocyba quercus

A. Hind wing.

B. Fore wing.

PLATE 33

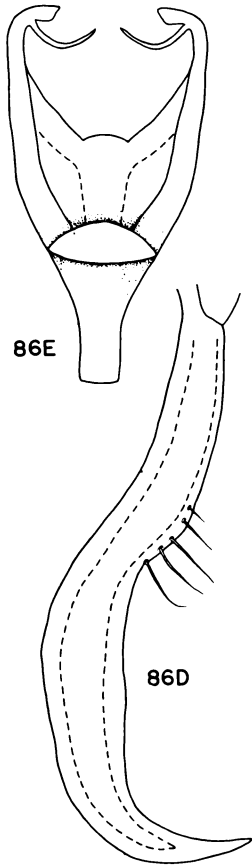


FIG. 86 OSSIANILSSONIA
BERENICE

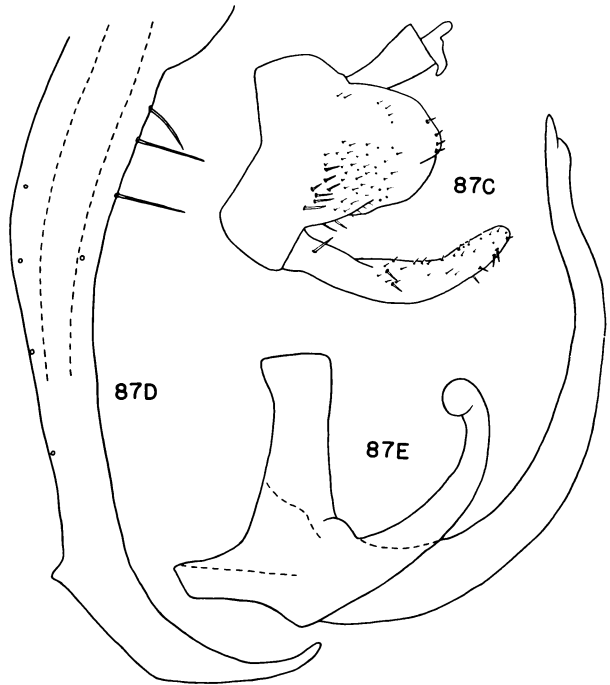
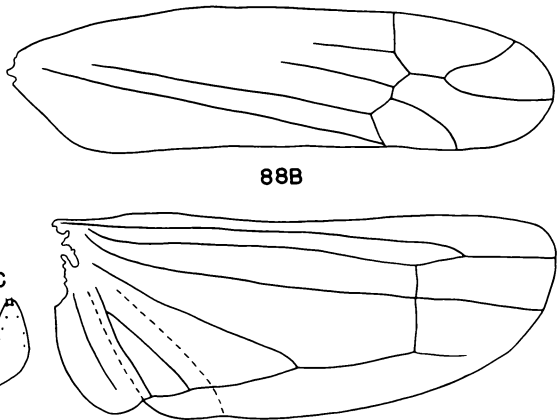


