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THE FULGORINA OF BARRO COLORADO AND OTHER PARTS OF PANAMA

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WITH TWENTY-THREE PLATES

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No. 5.—*The Fulgorina of Barro Colorado and Other Parts of Panama*

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In the summer of 1924 Mr. Nathan Banks, Curator of Insects of the Museum of Comparative Zoölogy of Harvard University spent some time collecting insects on Barro Colorado Island, Gatun Lake, Canal Zone. Among these was a large number of Fulgorids. These he turned over to me for study. At about the same time Mr. C. H. Curran, Assistant Curator of Insect Life of the American Museum of Natural History called my attention to a number of Fulgorids in their collections from Barro Colorado. Still later Mr. Paul Oman, Curator of Homoptera of the United States National Museum, separated the material in their collections from Barro Colorado and sent it to me for study. These three collections together with a considerable collection which I have from Central and South America formed the nucleus for a report which would supplement the reports of Distant and Fowler in the Biologia. I suggested this to Mr. Banks and he agreed to its publication.

CLASSIFICATION USED

In the present report I have used the general classification developed recently by Muir (1930c) and have supplemented this general classification with special works in more restricted groups especially the work of Melichar, Muir, Schmidt and Jacobi. I have tried as far as possible to identify the species included in the Biologia. I have, also, attempted in so far as material would permit to rehabilitate the genera established by Stål, and to modernize the descriptions. Whether I have been even partially successful in this, time alone can tell. Stål's descriptions and keys are concise, but are mostly without illustrations and whether we have always correctly translated and interpreted these descriptions is still another matter. The general illustrations in the Biologia are wonderful but the details and descriptions leave much to be desired. Color alone is not a very trustworthy taxonomic character, but I have done the best I could with the material available. This amounts almost to a revision of certain families like the Achilidae and Fulgoridae, where very little work has been done recently, and the new material has necessitated considerable revision in other families and especially in certain genera.

GENOTYPES

Again I have attempted to settle certain genotypes with the aid of the literature available. Certain matters in nomenclature can be settled by rule if we have all the facts before us. I have devoted more than twenty-five years to collecting and collating the literature dealing with the Homoptera. These years have taught me that it is practically impossible to collect and catalogue completely the literature dealing with even a small group of insects. However, I have developed a card catalogue of all the literature known to me. This now consists of about three-quarters of a million items. With it as a basis I have attempted to settle some controversial questions. Some of the dispositions I have made will require considerable readjustment of names, but not nearly as much as will be required eventually if present errors are perpetuated. None of the genotypes have been selected without the most painstaking care. However, I suffer from no delusions that I may have avoided all mistakes. In nomenclatorial work that seems to be practically impossible.

KEYS

I have introduced copious keys to subfamilies, tribes, genera and species, in an attempt to include as far as possible the forms that are known from Central America and contiguous areas. These keys have been used repeatedly on a large amount of material from the Americas. I have exhausted every effort to make them as clear cut and concise as possible. However, after all care is taken, the use of a key is largely a matter of interpretation. The worker must use all diligence in attempting to get the meaning which all language conveys so imperfectly.

ILLUSTRATIONS

The limitation of language has induced the author to use illustrations in all his taxonomic work. Illustrations, even those made with the utmost care, have their limitations. It is not possible to convey accurate ideas of tridimensional objects by means of flat drawings especially line drawings. But with all these limitations, carefully made illustrations tell more than many pages of printed matter, and for that reason I have used them extensively.

I am indebted to Mrs. Elizabeth Haben Kaston and Mr. George Horton for their painstaking efforts in this direction. Mrs. Kaston made most of the wash drawings and some of the outline drawings.

Mr. Horton made most of the outline drawings and has been especially industrious in working out the details of the complicated genitalia.

GENITALIA

The present study further confirms the writer's belief that the genitalia, especially the male genitalia, furnish the most reliable taxonomic and systematic characters. Eventually, I believe, that the phallic characters will take rank equal to, if not ahead of, chrotic characters in determining the taxonomic and systematic status of the Homoptera.

Fieber (1866b) was the first, I believe, to call attention to the value of the male genitalia in separating the various species of the family ARAEOPIDÆ (Delphacidæ). Much later Kirkaldy mentions the value of these characters for generic purposes, but apparently abandons the idea when he becomes involved in what he calls the "Delphax complex." Still later Muir lays great stress upon the value of phallic characters in establishing his classification of the families of the Fulgorids.

In the Fulgorina we have a group of primary species in which phallic characters have been developed to a high degree, while chrotic characters are not evident. In part this is due to the small size of the species and in part to the variable nature of the more obvious characters, such as arrangement of carinæ on the head and thorax, the comparative length and breadth of the forehead and crown and of the antennal segments and the tibial spines.

The placing of a species in the proper genus is, therefore, a task requiring the widest possible acquaintance with the genera of the world, a broad and comprehensive grasp of the extreme limits of these variable characters and the ability to assign true values to the characters from various regions of the body. The size of this task becomes apparent when we realize that there are 1217 known genera and 6521 species in the world. These insects have been collected and studied intensively only for Europe, North America north of Mexico, and the Hawaiian Islands. Rather extensive collecting has been done in portions of Central America, Cuba, South America, some of the South Pacific Islands, India and South Africa, while great areas of the world remain practically unexplored. We know perhaps one-third of the World fauna in this large group. Hence the necessity of laying as firm a foundation as possible. Any contribution, therefore, which will aid students in placing nearly related forms in the same genus is worthy of consideration. The necessity for proper care in placing species in the

correct genus is further emphasized when we observe that our present list shows 120 genera and 1050 species in synonymy in the family ARAEOPIDÆ. A part of this generic synonymy is *homosynonymy*, that is, two or more genera established for the same species. But a large part of it is *heterosynonymy*, that is, two or more genera established for species which subsequent writers believe should be placed in the same genus. Some of this *heterosynonymy* is true synonymy but much of it is false. While the unnecessary multiplication of genera and species has been much ridiculed, very little has been said about the reverse process, the unnecessary reduction to synonymy of valid genera and species. For example, a well known North American species of Fulgorina was selected recently as the type of a new genus. This genus was reduced subsequently to synonymy, being placed in a polyphyletic genus. Unfortunately, the polyphyletic genus in which it was placed belongs to a different subfamily. In the same way many of the genera in ARAEOPIDÆ proposed by Fieber in 1866 were subsequently reduced to synonymy by European workers only to be belatedly revived by Muir in 1915. Three hundred and twenty-nine of the specific synonyms noted above occur in the genus *Liburnia* Stål and three hundred and sixty-eight in the genus *Araeopus* Spinola (*Delphax* Fabricius) due to a process which we might call dumping. In the past, species with indefinite or obscure characters have been dumped first into *Delphax*, then into *Liburnia*. At the present time many species are dumped into *Delphacodes* Fieber, which contains two hundred and eighty-seven species. I have no more notion that this represents the final resting place of all of these two hundred and eighty-seven species than that the genus *Cicada* proposed by Linnaeus in 1758 represented the real classification of the forty-two species proposed at that time and which we place today in the families *sensus strictus* Fulgoridæ, Membracidæ, Cicadidæ, Cercopidæ, Cixiidæ, Flatidæ and Cicadellidæ.

TERMS USED

Most of the terms used are standard and have been used for many years. Throughout the present paper I have used the term crown instead of vertex to refer to the dorsal part of the head between the eyes. I have also used the term forehead to refer to that area of the head usually referred to as frons.

I propose to use these terms for these areas until the true morphological relations of the Homopterous head can be worked out.

Key to the Families of the FULGOROIDEA

(Modified from Muir)

A. Antennal flagellum segmented. Lateral ocelli not outside the lateral carinæ of forehead ..... TETTIGOMETRIDÆ

AA. Antennal flagellum not segmented. Lateral ocelli outside the lateral carinæ of forehead, generally beneath the eyes.

B. Second tarsi of hind leg not very small, the apex with a row of small spines, truncate or emarginate. Without a costal area or with only a small one without cross-veins.

C. One or both claval veins granulate, the apical joint of labium much longer than wide. The abdomen laterally compressed; the sixth, seventh, and eighth abdominal tergites bearing wax-secreting pores ..... MEENOPLIDÆ

CC. Claval veins not granulate, or, if so, then the apical segment of labium short, as wide as long *1*

1. The sixth, seventh, and eighth abdominal tergites bearing wax-secreting pores ..... KINNARIDÆ

1. The sixth, seventh, and eighth abdominal tergites not bearing wax-pores *2*

2. Anal area of hind wings reticulate, many cross-veins FULGORIDÆ

2. Anal area of hind wing not reticulate *3*

3. Apical segment of labium short, about as wide as long DERBIDÆ

3. Apical segment of labium long, distinctly longer than wide *4*

4. Claval vein entering the apex of clavus *5*

4. Claval veins not reaching to the apex of clavus, entering commissure before apex *6*

5. Base of abdomen with one or two short appendages bearing depressions. Laterally compressed forms; tegminae tectiform, the membrane not overlapping. . . . ACHILIXIIDÆ

5. Base of abdomen without such developments. Mostly horizontally flattened forms; the membranes beyond clavus overlapping ..... ACHILIDÆ

6. Hind tibia with a mobile spur at the apex . . ARAEOPIDÆ

6. Hind tibia without a mobile spur *7*

7. Head prolonged in front, sometimes greatly so, or if not, then forehead with two or three carinæ, or the tegulæ absent and claval suture obscure. Always without median ocellus ..... DICTYOPHARIDÆ

7. Head not prolonged in front or only moderately so, the forehead with only a median carina or none, excluding

lateral margin. Tegulae present and claval suture distinct. The median ocellus often present.....CIXIIDÆ

BB. Second hind tarsi small or very small, the apex without spines or with only one at each side; the apex generally rounded or pointed. Costal area absent or present.

C. Second hind tarsus with a spine on each side, the apex rounded or bluntly pointed. Claval vein nearly always ending in apex of clavus.....*1*

1. The posterior angle of mesonotum restricted off by a groove or fine line.....TROPIDUCHIDÆ

1. Posterior angle of mesonotum not so restricted off. Hind basitarsus generally short or very short.....*2*

2. With a cross-veined costal area, but without granules on clavus and nearly always with lateral carinae on clypeus NOGODINIDÆ

2. Without a cross-veined costal area, or, if with such, then the clavus granulate or the clypeus without lateral carinæ.....*3*

3. With a cross-veined costal area and the clavus granulate or the base of costa strongly curved.....FLATIDÆ

3. Clavus not granulate and base of costa not strongly curved.....*4*

4. Tegminæ large, steeply tectiform; hind tibiæ without spines on the sides; no costal area....ACANALONIIDÆ

4. Tegminæ not so large and generally not so steeply tectiform; hind tibiae generally with one or more spines on the side. Pronotum short, especially behind the eyes. Costal area generally absent or obscure.....ISSIDÆ

CC. Second hind tarsus small, with the apex rounded or bluntly pointed, without any spines.....*1*

1. Tegminæ wide on apical margin, steeply tectiform, with a cross-veined costal area; clavus long. Head as wide, or nearly as wide, as the thorax. Hind basitarsus short or fairly short.....RICANIIDÆ

1. Tegminæ not so wide on apical margin nor so steeply tectiform, or the head is distinctly narrower than thorax; clavus not so long.....*2*

2. Forehead seldom so wide as long and often with the lateral margins not angular, nearly always with one to three longitudinal carinæ, and the clypeus generally having lateral carinæ.....LOPHOPIDÆ

2. Forehead wider than long, sides angular; no lateral carinæ on clypeus and no longitudinal carinæ on forehead or only a very obscure one.....EURYBRACHYDIDÆ

Family CIXIIDAE

The head in this family is usually not much modified; the forehead is large and the clypeus relatively small; the third or median ocellus is usually present; the antennae are usually small with the first segment short, more or less concealed by the larger globose second segment; the pronotum is usually short; the mesonotum large, tegulae present; tegminae usually transparent or translucent, nodal cell conspicuous; legs slender, hind tibiae with or without lateral spines; ovipositor complete or incomplete in which case the pygofer is broad and flat.

Key to the American Genera of CIXIIDAE

(Modified from Muir)

A. Antennae in front of eyes, sunk into pits; with a distinct subantennal process. (Subfamily BOTHRIOCERINÆ) ..... *Bothriocera* Burm.

AA. Antennae below eyes, not sunk into pits; no subantennal process. (Subfamily CIXIINÆ).

B. Fourth and fifth abdominal segments with abdominal processes. (Tribe BENNINI) ..... *Bennarella* Muir 1930b: 12

BB. Abdominal segments without processes.

C. Ovipositor complete, female pygofer robust. Body compressed; tegminæ steeply tectiform. (Tribe PINTALIINI) *1*

1. Tegminæ opaque ..... *Cubana* Uhler 1895a: 62

1. Tegminæ transparent ..... *Pintalia* Stål

CC. Ovipositor incomplete, female pygofer flat often with waxy filaments. Body not greatly compressed, tegminæ usually not steeply tectiform. (Tribe CIXIINI) *1*

1. Media arising from basal cell or from base of subcostal-radial stalk but not forming a common stalk with them. (Subtribe CIXIINA) *2*

1. Media arising from the subcostal-radial stalk. (Subtribe MYNDINA *8*

2. First medial sector long, second medial sector very short ..... *Mnemosyne* Stål 1866a: 150

2. First medial sector only as long as or shorter than second medial sector *3*

3. Mesonotum with five carinæ *4*

3. With never more than three carinæ on the mesonotum *5*

4. Two transverse carinæ between crown and forehead often forming apical foveæ ..... *Oliarus* Stål

4. Only a single transverse carina between crown and forehead ..... *Hyalesthes* Signoret 1865a: 128

5. Never more than one carina between crown and forehead *6*
5. With two transverse carinæ between crown and forehead ..... *Cixius* Latreille 1804a: 310
6. Crown much wider than long *7*
6. Crown longer than wide ..... *Muirolonia* Metcalf
7. Forehead concave, with a median frontal carina ..... *Bothriocerodes* Fowler 1904a: 84
7. Basal half of forehead convex, apical half concave, no median frontal carina ..... *Sevia* Stål 1866a: 81
8. Mesonotum with five carinæ; crown trough-like ..... *Oecleus* Stål
8. Mesonotum with three carinæ *9*
9. Body compressed, tegminæ steeply tectiform ..... *Southia* Kirkaldy 1904c: 279 (*Paulia* Stål 1869a: 94)
9. Body not compressed, tegminæ not steeply tectiform .. *10*
10. Crown produced in front of eyes as long as pro- and mesonotum together *11*
10. Crown not greatly produced, shorter than pro- and mesonotum together *12*
11. Forehead with a median longitudinal carina ..... *Antillixius* Myers 1928i: 16
11. Forehead without a median longitudinal carina ..... *Rhamphixius* Fowler 1904a: 81
12. Forehead broader than long *13*
12. Forehead longer than broad *14*
13. Crown short, transverse, about four times as broad as long ..... *Monorachis* Uhler 1901a: 509
13. Crown more elongate about one and one-half times as broad as long ..... *Microledrida* Fowler 1904b: 99
14. With a median frontal carina *15*
14. Without a median frontal carina *16*
15. With two transverse carinæ between crown and forehead. *Myndus* Stål 1862a: 307
15. With a single carina between crown and forehead ..... *Nymphocixia* Van Duzee 1923a: 189
16. Crown broader than long .. *Pachyntheisa* Fowler 1904b: 99
16. Crown longer than broad *17*
17. Crown with a median carina ..... *Platycixius* Van Duzee 1914a: 37
17. Crown without a median carina ..... *Micrixia* Fowler 1904b: 100

Subfamily BOTHRIOCERINÆ

In this subfamily the head is much modified, the antennæ are sunk in pits or are provided with subantennal processes or ledges which are sometimes laminate and strongly produced.

Tribe BOTHRIOCERINI

In this tribe the head is peculiarly twisted, the ventral sinus of the compound eyes is directed more or less anteriorly and the antennæ lie in distinct pits anterior to the sinuses; the tegminæ are broad and the first cubital sector is deeply forked; the ovipositor is complete.

There is but a single known genus in this tribe with numerous species from North, Central and South America and the West Indies.

Bothriocera Burm.

(Burmeister 1835a: 156)

Haplotype *Bothriocera tinealis* Burmeister.

This very distinct genus may be recognized readily by the peculiar twisted head with the antennæ anterior to the eyes instead of ventral to them. The antennæ are also sunk into pits. The crown is short. The pronotum very short. The tegulæ and mesonotum are very large, the latter being tricarinate. The tegminæ are rather broad. Sc and R are united for some distance; there is a distinct stigmatal area; R is three-branched and M five-branched; cubital sector is deeply forked.

About a dozen species have been described from North, Central and South America. An examination of drawings of the types of *bicornis* Fabricius and *undata* Fabricius would indicate that there is considerable confusion in the various species. The species called *venosa* by Fowler (1904a: Plate IX, Figs. 14, 14a) is apparently *undata* Fabricius; *bicornis* Metcalf (1923a: 162; Plate 44, Fig. 84) is apparently *signoreti* Stål; *tinealis westwoodi* of Fowler (1904a: 82; Plate IX, Fig. 12) seems to be *westwoodi* Stål a valid species. *Signoreti* as identified by Fowler and Metcalf seems to be correct. *Undata* as identified by Metcalf seems to be correct. *Drakei* Metcalf, including *tinealis floridana* Dozier and *bicornis* Dozier seems to be a good species, as well as the following species described by Fowler: *albidipennis*, *excelsa* and *nigra*.

I have not seen males of all the species but the following key based on color of tegminæ is suggested as a means of stabilizing our nomen-

clature until the structural characters and especially the male genitalia may be correlated with the color characters.

Key to the Species of BOTHRIOCERA *Burmeister*

A. Tegminæ heavily marked with fuscous or black, often with pale or transparent spots.
  B. Tegminæ with conspicuous transparent spots.
    C. Clavus heavily marked with fuscous *1*
      1. With fuscous spots in the transparent apical cells *2*
      1. Apical cells not marked with a regular row of fuscous spots *6*
      2. With a single row of fuscous spots in the apical cells *3*
      2. With two rows of fuscous spots in the apical cells ..... *parvula* Fabricius 1798a: 521 (Stål 1869a: 93) (Brazil)
      3. Transparent pale spot on the base of tegminæ remote from the costal border ..... *tinealis* Burmeister (Brazil, Central America, West Indies, Southern United States)
      3. Basal transparent spot reaching costal margin *4*
      4. Basal costal spot narrowed to costal margin ..... *bicornis* Fabricius (Southern United States to Brazil)
      4. Basal costal spot not narrowed to the costal margin *5*
      5. Clavus entirely fuscous, tegminæ largely fuscous, basal spot and apical border transparent ..... *basalis* Metcalf (Central America)
      5. Clavus largely transparent, tegminæ largely transparent *westwoodi* Stål (Southern United States, Mexico, Central America)
      6. Clavus entirely fuscous ..... *signoreti* Stål 1864a: 50
      6. Clavus marked with transparent and fuscous ..... *excelsa* Fowler 1904a: 83 (Mexico)
    CC. Clavus transparent, not heavily marked with fuscous ..... *drakei* Metcalf 1923a: 179 (Florida)
  BB. Entire tegminæ black or fuscous . *nigra* Fowler 1904a: 84 (Mexico)
AA. Tegminæ transparent or very sparsely marked with fuscous.
  B. With an irregular fuscous fascia from stigmatal spot to apex of clavus ..... *undata* Fabricius 1803a:101 (Stål 1869a: 93) (Southern States, West Indies)
  BB. Tegminæ not transversely banded.
    C. Median tooth of male pygofer triangular, acute ..... *albidipennis* Fowler (Mexico)
    CC. Median tooth of male pygofer short, blunt ..... *pellucida* Fowler (Mexico)

Bothriocera bicornis Fab.

Plates XV, XVII

Fabricius 1803a: 101, Stål 1869a: 93.

This species may be distinguished from other species known to me by the fuscous tegminae with clavus almost entirely fuscous; the base of the corium irregularly spotted with pale testaceous, typically there is a small spot at the extreme base; a large irregular spot on the basal area extending from costal margin to claval suture, this spot narrows abruptly to the costal margin and widens out toward the claval suture; a short narrow diagonal streak at middle of costal margin; and internal to this streak there is a very small pale spot; the apex of the wing is pale with the veins narrowly fuscous and a regular row of fuscous submarginal spots.

The genitalia are quite distinct; the genital styles are robust widely separated basad, contiguous apically, with the apical margin oblique and sinuate, viewed laterally the dorsal apical margin is strongly produced forming elongate obtuse angles; the aedeagus is complex and the flagellum is elongate tubular.

In the present collection there is a considerable series from Barro Colorado, July and August 1924, N. B. and July 1929, C. H. C.

Bothriocera albidipennis Fowl.

Fowler 1904a: 84.

There is a single female specimen from Mount Hope, Canal Zone, that I place here. Although it is paler than typical *albidipennis* with the mesonotum and abdomen orange testaceous instead of black, the tegminæ do not overlap as much as Fowler indicates for his species. The head, however, is broad and bears the typical markings of *albidipennis* and until the male genitalia can be examined it may be placed here.

Bothriocera pellucida Fowl.

Fowler 1904a: 83.

There is a single female specimen from Barro Colorado, July 24, N. B. which seems to agree more closely with this species than any other. The tegminae are largely translucent with a large stigmatal spot and the clavus fairly heavily marked with fuscous.

Bothriocera tinealis Burm.

Plate XVII

Burmeister 1835a: 156.

I cannot be sure of this species as Burmeister's description is brief and does not quite agree with Fowler's illustration. There is, however, a single male from Barro Colorado, 20 July 1924, N. B., which resembles Fowler's illustration somewhat and more nearly fits Burmeister's description. The coloration of the tegminae resembles *bicornis* with the following differences: the transparent spot on the basal area is remote from the costal margin and invades the clavus; the subapical fuscous area has three distinct nearly circular transparent spots. These differences in color could not be considered specific if they were not coupled with very marked differences in genitalia. The genital styles are elongate, slender at the base broadly expanded apically and contiguous on their median margins for more than half their length; extending beyond apex of pygofer when viewed laterally they are short robust with the dorsal margin truncate. The aedeagus is relatively simple and the flagellum is serrate. The anal segment is strongly produced ventrally.

Bothriocera westwoodi Stål

Plate XVII

Stål 1856b: 163.

I am not sure whether I have correctly identified this species or not. Stål's description is brief and Fowler's illustration does not agree in all respects. However, there are three specimens in the present collection, Canal Zone, Mt. Hope, 8 July 1924, N. B., which agree closely enough. And in order to avoid further confusion I have decided to use this name for these specimens until the types can be studied. In general the tegminae have the same picture as found in *bicornis* and *tinealis*, the transparent areas are larger, the boundaries between the transparent areas and fuscous areas are much less definite, the subapical row of fuscous spots is somewhat large and less definite but not as much so as shown in Fowler's figure. The genitalia, however, are entirely different. The pygofer is short and robust. The genital styles are robust with the apices suddenly bent dorsad and ending in an obtuse tooth.

BOTHRIOCERA BASALIS spec. nov.

Plates XV, XVII

This species belongs to what I call the *bicornis-tinealis-westwoodi* group of species with a large basal transparent spot and with the apical area transparent with a single row of fuscous dots in the cells.

The crown, forehead, and legs are testaceous yellow. The pro- and mesonotum are blackish fuscous. The tegminae are largely fuscous. There is a large basal transparent spot which extends from the costal margin to the claval suture and apically almost to the nodal cell. There is a small elongate spot on the costal margin beyond the nodal cell and the apical margin is broadly transparent. The fuscous spots in the apical cells are rather faint.

The genitalia resemble *tinealis* somewhat, but the genital styles are shorter, shorter than the pygofer, and the outer apical angles are produced into a blunt tooth. The dorsal margin is very short and the anal segment is not much produced.

Length to apex of tegmina 4.3 mm.

Holotype, male, Canal Zone, 1 Jan. 1929, C. H. C.

Allotype, female, Barro Colorado, 18 July 1924, N. B.

Paratypes, one female, Barro Colorado, 18 July 1924, N. B., one female, Barro Colorado, 15 July 1924, N. B., one female Canal Zone, 16 Jan. 1929, C. H. C., one female, Canal Zone, 21 Jan. 1929, C. H. C.

Tribe STENOPHLEPSINI

This tribe may be distinguished by the following characters: sinus of the compound eyes ventral; cheeks with a subantennal process; venation sometimes reduced. There are at least four genera in this tribe, the species range from the Oriental Region through the East Indies to New Guinea, the Solomon Islands and Australia.

Subfamily CIXIINÆ

In this subfamily the head is simple; the sinus of the compound eyes is ventral, subantennal processes are wanting; venation relatively simple; ovipositor often incomplete. About eighty genera are known from all parts of the world.

Tribe BENNINI

In this tribe the tegminae are steeply tectiform and the fourth and fifth abdominal segments are provided with processes suggestive of

those found in ACHILIXIIDAE, but the other characters are those found in the family CIXIIDAE. No species of this tribe have been found in Central America.

Tribe PINTALIINI

In this tribe the tegminae are usually steeply tectiform, with the body more or less compressed and the female pygofer is broadly inflated. As Muir suggests (1923f: 222) this may not be a valid character but it holds for all the genera which I have examined from various regions of the world.

PINTALIA Stål

(Stål 1862e: 4)

Logotype *Pintalia lateralis* Stål, Muir 1925a: 103.

Apparently this genus has been described no less than four times. (*Cotyleceps* Uhler 1895a: 63, *Ciocixius* Metcalf 1923a: 183, *Metabrixia* Fowler 1904b: 86). The genus is composed of about 20 species which have a fairly wide range from Southeastern United States, as far north as Virginia; through Mexico, Central America and Brazil, as far south as Rio de Janeiro. The genus may be briefly characterized as follows: the vertex is separated from the frons by two slightly arcuate transverse carinae which are nearly parallel to each other and are not contiguous on the median line as in some of our common genera; mesonotum tricarinate; tegminae steeply tectiform with radius 3-branched and media 5-branched, first medial sector branched at about the same distance from apical margin as second medial sector; the pygofer of the female is fairly robust; the male pygofer is deeply incised posteriorly with a distinct median tooth at the bottom of the incision, the genital plates are broadly expanded apically with slender basal petioles.

The following purely tentative key based largely on incomplete descriptions of some of the South American forms may aid in the identification of the species concerned.

Key to the Species of the Genus PINTALIA *Stål*

A. Posterior tibiæ armed with one or more conspicuous spines.
  B. Posterior tibiæ armed with a single spine only.
    C. Median frontal carina distinct, percurrent.....*1*
      1. Frons about half again as long as broad. Veins of tegminæ not granulate.....*fraterna* Stål 1862e: 4 (Brazil)
      1. Frons about one-third longer than broad. Veins of tegminæ granulate.....*consobrina* Stål 1862e: 5 (Brazil)

CC. Median frontal carina evanescent towards the apex. . . . . *proxima* Stål 1862e: 5

BB. Posterior tibiæ armed with more than one spine.

C. Posterior tibiæ with five spines. . . . . *aspersa* Fowler 1904b: 87 (Mexico, Costa Rica)

CC. Posterior tibiæ with three spines. *1*

1. Lateral margins of the frons strongly elevated. General color pale testaceous. . . . . *lateralis* Stål 1862e: 4 (Brazil)

1. Lateral margins of the frons scarcely elevated. General color blackish. . . . . *fasciatipennis* Stål 1862e: 4 (Brazil)

CCC. Posterior tibiæ with two spines. *1*

1. A mid dorsal pale stripe extending to the apex of clavus; anal segment not elongate. . . . . *delicata* Fowler 1904b: 86 (Virginia, North and South Carolina, Florida, Mississippi, Texas, Mexico)

1. No mid dorsal pale stripe; anal segment of the male greatly elongate. . . . . *erecta* Metcalf (Panama)

AA. Posterior tibiæ unarmed, or spines inconspicuous.

B. Median carina of forehead obsolete. . . . . *obscuripennis* Stål 1862e: 4 (Brazil)

BB. Median carina of forehead distinct, percurrent.

C. Veins of tegminæ finely but distinctly granulate. *1*

1. General color pale. Male genital styles short, broadened apically. . . . . *germana* Fowler (Mexico, Costa Rica)

1. General color fuscous. Male genital styles elongate, slender. *2*

2. Apical half of the tegminæ with three distinct fasciæ. . . . . *tacta* Fowler (Mexico)

2. Apical half of the tegminæ not fasciate. . . . . *fusca* Metcalf (Panama)

CC. Veins of corium not granulate. *1*

1. Crown not produced in front of eyes. Brazilian species. . . *2*

1. Crown produced in front of eyes. Central American species *maculata* Fowler (Guatemala)

2. Frons twice as long as broad. *inornata* Stål 1862e: 4 (Brazil)

2. Frons one and one-half times as long as broad. . . . . *ustulata* Stål 1862e: 5 (Brazil)

Pintalia germana Fowl.

Plates I, IV, XVII

Fowler 1904b: 87.

This species is to be distinguished by its pale colors. The body generally testaceous yellow, eyes dark brown and one or more fuscous spots on the side of the head above the eyes. The tegminae are milky

sub-hyaline with a testaceous yellow tinge; the stigma is fuscous with one or two fuscous spots on the costal margin anteriorly and an irregular row of rather indistinct spots across the corium and clavus. The veins of the tegminae are faintly granulate and the hind tibiae are without spines on the sides. The frons is elongate, nearly twice as long as its greatest width; the median carina is percurrent; and the lateral margins are strongly elevated. The lateral margins of the crown are not strongly elevated.

Four males, and four females from Barro Colorado, July 13, N. B.

Pintalia tacta Fowl.

Plates I, IV

Fowler 1904b: 88.

There are two females identified as this species. It is a small dark colored species, with the general color yellowish brown; the tegminae dark heavily marked with fuscous fasciae; one from the basal cell diagonally across the clavus, a second narrow broken one across the corium half way to the stigma, a broad one before and two behind the stigma. The forehead is rather broad, the median carina percurrent. Hind tibiae without spines. Veins of the tegmina granulate.

Pintalia maculata Fowl.

Fowler 1904b: 88.

This species bears a general resemblance to *tacta* Fowler but is somewhat larger and the markings on the tegminae are much more irregular. The lateral margins of the crown are more elevated. The frons is distinctly narrow between the eyes broader below and then suddenly narrowed to the clypeal margin.

Pintalia fusca spec. nov.