FIG. 87 RIBAUTIANA ULMI



88A
FIG. 88 TYPHLOCYBA QUERCUS

Plate 34

Fig. 89. Typhlocyba quercus

C. Male genital capsule, lateral aspect
(x150).

D. Right style, broad aspect (x429).

E. Aedeagus, dorsal aspect (x200).

Fig. 90. Eualebra smithii

A. Holotype, hind wing.

B. Holotype, fore wing.

C. Holotype, male genital capsule, lateral
aspect (x150).

D. Holotype, right style (x429).

E. Holotype, aedeagus, lateral aspect
(x429).

PLATE 34

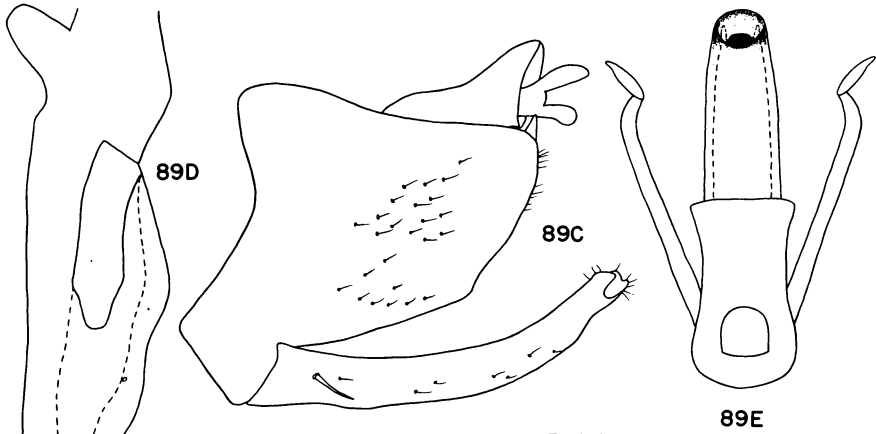


FIG.89 TYPHLOCYBA QUERCUS

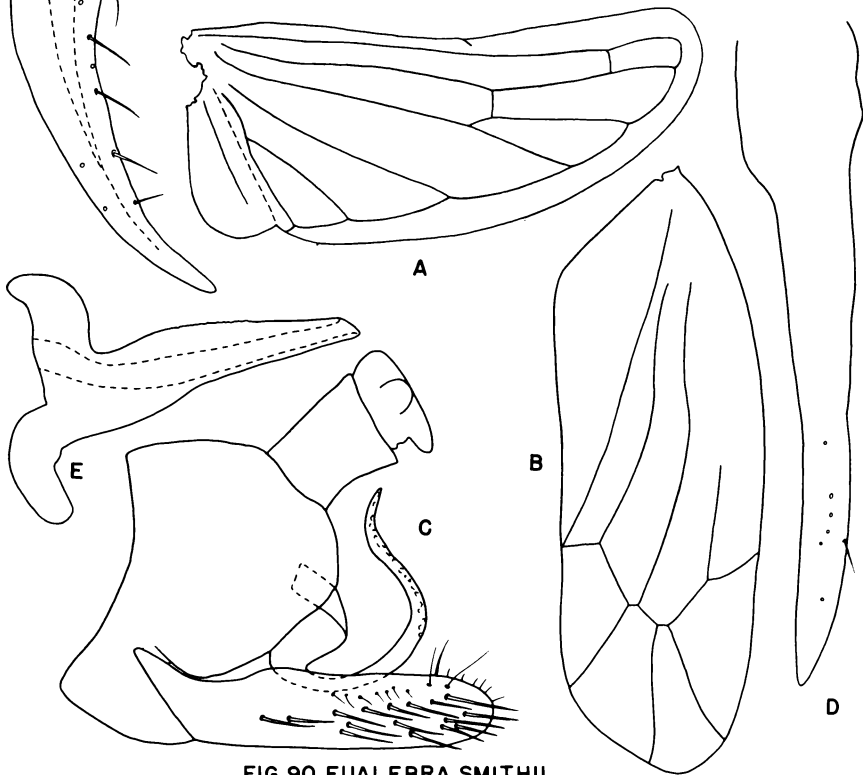


FIG.90 EUALEBRA SMITHII

Plate 35

Fig. 91. Joruma (Joruma) pisca

- A. Holotype, hind wing.
- B. Holotype, fore wing.
- C. Allotype, male genital capsule, lateral aspect (x150).
- D. Allotype, right style and connective, dorsal aspect (x429).
- E. Allotype, aedeagus, lateral aspect (x429).
- F. Allotype, right style apex, lateral aspect (x429).

Fig. 92. Joruma (Jorumidia) curvata

- C. Male genital capsule, lateral aspect (x200).
- D. Right style, dorsal aspect (x429).
- E. Aedeagus, lateral aspect (x429).

PLATE 35

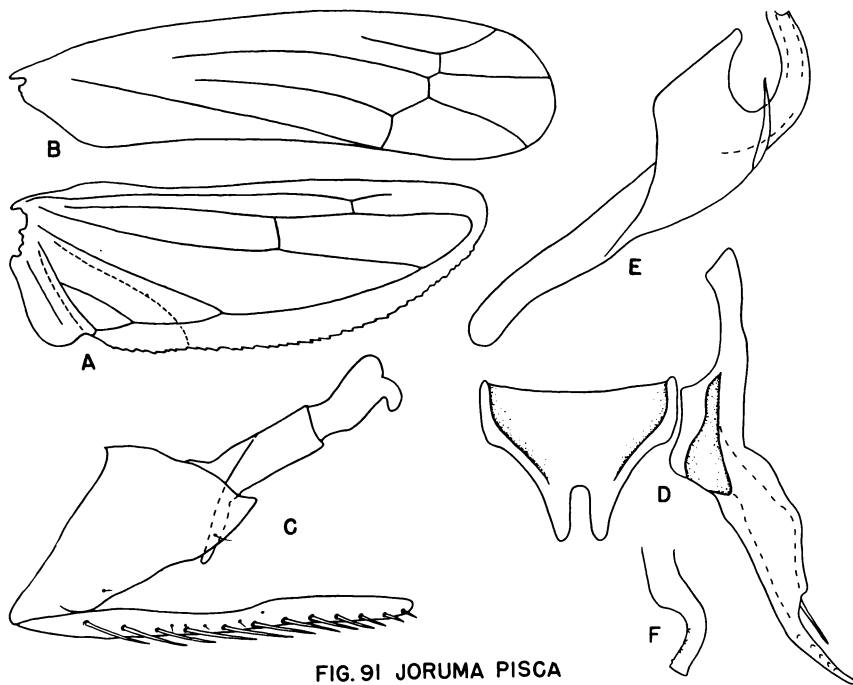


FIG. 91 JORUMA PISCA

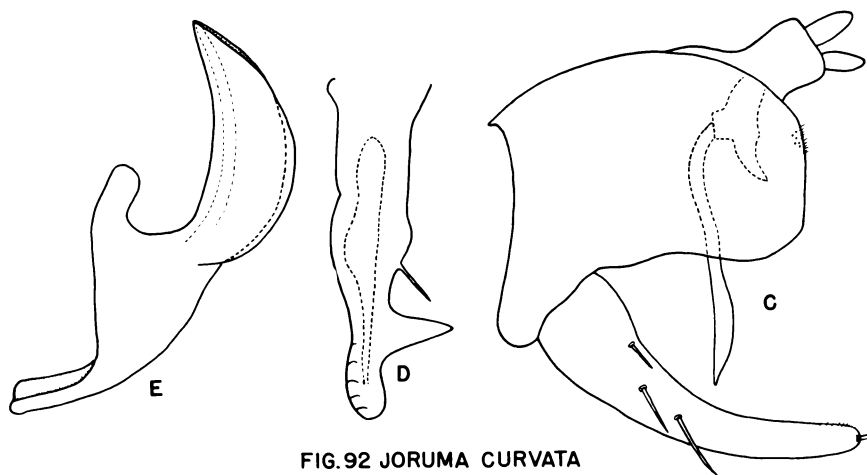


FIG. 92 JORUMA CURVATA

Plate 36

Fig. 93. Neojoruma adusta

C. Holotype, male genital capsule, lateral aspect (x100).

D. Holotype, right style, broad aspect (x429).

E. Holotype, aedeagus, lateral and slightly dorsal aspect (x150).

Fig. 94. Paulomanus cecropiae

A. Holotype, hind wing.

B. Holotype, fore wing.

E. Holotype, connective, dorsal aspect, and aedeagus, lateral aspect (x100).

F. Paratype, right pygofer process, lateral aspect, apical third (x429).

PLATE 36