Plate XVII

In general structure like *germana* Fowler but male genitalia very distinct. In general color like *tacta* Fowler but the markings not distinct, but with the veins of the tegmina distinctly granulate.

Crown projecting in front of eyes; lateral margins strongly elevated; transverse carina distinct. Forehead narrow elongate, but little

widened below the antennae; median carina percurrent; lateral margins strongly elevated. Antennae short and robust. Ocelli distinct. Pronotum rather elongate for this genus. Mesonotum large; median carina indistinct. Tegminae with stigma narrow elongate; radius four-branched; media five branched.

Male genitalia: Pygofer deeply and broadly incised posteriorly; median tooth short triangular; genital styles elongate, slender, with a quadrate tooth on the median margin near the base, the apices slender terete and converging.

General color of body and tegmina yellowish fuscous with the tegmina clouded with darker fuscous along the costal margin and apical area.

Length to apex of tegminae 6.2 mm.

Holotype male, Barro Colorado, July 19, 1924, N. B.

Allotype female, Barro Colorado, July 20, 1924, N. B.

Paratypes one male and seven females, various days in July 1924, N. B.

PINTALIA ERECTA spec. nov.

Plate XXIII

This is a uniform tawny species with the tegminae irregularly marked with fuscous. The male genitalia are distinct; the anal segment is produced ventrally into a long spatulate process.

Length to apex of tegminae 6.5 mm.

Holotype male, Barro Colorado, July 1923, R. C. Shannon. In National Museum Collection.

Tribe CIXIINI

In this tribe the body is not usually compressed; the tegminæ are not usually steeply tectiform; the ovipositor is not complete and the pygofer is broad and flat. This tribe may be readily divided into two subtribes; CIXIINA with media arising from the basal cell, and MYNDINA with media arising from the subcostal-radial stem.

Subtribe MYNDINA

This name is proposed for that group of genera including *Oecleus* Stål, *Myndus* Stål and many others in which subcosta, radius, and media form a common stalk from the basal cell.

Oecleus Stål

(Stål 1862a: 306)

Logotype *Oecleus seminiger* Stål, Oshanin 1912a: 117.

This genus may be recognized by its narrow trough-like vertex, quinque-carinate mesonotum and transparent wings with characteristic venation; radius short, branches of media short making elongate basal cells, short and fairly broad subapical and small apical cells.

Oecleus concinnus Fowl.

Plate IV

Fowler 1904b: 91.

There is a single female specimen from Las Sanas, Panama, July 7, 1924, N. B., in this collection which we place in this species with some hesitation. It has the general coloration of *O. addendus* Fowler but the crown projects distinctly in front of eyes and is not so narrow as in *addendus*. It may be placed here until males can be examined to determine its true location.

Subtribe CIXIINA

This subtribe is proposed for that group of genera including *Cixius* Latreille, *Mnemosyne* Stål, *Oliarus* Stål, and others which have media arising from the basal cell.

Muirolonia nom. nov.

For *Olonia* Muir 1925 (Cixiidæ) [nec *Olonia* Stål 1862 (Eurybrachydidæ)]. Orthotype *Bothriocerodes metallicus* Fowler.

This is a very distinct genus with only a single species. It gives me great pleasure to dedicate it to the late Fredrick Muir who has done so much to advance the study of the Fulgorina of the world.

Muirolonia metallicus Fowl.

Plates I, IV, XVII

Fowler 1904b: 85.

This interesting species was described by Fowler from Panama. We have a series of four females, Barro Colorado, July 20, 1924, N. B. The general color is metallic bluish black with the lateral margins of

the frons below, and the legs testaceous yellow, the abdominal segments are margined with red or yellow. Fowler says that this species differs from the other species but does not specify what the differences are. In the specimens before me the forehead is not as elongate as in *Bothriocerodes castaneus*, the clypeus more elongate, the median carina well elevated on forehead and crown branching near base, the forks of the carina combined on the lateral margins of the crown which is more elevated than Fowler shows in his figure. One of the specimens has the tegmina densely clothed with pale golden hairs. The ovipositors are extremely long, as long as or longer than the basal segments of the abdomen with the sheaths about twice as long as pygofers. The other characters may be observed in the illustrations.

Mnemosyne Stål

(Stål 1866c: 391)

Haplotype *Mnemosyne cubana* Stål.

This genus includes some eleven species at the present time, one from Cuba, one from Central and South America, three from Africa and six from India and the East Indies, athough the location of the African and Oriental species in this genus is doubtful.

The species of this genus resemble in general appearances a large *Oliarus*. They may be recognized readily by the tricarinate mesonotum, typical venation, and the series of fuscous granules in longitudinal rows on the apical and subapical cells.

Mnemosyne planiceps Fabr.

Plates XV, XVII

Fabricius 1803a: 48, Stål 1869a: 91.

Fowler makes *M. cubana* Stål (from Cuba) synonymous with this species but this is certainly incorrect. Typical specimens from Cuba are distinct in general structure, male genitalia, and color.

There is quite a series from Barro Colorado which agrees in general with Stål's description from the type. This species would seem to have a fairly wide range from Panama and British Guiana into South America.

Although the color is very variable, the male genitalia are quite distinctive.

Oliarus Stål

(Stål 1862a: 306)

Logotype *Oliarus walkeri* Stål, Distant 1906i: 256.

This is a world wide complex of nearly 300 species. Ball has recently revised the species from North America. His key to species is based largely on female color characters. In the species known to us this character is not reliable.

Male genitalia are reliable criteria but unfortunately real correlation of the sexes is not always possible. Until this is more carefully done we shall not accept the synonyms recently proposed.

Oliarus excelsus Fowl.

Plate IV

Fowler 1904b: 92.

We have a single female, Barro Colorado, June 23, N. B. which we place here with some hesitation. It has a single interrupted band before the middle of corium and some scattered fuscous markings on apex of tegminae, thus agreeing very well with Fowler's figure but the general color is paler and the face is entirely testaceous. Otherwise especially in the narrow vertex, the specimen agrees very well.

Oliarus omani spec. nov.

Plates IV, XVII

This is a very large species with a very narrow crown, with the forehead much narrowed between the eyes, the tegminae impunctate and distinctive genitalia.

Crown narrow, deeply impressed, its length three times its basal width; apical fovea deep, about twice as long as wide; face diamond shaped, more than twice as long as wide, the lateral margins strongly reflexed, median carina percurrent, distinct; clypeal suture indistinct; median ocellus evident. Antennae very short. Pronotum short, flaring, posterior margin deeply incised, the lateral carinae bordering the eyes. Mesonotum broad; the intermediate carinae complete. Tegminæ narrow; stem of subcosta and radius long; stigma large; media three plus four about five times as long as media one plus two. Hind tibiæ with two stout spines on the middle third. Male genitalia distinctive;

median tooth of pygofer simple, triangular, short about as long as its basal width.

General body color ochraceous tawny, ochraceous buff on the pronotum and the face, with blackish fuscous markings as follows: A median stripe on the crown; an irregular spot either side of the median carina of the face, at the level of the median ocellus; the sides of the labrum; the median area of the mesonotum between the intermediate carinæ; a longitudinal stripe laterad of the lateral carinæ; and the lateral areas of the abdominal segments ventrally. The legs are ochraceous tawny with the femora and tibiæ mostly fuscous. The tegminæ are transparent, shiny, without markings save the blackish stigma which is broadly ochraceous anteriorly, the three cross veins in the median area before the apex and the apical margin which is broadly clouded with fuscous.

Length to apex of tegmina, male, 11.5 mm.; female, 12.5 mm.

Holotype, male, Panama, May 2, 1911, August Busck.

Allotype, female, Panama, May 2, 1911, August Busck.

Paratypes, four males and four females, same locality.

This is the largest American *Oliarus* known to me, suggesting *Mnemosyne* Stål. I take pleasure in naming it for Mr. Paul Oman, curator of Homoptera in the United States National Museum, who has sent me many interesting Fulgoridæ from the National Museum collections.

Oliarus concinnulus Fowl.

Plate IV

Fowler 1904b: 92.

There is a single small female in the present collection, Barro Colorado, June 23, 1924, N. B., that we place here. It has milky hyaline tegminæ with black veins, and a somewhat narrower crown than Fowler shows in his illustration, but without a male I cannot place it more exactly.

Family ARAEOPIDÆ

(Family *Delphacidæ*)

The generic name *Delphax* Fabricius 1798a: 511 is preoccupied by *Delphax* Walbaum 1792 (Mammalia). The next available name is *Araeopus* Spinola 1839, which will replace *Delphax* Fabricius and the family name will be ARAEOPIDÆ.

The members of this family are all small or minute insects. They are represented in the present collections by a very few specimens, most of which are exceedingly interesting, indicating that much more extended collections should be made especially in tropical America. This family may be recognized by the presence of a peculiar spine or calcar between the basitarsi and tibiæ of the hind legs. This was originally shaped like a typical spine no doubt, but has been variously modified in the different genera. The function of the calcar is not known. Most of the specimens in the present collections are females and specific determinations can be made only by the examination of the male genitalia. Nevertheless I have attempted, with the aid of the figures in the Biologia, to place these females and given such notes as seem to me pertinent in each case.

Subfamily ASIRACINÆ

In this subfamily the calcar is subulate, awl-like or spinous either circular in outline or not.

Eucanyra Crawf.

(Crawford 1914a: 568)

Orthotype *Eucanyra stigmata* Crawford.

This genus belongs to that group of genera of the subfamily ASIRACINÆ which have a quinquecarinate mesonotum; elongate antennæ, with the first and second segments subequal; and a single median facial carina. This group includes the genera *Canyra* Stål 1862e: 7, *Eucanyra* Crawford 1914a: 568, *Epibidis* Fowler 1905a: 131, and possibly *Ugyops* Guerin-Meneville 1834a: 477. Although no one has made a thorough study of the genus *Ugyops* in modern times an examination of the genitalia and other morphological characters and geographic distribution would seem to indicate that the genus is a composite of several divergent elements. Apparently every species with elongate antennæ and subulate calcar has been included in the genus *Ugyops*. Some of these forms have a single median facial carina either forked or not, while others have two carinæ on the face. Some species have the first segment of the antennæ as long as the second while others have it about half as long. Some species have granulations on the veins of the tegminæ bearing setæ while others lack this character. Some species have complicated genitalia whereas other species have very

simple genitalia. Species have been described from Japan, Cochin-China and the Malay Peninsula throughout the East Indies to New Guinea, Queensland, New Hebrides and Samoa; also from Porto Rico and the Seychelles Islands.

The outstanding characters which will be useful in separating the other three genera may be summarized as follows: *Canyra*, first segment of antennæ sulcate above, veins of tegmina not granulate; Sc—R forked basad of cubitus. *Epibidis*, first segment of antennæ prismatic, veins of the tegmina granulate, setigerous, stigma indistinct, pygofer short robust; genital styles nearly as long as pygofer. *Eucanyra*, first segment of antennæ terete, stigma distinct with a distinct transverse vein from stigma to apex of clavus, pygofer elongate, genital styles short, anal segment asymmetrical.

Eucanyra stigmata Crawf.

Plates I, IV, XVII

Crawford 1914a: 569.

We have a series of one male and three females from Barro Colorado collected by H. F. Schwarz, and another series of one male and six females collected by N. Banks. This species is apparently very variable in color, some specimens having the tegmina sparsely maculate with small fuscous spots, in others the fuscous maculations coalesce so that they cover most of the area of the tegmina, while in others the fuscous markings form a distinct vitta from the base to the apex of the tegmina. So far as I am aware this is the only genus of Araeopids with asymmetrical male genitalia.

Subfamily ARÆOPINÆ

In this subfamily the calcar is flattened, sometimes very greatly flattened and leaf like with or without teeth on the posterior margin.

Tribe ARÆOPINI

In this tribe the calcar is thin often foliaceous or tectiform and with teeth, sometimes very minute, always present on the hind margin. This tribe includes the majority of our commoner genera.

Liburnia Stål

(Stål 1866a: 179)

Logotype *Liburnia vittacollis* Muir and Giffard 1924a: 12.

Liburnia was formerly used for species now assigned to *Delphacodes* Fieber. Muir and Giffard have recently restricted this genus and given *vittacollis* as the type. This appears to make it include *Sogata* Distant. As thus defined it has nearly a world wide distribution and 51 species. The members of this genus are slender elongate forms with a narrow crown which is not greatly produced in front of the eyes; forehead narrow elongate, lateral margins nearly straight, not distinctly narrowed between the eyes. In the species known to me the genital styles are flat with the inner and outer apical angles strongly produced and the anal spines are strongly produced.

Liburnia furcifera Horv.

Horvath 1899a: 372. Equals *Liburnia albolineosa* Fowler 1905a: 135.

A single teneral female from Barro Colorado seems to belong to this widely distributed species.

Furcifera seems to have the widest distribution of the species of *Liburnia* being known from Japan, Formosa, China, Indo-China, India, Ceylon, Sumatra, Philippines, Sebesi, Amboina, Ceram, Queensland, Fiji, Ecuador, Brazil, British Guiana, Central America, Mexico, Southern United States, Cuba and the West Indies, Bermudas, Nigeria, South Africa, East Africa, Seychelles Islands, Egypt, Sicily, South Europe, Manchuria, Siberia.

Pissonotus Van Duzee

(Van Duzee 1897a: 236)

Orthotype *Pissonotus marginatus* Van Duzee.

As now constituted this genus contains 19 species from North America, 3 from the West Indies and 6 from South America ranging as far south as Brazil. Many of the species are known only from brachypterous specimens, a few from macropterous specimens and in only a few cases have both types of individuals been collected. As these two types of individuals differ in most characters save the phallic

characters it is unwise to describe new species without males. There are in our collections two macropterous females from Barro Colorado which I cannot correlate with any species from North or South America or any species illustrated in the Biologia. But until males are in hand I hesitate to describe them as new.

Both specimens are black with pale legs; in one specimen, the eyes are black and the tegminæ strongly infuscated, in the other the eyes are pale and the tegminæ are milky subhyaline.

Delphacodes Fieb.

(Fieber 1866b: 524)

Logotype *Delphacodes mulsanti* Fieber.

As now constituted this is a complex of 172 species with species known from every region of the world. Most of the North American species formerly placed in the genus *Liburnia* Stål are now placed in this genus.

As constituted at present this genus may be characterized as follows: head nearly as broad as pronotum; vertex short, but little, if any longer, than broad; frons narrow elongate, lateral and median carinæ distinct, the later forked near apex of head; antennæ terete; tegminæ brachypterous, koelopterous or macropterous; calcar cultrate, concave, teeth on hind margin usually very minute.

In the Barro Colorado material there are four females representing two species. While it is impossible to determine females in this genus with absolute accuracy, I have placed them as follows.

Delphacodes sagata Fowl.

Fowler 1905a: 136; pl. 13, figs. 17, 17a–b.

This species was described from brachypterous males.

There are three specimens with macropterous wings which I believe represent this species. The vertex, pronotum and mesonotum are chiefly dirty white with the intercarinal areas clouded with fuscous; the face is black with the carinæ conspicuously white; the tegminæ are transparent with the veins distinctly punctate.

Delphacodes sp.

There is also a single koelopterous female in the Barro Colorado material which I cannot place from the material in the Biologia. It is pale ochraceous with the frontal carinæ edged with darker. In these respects it resembles a pale *Delphacodes detecta* Van Duzee, and since *detecta* has such a wide range in North America the present form may prove to be that species. However, there are a number of characters which do not agree well enough to place it in *detecta* without males for comparison. The head is shorter and broader, the crown is broader than long instead of the reverse; the pronotum is short, about one fourth as long as mesonotum, not about half as long as it is in *detecta*. However until more material is available it would be unwise to give a specific determination.

Kelisia Fieb.

(Fieber 1866b: 519)

Haplotype *Delphax guttula* Germar.

This is another complex of about 35 known species from various parts of the world, chiefly Europe and North America. Muir has recently described 9 species from South America which he says are not typical. These nine species seem to represent five distinct groups. There is a single female specimen in the Barro Colorado material that has the typical chrotic characters usually given for this genus but since there are no males it would be impossible to place it specifically. Its general color is ochraceous yellow, the tegminæ tinged with the same color and the veins have a single black dot on the apical margin. There is a pair of orange vittæ from the apex of the head to the apex of the mesonotum.

Tribe ALOHINI

This tribe includes a few genera which have a cultrate calcar, that is with the calcar thick on the anterior margin with both surfaces convex and with distinct teeth on the posterior margin.

The center for this tribe seems to be in the Pacific Islands, but the common European genus *Stiroma* Fieber and the common American genus *Stobaera* Stål belong to this tribe, and the recently described genus *Burnilia* Muir and Giffard which includes *Delphax pictifrons* (Stål 1864a: 50) from the Central American region is also included but I have not seen it.

Stobaera Stål

(Stål 1859a: 327)

Haplotype *Delphax concinna* Stål.

This strictly North American genus contains a dozen species, seven from North of Mexico.

It may be briefly characterized as follows: head rather broad, but narrower than pronotum; vertex nearly quadrangular; frons elongate nearly parallel-sided, with a distinct median carina; cheeks broad; eyes deeply emarginate; antennæ elongate, flattened, first segment broadly triangular; second segment elongate, parallel-sided. Pronotum elongate the lateral carinæ divergingly curved then suddenly bent reaching posterior margin. Veins punctate, setigerous. Calcar cultrate with distinct teeth on posterior margin.

Stobaera testaceum Fowl.

Fowler 1905a: 133.

There is a single female specimen which agrees with the description and illustration given by Fowler. If this is correct, however, the species *testaceum* does not belong to *Stobaera* Stål. The antennæ are not flattened but the first segment is elongate terete; the frons is elongate narrow and parallel-sided, the vertex is broad, the pronotum is nearly parallel-margined and the intermediate carinæ are nearly straight but diverging. The calcar is thin concave with distinct teeth on the posterior margin. But since it would require examination of male specimens to determine this point definitely I prefer to leave it as assigned at present.

Tribe TROPIDOCEPHALINI

This tribe includes those genera with the calcar generally rather thick but concave on one surface and without teeth on the hind margin. The common American genus *Liburniella* Crawford belongs here and several genera and species from the Neotropical region have been described but none are included in the present collection.

Family DERBIDÆ

This is a family of fulgorids with small bodies and usually elongate fragile tegminæ; the antennæ are variously modified; the head is frequently compressed with the forehead and crown very narrow; the beak

is usually short with the terminal segment short or minute; the tegminæ are usually much elongate and the venation is frequently much modified, in many genera stridulating organs are present on the basal portion of the costal or subcostal veins, and some of the larger species are said to produce sounds audible to the human ear. The wings are small, sometimes minute. The legs are slender. The male genitalia have the genital styles horizontal laminate and variously modified.

Key to the Subfamilies and Tribes of the DERBIDAE

A. Tegminæ long and narrow. Wings very small, not more than half as long as tegminæ; venation of wings greatly reduced. Subfamily ZORAIDINÆ
  B. Base of clypeus reaching to the level of the lower margin of the eyes. Subcostal cell short, or absent . . . Tribe SIKAIANINI (One genus in North America. *Euklastus* Metcalf)
  BB. Base of clypeus not reaching to the level of the lower margin of the eyes. Subcostal cell long . . . . . Tribe ZORAIDINI (Not represented in the Americas)

AA. Wings more than half as long as the tegminæ, if the wings are small venation not greatly reduced . . . . . Subfamily DERBINAE
  B. Clavus closed; or if narrowly opened, the claval stem not extending beyond the claval suture.
    C. First cubital sector with three or more branches . . . . . Tribe DERBINI
    CC. First cubital sector with less than three branches *1*
      1. Tegmina broad; first cubital sector merging with media . . Tribe RHOTANINI (No American genera)
      1. First cubital sector not merging with media, simple or bifurcate . . . . . Tribe CENCHREINI
  BB. Clavus open, the claval stem extending as a submarginal vein around the apex of the tegminæ . . . . . Tribe OTIOCERINI

Subfamily ZORAIDINÆ

In this subfamily the tegminæ are relatively long or very long, the wings are small or very small with reduced venation. There are numerous genera and species in the Ethiopian, Oriental, Malayan, Papuan and Australian Regions. Only one species is known from the Polynesian Region and one from the Nearctic Region, others perhaps await discovery in the Nearctic Region.

Tribe ZORAIDINI

This is the larger of the two tribes of the subfamily ZORAIDINÆ. The eyes and clypeus are relatively small so that the ventral

margin of the eyes is distinctly above the dorsal margin of the clypeus; the subcostal cell is elongate and narrow. No American genera are known for this tribe.

Tribe SIKAIANINI

This is a small tribe of six known genera all with a small number of species which are widely distributed in the southern half of the eastern hemisphere. Only one species is known from North America.

In this tribe the eyes are extended ventrad until they almost reach the dorsal margin of the clypeus; the subcostal cell is absent or very small.

Euklastus Metc.

(Metcalf 1923a: 194)

Orthotype *Euklastus harti* Metcalf.

Muir (1926f: 240) suggests that this may be the same as *Sikaiana* Distant. I cannot concur in this. The shapes of the foreheads are entirely different. The antennæ in *Euklastus* are more elongate, the second joint is not robust and constricted on the apical third but is broad and flattened, the flagellum is subterminal, not terminal; the frons is linear throughout, not widened apically as in *Sikaiana;* the clypeus represents hardly a third of the total length of the face; the vertex and pronotum are deeply excavated posteriorly and the mesonotum is ecarinate, not tricarinate as in *Sikaiana.* The venation is quite similar. Ball (1928b) states that, "The two illustrations of the venation in Metcalf's original drawings are quite different." The two illustrations are from different wings and the only difference is the point of origin of media two. Since there is frequently more variation in wing venation than this in this group and since the specimen has long since passed from our hands we cannot verify the matter and will consider this of minor importance only.

Subfamily DERBINÆ

In this subfamily the tegminæ are large and the wings are rather large with the venation not greatly reduced; the antennæ are frequently greatly modified.

Numerous genera and species are known from practically all regions of the world.

Key to the Genera of the Tribe DERBINI

A. Shoulder keels on pronotum large.....*Zeugma* Westwood
(No American species in this genus)

AA. Shoulder keels on pronotum absent or small.

B. Media with two sectors, the first dichotomously five-branched, the second pectinately 7–8 branched. Stridulating organs on the stems of both subcosta plus radius and media.....*Derbe* Westwood

BB. Media with three or four sectors, branches not pectinately arranged.

C. Cubitus one with three sectors the second branched. Media with seven apical branches.....*Mysidia* Westwood

CC. Cubitus one with three sectors all unbranched. Media with eleven apical branches.....*Pseudomysidia* Metcalf

Derbe Fabr.

(Westwood 1840d: 83)

Logotype *Derbe hæmorrhoidalis* Fabr.

This is a genus of relatively large species of Derbids with large tegminæ with media with two sectors, the second pectinately branched. The true species of *Derbe* range from Central America to Brazil.

Key to the Central American Species of DERBE

A. Color of fore and hind wings dark fuscous; venation almost concolorous, distinctly bordered by paler.....*muiri* Metcalf

AA. Color of fore and hind wings yellowish hyaline the cells more or less clouded with fuscous; the veins dark brownish fuscous, distinct.

B. Anal segment of female small, sunk into the pregenital tergite....
championi Muir 1918c: 230 (Panama)

BB. Anal segment of female large, almost as long as genital styles.

C. Anal segment of female with long processes.....*1*

1. Genital styles of female spinous at apex, the spines turned mesad.....*bergrothi* Muir 1923h: 67 (Brazil)

1. Genital styles of female not spinous at apex.....*2*

2. Subgenital plate truncate apically; tegminæ yellowish with a few fuscous clouds *fowleri* Muir 1918c: 230 (Guatemala)

2. Subgenital plate angulate apically; tegminæ yellowish, heavily clouded with fuscous.....*buscki* Metcalf

2. Subgenital plate produced into an elongate slender acute tooth.....*currani* Metcalf

CC. Anal segment with a shallow v-shaped notch posteriorly. Pregenital plate small, acute at apex.....*westwoodi* Fowler

Derbe westwoodi Fowl.

Plate XVIII

Fowler 1900g: 71

A single male from Barro Colorado, July 15, 1924, N. B., agrees in general with Fowler's description and differs from *D. championi* Muir in having less fuscous clouding in the cells and in having larger genital styles. It agrees with *D. fowleri* Muir in general coloring but the genitalia are decidedly different. The anal segment is notched at the apex with the processes short. The genital plate is short triangular with the apex acute.

When viewed dorsally the anal segment is broad about two and one half times as long as wide, nearly parallel sided for about two-thirds its length then uniformly narrowed to the blunt apex which is a deep notch; the base is narrow suddenly and almost rectangularly widened; the dorsal crest is not conspicuous; the dorsal notch is deep basally and shallow posteriorly. The anal segment is short and blunt. When viewed laterally the anal segment is broad and flat and ends in a broad triangular tooth. The genital styles are slender with a definite ridge from base to apex; the apex is recurved and ends in a slender recurved tooth. The ultimate ventral segment is about twice as long as broad bluntly triangular apically.

Derbe muiri spec. nov.

Plates I, XVIII, XIX

Distinguished at once from the other species of Central American *Derbe* by its dark fuscous color. Apparently closest to *D. punctum* Fabr. from South America.

Crown distinctly impressed; forehead elongate nearly parallel margined. Antennæ with second joint terete, twice as long as the long diameter of the eye. Pronotum collar-like broadly flaring. Mesonotum broad, strongly arched, with two conspicuous callosities on the posterior margin, with three distinct carinæ. Venation typical, radius 2-branched, media 12-branched, cubitus 5-branched.

When viewed dorsally the anal segment is long and narrow nearly three and one half times as long as its greatest width; the base is narrow, gradually widened to about one fourth from base and then ovally narrowed to the blunt apex which has a broad triangular notch; the dorsal crest is conspicuous and the dorsal notch broad of nearly

uniform depth to the apex of the segment and bordered by distinct carinæ on each side.

When viewed laterally the anal segment of the male is slender with the apex bent at right angles and ending in a slender acute tooth. The genital styles are broad nearly rectangular in outline with the apex obtuse with a conspicuous tooth directed toward the median line. There is a very conspicuous somewhat sinuate ridge from base to apex. The dorsal margin has a broad scroll-shaped tooth. The ultimate ventral segment is about three times as broad as long with the posterior margin broadly concave.

The female subgenital plate is large, the posterior margin is triangularly notched on either side and produced into a median triangular tooth. The genital styles are broad, short, about as long as the ovipositors and blunt apically. The anal segment is not long but is produced as slender processes which are about as long as the short ovipositors.

Length to apex of abdomen 7.5 mm.; wing expanse 30 mm.

Holotype, male, Barro Colorado, 15 July 1924, N. B.

Allotype, female, Barro Colorado, 15 July 1924, N. B.

Paratype, male, Barro Colorado, 15 July 1924, N. B.

Derbe buscki spec. nov.

Plate XIX

This species resembles *Derbe fowleri* Muir in structural characters but differs decidedly in color and in details of structure.

General color of the body blackish and yellowish fuscous. Crown and pronotum blackish; mesonotum and metanotum brownish; abdomen bright yellow with the margins and a mid-dorsal stripe black. Tegminæ and wings transparent, faintly tinged with yellow, and heavily marked with fuscous. Typically there is a large fuscous cloud on the corium at the apex of the clavus, another extending from the apical margin to the radius, this is separated by a narrow transparent area from a third which extends from the apex of the costal margin to the apical margin enclosing a transparent nearly circular area, at the extreme apex of the tegminæ many of the cells and cross veins are clouded with fuscous. The legs and ventral parts of the body are generally yellowish fuscous shading to blackish fuscous on the carinæ, apex of the clypeus and genitalia.

Forehead and clypeus narrow, nearly parallel-sided throughout. Antennæ short, slender; the second segment as long as the great diame-

ter of the eye. Female subgenital plate about as long as broad, angulate apically; genital styles elongate narrow acute at the apex not as long as ovipositors which have a crown of three or four teeth apically. Anal segment with a ventral plate which extends in a pair of elongate flagellate processes as long as the ovipositors.

Length to apex of abdomen 7.8 mm.; wing expanse 28.2 mm.

Holotype, female, Porto Bello, Panama, 15 Feb. 1911, A. Busck, United States National Museum.

Paratypes, four males, Porto Bello, Panama, 15 Feb. 1911, A. Busck, United States National Museum.

Derbe currani spec. nov.

Plate XIX

This species resembles *Derbe westwoodi* Fowler in general appearances but the genitalia are similar to *D. fowleri* Muir.

General color dark fuscous. Head fuscous with the eyes, most of cheeks and the sides of the clypeus pale greenish yellow. Pronotum chiefly greenish yellow with an irregular fuscous cloud behind the eyes. Mesonotum chiefly blackish fuscous with the posterior margin pale greenish yellow and a conspicuous black shining callosity at the middle of either side. Tegulæ greenish yellow with the posterior border brownish fuscous. Tegminæ more brownish than in *westwoodi* with the basal cells clouded with fuscous, a fuscous cloud on the costal margin near apex and another on the anal margin beyond the apex of clavus much as in *westwoodi*. Metanotum fuscous. Hind wings brownish the veins brown and the basal cells and apical angle clouded with fuscous. Abdomen above fuscous, the posterior margins narrowly greenish yellow. Under parts and legs drab gray; genital plate blackish fuscous.

Forehead narrow, parallel-sided, deeply impressed. Cheeks broad. Antennæ elongate, slender; second segment longer than the diameter of the eye. Pronotum long, anterior margin carinate and a distinct callosity behind each eye. Mesonotum rather distinctly tricarinate. Tegulæ large. Subgenital plate large, the posterior margins converging, then produced into a small quadrate plate which is prolonged caudad in an elongate, slender, acute tooth. Genital styles slender, elongate, acute. Anal segment with terminal flagella which are longer than the ovipositors.

Length to apex of abdomen 8.4 mm.; wing expanse 36 mm.

Holotype, female, Barro Colorado, 23 Nov. 1930.

Named for Dr. C. H. Curran of the American Museum of Natural

History who has sent me many interesting fulgorids from Barro Colorado.

Mysidia Westw.

(Westwood 1840d: 83)

Logotype *Derbe pallida* Fabr., Kirkaldy 1903c: 216.

This is a genus of median or medium small species, of various colors but quite frequently pale or whitish in color. About 27 species are known ranging from the Southern United States to Brazil. The species are all frail and the genitalia are quite distinct.

Key to the Species of Mysidia *Westwood*

A. Color of tegminæ and wings pale bluish. . . . . *glauca* Distant 1907e: 397 (Brazil)

AA. Color of tegminæ and wings whitish or yellowish.

B. Crown usually longer than pronotum; crown, between the frontal carinæ, produced in front of eyes.

C. Tegminæ milky subhyaline often densely covered with white wax, not marked with fuscous except on some of the veins and cross veins and along the costa. . . . . *costata* Fabricius (Stål 1869a: 97) (Guatemala, Panama)

CC. Tegminæ marked with fuscous. *1*

1. Size small. Wing expanse about 11 mm. *2*
1. Size large, wing expanse 15 mm. or more. *3*
2. Body scarlet, tegminæ hyaline. . . . . *rubidella* Ball 1928b: 199 (Mexico)
2. Body testaceous, tegminæ heavily marked with fuscous. Some of the median and cubital sectors with distinct black points. . . . . *nigropunctata* Metcalf (Canal Zone)
3. Color of body bright red. Tegminæ brownish, veins black . . . . . *caliginosa* Walker 1858b: 98 (Brazil)
3. Color pale, tegminæ more or less marked with milky subhyaline. *4*
4. Longitudinal veins dotted with fuscous on apical margin. . . *maculicosta* Fowler 1900g: 73 (Guatemala, Costa Rica)
4. Longitudinal veins not dotted with fuscous on apical margin. 5
5. Clypeus tricarinate, that is with a distinct median and lateral carinæ. *6*
5. Clypeus not tricarinate. *12*
6. Prothoracic shield with a large round black spot; tegulæ black. . . . . *squamigera* Fabricius (Stål 1869a: 97) (Brazil)

6. Prothoracic shield without spots, tegulæ concolorous....*7*
7. Tegminæ whitish hyaline with fuscous markings; with a distinct black puncture at the forking of media one.....*8*
7. Tegminæ chiefly pale fuscous marked with narrow transverse milky fascia; without a black puncture at forking of media one.....*9*
8. Second antennal segment about three times as long as basal width.....
punctum Fabricius (Stål 1869a: 98) (Brazil, Venezuela)
8. Second antennal segment about five times as long as basal width.....*punctifera* Metcalf
9. Size large, wing expanse about 30 mm....*obscura* Metcalf
9. Size smaller, wing expanse less than 20 mm.....*10*
10. Crown narrow elongate, nearly parallel sided.....*11*
10. Crown short broad, triangular in outline.....
subfusca Metcalf (Canal Zone)
11. Female subgenital plate about twice as broad as long, roundly produced caudad. *pallescens* Metcalf (Canal Zone)
11. Female subgenital plate nearly quadrate, broadly notched caudad.....*fasciata* Metcalf (Canal Zone)
12. Clypeus with a distinct median carina.....*13*
12. Clypeus not carinate or very obscurely carinate.....*14*
13. Second antennal segment more than twice as long as broad.
mississippiensis Dozier 1922a: 82
13. Second antennal segment not more than half as long as width at apex. *pallida* Fabricius (Stål 1869a: 99) (Brazil)
14. General color of body pale stramineous. Tegminæ with a short transverse fuscous fascia on basal third.....
steinbachi Distant 1907e: 396 (Bolivia)
14. General color of body testaceous. Tegminæ with apical and commissural margins marked with fuscous.....
testacea Fabricius (Stål 1869a: 98) (South America)

BB. Crown usually shorter than pronotum; crown between frontal carinæ not produced in front of eyes.

C. Tegminæ with transverse fuscous fascia or spots.....*1*

1. Wings with transverse fascia.....*2*
1. Wings with spots, no transverse fascia.....
albicans Stål 1855b: 191 (Brazil)
2. Some of the apical cells of tegminæ with marginal black dots.....*3*
2. Without black dots in the apical cells.....*5*
3. Genital styles broadest at apex.....
neonebulosa Muir 1918a: 424 (British Guiana)
3. Genital styles narrowed apically.....*4*

4. Internal tooth on genital style basal. . . . . *pseudonebulosa* Muir 1918a: 423 (British Guiana)
4. Internal tooth on genital style beyond middle. . . . . *nebulosa* Muir 1918a: 423 (Fowler 1905a: Pl. 13) (Brazil, Guatemala, Panama)
5. Apical veins with black dots before apex. . . . . *subfasciata* Westwood 1840d: 83 (Brazil)
5. Apical veins without black dots. . . . . *quadrifascia* Walker 1858b: 97 (Brazil)

CC. Tegminæ without transverse fuscous markings save on the veins. *1*

1. Fore or hind wings with distinct dots in the marginal cells. *2*
1. No black dots in the marginal cells. *3*
2. Fore and hind wings with distinct dots in the marginal cells. . . . . *acidalioides* Fowler 1900g: 72; Pl. 8 (Panama)
2. Hind wings only with distinct dots in the marginal cells. . *parviceps* Fowler 1900g: 73; Pl. 8 (Guatemala)
2. Tegmina only with two black dots in the marginal cells. . . *jamaicensis* Distant 1907e: 396 (Jamaica)
3. Clavus with distinct round black dots. *4*
3. Clavus without distinct round black dots. *6*
4. Clavus with two black dots. . . . . *albipennis* Westwood 1840d: 83 (Mexico, Honduras)
4. Clavus with a single black dot. *5*
5. Costal margin with three black dots towards the base. . . . *lactiflora* Westwood 1840d: 83 (Brazil)
5. Costal margin without black dots. 6
6. Costal and claval margins of the tegminæ brownish, cross veins unmarked. . . . . *citrina* Walker 1858b: 98 (Brazil)
6. Margins of the tegminæ not brownish, cross veins blackish a single black spot in the costal cell before the apex. . . . . *stigma* Germar 1830a: 56 (Uruguay)

Mysidia costata Fabr.

Plates I, IV, XVII, XVIII

Stål 1869a: 97.

This species is represented by a single male and two female specimens from Barro Colorado, July 17, 1924, N. B., and two females, Barro Colorado, 11 Nov. 1923, and 7 Jan. 1929, C. H. C.

The body is bright tawny with the eyes and antennæ darker and a dark fuscous spot on the tegulæ. The tegminæ are milky subhyaline with the costal margin and most of the cross veins fuscous. The costal

area is broad with eleven transverse veinlets. There are eleven stridulating pustules on Sc + R. The total length of the body is 4.5 mm., of the fore wings 11.0 mm. The head is strongly projected in front of the eyes. The second segment of the antennæ is robust about twice as long as the great diameter of the eyes.

Mysidia punctifera spec. nov.

Plates XV, XVII

This species resembles *mississippiensis* Dozier in a general way. The color markings however are darker and the second segments of the antennæ are much longer and thickly studded with sensory pits. The genitalia are entirely different in the two species: in *mississippiensis* the subgenital plate of the female is elongate, produced apically with a deep triangular notch; in *punctifera* the subgenital plate is very small not produced and slightly sinuate apically.

General color of body including legs and antennæ testaceous yellow. Eyes black. Tegminæ and wings milky translucent heavily marked with fuscous, especially on the basal third of the tegminæ; there is a conspicuous spot of the same color near the apex of the tegminæ on media one; and beyond the apex of the clavus; the series of subapical transverse veins in the medio-cubital area are also heavily but narrowly marked with blackish fuscous. The wings are marked with fuscous in the apical cells and on the transverse veins.

The head is narrow and the compound eyes are large. The crown is about twice as long as basal width, strongly projecting; the forehead is narrow, gradually widening to the clypeus; the lateral carinæ are strongly elevated. The clypeus is elongated, longer than forehead, robust, with a definite median carina. The antennæ are elongate, robust, more than twice as long as the great diameter of the eye; the second segment is thickly studded with sensory pits and is deeply notched on the dorsal side at the apex. The pronotum is relatively large deeply notched posteriorly. The mesonotum is large; tegulæ large nearly circular in outline. Tegminæ broad, venation typical. Legs elongate, slender. Abdomen robust about as long as head and thorax combined; dorsal carina evident. Subgenital plate small.

Length of body 4.7 mm.; wing expanse 20.4 mm.

Holotype, female, Barro Colorado, 15 July 1924, N. B.

Mysidia punctum Fabr.

Plate XVIII

Stål 1869a: 98.

This species belongs in the same general group as *squamiger* Fabr. The following characters are distinctive. The forehead is narrow parallel-sided to below base of antennæ where it is suddenly widened to base of clypeus. Clypeus elongate, longer than forehead. Tegminæ milky subhyaline with a distinct black dot at the apex of the first median sector.

This species was described from Brazil and has been listed from Venezuela. We have a single male specimen from Barro Colorado, 13 July 1924, N. B., which seems to be this species.

Mysidia fasciata spec. nov.

Plate XVIII

This species may be distinguished from other species by its structural characters and the evident fascia across the basal third of both fore and hind wings; the crown is long; and the clypeus tricarinate.

General color of body bright yellow, irregularly marked with bright red; eyes brown. Tegminæ and wings transparent heavily marked with pale fuscous; there is a regular fascia at the apex of the basal third of the tegminæ which is continued across the hind wings; the apical two-thirds of the tegminæ are largely fuscous with irregular transparent areas. The apical border of the wings is banded with fuscous.

Crown narrow, elongate, nearly two times as long as basal width; nearly parallel-sided; projecting. Forehead narrow, the lateral carinæ nearly parallel to lower margin of eyes then gradually widening to clypeus. Clypeus tricarinate; about as long as forehead. Antennæ short, robust about as long as the great diameter of the eye. Pronotum short; the lateral flaps strongly developed. Mesonotum large, inflated; median carina fairly evident. Tegulæ small. Abdomen short, robust, shorter than head and thorax combined, dorsal crest evident. Subgenital plate large, quadrangular, apical angles rounded, the apica margin excavated.

Length of body 2.9 mm.; wing expanse 19.7 mm.

Holotype, female, Barro Colorado, 9 Jan. 1929, C. H. C.

Allotype, male, Barro Colorado, 21 June 1924, N. B.

Mysidia pallescens spec. nov.

Plate XVIII

This species may be distinguished from *squamigera* Fabricius, *punctum* Fabricius and related species by its pale fuscous fore wings marked with milky subhyaline; narrow crown which is parallel-sided and by the large subgenital plate of the female.

Head small, less than half as wide as the pronotum. Crown narrow, elongate, nearly parallel-sided; produced in front of eyes; lateral carinæ strongly elevated. Forehead narrow, nearly parallel-sided to below the antennæ then suddenly flaring to the clypeus; the lateral carinæ strongly elevated nearly contiguous between the eyes. Clypeus elongate, robust; tricarinate. Antennæ short; the second segment about as long as the great diameter of the eye. Pronotum deeply emarginate posteriorly; the lateral flaps large. Mesonotum large, ecarinate; tegulæ large, the posterior margin truncate. Pustules on Sc + R stem large.

General color of the body tawny, more or less clouded with fuscous. Antennæ, cheeks, lateral areas of the mesonotum, apices of the tibiæ, the tarsi and the dorsal crest of the abdomen marked with red. The tegminæ are chiefly pale fuscous with three more or less distinct transverse fasciæ milky subhyaline.

Length to apex of abdomen 4.5 mm.; wing expanse 23.5 mm.

Holotype, female, Barro Colorado, 24 July 1924, N. B.

Paratype, female, Barro Colorado, 17 July 1924, N. B.

Mysidia subfusca spec. nov.

Plate XVIII

This species resembles *pallescens* Metcalf in general color but is structurally distinct. The crown is broadly triangular, not parallel-sided and the subgenital plate is elongate, nearly as long as broad, triangularly, produced not twice as broad as long, not produced as in *pallescens*.

Head small. Eyes large. Crown broad, about one and one half times as long as broad; triangular; the lateral carinæ not strongly elevated. Forehead narrow; the lateral carinæ parallel and nearly contiguous to the lower margin of the eyes and then diverging to the clypeus. Clypeus tricarinate; robust, about as long as the frons. Antennæ elon-

gate, about one and one-half times as long as the great diameter of the eye. Pronotum short, deeply emarginate posteriorly. Mesonotum large, not strongly elevated. Tegulæ triangular, posterior margin truncate. Subgenital plate elongate about one and one-half times as broad as long; produced posteriorly into a broad triangular tooth which is rounded apically.

General color of the body pale tawny. Eyes dark brown. Tegminæ chiefly pale fuscous with indistinct milky subhyaline fascia.

Wing expanse 21.0 mm.

Holotype, female, Barro Colorado, 26 June 1924, N. B.

Mysidia nigropunctata spec. nov.

Plate XVIII

This is one of the smaller species of the genus, with a moderately broad crown and forehead and with a few distinct black points on the medial and cubital sectors. The subgenital plate of the female is broad produced caudad into a broad tooth which has a deep triangular notch.

Crown broad and short, the median length about as long as the width at base; the lateral carinæ not strongly elevated. Forehead broad, the lateral carinæ strongly elevated; the lateral margins concavely curved from apex of crown to clypeus. Clypeus short robust with a very faint median carina. Antennæ short; the second segment about two-thirds as long as the great diameter of the eye; sensory pits wanting. Pronotum elongate, the lateral flaps large with a well developed carina from the lower margin of the eyes to the tegulæ. Mesonotum enlarged; carinæ indistinct. Subgenital plate broad, nearly twice as broad as long, posterior margin produced for one-half the length of the plate into a broad triangular tooth which is deeply notched.

General color of the body pale tawny yellow clouded with pale fuscous. Tegminæ and wings milky subhyaline clouded with pale fuscous especially along the veins and cross veins.

Wing expanse 18 mm.

Holotype, female, Barro Colorado, 27 July 1924, N. B.

Allotype, male, Barro Colorado, 26 July 1924, N. B.

Paratypes, 1 female, Barro Colorado, 25 July, and 1 male, Barro Colorado, 13 July, N. B.

Mysidia nebulosa Germ.

Plates XVII, XVIII

Fowler 1900g: 73.

A single mutilated male Canal Zone, Fort Sherman, 3 July, 1924, N. B., which fits Muir's revised description of this species.

Mysidia obscura spec. nov.

Plate XVIII

This is one of the largest species of the genus with the tegminæ and wings yellowish heavily clouded with fuscous.

General color of the body dull brownish ochraceous with the eyes black. Tegminæ and wings transparent, veins brownish and with the cross veins and the apical margins clouded with fuscous; each of the longitudinal veins of the tegminæ ends in a small oval transparent area.

Crown rather narrow, about twice as long as the basal width, distinctly produced in front of eyes. Forehead narrow nearly parallel-sided but somewhat widened below, the lateral margins pustulate. The median carina of the clypeus not reaching the base. Second segment of antennæ longer than the diameter of the eye. Subgenital plate of female more than twice as broad as long, the median area of the apical margin suddenly quadrately produced.

Wing expanse 28 mm.

Holotype, female, Porto Bello, Panama, 27 Feb. 1911, A. Busck, United States National Museum.

Pseudomysidia gen. nov.

Type *Pseudomysidia fuscovaria* sp. nov.

This genus is closely related to *Mysidia* Westwood. It differs in structure of head and antennæ and in details of wing venation.

Head small; crown reduced; lateral carinæ of head contiguous and continuing around vertex. Antennæ small; antennal collar conspicuous but not strongly elevated; second segment enlarged apically without definite sinus. Tegminæ elongate; branches of media one and two arising dichotomously not apparently arising from cell media one; media with eleven apical branches, the three main sectors of cubitus unbranched.

Pseudomysidia fuscovaria spec. nov.

Plates V, XIV, XVIII, XIX

Like a small *Mysidia* with different head structure, characteristic venation and different genitalia.

Head narrow, crown and forehead greatly compressed. Antennæ short; the second segment not as long as the great diameter of the eye. Pronotum elongate deeply but broadly sinuate posteriorly, not excised. Mesonotum large; tricarinate. Tegulæ large. Tegminæ elongate about twice as long as body.

General color of body ochraceous orange; abdomen more testaceous; eyes fuscous; tegminæ and wings milky subhyaline irregularly fasciate with fuscous.

Length to apex of tegmina 8.2 mm.

Holotype, male, Barro Colorado, 15 July 1924, N. B.

Allotype, female, Barro Colorado, 16 July 1924, N. B.

Paratypes, seven males and nineteen females, 15–18 July 1924, N. B.

Tribe OTIOCERINI

This tribe is quite distinct. The head is usually much compressed; the antennæ are frequently much modified; the tegminæ are elongate.

Key to the American Genera of the Tribe OTIOCERINI

A. Subcosta, radius and media forming a common stem from the basal cell with subcosta branching from the stem before media.
  B. Antennæ long projecting beyond the apex of head.
    C. Media with five main sectors before the submarginal vein. Head not produced ..... *Platonax* Metcalf
    CC. Media with three main sectors before the submarginal vein. Head strongly produced ..... *Platocera* Muir
  BB. Antennæ short not projecting beyond the apex of head ..... *Heronax* Kirkaldy

AA. Subcosta plus radius and media arising separately from the basal cell or if forming a common stem media branching before subcosta.
  B. First segment of antennæ more than twice as long as broad; antennæ with appendages.
    C. Head when viewed laterally notched on the dorsal margin and turned up at apex. Genital plates of male with slender hook-like appendages beyond the circular median incision ..... *Apache* Kirkaldy

CC. Head not notched on the dorsal margin. Genital plates with broad elongate plate-like processes beyond the circular median notch *1*

1. Apex of head rounding, not angled above. *Shellenius* Ball

1. Apex of head angled above ..... *Otiocerus* Kirby

BB. First segment of antennæ short sometimes broader than long, without appendages.

C. Second segment of antennæ short ..... *Pyrrhoneura* Kirkaldy

CC. Second segment of antennæ more than three times as long as broad *1*

1. Tegminæ with costal appendage strongly developed and flap like ..... *Sayiana* Ball

1. Costal appendage not developed *2*

2. Costa broad; transverse veinlets crowded together to give the appearance of a stigma ..... *Amalopota* Van Duzee

2. Costa narrow; transverse veinlets not crowded together, usually inconspicuous ..... *Anotia* Kirby

Platonax gen. nov.

Type *Platonax maculata* spec. nov.

This genus resembles the genera *Phra* Distant and *Heronax* Kirkaldy (equals *Fenuahala* Distant) in venation but the head characters and the antennæ are similar to the genus *Platocera* Muir.

Head narrow nearly circular in outline. Antennæ elongate slightly longer than face; second segment broad and flat, globosely expanded basally. No subantennal processes or shoulder keels. Forehead narrow, keels approximate, gradually diverging dorsally. Crown triangular, the lateral keels strongly elevated. Eyes globose, ventral sinus shallow. Pronotum relatively broad, deeply notched posteriorly, strongly sloping. Mesonotum strongly arched. Tegminæ broad, venation similar to *Heronax* and *Phra*. Subapical line connecting subcostal vein with claval vein conspicuous. Radius not branched before subapical line. Media five branched, the first and fourth branches branching beyond subapical line. Radius and media connected by a strong cross vein. Cubitus two branched. Legs elongate slender.

Platonax maculata spec. nov.

Plates V, XIX

This species may be recognized by the milky subhyaline tegminæ sparsely spotted with fuscous. General color of head and thorax yellowish testaceous, eyes brown.

A conspicuous testaceous yellow species with the tegminæ milky white with a few irregular spots and some of the veins blackish fuscous.

Crown triangular, about one and one-half times as long as basal width, deeply excavated, basal carina conspicuous. Forehead consisting of the strongly elevated carinæ which diverge slightly dorsally. Clypeus as long as forehead slightly shorter than beak. Antennæ conspicuous, longer than forehead, basal segment four times as long as broad; globose at base and then thin and foliaceous. Legs long and slender, pro- and mesothoracic tibiæ and femora subequal. Metathoracic tibiæ nearly twice as long as femora.

Length to apex of tegmina 10.5 mm.

Holotype, male, Barro Colorado, 2 Aug. 1924, N. B. (M.C.Z.)

Otiocerus Kirby

(Kirby 1821a: 13)

Logotype *Otiocerus stollii* Kirby.

Ball has recently (1928b: 196) revived the genus *Apache* Kirkaldy (*Hynnis* Burmeister) and erected the new genus *Shellenius* for *schellenbergii* Kirby and *balli* McAtee. Fowler described a number of species in this genus from Central America most of which Ball has placed in one of the above genera. There are no species of this group in the present collections save *rubescens* Fowler which belongs to the genus *Anotia*.

Among the many trivial criticisms of my key to this genus published in 1923 Ball states that: "Metcalf separated *reaumuri* Kirby from *signoretii* Fitch as "without" the five spots ignoring the fact that Kirby specially described them." The facts are these. My key gives as the character for *signoretii* Fitch, "Fore wings with a large black spot on the sutural margin and four smaller ones in a square." This is an almost direct quotation from Fitch's description (1856a: 394). The contrasting character is "without a large black spot and four smaller ones in a square." This merely means that the black spots are not arranged in this way. I had no intention of ignoring the fact that there were five black spots on the tegmina of *reaumurii* as described by Kirby (1821a: 18) as both Kirby and Fitch describe them. I was simply trying to emphasize the point that Fitch makes, that *reaumurii* and *signoretii* are quite similar but differ in the arrangement of the black spots. Until authentic specimens of *reaumurii* are produced I shall retain the name *signoretii* for the species with the spots arranged as described so aptly by Fitch.

Amalopota Van Duzee

(Van Duzee 1889d: 176)

Haplotype *Amalopota uhleri* Van Duzee.

This genus is close to *Anotia* Kirby. I separate it on the basis of the fact that the costal cell is broader, the costal cross veins are few in number and crowded together at the apex of the costal cell.

Amalopota fitchi Van Duz.

Plates I, XIX

Van Duzee 1893a: 280.

There is in the present collection a single mutilated female collected on Barro Colorado, 5 July 1923, R. C. Shannon, which seems to agree with this species; and two males Canal Zone, N. B., and one male Panama, 7 July 1924, N. B.

Anotia Kirby

(Kirby 1821a: 20)

Haplotype *Anotia bonnetii* Kirby.

The species of this genus are among the most delicate of North American Derbidæ. All the species have very compressed heads, the forehead reduced to a mere keel and the second antennal segment elongate nearly as long as the forehead. The tegminæ are two or more times as long as the body; with subcosta and radius united for about one-third their length; medius with four branches; cubitus one with two branches ending in the extended claval vein. The male genital plates consist of horizontal lamelliform plates usually narrowly ovoid with a vertical ridge on the dorsal surface forming a blunt recurved tooth near the middle.

Five species are known from Eastern North America and five from Central America.

Key to the Known Species of Anotia *Kirby*

A. Tegminæ transparent without definite spots or vittae. . . . . *pellucida* Fowler (Mexico)

AA. Tegminæ more or less marked.

B. Basal segments of the abdomen with a mid-dorsal black stripe.

C. Forewings with three conspicuous black spots; mesonotum black ..... *punctata* Metcalf (Canal Zone)

CC. Forewings without conspicuous spots; mesonotum pale ..... *burnetii* Fitch (Eastern United States)

BB. First three segments of abdomen without a mid-dorsal black stripe.

C. Apical border of fore wings with round black spots in cells..*1*

1. Wings with conspicuous transverse fasciæ.....*2*

1. Wings without conspicuous transverse fasciæ, markings obscure..... *tenella* Fowler (Mexico)

2. Second joint of antennæ at least three times as long as vertex; basal fascia conspicuous, apical fascia wanting.... *smithi* Fowler (Mexico)

2. Second joint of antennæ slightly longer than vertex; apical cloud conspicuous, basal fascia inconspicuous..... *bonnetii* Fitch (Eastern United States)

CC. Apical border of fore wings without round spots in cells.....*1*

1. Fore wings with a few cross veins marked with fuscous otherwise fore wings pale.....*2*

1. Fore wings more or less marked with fuscous.....*3*

2. Second segment of antennæ at least twice as long as vertex. *marginicornis* Fowler (Guatemala)

2. Second segment of antennæ about as long as vertex..... *robertsoni* Fitch (Eastern United States)

3. All veins of tegmina pale, bordered with smoky..... *westwoodi* Fitch (Eastern United States)

3. Some of veins of tegmina dark.....*4*

4. Anal segment of male shorter than genital styles, truncate at apex; genital styles from the ventral view acute at apex *kirkaldyi* Ball

4. Anal segment of male longer than genital styles, produced ventrad and notched at apex; genital styles from the ventral view truncate at apex..... *invalida* Fowler

4. All the veins of the tegmina bright red; most of the cells heavily clouded with fuscous..... *rubescens* Fowler

Anotia punctata spec. nov.

Plates V, XVIII, XIX

Resembling *burnettii* Fitch in general structure; differing in color and in the structure of male genital plates.

Head not angularly produced; vertex narrow nearly three times as long as basal width. Antennæ with second segment compressed, thickly and uniformly studded with sensory pits. Pronotum short deeply incised on the median line. Mesonotum large, flat.

General color of the body pale testaceous yellow, eyes, mesonotum largely and dorsum of the abdomen black. Antennæ tinged with brown. Tegminæ and wings milky subhyaline; the tegminæ marked with three large brownish spots one at the apex of the basal third extends from radius across media to cubitus one; a second at the base of the apical third extends across subcosta and radius touching media; the third is less definite covering the branching of media one. There is a smaller spot on the commissural margin near the apex of clavus and an indefinite brownish cloud across vein cubitus one a.

Length of body 3.5 mm.; to apex of tegmina 6.6 mm.

Holotype, male, Barro Colorado, 7 Jan. 1929, C. H. C.

Anotia invalida Fowl.

Plate XIX

Fowler 1904a: 79

Ball 1928b: 197 makes this species synonymous with *A. kirkaldyi* Ball. There is, however, a species with markings similar to what we call *kirkaldyi* but with entirely different genitalia. In *kirkaldyi* (plate XVIII) the genital styles are rather slender acuminate apically with the apices turned dorsad; the anal segment is about half as long as the styles, broad and round apically. In *invalida* the genital styles are broad, obtuse at the apex with a short dorsal tooth; the anal segment is elongate, slender, longer than the styles, the apex produced into two elongate processes.

A single male, Bella Vista, Panama, 7 Aug. 1924, N. B.

Anotia rubescens Fowl.

Plate XIX

Otiocerus rubescens Fowler 1900g: 76

The position of this species has been somewhat anomalous. Fowler placed it in *Otiocerus* with doubt. It suggests *Anotia* in some respects but the venation of the tegmina is not exactly like that genus.

This species is somewhat intermediate between *Otiocerus* Kirby and *Anotia* Kirby. Head is intermediate in shape and the wing venation is more like *Otiocerus*. However, the antennæ are simple not vermiculate and the genitalia are different from either genus.

Crown is elongate; forehead narrow linear; outline of head not concentric with margin of eye; antennæ simple, first segment very short,

second segment elongated. Pronotum almost completely excavated posteriorly. Mesonotum large, smooth. Tegminæ large; costal appendage not developed, costal cell narrow a few regular cross veins toward apex of costal cell, subcosta and radius united at base; media with five principal sectors before the ambient vein; cubitus one with two branches before ambient vein, Cu 1a connected to medius by a strong cross vein. Legs simple. Basal abdominal segments compressed, tenth segment elongate as long as genital styles.

The general color is ochraceous orange with the carinæ and the venation of tegmina bright red. The tegminæ are faintly clouded with fuscous.

A single male, Porto Bello, 15 Feb. 1911, A. Busck.

Tribe CENCHREINI

This is an extensive tribe, with numerous genera and species from all parts of the world. The chief distinctive character seems to be the fact that the claval veins unite to form a claval stem which ends before the apex of clavus; and that the first cubital sector is simple or bifurcate ending in the apical margin of the tegmina.

The chief generic characters are furnished by the presence or absence of a subantennal process on the cheeks, by the presence or absence of antennal foveæ on the pronotum with strongly developed dorsal and ventral keels, on the lateral fields of the pronotum behind the antennæ, and by the venation of the tegminæ, especially the arrangement of the subcostal-radial stem, with reference to the stem of media and the branching of media and cubitus; the relative length of subcostal cell; and whether the claval veins are granulate or not.

In the past there has been very much confusion in the various genera without any very clear concept of generic limits or generic characters. The older genera have been redescribed and synonymized without access to the types and in numerous instances without study of the descriptions or illustrations. I plead guilty to having done my share of this in the past. In the present paper I am retaining all past generic names of American genera, but I am not sure that the characters used are valid. I have not seen the type species for any of the genera except *Cedusa* Fowler and *Neocenchrea* Metcalf. The illustrations of the types of *Patara* Westwood, *Syntames* Fowler, *Cyclokara* Muir, *Cenchrea* Westwood, *Dysimia* Muir, *Symidia* Muir, *Phaciocephalus* Kirkaldy and *Basileocephalus* Kirkaldy are sufficient to establish these genera it seems to me. However many species have been assigned to these genera with-

out careful consideration of their characters or without any consideration of zoogeographic distribution. Hence I am not sure of the real position of some of these species. The following genera seem to be fairly distinctive and the included species seem to be accurately placed. *Persis*, *Syntames*, *Neocenchrea*, *Dysimia* (monotypical) and *Symidia* (monotypical). I am very doubtful in the following cases: *Patara* with species from St. Vincent Island and Eastern North America including *Aquæleium* with species from the Seychelles Islands; both genera have elongate antennæ but I believe the venation is distinct. *Cyelokara sordidulum* is somewhat anomalous in *Dawnaria* where the typical species of *Cyelokara*, *C. girdlestoni* seems to belong. I am doubtful about our North American species *fulva*, *meateei*, and *uhleri* belonging to the genus *Cenchrea*. *C. dorsalis*, the typical species, has according to the illustration a short subcostal cell, a short furcate first cubital sector and a characteristic arrangement of the branches of media. Our North American species have an elongate subcostal cell; a distinct discal cell from which the branches are continued in a pectinate manner to the apical border; and a deeply furcate first cubital sector and are best placed in *Syntames*. The genus *Phaciocephalus* as it now stands seems to be a composite of East Indian, Papuan, Polynesian, West Indian and Neotropical species. It will require a thorough restudy of all the species to determine their true status. The inclusion of *Mysidia spreta* in *Basilcocephalus* should be reviewed. *Herpis* is perhaps a composite with two species from South America, one from Formosa, one from India, one from Borneo and three from the Philippines. Muir states that one of his species from the Philippines has a subantennal process on the cheeks and shoulder keels on the pronotum. On this basis I have included it in the key although Stål does not mention this character in the original description and Muir's statement that *Herpis* and *Syntames* are synonymous may be correct and the East Indian species may belong elsewhere.