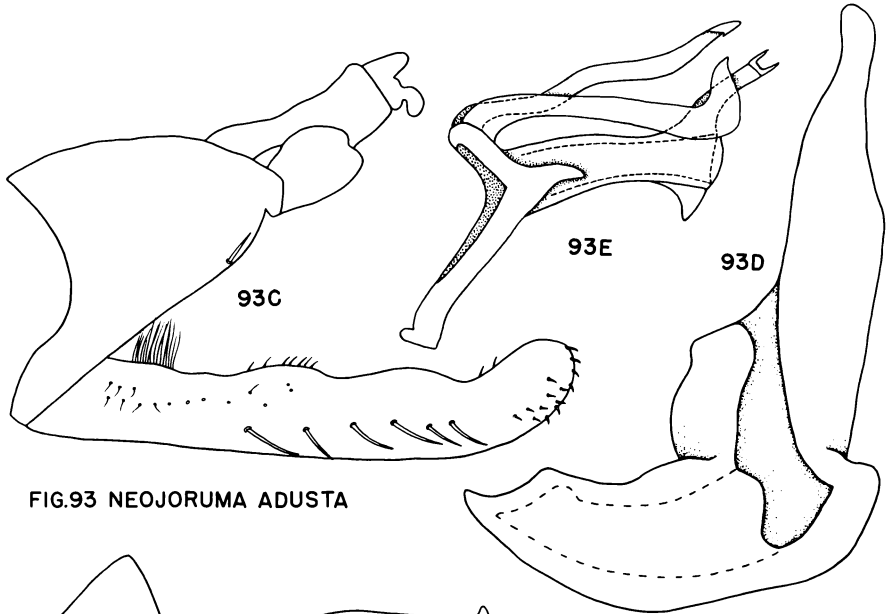


FIG.93 NEOJORUMA ADUSTA

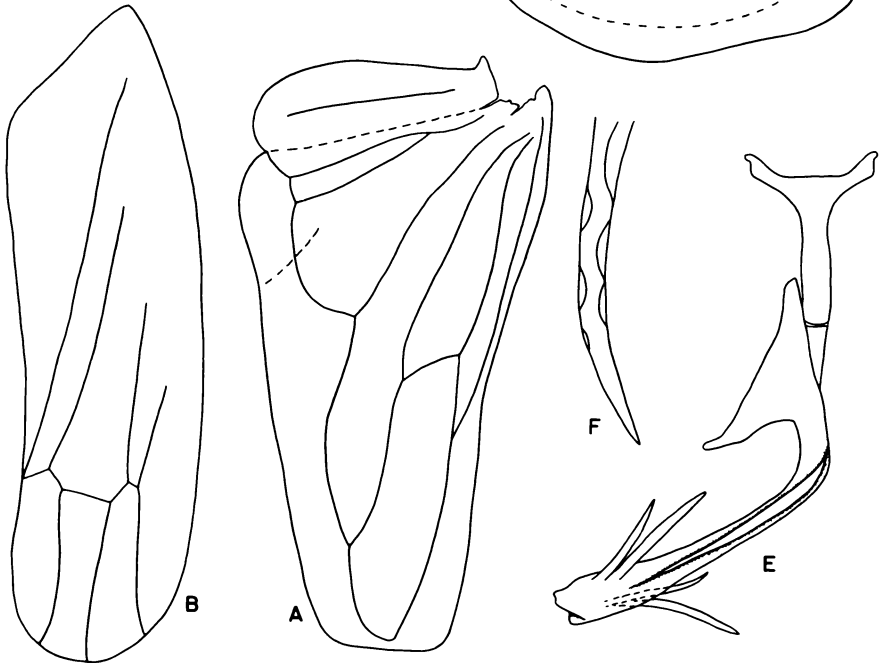


FIG.94 PAULOMANUS CECROPIAE

Plate 37

Fig. 95. Paulomanus cecropiae

C. Paratype, male genital capsule, lateral aspect (process not shown) (x150).

D. Holotype, right style, apical two-thirds, from Balsam mount, broad aspect (x429).

Fig. 96. Beamerella tropicalis

A. Hind wing (from type of Erythroneura similis, a synonym).

B. Fore wing, from same specimen as above.

C. Allotype, male genital capsule, lateral aspect (x100).

D. Allotype, right style, broad aspect (x429).