Key to American Genera of the Tribe CENCHREINI

A. Subantennal process on cheeks well developed.
  B. Pronotum without antennal fovea . . . . . *Cedusa* Fowler
  BB. Pronotum with well developed antennal fovea . . . . . *Herpis* Stål
AA. Subantennal process on cheeks absent or very small.
  B. Pronotum with well developed antennal fovea.
    C. Forehead linear, the lateral carinæ contiguous to near apex . . . *Symidia* Muir

CC. Forehead not linear, the lateral carinæ not contiguous *1*
1. Subcostal-radial stem, media and first cubital sector distinctly bifurcate . . . . . *Neocenchrea* Metcalf
1. Subcostal-radial stem, media and first cubital sector not distinctly bifurcate *2*
2. First claval vein distinctly granulate *3*
2. First claval vein not granulate. . . *Phaciocephalus* Kirkaldy
3. Radius branching from the stem close to the branching of media; subcostal-radial stem short, subcostal cell long. . . . *Syntames* Fowler
3. Radius not branching from the stem close to media; subcostal-radial stem long, subcostal cell short . . . . . *Cenchrea* Westwood

BB. Pronotum without antennal fovea.
C. Vertex meeting forehead at an angle . . . . . *Persis* Stål
CC. Vertex rounding into forehead *1*
1. Antennæ flattened, elongate reaching beyond apex of head *Patara* Westwood
1. Antennæ shorter than frons *2*
2. Subcosta, radius and media forming a common stalk on basal fifth of tegmina; media with seven apical veins . . . . . *Dysimia* Muir
2. Media barely united with the stem of subcosta and radius at the basal cell; media with five branches . . . . . *Dawnaria* Distant

Persis Stål

(Stål 1862e: 7)

Haplotype *Persis pugnax* Stål.

We consider this genus as distinct as many other genera in the Homoptera, hence we have retained it. Stål (1869a: 99) places *Cicada lineata* Fabricius (1803a: 66) in *Persis*. McAtee (1924b: 178) places it in *Cenchrea* Westwood. The type should be reexamined and its true location determined. In any event the name *Cicada lineata* Fabricius 1803 is preoccupied by *Cicada lineata* Linné (1761a: 241), now *Philæneus lineata* Linné. I propose *Persis fabrieiana* for *Cicada lineata* Fabricius.

Persis fuscinervis Muir

Plates I, V, XVIII, XIX

Muir 1918a: 417.

This species was originally described for a single female from British Guiana. We have a series of three females and two males from Ancon,

Red Tank, and Ft. Sherman, Canal Zone which seem to agree in all essential details with Muir's description.

The male genital styles are robust, elongate with the apices recurved and excavated ending in rather acute tips. The aedeagus is elongate about one and one-fourth times as long as the styles. The anal segment is elongate slender about one and one half times as long as the styles. The anal spines are short triangular incurved, with the acute apices approximate on the median line.

Cedusa Fowl.

(Fowler 1904c: 112)

Logotype *Cedusa funesta* Fowler, Muir 1913c: 35.

There has been much confusion in the use of the generic names *Herpis* Stål, logotype *Herpis fuscovittata* Stål, *Lamenia* Stål, haplotype *Delphax caliginea* Stål, and *Cedusa* Fowler, logotype *Cedusa funesta* Fowler. Muir has established the genotypes as indicated. According to this definition *Herpis* has well developed lamelliform subantennal processes on the cheeks and well developed antennal foveæ on the lateral margins of the pronotum. *Cedusa* has the subantennal processes and a single dorsal lamelliform carina on the lateral field of the pronotum and *Lamenia* has the foveæ and no subantennal process. If this definition is correct, all our common North American species belong in *Cedusa*.

Cedusa funesta Fowl.

Plate V

Fowler 1904c: 112.

There is a series of five specimens from Barro Colorado, Cristobal and Mt. Hope which I presume is this species. They are dull black in color with the tegminæ and wings smoky. The characters of the head and thorax are well shown in the illustrations.

Syntames Fowl.

(Fowler 1905a: 138)

Haplotype *Syntames delicatus* Fowler.

This genus can be recognized by the broad nearly parallel-margined crown and forehead, pronotum with a distinct antennal fovea; tegminæ

broad; subcostal cell long; there is a distinct discal cell from which the five or six branches of media arise; cubitus bifurcate before the level of the union of claval veins.

If my identification of *delicatus* is correct our common North American species, *fulva* Van Duzee, *uhleri* Ball, and *mcateei* Dozier, belong here and not in *Cenchrea* Westwood. This genus would also include *Cenchrea brunnea* McAtee.

Key to the Known Species of SYNTAMES *Fowler*

A. Tegminæ light ochraceous buff with a more or less regular and more or less complete oblique fascia from claval suture to apical angle.
  B. Genital styles, viewed ventrad, broad and obtuse at apex.
    C. Genital styles, viewed laterad, with the dorsal edge suddenly produced near base and then straight to apex..... *delicatus* Fowler
    CC. Genital styles, viewed laterad, with the dorsal edge triangularly produced at the middle..... *chiriquensis* Fowler (Central America, British Guiana)
  BB. Genital styles, viewed ventrad, sublanceolate and curved..... *sufflavus* Muir (British Guiana)

AA. Tegminæ variously colored usually white, testaceous or fuscous without oblique fascia.
  B. Tegminæ milky white..... *albidus* Metcalf
  BB. Tegminæ dark, fuscous or testaceous.
    C. Lateral margins of the crown strongly elevated..... *1*
      1. Size small, 3.5 mm. to 4.0 mm..... *mcateei* Dozier
      1. Size larger, 5.0 mm. to 6.5 mm..... *fulvus* Van Duzee
    CC. Lateral margins of the crown not strongly elevated..... *1*
      1. Tegminæ stramineous with dark costal and commissural streaks..... *uhleri* Ball
      1. Tegminæ dark without definite streaks..... *2*
      2. Forehead distinctly widened below..... *brunneus* McAtee
      2. Forehead parallel-sided..... *fuscus* Metcalf

SYNTAMES DELICATUS Fowl.

Plates I, XIX, XX

Fowler 1905a: 139.

The general appearance and the character of the genitalia are shown by the illustrations.

The head is ochraceous orange, with eyes fuscous; and the tegminæ light ochraceous buff, with a distinct fuscous oblique fascia extending

from the forking of the first cubital sector to the apical angle; there is a more or less distinct fuscous vitta along the first claval vein; a distinct fuscous spot beyond the apex of clavus; and a small fuscous spot on the base of the costal margin.

There is a rather extensive series in the present collection from Barro Colorado Island various days, July 1924, N. B.

Syntames fulvus Van D.

Plates V, XX

Cenchrea fulva Van Duzee 1909a: 195.

Dozier has recently (1928a: 128) separated the smaller species *mcateei* 3.5 — 4.0 mm., from the larger *fulvus* 6.5 mm. Five females from Barro Colorado are intermediate in size 5.0 — 5.5 mm., but otherwise agree with the general descriptions of *fulvus* or *mcateei*. The pregenital plate of the female is elongate, whereas in the smaller *mcateei* from North Carolina the pregenital plate is short and broad. In *mcateei* the basal hooks of the genital styles of the male are near the base, whereas by inference they are near the middle of the styles in *fulvus*.

Syntames brunneus McA.

Plate XX

Cenchrea brunnea McAtee 1924b: 178.

This species was described from Mexico, Canal Zone and Guatemala. There is a series of five females from Barro Colorado which agree in all essential details except size, 5.5 mm. to 6.0 mm. The pregenital plate of the female is elongate with the terminal flap short and broad. The forehead is distinctly widened below.

Syntames fuscus spec. nov.

Plate XX

This species is close to *brunneus* McAtee but differs in having a shorter broader crown, a broad parallel-sided forehead and distinct genitalia.

Crown short and broad, nearly twice as broad as long, the lateral margins not elevated. Forehead broad, nearly parallel-sided throughout; the lateral margins slightly elevated, coarsely granulated. Clypeus

elongate, broad at base, triangular, with strong median and lateral carinæ, nearly flat between the carinæ. Pronotum rather long; antennal foveæ large, deep. Mesonotum tricarinate.

Male: Last ventral segment about as broad as long with a long median tooth; genital styles long, narrow without basal tooth, the inner margins widely separated basad, then converging gradually to the apical third then diverging and curving dorsad to the acuminate apices. Viewed laterad, the styles are slender basad, widening dorsad in an obtuse triangular tooth, the apex slender and ending in a long slender spine which is directed dorsad; the anal segment is slender basad widened toward the apex, ending in a pair of elongate acute teeth.

The female pregenital plate is broad and short nearly three times as broad as long with an elongate truncate flap.

Length to apex of tegmina 7.0 mm.

Holotype, male, Barro Colorado, 19 June 1924, N. B.

Allotype, female, Barro Colorado, 19 June 1924, N. B.

Syntames albidus spec. nov.

Plates VI, XX

This is a small pale species with white tegminæ and a broad pregenital plate with a large flap.

Crown longer than broad, lateral margins but little elevated with a double row of punctures. Apical margin triangularly produced. Forehead broad, lateral margins straight and parallel, median carina strongly elevated dorsad. Clypeus short about half as long as forehead. Pronotum rather short, the antennal foveæ large, deep. Tegminæ rather short and broad.

Female pregenital plate broad and short more than twice as broad as long. Flap large constricted basad nearly circular in outline.

General color of head, thorax, legs and abdomen pale ochraceous buff; more or less covered with white wax. Eyes brown. Tegminæ and wings white, venation concolorous.

Length to apex of tegminæ 6.0 mm.

Holotype, female, Barro Colorado, 18 July 1924, N. B.

Paratype, female, Barro Colorado, 12 July 1924, N. B.

Neocenchrea Metc.

(Metcalf 1923a: 193)

Orthotype *Cenchrea heidemanni* Ball.

McAtee (1924b: 177) reduces this genus along with *Herpis* Stål and *Syntames* Fowler to synonymy with *Cenchrea* Westwood. We cannot agree with this, however, as the venation, the genitalia and other characters are fundamentally different and to lump these distinct groups together simply makes generic characters so broad and general as to be meaningless, and raises them to the rank of a subtribe or even a tribe. Such lumping is a distinct disservice in systematics for it does not permit natural grouping of related species without the cumbersome use of subgenera and its only function for the general zoologist is to enable him to use a generic name instead of the name of a tribe or subtribe when discussing problems of morphology, physiology, ecology, et cetera.

This genus may be distinguished by the following characters: Head narrow with narrow crown and forehead, both of which have strongly elevated lateral margins and are without a median carina. Antennal foveae on pronotum strongly developed. Tegminæ long and narrow; three main veins of corium bifurcate; radius separated from subcosta before the level of the apex of clavus, media branched just beyond apex of clavus and first cubital sector branching at about same level as the union of claval veins.

This genus is close to *Basileocephalus* Kirkaldy, which includes *Urabunna* Distant, with one species from Morty and one from Queensland. Muir has placed *Mysidia spreta* Fowler from Mexico in *Basileocephalus* but it probably belongs to this genus, if the two genera are to be kept separate.

Key to the Species of Neocenchrea *Metcalf*

A. Crown broad, truncate caudad, strongly converging anteriorly.
  B. Tegminæ with dusky dots in the apical cells. . . . . *bakeri* McAtee 1924b: 177 (Mexico)
  BB. Tegminæ without dusky dots. . . . . *pallida* Metcalf
AA. Crown narrow, angulate caudad, not strongly converging anteriorly.
  B. Forehead nearly parallel-margined. . . . . *pallescens* Metcalf
  BB. Forehead distinctly narrowed between the eyes. . . . . *heidemanni* Ball 1902d: 261 (United States)

Neocenchrea pallida spec. nov.

Plates VI, XX

This species resembles a small *N. heidemanni* Ball, the tegminæ are narrower and more pointed; the crown is broader, and the main sectors of media are more deeply bifurcated.

Crown of head broad, triangular, posterior margin straight, lateral margins strongly elevated, pustulate; forehead narrow, lateral margins strongly elevated, pustulate, somewhat widened below; clypeus tricarinate. Pronotum rather broad, tricarinate, the lateral carinæ sinuate; posterior border broadly sinuate; shoulder keels strongly elevated. Mesonotum broader than long; distinctly tricarinate, the carinæ parallel; apex depressed.

Female subgenital plate, produced caudad, the apex truncate and minutely serrulate.

General color ivory white, the tegminæ testaceous yellow, eyes rosy red.

Length 6.5 mm. to apex of tegminæ.

Holotype, female, Barro Colorado, July 1923, R. C. Shannon.

Neocenchrea pallescens spec. nov.

Plates I, VI, XX

Similar to *N. pallida* Metcalf but with a narrower, nearly parallel-sided crown; a relatively broader and shorter forehead and different genitalia.

Crown as long as broad at the base; deeply incised posteriorly; the lateral margins strongly elevated and granulate. Forehead longer than clypeus; the lateral margins strongly elevated and parallel-margined. Antennæ very short. Pronotum about half as long as crown; deeply incised posteriorly with anterior and posterior margins parallel; antennal foveæ large, deep. Mesonotum broad; obscurely tricarinate. Tegminæ elongate, narrow. Subgenital plate of female broad, triangular acuminate caudad.

General color of head, thorax, legs and abdomen ochraceous buff; with the mesonotum, crown and forehead shading to ochraceous orange; eyes and edges of frontal carinæ brown. Tegminæ white, slightly tinged with buff.

Length to apex of tegminæ 6.8 mm.

Holotype, female, Barro Colorado, 19 July 1924, N. B.

Allotype, female, Barro Colorado, 20 July 1924, N. B.

Family ACHILIXIIDÆ

This small family consists of two genera one, *Achilixius* Muir with four species from Borneo and the Philippines; the other, *Bebaiotes* Muir with two species from Ecuador.

Superficially the members of this family resemble certain species of *Cixiidæ* but the general characters are more nearly like the species of *Achilidæ* but with steeply tectiform tegminæ and with appendages on the basal segments of the abdomen.

Muirilixius gen. nov.

Type *Muirilixius banksi* spec. nov.

This is the second American genus of this small and interesting family. It is close to *Bebaiotes* Muir but differs in that the frontal carinæ are contiguous, and it differs fundamentally in wing venation.

Head narrow, crown narrow, triangular, the lateral margins converging and meeting anteriorly, base broadly emarginate; forehead reduced to the contiguous carinæ to near the base then widened suddenly to the clypeus; clypeus elongate nearly as long as frons, carinate. Antennæ elongate; antennal sockets strongly elevated; first segment nearly as long as broad; second segment about twice as long as first. Lateral ocelli conspicuous. Eyes deeply emarginate ventrally. Pronotum elongate, nearly as long as mesonotum; the disc strongly elevated, with lateral carinæ evident, median carina sometimes indistinct. Mesonotum tricarinate.

The venation of the tegminæ is characteristic. Radius is unbranched. Media arises from radius and branches into two main sectors; first sector united with radius by a strong cross vein close to its point of origin; first sector deeply furcate; second sector shallowly furcate. First cubital sector branches on a level with media.

Muirilixius banksi spec. nov.

Plates II, VI, XVI, XIX

General color of the body, legs and antennæ testaceous yellow. Segments of the abdomen clouded with fuscous. Tegminæ testaceous yellow; thrice banded with fuscous, the first at the apex of the basal third, the second beyond the apex of clavus, the third near the apex, the first connected with the second by a fuscous vitta sometimes ex-

tending along the costal margin to the base; the second and third fasciæ connected by an indefinite cloud over the central area.

Body slightly compressed; tegminæ tectiform; crown four or five times as long as basal width, shading imperceptibly into forehead; pronotum rather large, broadly incised posteriorly; mesonotum large, about as long as head and pronotum combined.

Male genitalia very small deeply inserted into the abdomen. Pygofer small, entire; anal segment small; anal style inserted, minute; genital styles small spine-like, outer margins concentric with margins of pygofer.

Length to apex of tegminæ 7.3 mm.

Holotype, female, Barro Colorado, 18 August 1924, N. B.

Allotype, male, Barro Colorado, 20 August 1924, N. B.

Paratypes, one female, 13 August; two females, 18 August; one male, 18 August; all Barro Colorado.

Family DICTYOPHARIDÆ

This family contains some of the most bizarre forms of Fulgorids. The head is frequently produced into an elongate cephalic process; the tegminæ are macropterous, transparent, with distinct venation in some genera; while in other genera they are koelopterous, without a claval furrow and venation reduced or indistinct.

Key to Subfamilies and Tribes of DICTYOPHARIDÆ

(Modified from Melichar)

A. Claval furrow present; tegminæ transparent. Tegulæ present..... Subfamily DICTYOPHARINÆ

B. First claval (first anal) vein united to claval furrow (cubitus two) by a cross vein.....Tribe DICHOPTERINI

C. Veins of the tegminæ setigerous..... Subtribe CLADODIPTERINA

(A single genus *Cladodiptera* Spinola in the Neogæan Realm)

CC. Veins of the tegminæ not setigerous..... Subtribe DICHOPTERINA

(No representatives in the Americas; *Rotunosa* Dist. placed here by Melichar belongs to the Family TROPIDUCHIDÆ)

BB. No cross veins in the clavus.....Tribe DICTYOPHARINI

AA. Claval furrow absent; tegminæ opaque; tegulæ absent..... Subfamily ORGERIINÆ

Key to the North and South American Genera of the Tribe Dictyopharini

(Modified from Melichar)

A. Crown of head usually longer than broad, always distinctly separated from forehead; frequently produced into a distinct cephalic process.

B. Crown of head triangularly produced, or the process conically produced not suddenly constricted in front of eyes.

C. Pronotum and face granulate
Chondrodera Melichar 1912a: 157

CC. Pronotum not granulate *1*

1. Tegmina with reticular network between the principle longitudinal veins on both corium and clavus .....
Plegmatoptera Spinola 1839a: 283

1. Cross veins on corium simple, no cross veins on clavus .. *2*
2. Tegulæ with distinct carina *3*
2. Tegulæ without carina *5*
3. Media and first cubital sector of tegmina distinctly branched before the cross veined apical areas *4*
3. Media only branched before the cross veined apical area .
Nersia Stål 1862e: 62
4. Posterior tibiæ with seven spines .....
Megadictya Melichar 1912a: 64
4. Posterior tibiæ with only four spines .....
Pteroplegma Melichar 1912a: 66
5. The entire corium with cross veins .....
Melicharoptera nom. nov. for *Dictyoptera* Melichar 1912a:77 [nec *Dictyoptera* Latreille 1829].
5. Cross veins on the apical third of the corium only .....
Dictyophara Germar

BB. Crown of head produced into a definite cephalic process, constricted in front of eyes.

C. Fore tibiæ markedly longer than femora making the fore legs especially long *1*

1. Cephalic process short; fore femora not toothed .....
Igava Melichar 1912a: 47
1. Cephalic process elongate *2*
2. Fore femora toothed at apex ..... *Dictyopharoides* Fowler
2. Fore femora not toothed at apex .....
Lappida Amyot and Serville

CC. Fore tibiæ not especially longer than the femora *1*

1. Pronotum inflated ..... *Sicoris* Stål 1866a: 151
1. Pronotum not inflated; when viewed from the side crown, pronotum and mesonotum in the same plane *2*

2. Tegminæ transparent *3*
2. Tegminæ leathery not transparent .....
Scolops Schaum 1850a: 68
3. Crown suddenly constricted in front of the eyes *4*
3. Crown not suddenly constricted in front of the eyes *5*
4. Lateral carinæ of the vertex when viewed laterally curved, concentric with the margin of the eyes .....
Toropa Melichar 1912a: 80
4. Lateral carinæ of the vertex when viewed laterally straight not curved ..... *Paralappida* Melichar 1912a: 89
5. The dorsal and lateral fields of the cephalic process convex
Dorimargus Melichar 1912a: 90
5. The dorsal and lateral fields of the cephalic process flat or concave *6*
6. Cephalic process robust ... *Parahasta* Melichar 1912a: 108
6. Cephalic process slender ... *Eudictya* Melichar 1912a: 113

AA. Crown of head broader than long, often curving imperceptibly into forehead, no cephalic process.

B. Fore femora compressed.

C. Fore tibiæ broadly widened ... *Phylloscelis* Germar 1839a: 191

CC. Fore tibiæ simple ..... *Sicorisia* Melichar 1912a: 29

BB. Fore femora and tibiæ not widened.

C. Forehead with three parallel carinæ
Taosa Distant 1906n: 355

CC. Forehead with two parallel carinæ *1*

1. Tegminæ with two rows of cross veins apically .....
Hydriena Melichar 1912a: 50

1. Tegminæ with a single row of cross veins apically .....
Parahydriena Muir 1924g: 464

Lappida Amyot and Serville

(Amyot and Serville 1843a: 505)

Haplotype *Dictyophara proboscidea* Spinola.

This genus may be recognized by the elongate, slender cephalic process which is usually expanded apically. The tegminæ are transparent with supernumerary longitudinal veins but not many cross veins; the stigma usually brightly colored with three or four cells. The anterior tibiæ are elongate, longer than the femora; the hind tibiæ have four or five spines.

There are fourteen species known from Mexico, Central and South America. The present study adds two apparently new species.

Key to the Central American Species of the Genus LAPPIDA *Amyot and Serville*

A. Apex of cephalic process with a shining black hemispherical callosity.
  B. Intermediate carinæ of the forehead marked with black on the upper third at least. Length to apex of tegminæ 25 mm. or more..... *ferocula* Distant
  BB. Intermediate carinæ of the forehead not marked with black. Length to apex of tegminæ not more than 20 mm..... *gracilis* Melichar 1912a: 85 (Nicaragua)
AA. Apex of cephalic process without a callosity.
  B. Cephalic process short robust, about as long as pro- and mesonotum combined.
    C. Intermediate carinæ of forehead on the upper half completely black.....1
      1. Pronotum with a transverse row of fine black points..... *fusca* Metcalf
      1. Pronotum without a transverse row of black points..... *chlorochroma* Walker (Mexico)
    CC. Intermediate carinæ not marked with black..... *lappidaoides* Melichar 1912a: 88 (Mexico)
  BB. Cephalic process elongate slender, longer than pro- and mesonotum combined..... *rubrovittata* Metcalf

LAPPIDA FEROCULA Dist.

Plate VI

Lappida rubella Melichar 1912a: 84. Distant 1887d: 40; Pl. 6, Figs. 2, 2a.

This species was described as a *Dictyophara* but the illustration plainly shows a species of *Lappida*. This genus was ignored by Distant. Melichar 1912a: 95, credits *ferocula* to Fowler and places it in the genus *Dictyopharoides* which he credits to Distant as of 1887. This part of the Biologia was not published until 1900, however, and the context clearly shows that it was described by Fowler. The genus *Dictyopharoides*, however, has the cephalic process elongate slender tapering not expanded at apex. Having assigned *ferocula* to *Dictyopharoides* Melichar redescribes a reddish color variety as *rubella*.

Ferocula may be recognized from other species of *Lappida* known to me by its large size, 25 mm. or more to the apex of tegminæ; by the elongate slender cephalic process, which is twice as long as pro- and mesonotum combined, with a distinct hemispherical elevation on the widened apex.

Six specimens, all females, Barro Colorado, June, July and August, N. B. and November and January, H. F. Schwarz.

Lappida rubrovittata spec. nov.

Plates VI, XX

This species is close to *L. stratiotes* Gerstæcker from Brazil but differs in certain essential points and until *stratiotes* is completely described I prefer to list it as a distinct species. In contrast to *stratiotes* the following points should be noted: There is no black line on the dorsal surface of the cephalic process. There is no shining black spot at the apex of the cephalic process. The legs have the three femora ringed with black distally and the fore and middle tibiæ are blackish on the distal half. The size is much smaller and the cephalic process relatively shorter.

Cephalic process longer than pro- and mesonotum combined; the dorsal area nearly parallel-sided; no callosity at apex; the widened apical portion formed by the curving of the lateral carinæ; frontal area of the cephalic process very narrow; lateral margins broad, well elevated; intermediate carinæ continued on the frons to the clypeal suture. Clypeus with median and lateral carinæ.

General color testaceous, paler beneath. Carinæ of cephalic process black, dorsal and frontal areas fuscous, lateral areas bright red; margins of pronotum black, a transverse row of small black dots behind carinæ of pronotum, two elongate black dashes on either side of median carina of mesonotum. Legs testaceous with a black ring at the apex of each femur and the distal third of the fore and middle tibiæ and all the tarsi clouded with fuscous. Tegminæ and wings glassy, faintly tinged, stigma bright red, with three or four elongate cells; apical margin clouded with fuscous. Abdomen yellowish testaceous, darker testaceous above with the third and fourth, and the sixth and seventh segments marked with large quadrate black spots.

Length to apex of tegminæ 20.5 mm.

Holotype, male, Barro Colorado, 26 July 1924, N. B.

Allotype, female, 30 December, C. H. C.

Paratypes, 2 males, 24 and 17 July 1924, N. B.

Lappida fusca spec. nov.

Plates VI, XX

This is one of the smaller species of the genus resembling *L. cayennensis* Melichar from French Guiana but smaller with different coloration and with a short, robust cephalic process.

Cephalic process about as long as pro- and mesonotum combined,

the dorsal carinæ straight and nearly parallel from in front of eyes to near the apex; the lateral carinæ distinctly widened apically.

General color ochraceous orange or greenish yellow, with the body and legs and carinæ heavily marked with black. The lateral margin of the cephalic process has a narrow black vitta extending about half way to apex. There is a heavy vitta from the eyes to the tegulæ; another across the clypeus and pleural pieces to the base of the hind wings and a third across the labrum and pleural pieces to the base of the abdomen. The fore femora are thrice ringed with black and the middle and hind femora are ringed with black at base and apex. The tegminæ have the stigma and apex infuscated; the stigma typically with five cells. The abdominal segments are heavily fasciate with black ventrally and slightly dorsally.

Length to apex of tegminæ 18.2 mm.

Holotype, male, Barro Colorado, 29 July 1924, N. B.

Allotype, female, Barro Colorado, 23 June 1924, N. B.

Paratypes, 1 male, Barro Colorado, 24 June 1924, N. B.; 1 female, Barro Colorado, 29 December 1928, C. H. C.; 1 male, Barro Colorado, 25 June 1933, Hood and Hook.

Lappida chlorochroma Walk.

Plate VI

Dictyophora [sic] *chlorochroma* Walker 1851a: 311.

As I identify this species it is a medium small species with a short robust cephalic process which is not much expanded apically; the lateral carinæ of the crown are black apically; and the cephalic process is marked with red laterally; the intermediate carinæ of the forehead are black on the upper third and the ocular process is black.

Dictyophara Germar

(Germar 1833a: 175)

Logotype *Fulgora europaea* Linné, Van Duzee 1916a: 78.

This genus is of world wide distribution. Many species have been included which belong perhaps to other genera.

Key to Central American Species of Dictyophara *Germar*

(Modified from Melichar)

A. Crown distinctly produced, its median length greater than the basal width . . . . . Subgenus *Dictyophara* Germar

B. Lateral margins of the forehead visible from above.
C. Tegminæ with the cross veins punctate..... *truncata* Walker 1851a: 316 (South and Central America)
CC. Cross veins not punctate.....*1*
1. Lateral carinæ of crown nearly parallel. Stigma with four cells.....*brachyrhina* Walker (Colombia, Guatemala)
1. Lateral carinæ of the crown converging anteriorly; stigma with three cells..... *obtusifrons* Walker (South and Central America)
BB. Lateral margins of the forehead not visible from above..... *platyrhina* Walker 1851a: 311 (Brazil, Panama)
AA. Crown as wide as, or wider than, the median length..... Subgenus *Cuernavaca* Kirkaldy 1913a: 14 (Orthotype *Fulgora herbida* Walker).
B. Crown with a median percurrent carina; the intermediate carinæ of forehead concolorous.*herbida* Walker (South and Central America)
BB. Crown triangularly impressed basad, median carina short; the intermediate carinæ of the forehead black dorsad..... *nigronotata* Stål (Mexico, Central and South America)

Dictyophara nigronotata Stål

Plates VI, XX

Stål 1862e: 65.

Three specimens, Barro Colorado, N. B.

This species on the basis of head characters is somewhat anomalous in the genus *Dictyophara*, subgenus *Cuernavaca* Kirkaldy, but the phallic characters are similar and I prefer to retain it in this composite genus for the present.

Vertex shorter than basal width, curvingly transversely impressed with short basal carina; intermediate carinæ of frons black dorsad; stigma concolorous with three cells.

Dictyophara herbida Walk.

Plate VII

Walker 1851a: 306.

A single female specimen from Panama, Las Sabanas, 7 July 1924, N. B.

This is another short headed *Dictyophara* with the vertex as long as broad and a distinct median carina from base to near apex; the intermediate carinæ of frons are tinged with reddish ochraceous, while the median carina is bright green at base; the ovipositors and plates are very short.

Dictyophara brachyrhina Walk.

Plate VII

Walker 1851a: 317.

This species was described from Colombia and is also known from Guatemala. There are a number of specimens in the present collections from Barro Colorado collected by Mr. Banks and Dr. Curran.

This species may be recognized by the broad cephalic process which is about twice as long as broad and nearly parallel-sided. Most of the specimens are dull ochraceous orange but a few have the carinæ and the veins of the tegminæ bright grass green.

Dictyophara obtusifrons Walk.

Plates VII, XXI

Walker 1851a: 318.

There are numerous specimens from Barro Colorado which agree with Melichar's description and Fowler's figure of this species. It may be recognized by its short obtuse crown with the lateral carinæ converging anteriorly. It averages smaller than *brachyrhina*, 15–16 mm. to apex of tegminæ.

Dictyopharoides Fowler

(Fowler 1900e: 44)

(*Paramisia* Melichar 1912a: 79)

Haplotype *Dictyopharoides tenuirostis* Fowler.

Melichar misinterpreted this genus, placing *Dictyophara ferocula* Distant in it and then redescribing this genus as *Paramisia*. Melichar's species of *Dictyopharoides* will have to be restudied but they perhaps belong to *Lappida*. As far as I can judge his species *Paramisia suturata* from Paraguay is a valid species of *Dictyopharoides*.

This genus may be characterized as follows: Crown elongate, produced in front of eyes, then suddenly constricted and produced as a thin compressed upturned cephalic process; cheeks produced in front of eyes, with a large ovoid callosity; anterior tibiæ longer than femora and trochanters combined; anterior femora triangularly expanded distally with four or five minute teeth on the edges of the expanded area; hind tibiæ with four spines; tegminæ elongate; radial, medial and cubital stems branching at about the level of the apex of clavus; claval veins united on the basal third of clavus, abdomen strongly depressed.

Dictyopharoides tenuirostris Fowl.

Plates VII, XV

Fowler 1900e: 44.

There is a single female in the National Museum collection from Buena Ventura, Panama, 10 March 1911, A. Busck. It is testaceous yellow heavily marked with black as follows: Dorsal and ventral margins of the cephalic process; genal callosities; pleural pieces of the pro-, meso-, and metathorax; and the lateral margins of the abdomen both dorsad and ventrad. The tegminæ are transparent save a broad fuscous vitta extending from the apex of the clavus to the apical margin of the tegmina.

Cladodiptera Spinola

(Spinola 1839a: 316)

Haplotype *Cladodiptera macrophthalma* Spinola

This genus has a wide distribution in the Caribbean and Neotropical Regions. Several species were described by Distant from Mexico and Central America but there are no specimens of any of these in the present collection.

Family FULGORIDÆ

This family comprises some of the largest and most conspicuous members of the Fulgorids. Numerous genera and species occur in the tropical regions of the world but they have been little studied since the time of Stål.

The head is frequently much modified often with a distinct, and sometimes with an enormous, cephalic process; the clypeus is carinate on the sides; the tegminæ are usually large with numerous supernumerary longitudinal veins and numerous cross veins; the anal area of the hind wings is reticulate.

Key to the Subfamilies and Tribes of the FULGORIDÆ

A. With a single straight transverse carina between the forehead and crown No cephalic process. . . . . Subfamily PHENACINÆ

AA. With a double carina between forehead and crown, or the head produced into a distinct process.

B. With a vertical carina or a distinct spine in front of eyes.

C. Cephalic process always present, porrect . . . . . Subfamily FULGORINÆ

1. With a distinct tooth on the vertical carina in front of eyes. Tribe FULGORINI

1. Carina in front of eyes simple, not toothed 2

2. Clypeus shallowly inserted in forehead; vertical carina in front of eyes straight . . . . . Tribe LATERNARIINI

2. Clypeus deeply inserted in forehead; vertical carina in front of eyes arched . . . . . Tribe ZANNINI

CC. Cephalic process, if present, erect, recurved, or appressed, its lateral margins formed by the continuation of the intermediate carinæ of the forehead; if absent the intermediate carinæ of the forehead continued, converging on the crown . . . Subfamily APHANINÆ

1. Pronotum tectiform . . . . . Tribe ENCHOPHORINI

1. Pronotum flat with a weak median carina or none . . . . . Tribe APHANINI

BB. Without a vertical carina or spine in front of eyes.

C. With a distinct groove between forehead and crown . . . . . Subfamily POIOCERINÆ

1. Tegminæ with costal area broad, reticulate, distinctly sinuate towards apex . . . . . Tribe PARALYSTRINI

1. Tegminæ with costal area narrow 2

2. Pronotum with a conspicuous tooth behind each eye . . . . . Tribe LYSTRINI

2. Pronotum not toothed 3

3. Forehead elongate, narrowed above, reflexed on the produced crown . . . . . Tribe DILOBURINI

3. Forehead not elongate and reflexed; crown not produced . . Tribe POIOCERINI

CC. Without a groove between forehead and crown; head produced Subfamily AMYCALINÆ

Subfamily PHENACINÆ

This subfamily may be distinguished by the following characters: Head narrower than the pronotum; crown broad and short, separated from the forehead by a single straight transverse carina; tegminæ elongate, narrow, with the corium twice as long as the clavus, with numerous longitudinal veins and reticulate cross-veins; the legs are usually elongate slender; and the abdomen is frequently provided with long waxy scales.

Key to the American Genera of the Subfamily PHENACINÆ

A. Tegminæ transparent, cross-veins regular . . . . . *Pterodictya* Burmeister
AA. Tegminæ opaque, cross-veins irregular.
  B. Forehead narrow above, broadly ampliate ventrad; intermediate carinæ broadly curved and united dorsad . . . . . *Phenax* Germar 1833a: 175
  BB. Forehead broader than long, not narrowed above; intermediate carinæ strongly diverging.
    C. Pronotum as long as mesonotum, with a distinct median carina *Menenia* Stål 1866a: 139
    CC. Pronotum shorter than mesonotum with two elongate impressions converging caudad; with an obtuse tubercle cephalad between the impressions . . . . . *Cerogenes* Horvath 1909b: 632

PTERODICTYA Burm.

(Burmeister 1835a: 155)

Haplotype *Fulgora reticularis* Olivier, (*Tettigonia ephemera* Fabricius).

This is one of the most conspicuous and readily recognized genera of FULGORIDÆ. The tegminæ are transparent with numerous longitudinal veins and numerous rather straight cross-veins which are nearly uniformly distributed from base to apex.

PTERODICTYA RETICULARIS Oliv.

Fulgora reticularis Olivier 1791a: 574; *Tettigonia ephemera* Fabricius 1794a: 25; *Pterodictya ephemera* Burmeister 1835a: 155; *Pterodictya nigrolineata* Blanchard and Brulle 1846a: 221.

This species has a wide distribution in Central and South America, ranging as far north as Panama and as far south as Argentina. We have seen numerous specimens from South America and can find no reliable character to distinguish *nigrolineata* from *reticularis*.

There is a single specimen from Barro Colorado, 13 August 1934, Otis E. Shattuck, Museum of Comparative Zoölogy.

Subfamily POIOCERINÆ

In this subfamily the head is broad, the forehead and crown are broad and there is a distinct groove between them bordered by carinæ. I recognize no less than four tribes, only one of which is very extensive.

Tribe PARALYSTRINI

This is a very distinct tribe of the subfamily POIOCERINÆ. In general appearance the species resembles certain tropical species of the family FLATIDÆ, but are true FULGORIDÆ with the anal area of the hind wings reticulate; the clypeus with lateral carinæ; and the second tarsus of the hind leg long with a row of small spines at the apex.

The members of this tribe may be distinguished by the distinct groove between the forehead and crown. The tegminæ are broad with a broad reticulate costal margin which is distinctly sinuate beyond the middle.

The genus *Paralystra* was described many years ago for a single species from Brazil. We have two species from Brazil which undoubtedly represent a new genus of this interesting tribe.

Tribe LYSTRINI

This tribe is represented by the well known genus *Lystra*. It may be readily recognized by the facts that the forehead is quadrate; the lateral margins broadly elevated; crown excavated with the lateral margins produced into triangular teeth above the eyes. The pronotum is provided with a triangular tooth behind the eyes. The tegminæ are strongly tectiform and the legs are elongate slender.

Tribe POIOCERINI

In this tribe the body is somewhat depressed. The head is frequently broad or very broad. The crown is strongly transverse not produced. The forehead is usually transverse. The pronotum and mesonotum are generally flat. The tegminæ are narrow and elongate.

This is the largest tribe of the subfamily POIOCERINÆ. Twenty-eight genera have been described from the Americas and many others are in our collection awaiting description. I recognize two subtribes, POIOCERINA with the last dorsal abdominal (sixth) segment of the female not produced and CALYPTOPROCTINA with the last dorsal segment of the female longer than the penultimate.

A Key to the Known American Genera of the Tribe POIOCERINI

A. Last dorsal segment of the abdomen of the female not produced, about as long as penultimate. Basal margins of clypeus distinctly rounded.

B. Pronotum truncate posteriorly, longer than mesonotum . . . . . *Amantia* Stål 1864b: 49

BB. Pronotum broadly sinuate posteriorly, shorter than the mesonotum.
C. Tegminæ abruptly transparent apically *1*
1. Head including the eyes broader than the pronotum .....
Crepusia Stål
1. Head much narrower than the pronotum *2*
2. Veins on the basal area of tegminæ strong, reticulations inconspicuous; media branched before the middle .....
Florichisme Kirkaldy 1904c: 279
2. Veins on the basal area of tegminæ weak, media branching near the apical area ..... *Hypæpa* Stål 1862a: 306
CC. Tegminæ opaque or translucent throughout *1*
1. Anterior legs compressed, femora dilated below .....
Poiocera Laporte 1832b: 221
1. Anterior legs simple, slender *2*
2. Tegminæ narrowed apically, with a distinct ruga from the costal margin to apex of clavus ..... *Aburia* Stål
2. Tegminæ not narrowed apically, without a transverse ruga *3*
3. Clypeus bicarinate at the base *4*
3. Clypeus ecarinate or with a single median carina *5*
4. Body oval; tegminæ strongly convex .....
Oomima Berg 1879b: 180
4. Body elongate; tegminæ narrow .....
Alaruasa Distant 1906m: 199
5. Clavus open; claval stem continued beyond the apex of clavus; forehead with transverse ruga near the clypeal suture *6*
5. Clavus closed; claval stem united to the commissural margin near the apex *7*
6. Head including eyes much narrower than pronotum .....
Zeunasa Distant 1906m: 200
6. Head including eyes almost as broad as pronotum .....
Acræphia Stål 1866a: 136
7. Clypeal suture deeply impressed; clypeus viewed from the side distinctly curved at the base *8*
7. Clypeus and forehead viewed from the side nearly in the same plane ..... *Poblicia* Stål 1866a: 138
8. Forehead above the apical lobes more or less ampliate, a transverse ruga above the clypeal suture *9*
8. Forehead broad and parallel above the apical lobes, no transverse ruga above the clypeal suture .....
Aliphera Stål 1866a: 138
9. Head broader than pronotum . . *Itzalana* Distant 1905l: 146
9. Head not broader than pronotum . *Acmonia* Stål 1866a: 137

AA. Last dorsal segment of female abdomen produced at least twice as long as penultimate. Lateral margins of clypeus straight.

B. Tegminæ abruptly transparent apically ..... *Scaralis* Stål

BB. Tegminæ opaque or translucent not abruptly transparent.

C. Posterior femora longer than anterior, extending beyond the apex of abdomen, with a large spine on the exterior ventral margin; second segment of antennæ cylindric .....
Coptopola Stål 1869b: 239

CC. Posterior femora not longer than anterior, without a spine; second segment of antennæ subglobose *1*

1. Head obtusely angulate anteriorly, crown distinctly longer in the middle than next the eyes .....
Tomintus Stål 1864b: 49

1. Head not angulate *2*
2. Forehead nearly as long as broad with a distinct percurrent median carina and pair of nearly parallel intermediate carinæ ..... *Jamaicastes* Kirkaldy 1900b: 243
2. Forehead much broader than long without distinct percurrent median carina and intermediate carinæ *3*
3. Postocular area with a tooth like process; anterior femora dilated below ..... *Cyrpoptus* Stål
3. Postocular area without a tooth like process *4*
4. Pronotum incised behind the eyes *5*
4. Pronotum not incised behind the eyes *6*
5. Forehead with a central fovea; last dorsal segment of female tricarinate ..... *Calyptoproctus* Spinola
5. Forehead without a central fovea, with a faint median carina; last dorsal segment of female unicarinate .....
Pelidnopepla Stål 1869a: 88
6. A round shining callosity on the basal angles of the forehead *7*
6. Basal angles of the forehead without a callosity *8*
7. Apex of forehead with a transverse ruga; clypeus ecarinate; mesonotum twice as long as pronotum .....
Learcha Stål 1863b: 240
7. No transverse ruga on forehead; clypeus with a distinct median carina; mesonotum not twice as long as pronotum
Tabocasa Distant 1906m: 202
8. Basal margin of crown tangent to an imaginary line drawn between the apices of the eyes
Matacosa Distant 1906m: 198
8. Basal margin of crown distinctly caudad to an imaginary line drawn between the apices of the eyes *9*
9. Head very broad, as broad as pronotum; clypeus ecarinate
Oeagra Stål 1863b: 239
9. Head somewhat narrower than pronotum, clypeus with a distinct median carina ..... *Alphina* Stål 1863b: 243

Calyptoproctus Spin.

(Spinola 1839a: 266)

Logotype *Lystra stigma* Fabricius (*Calyptoproctus lystroides* Spinola) Duponchel 1840a: 201.

This genus was established by Spinola for those species of Fulgorids with a produced ("fifth") sixth abdominal segment. He included six species, three of which have subsequently been removed to other genera. Four species have been added to this genus since Spinola's time, making seven species in all, one from "America Septentrionale," two from Mexico and Central America, and four from South America.

The species are generally medium sized, 25mm. or less to apex of tegminæ, generally grayish in color with the veins of the tegminæ and the base of the hind wings frequently reddish. The head is broad, slightly broader than pronotum; the face is transverse, ampliate dorsad with a distinct areolet. The pronotum is short, somewhat truncate anteriorly, distinctly incised behind the eyes and with a well elevated median carina. The tegminæ are narrow, elongate and opaque; with costal margin with numerous cross veins; media and cubitus with numerous branches; clavus closed. Hind tibiæ with four spines. Sixth abdominal segment produced usually nearly as long as the five basal segments combined, tricarinate. Seventh, eighth and ninth segments concealed.

Ball has recently (1933d: 145) made this genus include *Crepusia* Stål but I cannot accept this. Ball's conclusion is that I misinterpreted the description and overlooked the fact that it is the fifth and not the ninth segment that is elongate. Spinola's figure clearly shows that it is the last visible abdominal segment that is elongate. Morphologically and actually the last segment is the sixth, not the ninth or fifth, as anyone can readily see if they will take the time to examine the abdomen of a specimen of any species of *Calyptroproctina* and not simply jump to conclusions. There are at least twelve genera of American POIOCERINÆ that have the last visible dorsal segment longer than the penultimate. My *Crepusia glauca* does not belong in *Crepusia* or *Calyptoproctus* and is not identical with *marmoratus* Spinola but belongs perhaps to the genus *Alphina* Stål (Plate XXII). So far as I know no one has seen a genuine *marmoratus* recently. Spinola gives Amerique Septentrionale for distribution of this species which may include Mexico and Central America. I had a specimen of the female of *glauca;* the sixth segment is about twice as long as the fifth hence, "not produced" with sides deflexed hence, "tricarinate" whereas in *Calypto-*

proctus the sixth segment is about four times as long as the fifth nearly as long as the first five segments combined hence, "produced" with sides not deflexed hence, "quinquecarinate." These characters agree with Spinola's figures and description whereas *glauca* agrees with neither but does agree with Dozier's description of *marmoratus* which is *glauca*. Every key ever devised can easily be misinterpreted for keys can at best be only a brief display of the characters involved.

Calyptoproctus elegans Oliv.

Plates VIII, XXI

Fulgora elegans Olivier 1791a: 574.

This is a large species of *Calyptoproctus*. The general color of the head, the thorax, the legs and the ventral side of the abdomen is ochraceous buff, more or less marbled with fuscous. The tegminæ are rosy red at the base, translucent apically. The hind wings are transparent. The abdomen above is bluish black with the posterior borders of the basal segments pale bluish green. There is a pair of large spots of the same color on the sixth segment.

The crown is about four times as broad as long, nearly parallel margined; the forehead is broad; distinctly ampliate dorsad; central areolet indistinct. Pronotum with a strong median carina which ends in a strong transverse ruga posteriorly; post-ocular incisions deep. Sixth dorsal abdominal segment produced, nearly as long as the basal segments combined; tricarinate, the carinæ parallel.

This species was described from Guiana and has been recorded from Brazil. I have a female from Barro Colorado, 2 August 1924, N. B.; two females, Barro Colorado, 27 June 1933, J. D. and H. Hood in the National Museum; and seven females and two males, Barro Colorado, October to December, M. Bates, in the Museum of Comparative Zoölogy.

Crepusia Stål

(Stål 1866a: 138)

Logotype *Poiocera miniacea* Germar 1830a: 54 (includes *Lystra servillei* Guerin-Meneville 1838a: 187.)

Ball states that "*Crepusia* is apparently one of the many genera proposed by Stål in his Hemiptera Africana keys that were never described or to which no species were referred. It seems best, therefore, to fix *glauca* Metcalf as the type of *Crepusia* Stål." As is well known

to most Hemipterists Stål listed species for most of the genera not included in his Hemiptera Africana in his Analecta Hemipterologica, Berliner Ent. Zeits. 10; 1866. Two species were listed for *Crepusia* Stål 1866c: 391, *Poiocera servillei* Guerin-Meneville and *P. nuptialis* Gerstæcker. One of the other of these two species must be selected as the type. Since no type has been selected and since I have from Brazil a species which I identify as *miniacea* Germar (includes *servillei* Guerin-Meneville) I have selected it as the type. *Miniacea* is not congeneric with *glauca*. I was misled by Stål's emphasis on the presence of a transverse carina on the pronotum. This is not a valid generic distinction but applies to a whole series of genera.

Crepusia Stål may be briefly characterized as follows: Head broad, as broad as or nearly as broad as pronotum; crown transverse, all margins carinate; forehead transverse, rugulose, ampliate dorsad; clypeal margin bisinuate; clypeus somewhat impressed; pronotum rather elongate, shorter than mesonotum, tricarinate, the intermediate carinæ diverging following the contour of the eyes, a transverse rugæ near posterior border; mesonotum nearly as long as crown and pronotum together, tricarinate, the intermediate carinæ sinuate; tegminæ coriaceous on basal two-thirds, suddenly transparent apically; subcosta and radius unbranched before apex of clavus; media three branched; first cubital sector branched; clavus closed, claval stem uniting with commissural margin before apex; hind tibæ with four or five spines; sixth abdominal segment not produced.

Crepusia ornata spec. nov.

Plate VIII

Head broad, broader than pronotum. Crown short trough-like; anterior, posterior and lateral margins carinate. Forehead transverse, ampliate dorsad, slightly lobate ventrad; deeply impressed above the clypeal suture, with a distinct transverse ridge and with an indistinct median and a pair of more distinct intermediate carinæ which curve outward toward the eyes and are united dorsad by a distinct transverse ruga; whole surface of forehead rugulose. Pronotum about half as long as mesonotum, with a distinct median carina and indistinct transverse ruga. Mesonotum tricarinate. Tegminæ narrow, elongate, with the basal area rugulose; the transparent apical area with numerous straight cross veins. Sixth abdominal segment about as long as fifth, not produced.

Crown, pronotum and mesonotum testaceous yellow, shaded with

fuscous and marked with black as follows: Narrow anterior border of pronotum and four longitudinal vitæ on the mesonotum. Forehead and beneath reddish; the legs the same color with the coxæ, femora and tibiæ ringed with black. The abdomen with small black spots on the basal angles next the pleural pieces. Tegminæ red on the basal opaque area, with large testaceous yellow spots; there are usually five or six spots on corium and three or four on the clavus, in addition to the three large spots at the apex of the opaque area, which are more or less bordered with black, most of the longitudinal veins are narrowly bordered with black; the apical area is transparent, veins brown. The hind wings are transparent with brown veins; the basal area is bright red clouded with fuscous at the base and along the anal and apical margins. The abdomen is red above the first three segments largely black; the fourth, fifth and sixth segments have a small median black spot and a pair of round black spots on the lateral fields.

Length to apex of abdomen 11.3 mm.; wing expanse 30 mm.

Holotype, female, San Carlos, Costa Rica, in the National Museum.

Paratypes, two females, San Carlos, Costa Rica, in the National Museum.

Aburia Stål

(Stål 1866a: 138 and 1866c: 390)

Logotype *Poiocera coleoptrata* Gerstæcker.

Stål places two species *coleoptrata* Gerstæcker and *olivacea* Blanchard in this genus. I have selected the type as indicated above.

This is a very distinct genus of POIOCERINÆ. The body is depressed, the head is narrow and the tegminæ are broad and flat. Forehead nearly as long as broad, lobate ventrad, surface rugulose, median carina fairly distinct ventrad. Pronotum elongate without median carina with two distinct punctiform impressions. Tegminæ broad, flat, distinctly narrowed apically; the basal area with a few strongly elevated straight veins, with indistinct reticulations between; apical membrane depressed, with numerous longitudinal and cross veins. Posterior tibiæ with four spines.

Aburia coleoptrata Gerst.

Gerstæcker 1860a: 229.

The general color of this species is bright cinnamon, more or less marked with black especially below. Crown with two shallow im-

pressed black points. Pronotum with two deeper impressed points. Mesonotum with an indefinite median longitudinal fascia and the lateral fields blackish fuscous, and two shallow impressed points near the posterior border. The tegminæ are irregularly marked with black in the reticulations between the veins, there is an irregular transverse black fascia between the base and the membrane, this fascia is extended as a pair of irregular longitudinal vittæ to the apex. Forehead and clypeus fuscous; legs and beneath chiefly black; pleural pieces bright yellow spotted with black; anterior and middle tibiæ ringed with bright yellow beyond the middle; abdomen black with the segments narrowly margined with bright orange yellow.

Length to apex of tegmina 17.2 mm.

There is a single female in the National collection from San Carlos, Costa Rica.

Cyrpoptus Stål

(Stål 1862a: 304)

Haplotype *Cyrpoptus suavis* Stål.

This is a fairly distinct genus of POIOCERINÆ. The head is broad. The crown is transverse, somewhat longer on the median line than next to the eyes. The postocular area is distinctly produced, toothlike. The pronotum is incised behind the eyes. The tegminæ are elongate, somewhat flaring apically. The anterior femora are somewhat dilated below. The last abdominal segment of the female produced.

The known species of this genus range from the southern United States to Cuba and Mexico.

Cyrpoptus obscurus spec. nov.

Plates IX, XXII

This is a rather large species of *Cyrpoptus* with completely transparent hind wings and completely opaque tegminæ.

The general color of the head, thorax and tegminæ, ochraceous buff; more or less suffused with red, especially on the veins of the tegminæ; the tegminæ also marked with obscure fuscous, forming a fairly distinct vitta between the veins of the clavus. Hind wings transparent throughout; veins fuscous. Entire underside, including legs, fuscous with numerous small ochraceous dots.

Forehead rather long and narrow. Crown long. Pronotum with a rather distinct median percurrent carina and a pair of conspicuous

straight intermediate carinæ behind the eyes. Mesonotum with an obscure median carina. Media and cubitus forked at about the same level, slightly before the middle of the wing, considerably before the level of the union of the claval veins.

Length to apex of abdomen 11.2 mm., wing expanse 31mm.

Holotype, male, Barro Colorado, 3 December 1930, F. E. Lutz, American Museum of Natural History.

Scaralis Stål

(Stål 1863b: 241)

Logotype *Lystra picta* Germ., Distant 1906m: 197.

As I understand this genus from the examination of the type it has a narrow head with the dorsal margin of the forehead broadly curved touching the anterior carina of the crown at the median line; the forehead is ampliate ventrad nearly parallel sided dorsad; there is a faint indication of a median carina and two v-shaped rugæ which touch the median carina below the middle. The clypeus is deeply impressed at the base. The margins of the crown are nearly parallel; there is a small postocular tooth. The pronotum is broad and short; truncate anteriorly; broadly sinuate posteriorly with median carina and distinct transverse ruga near the posterior border. The mesonotum is as long as the pronotum, tricarinate; intermediate carinæ connected by a transverse ruga on the anterior margin. The tegminæ are broad; abruptly transparent apically. Cross-veins irregularly reticulate on the opaque basal area, simple on the transparent apical area. Clavus closed, the claval stem united with the commissural margin. The legs are slender and simple; hind tibiæ with four or five spines. The last dorsal abdominal segment is elongate, produced; two or three times as long as penultimate.

There seems to be considerable confusion about the species of this genus. Distant (1887c and d: 32–33) placed *neotropicalis* and *obscura* in the genus *Jamaicastes* Kirkaldy (*Domitia* Stål) and *spectabilis* in *Scaralis* Stål. *Neotropicalis* and *obscura* have little in common with *Jamaicastes* and are very closely related to *picta*, hence I place them in the genus *Scaralis*. *Spectabilis*, judging from the figure alone, belongs to the genus *Poblicia*.

Scaralis neotropicalis Dist.

Plates IX, XXI

Domitia neotropicalis Distant 1887c: 32; pl. 5, figs. 3, 3a.

There is a single female of this species in the Museum of Comparative Zoölogy from Barro Colorado, October 26, M. Bates.

It is a beautiful species with the head and thorax largely dark green and testaceous, marked with cinnamon. The tegminæ are light ochraceous buff and the veins and cross-veins of the opaque area dark green. The basal area of the hind wings black, with a few irregular spots and cross-veins bright blue. The abdomen and femora are red, with the dorsal segments narrowly bordered with green; the last segment of the female is about twice as long as the penultimate.

Length to apex of abdomen 21.5mm.; wing expanse 66mm.

Tribe DILOBURINI

In this tribe the head is somewhat produced in front of eyes; the forehead is elongate frequently broadly ampliate ventrad; the tegminæ are elongate, costal margin usually large, clavus sometimes open, sometimes closed.

Key to the Genera of Diloburini

A. Clavus open, claval stem extending beyond the apex of the clavus or claval stem uniting with apex of clavus.
  B. Crown twice as long as broad . . . . . *Episcius* Spinola 1839a: 249
  BB. Crown much broader than long.
    C. Forehead with median carina faint or wanting, intermediate carinæ united above. Six prominent spines on posterior tibiæ *Echetra* Walker 1858a: 36
    CC. Forehead with four carinæ united above by a large callous area *Aracynthus* Stål 1866a: 136

AA. Clavus closed, claval stem united with the commissural margin before the apex.
  B. Forehead without percurrent carinæ.
    C. Sixth abdominal segment of the female produced . . . . . *Japetus* Stål 1863b: 244
    CC. Sixth abdominal segment of the female not produced . . . . . *Dilobura* Spinola 1839a: 254
  BB. Forehead with a median percurrent carina.
    C. Forehead with three percurrent carinæ, with five stout spines on posterior tibiæ . . . . . *Obia* Distant 1887c: 29
    CC. Forehead with a single percurrent carina; posterior tibiæ with numerous fine spines . . . . . *Abrahameria* Distant 1920a: 126

Subfamily APHANINÆ

This subfamily may be recognized by these characters: The forehead is broadly ampliate ventrad, narrowed dorsad; the intermediate carinæ of the forehead are continued as the lateral carinæ of the cephalic process, if present; if the process is reduced the carinæ are continued over the margin between the forehead and crown and converge on the crown.

This subfamily may be divided into two tribes, the APHANINI and the ENCHOPHORINI.

Tribe APHANINI

This tribe has the pronotum flat with a faint median carina or none. This tribe is composed of 24 known genera and is almost completely confined to the Eastern Hemisphere but will include the South American genus, *Copidocephala* Stål.

Copidocephala Stål

(Stål 1869b: 235)

(*Coanaco* Distant 1887c: 29)

Orthotype *Enchophora guttata* White.

This genus may be recognized by the slender erect cephalic process which is not recurved as in *Enchophora* and the pronotum is not tectiform as in *Enchophora*. The forehead is very broad on the clypeal margin rather suddenly constricted dorsad and then gradually narrowed to middle of the eyes and then suddenly to the cephalic process; there are two percurrent intermediate carinæ which branch near the clypeal margin, one branch extending towards the median line and the other towards the lateral margins. The pronotum is large; with a median and a pair of diverging intermediate carinæ, which extend to the posterior margin and have parallel carinæ ventrad on the lateral margins. The mesonotum is relatively small with a faint median carina. The tegminæ are largely reticulate over the entire surface of the clavus and corium. The legs are rather short; the hind tibiæ are elongate with five or six stout spines.

This is a small genus with five species from Central and South America.

Copidocephala ornanda Dist.

Plates VII, XXI

Distant 1887c: 29; pl. IV, figs. 13a-b.

This species may be recognized by the dull fuscous color of the head thorax and tegminæ, the latter spotted with black basally and with pale luteous apically, some of the black spots have red centers. The hind wings are fuscous with numerous bluish green spots. The abdomen is bright red above with the first three segments black and the median area of the other segments and the anal segments black. Beneath except the face and the lateral pieces of the pronotum, dull red.

Length to apex of tegminæ 27 mm.

There is a single specimen in the National Museum from Barro Colorado, 7 March 1929, S. W. Frost.

Tribe ENCHOPHORINI

This tribe has the median carina strongly elevated and the pronotum steeply tectiform. All the 6 known genera are confined to tropical America.

Key to the Known Genera of the Tribe Enchophorini

A. Cephalic process appressed, short, strongly recurved; apex resting on the crown ..... *Artacie* Stål 1866a: 131

AA. Cephalic process not appressed, apex free.

B. Tegminæ opaque ..... *Enchophora* Spinola

BB. Tegminæ transparent in part at least.

C. Forehead strongly lobate ventrad; tegminæ transparent before the middle ..... *Chilobia* Stål 1863b: 237

CC. Lateral margins of the forehead not lobate ventrad *1*

1. Tegminæ almost completely transparent; cephalic process slender, acuminate, porrect at base and somewhat recurved *Enhydria* Walker 1858b: 44

1. Tegminæ on basal half opaque; cephalic process about as long as pronotum, robust .... *Ecuadoria* Distant 1906l:21

Enchophora Spin.

(Spinola 1839a: 221)

Logotype *Fulgora recurva* Oliv., Duponchel 1840a: 200.

This genus may be readily distinguished by the short, slender, recurved cephalic process. The forehead is elongate, ampliate ventrad;

with a distinct median and a pair of intermediate carinæ, which are continued on the cephalic process. The pronotum is strongly tectiform. The mesonotum is tricarinate with the intermediate carinæ strongly curving outward, with a strong curving transverse carina before the apex and with the apex tripartite. Tegminæ coriaceous, strongly reticulate on the basal two-thirds; the membrane with numerous longitudinal veins and simple cross-veins. Hind tibiæ with four or five spines.

About twenty-three species are known from Central and South America.