E. Allotype, aedeagus, lateral aspect (x150).

PLATE 37

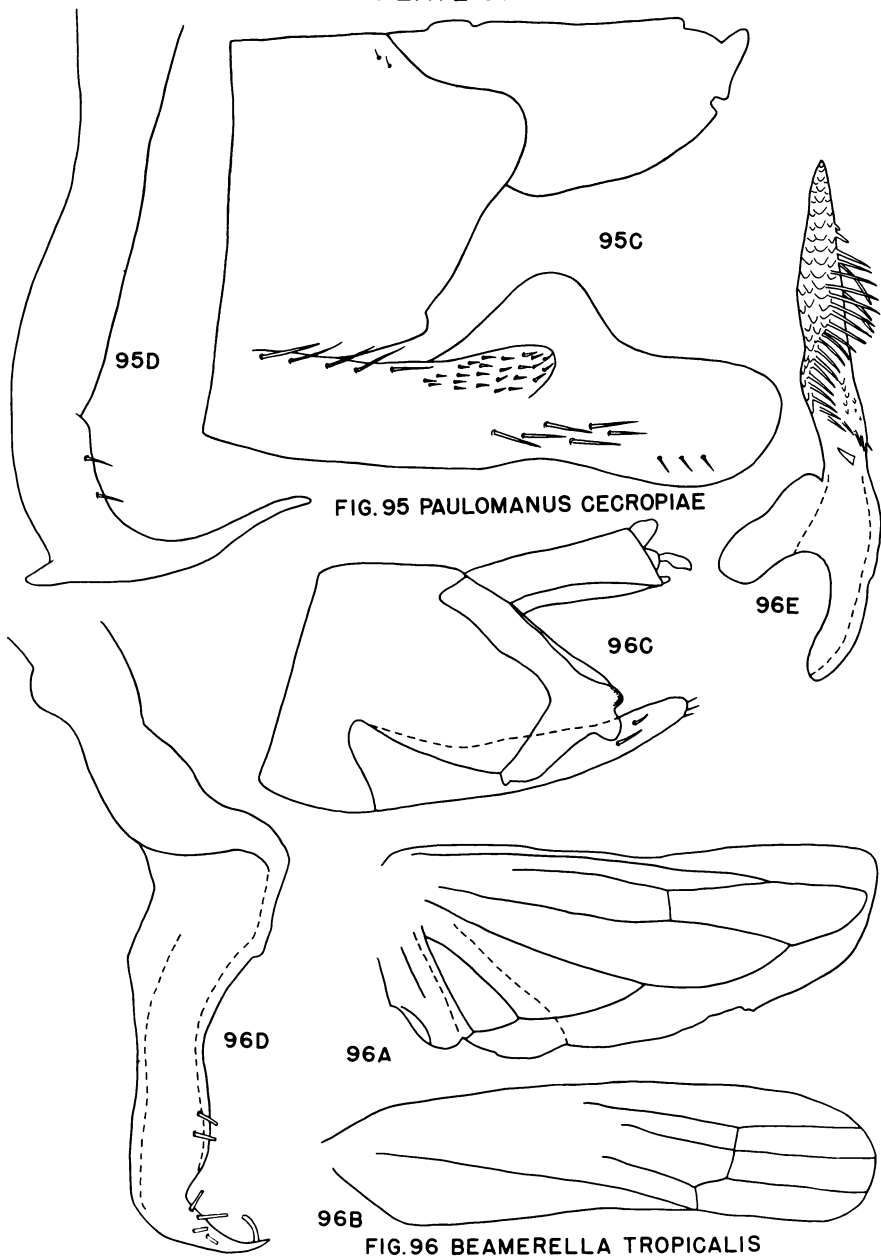


FIG. 95 PAULOMANUS CECROPIAE

FIG. 96 BEAMERELLA TROPICALIS

Plate 38

Fig. 97. Empoasca

- A. Empoasca fabae, hind wing.
- B. Empoasca fabae, fore wing.
- C. Empoasca fabae, male genital capsule, lateral aspect (x150).
- D. Empoasca fabae, right style, broad aspect (ventrolateral) (x429).
- E. Empoasca fabae, aedeagus, anterior aspect (x429).
- F. Empoasca fabae, right pygofer process, broad (ventral) aspect (x429).
- G. Empoasca confusa, fore wing.
- H. Empoasca smaragdula, right style apex, broad aspect (x429).