Key to the Genus ENCHOPHORA

A. Hind wings red at base.
  B. Tegminæ with waxy points on apical area.
    C. Hind wings with conspicuous white dots in the basal red area *stillifera* (Stål) Distant 1887c: 27; pl. 4 (Mexico)
    CC. Hind wings without white dots in basal area *1*
      1. Apical area of tegminæ with waxy points white *2*
      1. Apical area of fore wings with waxy points either yellow or black *3*
      2. Pronotum with a submarginal black fascia. Abdomen above piceous with posterior margins of the segments dull sanguineous .... *nigromaculata* Distant 1906l: 23 (Bolivia)
      2. Pronotum without transverse fascia. Abdomen above sanguineous ..... *sanguinea* Distant
      3. Abdomen tawny. Tegminæ with small orange spots, tips greenish ..... *pyrrhocrypta* Walker 1851a: 272 (Brazil)
      3. Abdomen above black, hind borders of segments red. Tegminæ with small black dots, tips yellowish brown .... *parvipennis* Walker 1858a: 30 (Brazil)
  BB. Tegminæ without waxy points.
    C. Abdomen red above *1*
      1. Tegminæ with transverse fascia *2*
      1. Tegminæ without transverse fascia *5*
      2. With a single apical fascia *3*
      2. With two transverse fasciæ, one at the middle and one before the middle ..... *bohemani* Stål 1854b: 244 (Brazil)
      3. Proboscis of ordinary length reaching hind coxæ *4*
      3. Proboscis long reaching to apex of abdomen ..... *longirostris* Distant 1887c: 28 (Colombia)
      4. Costal margin with two conspicuous white spots ..... *ensifera* Germar 1830a: 47 (Brazil)
      4. Costal margin without conspicuous white spots ..... *florens* Distant 1887c: 28; pl. 4 (Nicaragua, Costa Rica)

5. Legs ringed with black . . . . . *fuscata* Spinola 1839a: 229
5. Legs uniform not ringed with black 6
6. Abdomen red above and gray below . . . . . *tuba* Germar 1830a: 46 (Brazil)
6. Abdomen red above and below . . . . . *recurva* (Olivier) Spinola 1839a: 222 (Dutch Guiana)

CC. Abdomen not red above 1
1. Apical area of hind wings with conspicuous white dots . . . . *dufouri* Signoret 1858c: 497 (French Guiana)
1. Apical area of hind wings without white dots 2
2. Anterior tibiæ twice ringed with black . . . . . *brachialis* Stål 1862e: 1 (Brazil)
2. Anterior tibiæ not ringed . . . . . *eminata* Schmidt 1909b: 187 (Brazil)

AA. Hind wings not red at base.

B. Tegminæ with waxy points.

C. Waxy points white 1
1. Tegminæ red with the veins broadly green. Hind wings chiefly milky white . . . . . *rosacea* Distant
1. Hind wings not milky white 2
2. Tegminæ dark green, hind wings bordered with fuscous . . . *subviridis* Distant 1887c: 28; pl. 4 (Panama)
2. Tegminæ and hind wings yellowish testaceous. Hind wings uniform not bordered *distanti* Metcalf [Distant 1887c: pl. 4]

CC. Waxy points black . . . . . *viridipennis* Spinola 1839a: 225; pl. 11 (Brazil)

BB. Tegminæ without waxy points.

C. Hind wings testaceous or brown . . . . . *tuberculata* Olivier 1791a: 569 (Dutch Guiana, Brazil)

CC. Hind wings milky white; tegminæ greenish unspotted . . . . . *prasina* Gerstæcker

Enchophora sanguinea Dist.

Plates VIII, XXI

Distant 1887c: 27.

The female specimens from Barro Colorado are typical dark *sanguinea*. One female from Drayton Trail, Barro Colorado, 11 November 1930, H. F. Schwarz, and another female, 9 October, M. Bates, have the red on the basal area of the tegminæ reduced to circulate spots each spot being bordered with pale yellow brown which makes the spots very conspicuous on the blackish fuscous background. Otherwise they agree with typical *sanguinea*.

The males have the tegminæ pale in color chiefly greenish with a faint indication of rosaceous brown in the cells and the waxy white points are more uniformly distributed over the surface of the corium.

Enchophora longirostris Dist.

Plates VIII, XXI

Distant 1887c: 28.

This is a dull cinnamon buff species with a bright red abdomen. The proboscis is elongate, reaching almost to the apex of the abdomen. The cephalic process is slender and but little expanded apically.

We have a single male from Barro Colorado Island, 24 December 1928, C. H. C.

Enchophora rosacea Dist.

Plates VIII, XX

Distant 1887c: 27; pl. 4, figs. 11a-b.

A single male, 24 December 1929, C. H. C. in the American Museum of Natural History, is typical but decidedly greenish on head, thorax, legs and tegminæ. The median pronotal carina does not extend more than three-fourths the length of the pronotum.

A single female, 27 June 1933, J. D. and H. Hood in the National Museum collection, and a single female 11–13 October, M. Bates in the Museum of Comparative Zoölogy.

Enchophora prasina Gerst.

Plates IX, XXI

Gerstæcker 1895a: 37.

This species was described from Colombia. There is a single pair from Barro Colorado, 4–5 December, collected by M. Bates in the Museum of Comparative Zoölogy.

The general color, light greenish yellow. The head and cephalic process are chiefly dark red. The legs and venter chiefly testaceous, more or less shaded with green on the thorax and with red on the apical segments of the abdomen. Tegminæ light greenish yellow with the costal membrane white and the subcostal vein bordered with dark red dashes from base to apex. Hind wings milky translucent. Abdomen above testaceous, apical segments red, more or less covered with waxy powder.

Subfamily FULGORINÆ

This subfamily includes the larger and more conspicuous genera of Fulgorids. All the known genera have conspicuous cephalic processes and a vertical carina in front of the eyes which is reduced in some genera to a conspicuous triangular tooth.

This family is confined to the tropical regions of the world.

As indicated above I recognize three tribes: FULGORINI (American genera), LATERNARIINI (Oriental genera), and ZANNINI (Oriental and African genera).

Types of Laternaria Linné and Fulgora Linné

Linné (1764a: 152) indicated the new genus *Laternaria* with two species, *phosphorea* and *candelaria*. *Phosphorea* (1764) is the same as *Cicada laternaria* Linné (1758a: 434) which was selected as the type of *Fulgora* by Lamarck (1801a: 291) and therefore cannot be the type of *Laternaria*. I am aware that some people do not accept Lamarck's designations as types but he states, "Pour faire connaître d'une manière certaine les genres dont je donne ici les caractères, j'ai cité sous chacun d'eux une espèce connue, ou très-rarement plusieurs, et j'y ai joint quelques synonymes que je puis certifier; cela suffit pour me faire entendre." This is an excellent statement of the purpose of type designation and it seems to me that it must be accepted as such. The rest of the history known to me is indicated in the table of type designation given below.

The only remaining species of *Laternaria* is *Cicada candelaria* which must be its type. *Pyrops* Spinola (1839a: 231), logotype *Pyrops candelaria* Duponchel (1840a: 200); *Hotinus* Amyot and Serville (1843a: 490), logotype *Laternaria candelaria* Linné; and *Fulgora* [nec Linné] Stål (1866a: 133) are synonymous with *Laternaria*.

Fulgora Linné 1767a: 703

Logotype *Fulgora laternaria* Linné, Lamarck 1801a: 291; 1801a: 258; Duponchel 1840a: 200; Kirkaldy 1900c: 263; 1902d: 47.

Pseudotype *Fulgora europaea* Linné, Laterille 1810b: 434; Kirkaldy 1913a: 11, 14; Muir 1923f: 230.

Pseudotype *Fulgora candelaria* Linné, Distant 1906i: 182; Schmidt 1911c: 161.

(Includes *Laternaria* [nec Linné] Stål 1866a: 132; pseudotype *Laternaria laternaria* Linné, Kirkaldy 1902d: 46.)

Laternaria Linné 1764a: 152

Logotype *Laternaria candelaria*.
(Includes *Pyrops* Spinola 1839a: 231; logotype *Fulgora candelaria* Duponchel 1840a: 200, Kirkaldy 1903c: 214.)
(Includes *Hotinus* Amyot and Servielle 1843a: 490; logotype *Fulgora candelaria* Kirkaldy 1903d: 232.)

Zanna Kirkaldy 1902d: 47

Orthotype *Fulgora tenebrosa* Fabricius, Kirkaldy 1902d: 47.
(Includes *Pyrops* [nec Spinola] Amyot and Servielle 1843a: 491; logotype *Fulgora tenebrosa* Fabricius, Distant 1906i: 179, Schmidt 1911c: 163.)

I recognize that these conclusions are somewhat disturbing but I believe that they are sound and will therefore cause less confusion in the long run. If these conclusions are sound, the American genus now known as *Laternaria* will be known in the future as *Fulgora*, the Oriental genus now known as *Fulgora* will be known as *Laternaria*, and the African and Oriental genus, if all these species remain in one genus in the future, formerly known as *Pyrops* must be called *Zanna*.

Tribe FULGORINI

This tribe includes our largest North American genera. The cephalic process is much modified, frequently with lateral teeth or strongly inflated.

Key to the American Genera of the Tribe Fulgorini

A. Pronotum steeply tectiform, deeply bi-impressed either side of median carina anteriorly . . . . . Subtribe FULGORINA
  B. Head large; cephalic process gibbous . . . . *Fulgora* Linné 1767a: 703
  BB. Cephalic process various, not gibbous.
    C. Cephalic process porrect, with two triangular spines in front of eyes. Crown without a prominent tooth above the eyes . . *Diareusa* Walker
    CC. Cephalic process toothed on the lateral margins; crown with a prominent tooth above the eyes *1*
      1. Apex of cephalic process trilobed, cephalic process with three pairs of triangular teeth laterad . . . *Phrictus* Spinola
      1. Apex of cephalic process acute not trilobed, cephalic process with eight pairs of triangular teeth laterad . . . . . *Cathedra* Kirkaldy 1903b: 179
AA. Pronotum not tectiform, median carina slightly elevated or wanting, impressed points wanting or punctiform not deeply impressed . . . . . Subtribe ODONTOPTERINA

B. Clypeus small, about half as wide as the ventral margin of forehead; cephalic process elongate conical with a prominent tooth either side in front of eyes ..... *Odontoptera* Carreno

BB. Clypeus of normal size; cephalic process of various forms not elongate conical ..... *Aphrodisias* Kirkaldy 1906b: 248

Diareusa Walk.

(Walker 1858b: 43)

Haplotype *Fulgora annularis* Olivier.

This is a very distinct genus of American Fulgorids. The cephalic process is short with two carinæ dorsad. The forehead is broadly ampliate ventrad with a pair of nearly parallel intermediate carinæ which fork ventrad. The vertical carina anterior to the eye forms a distinct tooth. The tegminæ are elongate with numerous longitudinal veins and reticulate cross-veins; the clavus is open. Hind tibiæ elongate with five or six stout spines.

Diareusa conspersa Schm.

Plates IX, XXI

Schmidt 1906e: 375.

This species was described from Ecuador. A single pair was collected at Barro Colorado, 5 December and 28 January, 1935, M. Bates. They agree in all essential details with Schmidt's description except the color of the spots on the hind wing which are pale yellow instead of orange red.

This species may be distinguished from *D. annularis* Olivier by the following characters: The cephalic process is shorter, nearly parallel sided, not expanded apically as in *annularis;* the dorsal carinæ are straight nearly parallel to near the apex where they gradually converge forming a short median carina. In *annularis* the dorsal carinæ gradually diverge from near the base, and then suddenly converge to form the median carinæ. In *conspersa* there is no distinct median carinæ on the forehead whereas in *annularis* there is a distinct median carina from the apex for more than half the length of the cephalic process. In color the two species are quite similar. The pronotum is spotted with black in *annularis,* unspotted in *conspersa.* The tegminæ are suffused with red at the base in *conspersa* and not in *annularis.*

We have no males for comparison but the female genitalia are very distinct. In *conspersa* the last ventral segment is more than twice as

broad as long, the posterior border broadly sinuate and the lateral margins rounded. In *annularis* the last ventral segment is about one and a half times as broad as long and deeply sinuate, the lateral margins are nearly straight and converge caudad.

Distant (1887c: 25) records *Diarcusa annularis* Olivier from Mexico, Guatemala, Panama, Colombia, and Guiana. We have not seen this species from Central America but have specimens of the closely related *D. conspersa* Schmidt from Central America.

PHRICTUS Spin.

(Spinola 1839a: 216)

Haplotype *Fulgora diadema* Linné.

This is one of the most conspicuous genera of the larger FULGORIDÆ. The head has an elongate cephalic process which is expanded apically and trilobed. The cephalic process has three pairs of teeth laterad and there are large supraocular and postocular spines. The pronotum is strongly tectiform. The tegminæ are coriaceous with a few longitudinal veins connected by reticulations on the basal area and numerous nearly straight longitudinal veins on the membrane connected by numerous, usually simple, cross veins. Hind tibiæ with six spines.

Key to the Species of PHRICTUS *Spinola*

(Modified from Schmidt)

A. Cephalic process longer than pronotum.
  B. Cephalic process with three apical teeth.
    C. Tegminæ translucent. Apical area of hind wing with large hyaline spots . . . . . *ocellatus* Signoret 1855e: v (Venezuela)
    CC. Tegminæ opaque; apical area of hind wings without hyaline spots *1*
      1. Apical lobes robust; with anterior margin of lateral lobes crenulate; genital styles obliquely truncate apically . . . . . *tripartitus* Metcalf (British Honduras)
      1. Apical lobes slender; with lateral margins of lateral lobes not crenulate; genital styles broadly rounded apically . . . . *diadema* Linné (Spinola 1839a: 219) (Brazil)
  BB. Cephalic process with five apical teeth . . . . . *quinquepartitus* Distant (Panama, Colombia)
AA. Cephalic process shorter than pronotum.
  B. Abdomen above and beneath chiefly black.

C. Basal area of hind wings yellow..... *auromaculatus* Distant 1905i: 672 (Bolivia)

CC. Basal area of hind wings red or orange red..... *1*

1. Apical area of cephalic process flat; apical spines long and slender..... *hoffmannsi* Schmidt 1905b: 338 (Peru)

1. Apical area of cephalic process inflated; apical spines short robust..... *moebiusi* Schmidt 1905b: 340 (Colombia)

BB. Abdomen above black, beneath brownish yellow; basal area of hind wings yellow..... *xanthopterus* Schmidt 1910b: 144 (Ecuador)

Phrictus diadema Linné

Plate XXI

Linné 1767a: 703.

This is one of the smaller species of the genus with the cephalic process longer than the pronotum. The colors are dull or the specimens we have are much faded. A transverse fascia at the base of the membrane is indistinct; the base of the hind wings broadly red, without spots. The genitalia are distinct.

This species is known from Brazil, Dutch Guiana. Distant records a variety from British Honduras which we believe is the species we describe as *tripartitus*.

Phrictus quinquepartitus Dist.

Plates XX, XXI

Distant 1883a: 24.

This is one of the largest species with the cephalic process longer than the pronotum and with five teeth at the apex, with the longitudinal veins and some of the reticulations testaceous yellow and some irregular margins along the costal border black; the transverse fascia at the base of the membrane is testaceous yellow, irregularly bordered with black; the membrane is spotted with the same color with some of the cross veins similarly marked. The base of the hind wing is scarlet red, irregularly spotted with fuscous; the apical and anal margins broadly fuscous with some of the cross-veins pale.

There is a single male specimen from Barro Colorado, 15 July 1933, J. P. Hood; and two males and one female collected in October, December and February by M. Bates.

PHRICTUS TRIPARTITUS spec. nov.

Plates XX, XXI

This species is similar to *diadema*, but the cephalic process is somewhat different and the genitalia are different. The colors appear to be brighter and the transverse fasciæ on the tegminæ more conspicuous.

The cephalic process is longer than the pronotum with the tripartite vertex crenulate on the anterior border, somewhat intermediate between *diadema* and *quinquepartitus*, the median tooth is obtuse, not acute as in *diadema*. The genital styles are broadly divergent as in *diadema* but are obliquely truncate apically and not rounded.

General color of head and thorax cinnamon buff shading to orange-red at the apex of the cephalic process. The head and thorax are more or less marked with black, especially on the lateral areas of the cephalic process, pronotum and mesonotum; the ocular spines are largely black; the ventral area of the cephalic process and forehead are dull testaceous. The tegminæ are largely carmine with the veins and reticulations more or less marked with ochraceous and the transverse fasciæ broad and bright ochraceous yellow; a few irregular black spots along the costal margin and beyond the apex of the clavus. Hind wings bright carmine at the base, fuscous at the apex. Legs and beneath black more or less marked with ochraceous.

Length to apex of tegminæ 39.5 mm.

Holotype, male, British Honduras, American Museum of Natural History.

ODONTOPTERA Carreno

(Carreno 1841a: 275)

Haplotype *Odontoptera spectabilis* Carreno.

This genus was described for *O. spectabilis* from America (?). I have three specimens of this species from Brazil which may be taken as the original habitat. In the present collections there are four specimens of *O. carrenoi* Signoret (1849b: 178) which was also described without locality.

The genus may be characterized as follows: Cephalic process elongate, conical, apex more or less upturned, with a pair of triangular teeth on each side in front of eyes. Clypeus small. Antennæ small; second segment capitate. Tegminæ broad; apical angle produced; the membrane with numerous veins and cross veins.

Odontoptera carrenoi Sign.

Plates VII, XXI

Signoret 1849b: 178.

Smaller than *O. spectabilis* Carreno with a more elongate cephalic process, shorter anal angle and entirely different coloration.

Head about as long as abdomen, nearly as wide as pronotum, cephalic process elongate, conical; sharply upturned at apex, lateral carinæ faintly indicated on base only, lateral frontal carinæ converging to base of upturned apex, then diverging and continued to apex of process; median dorsal and ventral carinæ very distinct on upturned portion of process. Pronotum smooth, anterior and posterior margins strongly curved. Mesonotum as long as broad, with five faint carinæ. Tegminæ about twice as long as broad; apical angle sharply rounded, broadly produced; costal membrane broad, subcostal vein with numerous branches, media with nine or more branches before the membrane; membrane with numerous veins and cross veins; claval area reticulate. Hind wings reticulate over most of the area. Hind tibiæ with four or five stout spines. Abdomen compressed with a definite median carina dorsad. Female eighth abdominal segment with elongate cerci-like appendages; tenth segment broadly U-shaped with the anal spine between the arms.

General color dark leaf green fading to light yellow green or ochraceous. Lateral margins of the cephalic process fuscous, bordered above and below by creamy white carinæ, upturned apex black; thorax beneath, legs and abdomen dark leaf green fading to ochraceous buff. Tegminæ basally dark leaf green fading to light yellow green, apical margin broadly fuscous; a small black ocellate dot just inside the anal angle. Hind wings with the anal area ochraceous orange with two large black spots; apical area transparent; basal area green.

Redescribed from a pair in the National Museum from Guatemala and a pair from Barro Colorado, collected by M. Bates. Signoret does not describe the black spot on the tegmina but he illustrates it and the species seems to agree in other details.

Subfamily AMYCALINÆ

In this subfamily the head is produced but there is no carina in front of eyes and no groove between forehead and crown.

So far as is known at present this subfamily is strictly American in distribution. It is more closely related to the POIOCERINÆ than to FULGORINÆ.

Key to the Genera of the Subfamily AMYCALINÆ

A. Cephalic process subterete..... *Rhabdocephala* Van Duzee 1929a: 190
AA. Cephalic process with lateral carinæ dorsad, flattened between.
B. Cephalic process broad, triangular but little expanded apically; lateral carinæ not crenulate..... *Amycale* Stål 1870b: 291
BB. Cephalic process slender, expanded apically, lateral carinæ crenulate. *Scolopsella* Ball 1905a: 118

Family ACHILIDÆ

This family consists of 64 known genera. The tegminæ have no costal area, claval veins distinct, the claval stem entering apex of clavus, and the apical area of tegminæ is usually enlarged beyond the apex of the clavus.

Key to the Genera of the Family ACHILIDÆ

A. Head broad including eyes, usually more than half as broad as pronotum; the lateral margins of the pronotum continuing the main axes of the eyes.
B. Tegminæ emarginate on the apical margin, not overlapping apically *Apateson* Fowler
BB. Tegminæ not emarginate apically.
C. Crown with the lateral margins distinctly longer than the median line; anterior margin straight or slightly concave.... *Ateson* Metcalf
CC. Crown with the median line as long as the lateral margins; anterior margin broadly rounded or angulate..... *1*
1. Crown and face both concave, trough-like..... *Kardopocephalus* Metcalf
1. Crown and face not trough-like..... *2*
2. Crown separated from the forehead by a distinct transverse carina, or carinæ..... *3*
2. Crown not separated from the forehead by a distinct carina..... *11*
3. Pronotum very short, usually distinctly shorter than the crown..... *4*
3. Pronotum more elongate..... *7*
4. Apex of head with two transverse carinæ forming a pair of areolets; a chain of areolets on posterior margin of pronotum..... *Catonia* Uhler
4. Apex of head with a single transverse carina; no chain of areolets on posterior margin of pronotum..... *5*
5. Posterior tibiæ with a single spine. Tegminæ nearly horizontal..... *6*

5. Posterior tibiæ without apparent spines. Tegminæ steeply tectiform ..... *Amblycratus* Uhler
6. Forehead elongate flat; clypeus not suddenly and distinctly narrower ..... *Catonoides* Metcalf
6. Forehead broad inflated; clypeus suddenly and distinctly narrower ..... *Plectoderes* Spinola
7. Tegminæ with a distinct costal fold between corium and membrane ..... *Koloptera* Metcalf
7. Costal margin continuous, no costal fold *8*
8. Face narrow, elongate, narrowed between the eyes *9*
8. Face broad, not narrowed between the eyes .. *Messeis* Stål
9. With a single carina between forehead and crown *10*
9. With two carinæ between forehead and crown, forming areolets ..... *Messoides* Metcalf
10. Posterior tibiæ with four spines; mesonotum short and broad, but little longer than the pronotum .....
Rhotala (Walk.) Fowler 1905a: 137
10. Posterior tibiæ with a single spine; mesonotum elongate, as long as broad. Pronotum about as long as vertex .....
Rhotella Metcalf
11. Forehead not separated from crown by an impressed line *12*
11. Forehead separated from crown by an impressed line ....
Cionoderus Uhler 1895a: 66
12. Subcostal-radial stem, media and first cubital sector all branching at the same level ..... *Phrygia* Stål 1856b: 163
12. Media unbranched before the apical area .....
Nelidia Stål 1862e: 66

AA. Head narrow, including eyes usually only about half as wide as pronotum.

B. Crown distinctly produced in front of eyes, median line usually distinctly longer than lateral margins.

C. Crown without a carina on the median line *1*

1. Crown deeply excavated, elongate bifid at the apex reflexed; dorsal margin of face distinctly emarginate .....
Pseudohelicoptera Fowler 1904b: 107
1. Crown not deeply excavated sulcate on median line, not bifid at the apex; dorsal margin of the face not emarginate
Epiptera Metcalf 1922a: 264

CC. Crown with a carina on the median line *1*

1. Forehead with intermediate carinæ .....
Taracticus Berg 1881b: 265
1. Forehead without intermediate carinæ *2*
2. Tegminæ with callosities on the membrane beyond the apex of clavus ..... *Elidiptera* Spinola 1839a: 304
2. No callosities on the tegminæ .... *Myconus* Stål 1862e: 65

BB. Crown short, transverse, not produced in front of eyes, anterior and posterior margins nearly parallel.
C. Posterior tibiæ unispinous; base of vertex sinuate *1*
1. Pronotum twice as broad as the head ..... *Achilus* Kirby
1. Pronotum narrower ..... *Phypia* Stål

Subfamily APATESONINÆ

This subfamily may be characterized as follows: Crown short, anterior margin straight or concave with a single distinct transverse carina; face concave the lateral margins strongly elevated; tegminæ steeply tectiform, not over-lapping, apex of clavus broadly rounded, claval veins ending in apex; subcostal vein with numerous veinlets to costal margin near apex.

Apateson Fowl.

(Fowler 1900g: 70)

Haplotype *Apateson albomaculatum* Fowl.

This genus was placed in the RICANIIDÆ (i.e. the NOGODINIDÆ) by Fowler, and in the ACHILIDÆ by Muir. It is somewhat anomalous in either family; but the venation is much more like an achilid venation than the venation of the NOGODINIDÆ, hence I place it here for the present and erect a subfamily APATESONINÆ for this genus and *Ateson* Metcalf.

Apateson albomaculatum Fowl.

Plates IX, XV

Fowler 1900g: 70.

This species may be recognized by its blackish color with conspicuous pale yellow or ivory white spots.

Apateson albomaculatum Fowler was described from Mexico, Nicaragua and Panama and I have seen specimens from British Honduras, hence I conclude that it is widely distributed in Central America.

Ateson gen. nov.

Orthotype *Ateson marmoratum* spec. nov.

This genus has the general aspect of *Apateson* Fowler but the tegminæ are not emarginate and the venation is entirely distinct.

Crown short and broad, ecarinate, anterior margin straight. Face

elongate, concave, not narrowed between the eyes, median carina faint, percurrent. Antennæ small, second segment slender, capitate. Pronotum short with distinct median and intermediate carinæ. Mesonotum large, compressed, tricarinate. Tegulæ large. Tegminæ large, steeply tectiform; costal and commissural margins nearly parallel, apical margin broadly rounded. Subcostal vein indistinct basad, with numerous veinlets to the costal margin apically. Radius unbranched before the apical cells. Media with five branches before the apical cells. Claval veins united on the apical fourth; the stem connected with the blunt apex of clavus. Hind tibiæ short, stout with a single stout spine beyond middle.

Ateson marmoratum spec. nov.

Plates II, XV, XXII

This is a blackish brown species with the tegminæ irregularly marked and the veins dotted with ochraceous yellow.

Crown short about three times as broad as long; anterior margin straight, distinctly carinate; posterior margin broadly curved. Forehead and clypeus with lateral margins strongly elevated, carinæ distinct on the basal two-thirds. The last ventral segment of the male broadly triangular, three times as long as broad; central area broadly rounded, somewhat flap-like. Genital styles about twice as long as broad; notched at the apex; the outer and inner angles obtuse.

General color blackish brown shading to testaceous on the forehead, the lateral margins of the head and the center of the thorax. Pronotum, mesonotum, tegminæ and legs blackish brown. The fore tibiæ ringed with ochraceous yellow at the apex. Lateral fields of the pronotum dotted with ochraceous yellow. Cells of the tegminæ irregularly marked and the veins punctuate with ochraceous yellow.

Length to apex of tegminæ 10.4 mm.

Holotype, male, Maroni River, French Guiana.

Allotype, female, Barro Colorado, 26 July 1924, N. Banks.

Paratypes, 1 female, Maroni River, French Guiana; 1 female Barro Colorado, 4 February 1929; 1 male and 1 female, Barro Colorado, July 1923, R. C. Shannon.

Ateson fuscum spec. nov.

Plates II, VIII, IX, XVI, XXII

This species is closely related to *marmoratum* but it is differently colored and has a differently shaped head and distinct genitalia.

General color tawny brown. Crown, pronotum and mesonotum testaceous. Forehead and legs testaceous, the forehead and the lateral fields of the pronotum with numerous small ochraceous yellow pustules. The lateral margins of the forehead with numerous black dashes. The tegminæ almost uniform tawny brown, with the principal veins testaceous and the cross veins ochraceous yellow; the apical cells and the stigmatal area are clouded with blackish fuscous. There is a distinct brownish saddle across the middle of the clavus. Crown shorter than in *marmoratum*, more than four times as long as broad; the carinæ not so strongly elevated. Forehead with the lateral margins nearly parallel, not so strongly elevated; median carina distinct. Mesonotum more elongate than in *marmoratum*. The carinæ more strongly elevated. Tegminæ more strongly rugulose than in *marmoratum*. The last ventral segment about twice as broad as long; the median area separated from the lateral areas by a distinctly rounded notch; the median area triangularly produced; lateral margins sinuate. Genital styles short and broad; distinctly indented apically and the outer angles produced into an acute tooth.

Length to apex of tegminæ 10 mm.

Holotype, male, Barro Colorado, 27 June 1924, N. Banks.

Subfamily ACHILINÆ

This subfamily includes those genera of the Family ACHILIDÆ which have the body depressed; the tegminæ nearly horizontal overlapping more or less beyond apex of clavus; crown produced, separated from forehead by one or two carinæ.

KOLOPTERA gen. nov.

Orthotype *Koloptera callosa* spec. nov.

This genus has a superficial resemblance to *Epiptera* Metcalf. It differs, however, in a number of important respects. The head is broader, is carinate laterally, the pronotum has supernumerary lateral carinæ and the shape and venation of the tegminæ are entirely different.

Head broad produced, the crown about twice as long as broad at base, with a distinct median carina; forehead broad the lateral margins nearly parallel not constricted between eyes, with a distinct median carina; clypeus short about half as long as forehead, carinate; lateral margins of head with a distinct carina from eye to anterior border. Antennæ small, second segment globose. Pronotum with the margins

nearly parallel, three pairs of supernumerary longitudinal carinæ in addition to the median and intermediate carinæ, lateral margins with two carinæ. Mesonotum broader than long. Tegminæ elongate with a characteristic fold on the costal margin in the region of the nodal cell. All the longitudinal veins of the tegminæ converge towards the middle of the line separating corium from membrane and then radiate to the apical margin; there are numerous pseudoveinlets between the costal margin and subcosta; two callosities on either side of the costal fold; radius two-branched; media with three branches; cubitus two bent sharply toward media.

Koloptera callosa spec. nov.

Plates II, IX, XVI

This species bears a superficial resemblance to *Epiptera* (*Helicoptera*) *longiceps* Fowler. The latter species, however, lacks the distinct costal fold.

General color tawny olive with numerous small ochraceous yellow spots and a few clouds of fuscous. Two transverse fuscous fasciæ on the crown and base of the forehead. The forehead and venter ochraceous buff, with the legs and clypeus tawny olive; spines and claws black. The callosities of the tegminæ black; hind wings fuscous.

Length to apex of tegminæ 4.5 mm.

Holotype, male, Las Sabanas, Panama; 7 July 1924, N. B.

Allotype, female, Las Sabanas, Panama; 7 July 1924, N. B.

Paratypes, 1 male, Fort Davis, Canal Zone; 25 July 1924, N. B.; 1 female, Las Sabanas, Panama; 7 July 1924, N. B.

Messeis Stål

(Stål 1862e: 66)

Haplotype *Messeis fuscovaria* Stål.

If I interpret this genus correctly, it resembles *Catonia* Uhler in general appearances. It differs, however, in being more depressed; in having the pronotum distinctly tricarinate without a chain of areolets along the posterior border; the vertex is not separated from the forehead by a transverse carina in addition to the forks of the median facial carina; the venation is quite similar in both genera and the veins are irregularly granulate; the hind tibiæ have a single large spine on the basal third.

Messeis asper Fowl.

Plates VII, XVI, XXII

Plectoderes asper Fowler 1904c: 110.

We have a single male which agrees in essential details with Fowler's short description and illustration. The head and the pronotum are more elongate than is indicated in Fowler's figure. The pronotum is rather heavily marked with testaceous and the basal cells are variegated with deep ferruginous olive.

Messoides gen. nov.

Orthotype *Messoides uniformis* spec. nov.

Superficially this genus suggests *Epiptera* Metcalf. The head is broader; the crown is distinctly carinate on the median line, not sulcate; and the pro- and mesonotum are distinctly tricarinate.

Head broad, distinctly produced in front of eyes. Crown with distinct median carina and strongly elevated lateral margins. Forehead elongate; distinctly narrowed between the eyes, with a distinct median carina which is continued onto the clypeus. Pronotum elongate, tricarinate on the disk; the intermediate carinæ continuous with the lateral margins of the head and with the intermediate carinæ of the mesonotum; lateral margins with two carinæ. Tegminæ with subcosta and radius branching on the basal third; the subcosta branching at the level of the first cubital sector; media with five distinct branches; first cubital sector branching at the level of the union of the claval veins. Hind tibiæ with three stout spines.

Messoides uniformis spec. nov.

Plate X

General color dark cinnamon brown, almost uniform above and below including tegminæ and wings. The veins paler with indistinct dashes of paler fuscous; and subapical margin with an indistinct fascia of black; the first medial sector distinctly black apically.

Crown longer than broad; triangularly produced anteriorly; cephalic areolets deeply impressed. Pronotum with a row of indistinct pustules on the lateral areas behind the middle.

Length to apex of tegmina 12.3 mm.

Holotype, female, Barro Colorado, 29 June 1933, Hood, Hood and Hook. In the collection of the U. S. National Museum.

Catonia Uhl.

(Uhler 1895a: 61)

Logotype *Catonia nava* Say.

This is a conspicuous North American genus which ranges southward through Mexico, Central America and the West Indies to Northern South America.

The genus may be recognized by its broad head, short nearly quadrangular crown with two distinct transverse carinæ anteriorly forming distinct triangular areolets. Forehead distinctly narrowed between the eyes, with an evident median carina. Short collar-like pronotum with a row of areolets along the posterior margin formed by short carinæ from the diverging intermediate carinæ to the posterior border. The venation of the tegminæ is fairly typical. Subcosta and radius are united on the basal third both with short branches before the margin; media with three short branches before the submarginal vein; first cubital sector branching before the middle. Hind tibiæ with a single spine.

Helicoptera sobrina, *H. sobrina* var. *albidovariegata*, and *H. chiriquensis* Fowler undoubtedly belong to the genus *Catonia*.

Catonia sobrina Fowl.

Plate II

Helicoptera sobrina Fowler 1904b: 106.

From the description I judge that *sobrina* is a complex, perhaps of several species. Since I have only a single specimen of *Catonia* from Barro Colorado I prefer to consider it as belonging to this species until the complex can be straightened out. This specimen is lighter than typical *sobrina* as described by Fowler. The clypeus has a strong median carina, irregularly testaceous, lateral margins blackish; forehead not much narrowed between the eyes, base and apex brownish testaceous with an intermediate narrower band of ivory white, lateral margins with rather regular alternate black and ivory white dots. Mesonotum largely blackish testaceous. Tegminæ almost uniform testaceous with the veins dotted with black especially conspicuous on the costal margin.

A single female, Barro Colorado, 24 July 1924, N. B.

Rhotella gen. nov.

Orthotype *Rhotella punctata* spec. nov.

This genus has a head and thorax suggestive of *Pintalia* Stål (CIXIIDÆ) but the other characters are those of a typical Achilid, resembling *Rhotala* Walker but with the pronotum much shorter, and the mesonotum much longer and the posterior tibiæ with a single spine.

Crown with a distinct median carina, sloping anteriorly and gently rounded into forehead but separated by a distinct transverse carina; forehead rather broad with a distinct median carina. Antennæ small, the second segment somewhat longer than wide. Pronotum elongate, with three carinæ; mesonotum longer than broad, with three carinæ. Tegulæ large. Tegminæ coriaceous; subcosta and radius united on the basal fifth, both unbranched before the apical cells; media with three branches before the apical cells; first cubital sector branching before the apex of clavus; claval veins connected by a strong cross vein. Posterior tibiæ with a single spine.

Rhotella punctata spec. nov.

Plates IX, XV

This is a fairly large species of a pale yellowish testaceous color with the tegminæ spotted and clouded with fuscous.

Crown broader than long, median carina very distinct. Forehead broadest at clypeal margin then somewhat rounded and narrowed below the eyes; lateral margins carinate but not strongly elevated, median carina distinct to labrum, ending in a Y-shaped carina separating forehead from crown. Pronotum strongly compressed, the median field between the intermediate carinæ strongly elevated.

General color yellowish testaceous with variable markings of blackish fuscous. The following are marked with blackish fuscous; the eyes, the sides of the forehead in front of eyes, the lateral fields of the pronotum, the pleural pieces, and the abdomen; the fuscous markings on the tegminæ are very variable, and may be represented by minute round points or broad irregular clouds; there are usually several small points at the base of the tegminæ and in the apical cells.

Length to apex of tegminæ, male 6.6 mm.; female 7.1 mm.

Holotype, male, Rio Grande, British Honduras, December 1930, J. J. White. In author's collection.

Allotype, female, Rio Grande, British Honduras, December 1930, J. J. White. In author's collection.

Elidiptera Spin.

(Spinola 1839a: 304)

Logotype *Elidiptera callosa* Spinola.

The genus *Elidiptera* was established by Spinola (1839a: 304) for five species, and this name was long used as the generic name for the common Palearctic and Nearctic species of ACHILIDÆ. *E. callosa* was subsequently selected as the type of *Elidiptera* and since *callosa* is not congeneric with Nearctic and Palearctic species Metcalf (1922a: 263) proposed that the latter group be assigned to the genus *Epiptera*. *Callosa* is apparently the only species belonging to the restricted genus *Elidiptera*. This species is known from Brazil (Spinola) and Trinidad (Muir).

Elidiptera callosa Spin.

Plates II, X, XVI

Spinola 1839a: 305.

A single female from Red Tank, Canal Zone, 30 June 1924, agrees in essential details with the original description and illustration of this species although it differs considerably in coloration. The chances are that a careful comparison between these Central American forms, the specimens Muir received from Trinidad and specimens from Brazil might show constant specific differences.

The present specimen differs chiefly from typical *callosa* in having a regular series of diagonal fuscous markings in the costal area extending from the base of the tegminæ to the nodal cell, the markings on the tegminæ are more irregular, and there are two callosities on the tegminæ, the posterior small but distinct.

Catonoides gen. nov.

Orthotype *Catonoides fusca* spec. nov.

This genus resembles *Catonia* Uhler but is more depressed. There is only a single transverse carina between the forehead and crown. The forehead is not narrowed between the eyes and the pronotum is without areolets on the posterior margin. Mesonotum about as long as broad, tricarinate. Tegminæ with the radial-subcostal fork, the forking of the first cubital sector and the union of the claval veins at the same level; media forked toward the apex. Hind tibiæ with a single spine.

CATONOIDES FUSCA spec. nov.

This species has the appearance of a small dull *Catonia*.

The crown is broad, triangularly produced apically. Forehead with a distinct median and lateral carinæ which are continued on the clypeus. Pronotum with indistinct carinæ.

General color cinnamon brown, irregularly marked with ochraceous buff and ochraceous tawny and fuscous. Crown and thorax ochraceous buff. The mesonotum with a broad transverse fascia of ochraceous tawny behind the middle. Face and beneath including legs uniform ochraceous tawny. Tegminæ chiefly ochraceous tawny, with the transverse veins and the apical margins marked with ochraceous buff; and the cells irregularly clouded with fuscous.

Length to apex of tegminæ 4.9 mm.

Holotype, female, Barro Colorado, 12 July 1924, N. B.

PLECTODERES Spin.

(Spinola 1839a: 328)

Haplotype *Flata collaris* Fabricius.

This is a genus of small flat compact Achilids. The forehead is broad and short with a distinct median and lateral carinæ. It has a single carina between the forehead and crown; crown flat with a distinct median carina, the lateral margins are elevated. The pronotum is very short. The mesonotum is large, tricarinate. The venation is relatively simple and the forking of the radial-subcostal stem, the first cubital sector and the union of the claval veins are at about the same level. The hind tibiæ have a single spine.

Fowler described nine species in this genus. If his illustrations are correct, I believe that some of these species belong to *Amblycratus* Uhler and others to *Catonoides* Metcalf.

PLECTODERES COLLARIS Fabr.

Plates X, XVI

Fabricius 1803a: 53.

We have a single specimen of this species from Maroni River, French Guiana which agrees with Spinola's illustration and the general description of this species. There is also a single female in the National Museum collection from Barro Colorado, 18 April 1929, S. W. Frost,

which agrees in essential details and color. It is smaller and lacks the light costal margins characteristic of this species, but until more specimens are available it should remain here.

Plectoderes scapularis spec. nov.

Plates X, XVI, XXII

This is one of the smaller species of *Plectoderes*; black marked with pale yellow.

The head nearly as wide as pronotum; crown short transverse, about twice as broad as long, distinctly impressed. Forehead rather long for *Plectoderes*, distinctly inflated; median carina indistinct; whole surface finely rugulose. Clypeus rather large for *Plectoderes*, triangular; median and lateral carinæ strongly elevated. Pronotum short; median and intermediate carinæ rather distinct for *Plectoderes*. Mesonotum about as long as broad, strongly elevated, tricarinate; the intermediate carinæ somewhat diverging laterad. Venation somewhat typical; subcosta distant from the costal margin, strongly curved; radius distant from and running nearly parallel to the subcosta; media and first cubital sector closely crowded together.

General color black, strongly marked with bright yellow as follows: Posterior half and lateral margins of crown; posterior border and carinæ of pronotum; the lateral margins of the mesonotum; the claval and commissural margins of the tegminæ, with a broad vitta from near the base extending between the subcosta and radius. Beneath, the clypeus, the lateral fields of the pronotum and the basal half of the tegulæ are yellow.

Length to apex of tegminæ 5.5 mm.

Holotype, male, Rio Grande, British Honduras, February 1932, J. J. White.

On the basis of venation this species should perhaps constitute a new genus but the characters of the head and thorax are similar to *Plectoderes*, hence I place it there until the whole family may be restudied.

Amblycratus Uhl.

(Uhler 1895a: 64)

Haplotype *Amblycratus pallidus* Uhl.

This genus was described for a single species from St. Vincent Island, West Indies. As I understand this genus it is closely related to *Plecto-*

deres but the crown is broad, slightly angulate anteriorly and separated from the forehead by a single carina. The forehead is broad nearly parallel margined, not much wider than the clypeus. Both the forehead and clypeus are provided with a median carina and strongly elevated lateral margins. The pronotum is narrow. The mesonotum is about as long as broad, strongly inflated with three carinæ. The tegminæ are steeply tectiform, long and narrow; subcostal-radial stem branching on the basal third; media with three branches; subapical cells long and narrow. Hind tibiæ without conspicuous spines.

Amblycratus fuscolineatus Fowl.

Plates X, XV, XXII

Pleetoderes fuscolineatus Fowler 1904c: 111.

A single male from Gamboa, Canal Zone, 9 July 1924, N. B., agrees with Fowler's short description and illustration.

Amblycratus fuscus spec. nov.

Plate XXII

This species differs from *fuscolineatus* Fowler chiefly in color being nearly uniform honey yellow with the veins not lineate with fuscous. The male genitalia entirely distinct.

Crown more elongate than in *fuscolineatus*. Forehead with lateral margins parallel broader than in *fuscolineatus*. Pronotum nearly crescentric very short behind the eyes, venation indistinct but typical.

General color honey yellow, eyes black, ocelli deep coral red. Tegminæ uniform honey yellow slightly paler apically. Costal margin and some of the veins narrowly marked with bright red.

Length to apex of tegminæ 5.1 mm.

Holotype, male, Barro Colorado, 29 July 1924, N. B.

Allotype, female, Barro Colorado, 26 June 1924, N. B.

Paratypes, 1 female, Barro Colorado, 27 June 1924, N. B.; 1 male, Barro Colorado, 21 June 1924, N. B.

Kardopocephalus gen. nov.

Orthotype *Kardopocephalus lineatus* spec. nov.

This genus may be recognized by the elongate head with a trough-like crown; elongate tegminæ with two callosities at the apical angle.

Head produced; crown with the lateral margins strongly elevated; median carina faint on basal half. Forehead elongate triangular, deeply impressed; lateral margins straight, converging from the clypeal margin to the apex of the head. Pronotum elongate; tricarinate with supernumerary carinæ laterad. Mesonotum broader than long, tricarinate. Tegminæ elongate with the venation simple; subcosta and radius united on the basal third; media unbranched before the membrane; first cubital sector branched at the level of the union of claval veins. Posterior tibiæ without spines.

KARDOPOCEPHALUS LINEATUS spec. nov.

Plates XI, XVI, XXII

Crown more than twice as long as basal width, trough like; basal margins broadly sinuate. Forehead with the lateral margins strongly elevated; median carina distinct to apex of clypeus. Pronotum triangularly excavated posteriorly. Mesonotum about five times as long as pronotum.

General color deep olive buff with the mesonotum and the tegminæ strongly lineate with fuscous. Eyes marked with fuscous. Mesonotum with the carinæ pale broadly lineate with fuscous. Tegminæ with the veins clay color, broadly margined with fuscous leaving a narrow longitudinal vitta of olive buff in each cell.

Length to apex of tegminæ 8.8 mm.

Holotype, male, San Antonia, British Honduras, May 1931, J. J. White.

MYCONUS Stål

(Stål 1862e: 65)

Haplotype *Achilus conspersinervis* Stål.

As I interpret this genus it is depressed with a narrow head which projects in front of the eyes. The crown is transverse with a distinct median carina and separated from the forehead by a distinct transverse carina. The forehead is elongate with a distinct median carina which is continued onto the clypeus. The pronotum is produced to the middle of the eyes; the central area is bounded by straight diverging carinæ. The mesonotum is about as long as broad with three parallel carinæ. The tegminæ are rather broad not strongly overlapping; the subcostal radial stem branches on the basal third; the media branches before the membrane; the first cubital sector just before the apex of clavus.

Myconus conspersinervis Stål

Plates XI, XVI

Achilus conspersinervis Stål 1862e: 3.

I have a single specimen of this species from British Honduras which agrees in essential details with Fowler's description.

The general color of the tegminæ is sordid white, with the head and thorax, legs and abdomen fuscous. The veins of the tegminæ are spotted with minute spots of fuscous and the cells are dotted with minute points of the same color.

Family TROPIDUCHIDÆ

This is a small family of about 80 genera. It was revised by Melichar (1914f) and I follow his classification in the following discussion.

Muir states that there is always a distinct suture which restricts the posterior angle of the mesonotum. In most genera there is a transverse row of cross veins or cross line across the tegminæ. The head is various, sometimes with and sometimes without a cephalic process. The former genera superficially resemble members of the family DICTYOPHARIDÆ but may be readily distinguished by the small second joint of the hind tarsi, with a spine on each side.

Key to the Subfamilies and Tribes of the Family Tropiduchidæ

(Modified from Muir)

A. Costal area with cross veins ..... Subfamily TROPIDUCHINÆ
  B. Antennæ short, globose ..... Tribe TROPIDUCHINI
  BB. Antennæ more elongate, segments cylindric; second segment visible from above .... Tribe CATULLIINI (No American genera)
AA. Costal area absent or small, without cross veins ..... Subfamily TAMBINIINÆ
  B. Subcosta with several furcate branches to costal margin ..... Tribe ALCESTISINI
  BB. Subcosta without furcate branches to costal margin.
    C. Tegminæ leathery ..... Tribe HIRACIINI
    CC. Tegminæ transparent *1*
      1. No subapical line on tegminæ ..... Tribe TRYPETIMORPHINI (No American genera)
      1. Subapical line present *2*
      2. Subapical line basad of the middle of tegminæ ..... Tribe PARICANINI (A single American genus *Achilorma* Metcalf and Bruner 1930a: 400).
      2. Subapical line distad of the middle of tegminæ ..... Tribe TAMBINIINI

Tribe TROPIDUCHINI

In this tribe the tegminæ are transparent with a distinct row of cross veins separating basal corium from apical membrane; there is a distinct costal membrane with numerous cross veins.

Melichar recognized three genera in this group. Metcalf and Bruner (1930a: 397) pointed out that Melichar's genus *Tangiopsis* was preoccupied by *Tangiopsis* Uhler and proposed the new name *Tangiella*. They also included Van Duzee's (1907a: 35) *Tangia sponsa* from Jamaica. A reexamination of this material convinces me that this assignment is incorrect. I propose for *Tangia sponsa* Van Duzee from Jamaica, *nec Tangia sponsa* that is *Neurotmeta sponsa* Guerin-Meneville, the new genus *Pseudotangia* and the new species *sponsa*. (Plates X, XV). This genus differs from *Tangiella* Metcalf and Bruner in possessing a distinct cephalic process; in having the forehead more elongate with a fine median carina instead of a broad roll like carinæ; crown elongate with faint median carina.

Key to the American Genera of the Tribe Tropiduchini

A. With a cephalic process crown two or three times as broad as long..... *Pseudotangia* Metcalf

AA. Without a cephalic process.

B. Forehead with a median carina and two diverging carinæ from the clypeal suture..... *Vanuoides* Metcalf

BB. Forehead with median carina only ..... *Ladella* Stål

Vanuoides gen. nov.

Orthotype *Vanuoides pallescens* spec. nov.

This genus resembles *Vanua* Kirkaldy in general head characters with a more produced crown but the venation is different.

Head narrow only about half as wide as the pronotum; crown produced, the lateral margins converging slightly anteriorly and rounded on the anterior margin, the lateral and anterior margins sharply carinate, median carina on anterior half then branching to the posterior margin and continued on posterior margin to lateral borders; forehead with stout median carina and short intermediate carinæ diverging dorsad; lateral margins strongly carinate. Clypeus short, depressed; with a median carina. Antennæ short and slender. Pronotum short, impressed and tricarinate on the disc, with two lateral carinæ; mesonotum tricarinate. Tegminæ elongate; membrane distinct separated from

corium by a cross line, with numerous cross veins; costal membrane narrow, with several cross veins; radius branched just before transverse vein; media and cubitus branched before the middle, the second medial sector branched before the transverse vein. Legs rather slender; hind tibiæ with three spines on the apical half.

VANUOIDES PALLESCENS spec. nov.

Plates X, XVI

General color warm buff, with the carinæ of the head, the thorax and the veins bright red.

Crown elongate, about as long as broad at the base. Forehead elongate, nearly twice as long as broad. Pronotum deeply incised posteriorly.

Length to apex of tegminæ 13.6 mm.

Holotype, female, Barro Colorado, July 1923, R. C. Shannon; collection of National Museum.

Tribe ALCESTISINI

In this tribe only a single genus *Alcestis* Stål, with 9 known species from South America, is recognized. The venation of this genus is peculiar. What appears to be subcosta and radius are united for a considerable distance from the base and far removed from the costal border, with subcosta having many branches to the costal border.

Tribe TAMBINIINI

In this tribe the tegminæ are transparent with a distinct costal area without cross veins.

This is the largest tribe of Tropiduchids in America. Twelve genera are known from North and South America and the West Indies.

Key to the American Genera of the Tribe TAMBINIINI

(Modified from Melichar)

A. Head with a distinct slender cephalic process.
   B. Cephalic process about as long as pro- and mesonotum combined; membrane with few cross veins. . . . . *Athestia* Melichar 1914f: 71
   BB. Cephalic process longer than pro- and mesonotum combined; membrane with numerous cross veins. . *Remosa* Distant 1906n: 355
AA. Head more or less produced or spatulate but not with a distinct cephalic process.

B. Radius branched before the cross line.
C. Media branched before the cross line.....*1*
1. Forehead with a median carina only.....
Neurotmeta Guerin-Meneville 1856a: 180
1. Forehead with a median carina and a pair of intermediate carinæ.....*Rotunosa* Distant 1906n: 353
CC. Media unbranched before the cross line.....
Tangidia Uhler 1895a: 59
BB. Radius unbranched before the cross line.
C. Media branched before the cross line.....*1*
1. Forehead with a median carina; media branching near the base; cross line distinct.....*Monopsis* Spinola 1839a: 302
1. Forehead without a median carina; media branching near the cross line; cross line indistinct.....
Pelitropis Van Duzee 1908d: 474
CC. Media unbranched.....*1*
1. Dorsal margin of the forehead incised; lateral margins of the crown strongly elevated.....
Cyphoceratops Uhler 1901a: 510
1. Dorsal margin of the forehead not incised; lateral margins of the crown not strongly elevated.....*2*
2. Forehead impressed either side of the broad median carina
Tangiopsis Uhler
2. Forehead not impressed; median carina simple slender..*3*
3. Crown transverse with a simple median carina.....
Amapala Melichar 1914f: 73
3. Crown elongate, median carina branched caudad.....
Neotangia Melichar 1914f: 77

Tangiopsis Uhl.

(Uhler 1901a: 512)

(*Rudia* Stål, *Temora* Kirkaldy, *Colgorma* Kirkaldy)

Haplotype *Tangiopsis tetrastichus* Uhler.

In a nomenclatorial way this genus has had a varied career. Kirkaldy proposed two new names for *Rudia* one of which was preoccupied. I have examined the type of *Tangiopsis* (Metcalf and Bruner 1930a: 397) but unfortunately did not recognize that this was the same as *Colgorma* Kirkaldy. A reexamination of the material convinces me that this is the case; hence *Tangiopsis* Uhler would replace *Colgorma* Kirkaldy.

This is a very distinct genus of the family TROPIDUCHIDÆ. The crown shades into the forehead which is elongate with a median

and lateral roll-like carinæ. The mesonotum is large, tricarinate. The tegminæ have few veins and cross veins; there are no costal cross veins. Subcosta, radius and media form a common stem on the basal fourth, the subcostal-radial stem and media are not branched before the subapical line; first cubital sector is forked before apex of clavus.

Six species are known from the West Indies, Central and South America.

Tangiopsis diluta Stål

Achilus dilutus Stål 1859b: 271.

There are three females in the present collection, Barro Colorado, 20 July 1924, N. B., and 9–12 November 1923, American Museum of National History, which belong to this species. It is uniform dull amber brown in color with transparent tegminæ with a yellowish cast and brown veins. This appears to be a color variety of this typical greenish species. The crown is nearly three times as long as broad, impressed; the lateral foveæ of the forehead are narrow and deep. The venation is typical and the hind tibiæ have four short stout spines and a fringe of stout bristles.

Tribe HIRACIINI

This is a small tribe of 15 known genera. Two genera are recognized from North America; *Grynia* Stål which has the body oval, the tegminæ with the veins distinct at the base and granulate at the apex, and *Gastrinia* Stål which has the body elongate oval with the venation simple on the base, reticulate apically.

Kirkaldy considered *Gastrinia* Stål preoccupied by *Gastrina* Guenee and proposed the new name *Amfortas*. I consider these names distinct on the basis of their spelling.

Family NOGODINIDÆ

Muir recently (1930c: 475) separated this group from the family RICANIIDÆ. He gives as his reasons: "This group has hitherto been included as a subfamily, tribe, or a part of the RICANIIDÆ. I have separated it as a distinct family, as the general facies as well as distinct morphological characters indicate. The two spines on the second hind tarsus, the frons longer than wide, and the lateral carinæ on the clypeus all distinguish it from the RICANIIDÆ. As the family stands at present it contains about forty genera and has greater affinity to the ISSIDÆ than to the RICANIIDÆ."

Key to the American Genera of the Family NOGODINIDÆ
(Modified from Melichar)

A. Head, including the eyes, wider than the pronotum.....
Gaetulia Stål 1864b: 54

AA. Head, including the eyes, never wider than the pronotum; sometimes a little narrower.

B. Tegminæ coriaceous, or subhyaline.

C. Costal membrane broad; tegminæ large with numerous veins and cross veins.....*1*

1. Forehead with a median carina.....*Vutina* Stål

1. Forehead without a carina....*Semestra* Jacobi 1916a: 309

CC. Costal membrane narrow; tegminæ narrow elongate.....
Bladina Stål

BB. Tegminæ hyaline.

C. Subcosta and radius forming a common stalk at the base of the tegminæ.....*Biolleyana* Distant

CC. Subcosta and radius arising separately from the basal cell...
Nogodina Stål

NOGODINA Stål

(Stål 1862e: 70)

Logotype *Flata reticulata* Fabr., Schmidt 1919a: 157.

In this genus the forehead is longer than broad with the lateral margins elevated and a distinct percurrent median carina. The tegminæ are large; the costal membrane is crossed by numerous cross veins There is a single subapical line parallel to apical margin.

NOGODINA RETICULATA Fabr.

Plates XI, XXII

Fabricius 1803a: 47.

Reticulata has a wide range from Central America to Brazil. There is a single specimen from British Guiana in the present collection but none from Barro Colorado.

VUTINA Stål

(Stål 1862e: 70)

Logotype *Flatoides pelops* Walker.

In this genus the head is slightly narrower than the pronotum; the crown is short overlapped by the pronotum; the forehead is longer than

broad, the lateral margins parallel to the level of the antennæ and then converging to the narrower clypeus; median carina distinct sometimes not complete, lateral margins strongly elevated. Pronotum short, obtusely produced between the eyes. Mesonotum tricarinate. Tegminæ coriaceous, large; costal margin slightly sinuate in the stigmatal area; costal area broad with numerous simple cross veins; apical area with a simple submarginal line, and numerous longitudinal and cross veins. Hind tibiæ with three or four spines.

Four species and varieties are known from Central and South America. The following species seems to be very distinct.

Melichar gives *Ricania sexmaculata* Signoret as the type but this name was established (Stål 1862e: 70) for *Flatoides pelops* Walker and *Flatoides humeralis* Walker which belongs to *Vutina atrata* Fabricius. *Ricania sexmaculata* Signoret was not transferred to this genus until 1864 (Stål 1864b: 64), therefore, I cannot accept it as the type and have designated *Flatoides pelops* Walker as the type.

Vutina bipunctata spec. nov.

Plate XII

This species bears a superficial resemblance to *atrata* Fabricius (equals *feralis* Fowler) but may be distinguished at once by the black circular puncture on the basal third of the corium.

Crown very short, the pronotum almost reaching the anterior margin; median carina of forehead reaching only half way to clypeal suture. Median and lateral carinæ on clypeus conspicuous. Antennæ very short, the second segment globose. Pronotum very obtuse anteriorly; the posterior margin broadly emarginate. Mesonotum as broad as long. Tegminæ very broad about one and one half times as long as broad; costal margin very slightly sinuate apically; costal area broad, with numerous cross veins; numerous cross veinlets between subcosta and costa; subapical line about half as far from the apical margin as the greatest width of the costal area. A distinct circular impressed area on basal third of tegminæ between subcosta and media one; this area smooth and shining with the venation only faintly indicated. Hind tibiæ with three spines.

General color rich sepia clouded with fuscous. Forehead ivory white, with two fuscous transverse bands, one just above clypeal margin, the other on the dorsal margin. Clypeus and legs sepia. Cheeks and pleural pieces ivory yellow. Pro- and mesonotum and abdomen sepia. Tegminæ sepia clouded with fuscous with the black impressed mark al-

ready mentioned, behind the black mark there is an irregular ivory white semitransparent mark extending from subcosta to media one; another irregular ivory white mark on the apical angle and two narrow ivory white marks on the apical margin. There is a narrow pale fascia extending from near the base in front of the black punctures straight across the clavus to the commissural margin and another extending diagonally from the pale spot on the corium to the apex of the clavus.

Length to apex of tegminæ 14 mm.

Holotype, female, Barro Colorado, 16 February 1929, C. H. C.

Biolleyana Dist.

(Distant 1909f: 335)

Orthotype *Nogodina pictifrons* Stål.

This is a Central American genus which ranges southward into Northern South America. Its large transparent tegminæ with large costal area and numerous cross veins are suggestive of the family RICANIIDÆ but the other characters are those found in the NOGODINIDÆ.

Head about as broad as pronotum; crown transverse, separated from forehead by a distinct transverse carina; forehead long and narrow with complete lateral and median carinæ, and usually incomplete intermediate carinæ. Tegminæ rather broad, transparent, the veins and cross veins stout; costal membrane with many transverse veins; the apical area of tegminæ with three fairly regular transverse lines, one from stigma to apex of clavus bent basad, another parallel to apical margin extending from the stigma to the apex of the clavus, a third lying between these two.

Of the four species of this genus which may occur in Central America there is only one in the present collections.

Biolleyana costalis Fowl.

Plates II, XI, XXII

Fowler 1900g: 68.

This is the most abundant species in the present collections, being represented by numerous specimens. It is slightly variable in color, the tegminæ in some cases without fuscous marks and in other cases with a few fuscous marks, especially on the apical border. The stigma, in all the specimens which we have examined, is fuscous with an orange red center.

Bladina Stål

(Stål 1859a: 324)

Haplotype *Bladina fuscovenosa* Stål.

This is a Neotropical genus, one species ranging northward to Mexico.

This genus may be characterized briefly as follows: Head nearly as broad as pronotum, a distinct transverse carina between crown and forehead, forehead nearly quadrangular narrowed to clypeus, with a row of pustules along the lateral margins; forehead and clypeus with median and lateral carinæ. Tegminæ long and narrow, the costal area narrow, irregularly reticulate; media branched on the basal third, each sector with five or more main branches.

Bladina magnifrons Walk.

Plates XI, XXII

Poeciloptera magnifrons Walker 1858a: 56.

This species may be recognized by the general testaceous yellow color of the body and legs; the forehead fuscous with the pustules conspicuously paler or yellow. Tegminæ testaceous yellow with the veins fuscous, except the costal area which is fuscous with the reticular veins yellow. The structural characters may be observed in the illustrations.

There is a good series of this species in the present collections from Barro Colorado and various points in the Canal Zone by Mr. Banks and from Barro Colorado by Mr. Curran and Mr. Schwarz.

Family ACANALONIIDÆ

In this family the tegminæ are large, held vertical in repose. In these respects they resemble members of the family FLATIDÆ. They differ from the FLATIDÆ in lacking a costal area and in having the clavus not granulate. Acanalonids resemble Issids somewhat but the tegminæ are generally larger in the Acanolonids; the hind tibiæ are without spines.