PLATE 38

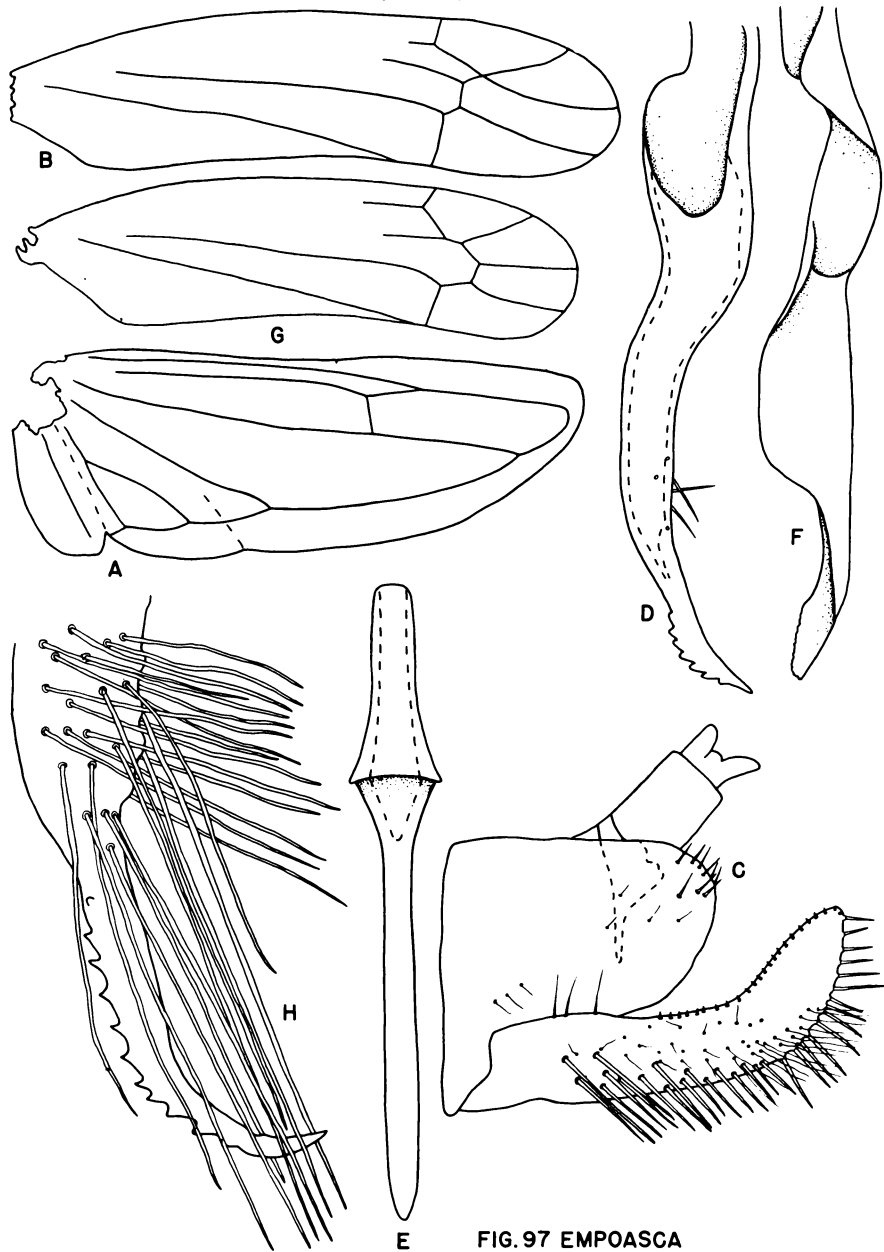


FIG. 97 EMPOASCA