This is a small family with eleven known genera; two of which, *Acanalonia* Spinola and *Philatis* Stål, have species known from Mexico and Central America. In *Acanalonia* the crown is broad usually broader than long; whereas in *Philatis* the head is conically produced, with the crown longer than broad.

There are no specimens of either genus in the present collections.

Family FLATIDÆ

This is a large family of nearly world wide distribution. The family was monographed by Melichar in 1901–1902 and again in 1923. I have followed Melichar's arrangement of subfamilies and tribes although Muir states that they are not natural. They are, however, very convenient and must serve until a better division is proposed.

Key to the Subfamilies and Tribes of the Family FLATIDÆ

(Modified from Melichar)

A. Tegminæ vertical or steeply tectiform . . . . . Subfamily FLATINÆ
  B. Tegminæ broadly rounded apically.
    C. Apical areas of the tegminæ beyond the apex of clavus very large *1*
      1. Forehead concave Tribe SISCIINI (No American genera)
      1. Forehead flat or slightly convex *2*
      2. Costal cell short, more than twice as broad as the costal membrane . . . . . Tribe FLATINI
      2. Costal cell elongate, about as wide as costal membrane . . . . Tribe CERYNIINI
    CC. Apical areas of the tegminæ beyond the apex of the clavus not large . . . . . Tribe PHANTIINI (No Central American genera)
  BB. Tegminæ truncate or narrowed apically.
    C. Tegminæ broadly triangular apical margin truncate *1*
      1. Sutural angle triangularly produced. . Tribe FLATISSINI
      1. Sutural angle rounded not produced. . Tribe NEPHESINI
    CC. Tegminæ narrow, costal and apical margins sinuate . . . . . Tribe SELIZINI
AA. Tegminæ horizontal or gradually tectiform . . . Subfamily FLATOIDINÆ

Subfamily FLATINÆ

In this subfamily the tegminæ are nearly vertical, with the costal membrane strongly developed with numerous cross veins.

Tribe FLATINI

In this tribe the tegminæ are very large with the apical margin broadly rounded, the costal cell is short and more than twice as broad as the costal membrane; the head is typically short, with the anterior margin of crown usually straight and transverse.

Only a single genus is recognized from America, *Poekilloptera* Latreille.

In establishing this tribe Melichar based the name on the genus *Phromnia* Stål, logotype *Cicada limbata* Fabricius. Unfortunately Duponchel (1840a: 205) had selected *limbata* as the type of *Flata* and *Phromnia* Stål will be a synonym of *Flata* Fabricius. For *Flata* Melichar (nec Fabricius), type *Cicada ocellata* Fabricius I propose the name *Flatissa*.

Poekilloptera Latr.

(Latreille 1796a: 90)

Haplotype *Cicada phalænoides* Linné, Latreille 1804a: 315.

This is a genus of common tropical American Flatids.

The head is small with a single transverse carina between the forehead and crown. The pronotum is short and broad; the lateral areas are elongate with a definite vertical carina. The mesonotum is large and inflated, ecarinate. The tegminæ are large; broadly rounded on the apical margin; irregularly reticulate over the entire surface; costal membrane narrower than the costal cell; costal cell short and broad. Legs relatively short and stout. Hind tibiæ with a single spine on the apical third.

Poekilloptera phalaenoides Linné

Plate XXII

Jacobi 1904b: 9.

This is the common Central and South American *Pockilloptera* with the head, thorax, legs and basal area of the costal margin ochraceous orange. Tegminæ white fading to light buff; irregularly sprinkled with round black dots, especially along the costal margin and claval suture.

Size very variable. Length to apex of tegminæ 15 — 23 mm.

Tribe CERYNIINI

This tribe contains two American genera *Adexia* Melichar and *Doria* Melichar. *Adexia* has a conspicuous subapical line in the corium and *Doria* has none.

Adexia Mel.

(Melichar 1901a: 229)

Logotype *Ormenis ermina* Fowl., Melichar 1923a: 27.

In this genus the head is small and the forehead narrow and elon-

gate. The tegminæ are large; broadly rounded apically with numerous straight transverse cross-veins; the apical area without cross veins except a single subapical line.

ADEXIA FOWLERI Mel.

Melichar 1901a: 230.

This species was described from Colombia. There is a single female from Barro Colorado, 24 December 1928, C. H. C.

The head, thorax and legs are dull black. The tegminæ are covered with whitish powder except the veins and cross veins which are black. The hind wings are white with the veins faintly fuscous. The abdomen is ochraceous orange with long white waxy filaments in the female.

Length to apex of tegminæ 20 — 22 mm.

Tribe FLATISSINI

This tribe includes two American genera *Hesperophantia* Kirkaldy n. n. for *Carthæa* Stål which has the forehead longer than broad, the tegminæ obliquely truncate; and *Carthæomorpha* Melichar which has the forehead as broad as long, tegminæ truncate but not obliquely.

CARTHAEOMORPHA Mel.

(Melichar 1901a: 198)

Logotype *Carthæmorpha rufipes* Mel., Oshanin 1912a: 125.

Crown broad and short, nearly four times as long as broad; anterior and posterior margins nearly parallel, broadly curved; with a distinct carina separating the crown from forehead. Forehead slightly longer than broad; flat, lateral margins strongly elevated, broadly curved; median carina distinct dorsad. Tegminæ large; apex truncate; sutural angle strongly produced; venation reticulate; longitudinal veins distinct; costal cell broader than the costal membrane; media branched before the first cubital sector. Hind tibiæ with two spines on the apical third.

CARTHÆOMORPHA RUFIPES Mel.

Melichar 1902a: 34.

General color bright grass green fading to ochraceous orange. Carinæ of the head, anterior and intermediate tarsi and posterior tarsi

tinged with bright red. Commissural margin narrowly fuscous. A conspicuous row of fuscous granules along the second claval vein.

Two females, Barro Colorado, 27 June 1933, J. D. and H. Hood, in collection of National Museum; and Barro Colorado, 19 December 1928, C. H. Curran, in the American Museum of Natural History.

Tribe NEPHESINI

Melichar has recently (1923a: 62) established a number of new genera in this tribe based especially on species formerly included in the genus *Ormenis* Stål. As mentioned below this complex should be broken up. I have attempted to interpret Melichar's key and modified it to suit our American genera as far as they are known to me. Much more work must be done on this tribe before it is in satisfactory shape. The genera are complex and the characters are obscure. Students of the Homoptera are deeply indebted to Dr. Melichar for the fine preliminary work which he has done, but he would have been the last to assume that his work was complete, and the problem before us is to forward the work which he has so ably started.

Key to the American Genera of the Tribe NEPHESINI

(Modified from Melichar)

A. Two subapical lines on the corium.
  B. Anterior subapical line reaching, the posterior subapical line not reaching the costal margin ..... *Leptormenis* Melichar 1923a: 65
  BB. Both subapical lines reaching the costal margin.
    C. Very few of the longitudinal veins forked beyond the last subapical line *1*
      1. Posterior tibiæ with two spines *2*
      1. Posterior tibiæ with a single spine only ..... *Petrusina* Melichar 1923a: 73
      2. Forehead as long as broad ..... *Anormenis* Melichar
      2. Forehead distinctly broader than long ..... *Flatormenis* Melichar
    CC. Most of the longitudinal veins beyond last subapical line forked *1*
      1. Costal membrane broader than costal cell, apical and sutural angles equally rounded ..... *Ormenis* Stål (*Ormenoflata* Melichar)
      1. Costal membrane as broad as the costal cell, sutural angle angled ..... *Ricanoflata* Melichar 1923a: 67

AA. One subapical line on the corium.
B. Forehead broader than long ..... *Monoflata* Melichar
BB. Forehead longer than broad.
C. Few of the longitudinal veins forked beyond the subapical line *Ormenoides* Melichar 1923a: 73
CC. Most of the longitudinal veins forked beyond the subapical line ..... *Melormenis* Metcalf

Ormenis Stål

(Stål 1862e: 68)

Logotype *Poeciloptera roscida* Germar.

Melichar has recently (1923a: 62 ff) divided this genus into a number of genera. This division has been needed for many years as the genus *Ormenis* had become a dumping place for a large number of species, with vague and indefinite characters. And since this separation should be made we will follow it for the present although we are by no means convinced that Melichar has always selected valid characters for the separations which he has made. Many of the characters he uses are vague and capable of several interpretations and others are not of generic value. But even accepting all his characters as valid and reliable, he has assigned some species to the wrong genera. However, the whole matter must be held in abeyance until a thorough study of all the chrotic and phallic characters can be made. He was not fortunate always in his selection of types and this matter I have attempted to straighten out in all cases.

Melichar selects as the type of *Ormenis, Cicada quadripunctata* Fabricius. This cannot be correct as *quadripunctata* was not included in the original description of this genus. As a matter of fact none of the species mentioned by Stål (1862e: 68) as belonging to *Ormenis* are included in the genus *Ormenis* of Melichar. I have selected *Poeciloptera roscida* Germar as the type of *Ormenis* Stål as it is the oldest included species. *Ormenis* Stål would replace *Ormenoflata* Melichar (1923a: 66), orthotype *Poeciloptera pulverulenta* Guerin-Meneville.

Ormenis roscida Germ.

Plate XXIII

Germar 1821a: 104.

I have followed Melichar (1902a: 64) in assuming that *roscida* Germar is the small species of *Ormenis* about 9—11 mm. long and

which is dark colored with the wings heavily powdered with blue and that *pulverulenta* Guerin-Meneville is the large species about 17 — 18 mm. long which is also dark colored. *Roscida* has been recorded previously from South America only, Dutch Guiana to Peru, Bolivia and Brazil. There is, however, a good series of specimens from Barro Colorado, 20 July 1924, N. B. and 18 July 1923 R. C. Shannon, in the present collections.

Melormenis nom. nov.

For the genus *Ormenis* Melichar (nec Stål) I would propose the nomen novum *Melormenis*. Orthotype *Cicada quadripunctata* Fabricius.

This genus has a wide distribution from Eastern North America through Mexico, Central America and the West Indies to Brazil and Argentina.

This genus may be characterized as follows: Face longer than broad, with a fairly distinct median carina; tegminæ with a single subapical line. This genus includes the common North American species *Flata pruinosa* Say and *Flata regularis* Fowler from Central America.

Melormenis regularis Fowl.

Flata regularis Fowler 1900f: 53.

I have seen no specimens that I could assign to this species. It is, from the figure and description in the Biologia, a small bright green species with the tegminæ narrowly infuscated along the costal and apical margins; the tegminæ are apparently elongate and narrow, with the face longer than broad.

Monoflata Mel.

(Melichar 1923a: 76)

Orthotype *Poeciloptera brasiliensis* Spinola.

This genus was established to include *Poeciloptera brasiliensis* Spinola from Brazil and *Ormenis pallescens* from Mexico. This genus is a very distinct genus of the *Ormenis* group with a fairly broad face with the lateral margins broadly arcuate, strongly elevated and united to the median carina by a fairly distinct transverse carina at the apex of the head. The tegminæ are distinctly widened apically,

venation very distinct, a single subapical line forming numerous apical cells about as long as the costal cells.

Monoflata banksi spec. nov.

Plate III

This is a very pretty little species testaceous green, perhaps bright green in life, with the lateral and dorsal margins of the face and the anterior and intermediate tibiæ narrowly lineate with black and the costal margin broadly and the apical margin less broadly margined with blackish fuscous. This species bears a superficial resemblance to *Ormenis nigromarginata* Melichar from South America, but it is much smaller. Melichar places *nigromarginata* in his genus *Anormenis* but the present species has none of the characters of that genus. Hence I conclude that it is specifically distinct.

Head broad, with the eyes broader than the pronotum. Vertex very short, with a rather distinct carina between it and the forehead. Forehead broad; the lateral margins distinctly arcuate; median carina short but distinct. Pronotum broadly arcuate; anterior border broadly subtruncate between the eyes; the posterior border broadly rounded. Mesonotum broad; indistinctly tricarinate. Tegminæ broad, widened apically; venation distinct; a single subapical line; apical cells numerous, about as long as the costal cells. Anterior and intermediate tibiæ distinctly carinate. Posterior tibiæ clavate; with two stout spines on the apical third.

General color testaceous green; the lateral carinæ, of the head, the posterior margin of the crown and the carinæ of the anterior and intermediate tibiæ narrowly lined with black. The costal margin of the tegminæ is broadly bordered with black for about half the width of the costal cell, the rest of the costal cell is ochraceous orange. The apical margin of tegminæ narrowly blackish fuscous this color being continued faintly around the inner apical angle to the apex of the clavus.

Length to apex of tegminæ 9.1 mm.

Holotype, female, Barro Colorado, 15 July 1924, N. B.

Anormenis Mel.

(Melichar 1923a: 68)

Orthotype *Poeciloptera tortricina* Germar.

This genus was described to include those American species of the group *Ormenis* which have the forehead as long as or longer than

broad, with the median carina percurrent or indicated dorsad only; and the tegminæ with two parallel subapical lines. The Central American species in this collection included in this genus are *media* Melichar and *discus* Walker both of which were described from South America; and *nigrolimbata* Fowler from Panama.

Key to Central American Species of ANORMENIS *Melichar*

A. Tegminæ fuscous with a large milky subhyaline spot near the costal margin before the first subapical line..... *discus* Walker

AA. Tegminæ chiefly pale.

B. With a distinct fuscous spot at the apex of the clavus..... *nigrolimbata* Fowler

BB. No fuscous spot at the apex of the clavus.

C. Costal margin of the tegminæ fuscous..... *inferior* Fowler 1900a: 58 (Mexico, Costa Rica)

CC. Costal margin of tegminæ not fuscous..... *media* Melichar

ANORMENIS MEDIA Mel.

Plates XVI, XXIII

Melichar 1902a: 89.

This species was described from Colombia. There is a single male in the present collection, Barro Colorado, 24 July 1924, N. B., which agrees with Melichar's short description except it is ochraceous orange in color with the veins more reddish, whereas the species was originally described as green. But pink variants of green Homoptera are common, hence we assume that this specimen is a pink color variety of *media*.

ANORMENIS DISCUS Walk.

Plates III, XII

Walker 1851a: 409.

This species was described from Brazil, but as far as we can determine the present specimen agrees with the description but is somewhat larger, 10 mm to apex of tegminæ. The species, *griseoalba* Fowler and *dolabrata* Fowler are very similar in coloration, but in *discus* the face is only as broad as long whereas in *dolabrata* and *griseoalba* the face is much broader than long. The elongate face with short but distinct median carina, fuscous tegminæ with large translucent spot on the costal border extending half way across the tegminæ will distinguish this species.

Anormenis nigrolimbata Fowl.

Fowler 1900f: 55.

This is a very distinct species with the face longer than broad; two parallel subapical lines about equidistant from each other and the apical margin. The general color is pale ivory yellow with a distinct black spot beyond the apex of the clavus; in one specimen there is a distinct fuscous margin from the apex of clavus around the apical margin to the costal border, in the other specimen this band is reduced to fuscous dashes between the longitudinal veins on the apical margin. Two females, Las Sabanas, 7 July 1924, and Ancon, 6 July 1924, N. B.

Flatormenis Mel.

(Melichar 1923a: 71)

Orthotype *Ormenis squamulosa* Fowler.

Melichar described this genus as having the forehead longer than wide but the context indicates that he really meant wider than long. In the species which I have identified as *griseoalba* Fowler and *panamensis* Schmidt the forehead is distinctly wider than long and Melichar places both these species in his genus *Flatornemis* (sic).

This genus may be characterized briefly as follows: Forehead broader than long; the lateral and clypeal margins distinctly raised; median carina fairly distinct. Tegminæ with two parallel subapical lines about equidistant from each other and from the apical margin, this distance greater than the width of the costal membrane. Few of the longitudinal veins beyond the last subapical forked.

Flatormenis griseoalba Fowl.

Plate XXIII

Fowler 1900g: 57.

There is a single male specimen in the present collection, Ancon, 6 August 1924, N. B., which agrees in essential details with Fowler's description. The dark costal margin is less definite than in Fowler's illustration and the apical dark margin is more distinct and about twice as broad, but otherwise the illustration agrees well enough.

Flatormenis panamensis Schm.

Plates III, XII, XXIII

Schmidt 1904b: 364.

This species appears to resemble *F. dolabrata* Fowler rather closely, but lacks the pale longitudinal vitta on the tegminæ, the pale spot on the corium is nearly circular in outline; the claval furrow is concolorous and the commissural margin is pale to the apex of clavus, where there is a distinct fuscous spot.

There is a single male in the present collection, Ancon, 8 August 1924, N. B., that agrees almost perfectly with Schmidt's description.

Flatormenis albescens Fowl.

Plate XXIII

Ormenis albescens Fowler 1900g: 57.

Structurally this species is close to *Flatormenis panamensis* Schmidt. The color, however, is entirely different. The head and thorax is tawny brown. The tegminæ are light buff with the costal and commissural margins tawny.

The genital styles short and broad, whereas in *panamensis* they are narrow and more elongate.

There is a single male specimen from Barro Colorado, November 1930, H. F. Schwarz in the American Museum of Natural History.

Tribe SELIZINI

In this tribe the genera have the tegminæ elongate, sometimes narrowed apically with the apical margin truncate or sinuate.

There has been some little confusion about the genus *Dascalia* Stål (1862e: 68). Stål originally included five species. Melichar (1902a: 142) included all but one of these species *convirus* Stål in the genus *Dascalia* and made *sinuatipennis* Stål the type. Subsequently Melichar (1923a: 101) made *sinuatipennis* the type of his new genus *Eudascalia* and made *grisea* Fabricius the type of *Dascalia* which he limited to species with the subapical lines parallel. *Eudascalia* is, therefore, a synonym of *Dascalia* and if these two genera are to remain separate *Dascalia* Melichar (nec Stal) with type *Cicada grisea* Fabricius must be renamed. I would suggest *Paradascalia.*

Key to the American Genera of the Tribe SELIZINI
(Modified from Melichar)

A. Sutural angle of the tegminæ not prolonged.
  B. Tegminæ broad at base, much narrowed caudad.
    C. Hind wings rudimentary ..... *Mistharnophantia* Kirkaldy 1907i: 65
    CC. Hind wings well developed *1*
      1. Tegminæ slightly narrowed apically ..... *Scarposa* Uhler 1895a: 72
      1. Tegminæ strongly narrowed apically *2*
      2. Tegminæ three or four times as long as broad, with the apical margin obliquely truncate ..... *Cyarda* Walker 1858b: 121
      2. Tegminæ but little longer than broad, produced into an acute point ..... *Rhynchopteryx* Van Duzee 1914a: 43
  BB. Tegminæ long and narrow not especially narrowed posteriorly.
    C. Tegminæ with two subapical lines *1*
      1. The two subapical lines broadly curved and parallel to the apical border *2*
      1. One or both subapical lines sinuate *3*
      2. Three longitudinal carinæ on the forehead ..... *Paradascalia* Metcalf
      2. An oblique transverse carina at the base of the forehead .. *Anadascalia* Melichar 1923a: 103
      3. Anterior subapical line only sinuate *4*
      3. Both subapical lines sinuate ..... *Pseudodascalia* Melichar 1923a: 102
      4. Forehead with three carinæ; base of the clavus strongly elevated ..... *Dascalia* Stål 1862e: 68
      4. Forehead with a median carina only, sometimes not complete; base of clavus not elevated *5*
      5. Base of the forehead concave; apical margin of the tegminæ obliquely truncate ..... *Dascalimorpha* Melichar 1923a: 103
      5. Forehead flat; apical margin of the tegminæ broadly sinuate ..... *Leptodascalia* Melichar 1923a: 102
    CC. Tegminæ without a subapical line *Exoma* Melichar 1901a :200
AA. Sutural angle of the tegminæ prolonged but rounded.
  B. Posterior tibiæ with one spine ..... *Neocerus* Melichar 1901a: 199
  BB. Posterior tibiæ with two spines .... *Eurocalia* Van Duzee 1907a: 40

Subfamily FLATOIDINÆ

The genera in this subfamily have the tegminæ nearly horizontal or gradually tectiform.

There has been much confusion in the use of generic names in this group. The genus *Flatoides* was first proposed by Guerin-Meneville (1844a: 362) for a species *tortrix* from Madagascar. Later Guerin-Meneville (1856a: 181 and 1857a: 431) described the new species *Flata* (*Phalænomorpha*) *tortrix* from Cuba and these two species have been considered the same by many subsequent writers. I have specimens of what I consider these species and they do not belong to the same genus. I have indicated therefore in the key the new genus *Pseudoflatoides* with *Flata tortrix* Guerin-Meneville as the type.

Many American species have since been described as belonging to the genus *Flatoides*. So far as the specimens in the present collections are concerned they fall into four genera; *Atracis* Stål (1866a: 250), logotype *Flata pyralis* Guerin-Meneville from the East Indies which may not be congeneric with our American species; *Flatarus* Melichar (1923a: 116), orthotype *Ricania corticina* Burmeister from South America; *Flataloides* Metcalf, orthotype *Elidiptera obliqua* Walker from Mexico; and *Flatoidinus* Melichar (1923a: 117), orthotype *Poeciloptera convira* Stål from Brazil.

Key to the American Genera of the Subfamily FLATOIDINÆ

A. With a single spine on the posterior tibiæ ..... *Atracis* Stål
AA. With two spines on the posterior tibiæ.
  B. Crown longer than broad.
    C. Costal margin of the tegminæ undulate, with two subapical lines ..... *Pseudoflatoides* Metcalf
    CC. Costal margin of the tegminæ not undulate, with a single subapical line ..... *Flataloides* Metcalf
  BB. Crown as broad as long or broader.
    C. Crown only as broad as long .... *Flatarus* Melichar 1923a: 116
    CC. Crown broader than long ..... *Flatoidinus* Melichar

ATRACIS Stål

(Stål 1866a: 250)

Logotype *Flata pyralis* Guerin-Meneville.

This is a genus in which certain Neotropical species have been placed. Our American species may be characterized as follows: Head

narrower than pronotum; crown usually as long as broad; antennæ with first segment half as long as second. Pronotum shorter than or as long as crown. Tegminæ large; costal membrane three or four times as broad as costal cell. Posterior tibiæ with a single spine on the apical third.

Atracis humeralis Walk.

Plates XII, XXIII

Walker 1858b: 70.

There is a single teneral male that we place as this species on the basis of the head characters.

Atracis quadripunctulus Fowl.

Flatoides quadripunctulus Fowler 1900g: 61.

This is a small olive green species with the veins irregularly marked with fuscous.

The crown is somewhat broader than long, broadly rounded anteriorly. The forehead is flat, with two conspicuous elevations dorsad.

There is a single female Barro Colorado, 11 January 1929, C. H. C. in the American Museum of Natural History ¡which is smaller than Fowler's description indicates, but seems to agree otherwise.

Atracis pollutus Fowl.

Plate XXIII

Flatoides pollutus Fowler 1900g: 62.

This is a large pale greenish species which seems to fade to light buff. The tegminæ irregularly marked with blackish brown. The crown is longer than broad, obtuse anteriorly. The forehead is flat with two elongate elevations dorsad.

There is a single male from Barro Colorado, 9 December, M. Bates; Museum of Comparative Zoölogy.

Flataloides gen. nov.

Orthotype *Elidiptera obliqua* Walker.

This genus is quite similar to *Pseudoflatoides* Metcalf differing chiefly in having only a single subapical line on the tegminæ and the costal margin not undulate.

Head narrow produced; face smooth not carinate on the median

line; antennæ cylindric; first segment robust about half as long as second. Disc of pronotum flat, about as wide as head; anterior margin carinate; lateral fields with a distinct triangular process behind eyes. Mesonotum broad and flat, carinæ indistinct. Tegminæ very broad, held nearly horizontal; the costal membrane very broad, subcostal vein continued as a single subapical line to the apex of clavus. Hind tibiæ with two spines.

It is quite probable that many American species which have been assigned heretofore to *Flatoides* Guerin-Meneville should be assigned to this genus. If I identify *Flatoides tortrix* Guerin-Meneville correctly it is the type of a very distinct genus with undulate costa and two subapical lines.

Flataloides obliqua Walk.

Plate XXIII

Elidiptera obliqua Walker 1858a: 70; *Flatoides obliquus* Fowler 1900g: 64.

A large pale greenish species with a few small irregular fuscous spots, especially along the costal and subapical margin; the costal vein and the subapical line. The eyes are fuscous and there is a fuscous spot at the apex of the head and on the disc of the clypeus.

There is a pair in the National Museum from Barro Colorado. The male, 29 June 1933, Hood, Hood and Hook. The female 6 July 1923, R. C. Shannon.

Flatoidinus Mel.

(Melichar 1923a: 117)

Orthotype *Poeciloptera convivus* Stål.

In this genus the crown is broader than long but the head is narrower than the pronotum. The pronotum is about as long as the crown with the mesonotum broader than long. Forehead elongate. Tegminæ elongate; costal margin about twice as broad as costal cell; two irregular subapical lines, the second short. Hind tibiæ with two spines.

Flatoidinus occidentalis Walk.

Plates XII, XXIII

Elidiptera occidentals Walker 1851a: 331; *Flatoides isabellinus* Fowler 1900g: 63.

I have a single male from Taboga, Panama, 29 June, N. B. which agrees in essential details with Fowler's short description and illus-

tration. It is clay colored with small fuscous points on the pronotum, mesonotum and irregularly scattered on the tegminæ forming a more or less irregular band between the subapical lines and a regular row of spots on the apical margin in the cells.

Melichar (1923a: 113) placed *occidentalis* in *Flatoides* but if I have identified the species correctly it belongs in his genus *Flatoidinus*.

Family ISSIDAE

This is a large family of Fulgorids. In many genera the tegminæ are reduced and often much modified. Most of the species are small or very small.

Key to the Subfamilies and Tribes of the Family ISSIDÆ

A. Tegminæ short and only reaching slightly beyond the base of abdomen, or exceedingly narrow, parchment-like, thick or opaque, seldom hyaline; wings absent or rudimentary . . . . . Subfamily CALISCELINÆ

AA. Tegminæ entirely covering the abdomen or the greater portion of it.

B. Clavus and corium not separated by a suture. Tegminæ generally convex, thick, and the venation obscure . . . . . Subfamily HEMISPHÆRINÆ (No American genera)

BB. Clavus separated from corium by a suture . . . . Subfamily ISSINÆ

C. Wings absent, or rudimentary, not folded . . . . . Tribe HYSTEROPTERINI

CC. Wings present *1*

1. Wings with margins entire, anal area not enlarged. . . . . Tribe ISSINI

1. Wings with a deep cleft in the apical margin, the anal area very large . . . . . Tribe THIONIINI

Subfamily CALISCELINÆ

Representatives of two genera *Bruchomorpha* Newman and *Fitchiella* Van Duzee have been reported from Central America but there are no specimens in the present collections. Both genera occur in North America. These genera may be distinguished from each other by the fact that the anterior and middle tibiæ are expanded in *Fitchiella* and simple in *Bruchomorpha*.

Subfamily ISSINÆ

This is the largest subfamily of the family ISSIDÆ. As a general thing the head is not much modified. The tegminæ are fairly well de-

veloped but much modified with the venation much reduced and frequently reticulate. The claval furrow is distinct and the hind wings are present or absent.

Tribe HYSTEROPTERINI

This tribe includes those genera which have the hind wings absent or greatly reduced. For the most part these genera reach their best development in the arid regions of the world.

Key to the Genera of the Tribe HYSTEROPTERINI *Known to Occur in Mexico and Central America*[1]

A. Tegminæ horizontal with transparent areas. . . . . *Dictyssa* Melichar 1906a: 163

AA. Tegminæ vertical without transverse areas.

B. Dorsal margin of the forehead straight. . . . . *Hysteropterum* Amyot and Serville 1843a: 519

BB. Dorsal margin of the head deeply triangularly incised. . . . . *Traxus* Metcalf 1923a: 189

Tribe ISSINI

In this tribe are included those genera which have the hind wings well developed with a small anal fold which is not separated from the rest of the wing by an anal incision. The various genera are widely distributed in the principal zoo-geographic regions of the world. For the most part they are monotypical or contain very few species.

Key to the Genera of the Tribe ISSINI *Known to Occur in Mexico and Central America*

A. Head produced into a distinct cephalic process. . . . . *Proteinissus* Fowler 1904c: 121

AA. Head rounded before not produced into a distinct cephalic process.

B. Tegminæ elongate, costal margin sinuate apically, humeral angles not strongly produced. . . . . *Colpoptera* Burmeister

BB. Tegminæ scarcely longer than broad, costal margin not sinuate.

C. Humeral angles of tegminæ strongly produced; tegminæ not falcate. . . . . *Ulixes* Stål 1862e: 67

CC. Humeral angles of tegminæ not produced; tegminæ falcate. . . . *Hypancylus* Fowler 1904c: 114

[1] In addition to these genera several others are found in the arid Southwest which undoubtedly extend into Mexico.

COLPOPTERA Burm.

(Burmeister 1835a: 155)

Logotype *Colpoptera sinuata* Burm.

This genus has been placed in various families. Melichar (1923a: 91) placed it in the FLATIDÆ, tribe SELIZINI next to the genus *Cyarda* which it superficially resembles. It belongs, however, in the ISSIDÆ, tribe ISSINI and has the broad head, the short pronotum with the lateral margins behind the eyes very short; typical tegminæ and the entire wings found in this group.

Key to the Species of COLPOPTERA *Burmeister*

A: Crown narrow, elongate, longer than broad.
- B. Lateral margins of forehead reflexed, median carina distinct..... *rugosa* Van Duzee 1907a: 36 (Jamaica)
- BB. Lateral margins of forehead only slightly elevated, median carina indistinct..... *elevans* Walker 1858c: 335 (Haiti, Jamaica)

AA. Crown broader than long.
- B. Length to apex of tegminæ 5 — 6 mm.
  - C. Crown truncate anteriorly, forehead dark with lighter median spot..... *brunneus* Muir 1924g: 465 (West Indies)
  - CC. Crown arcuate anteriorly, forehead with a double row of lighter spots..... *maculifrons* Muir 1924g: 466 (West Indies)
- BB. Length to apex of tegminæ 8 or more mm.
  - C. Tegminæ with a stigmatal spot dark brown..... *sinuata* Burmeister 1835a: 135 (Mexico)
  - CC. Stigmatal spot pale, translucent..... *marginalis* Burmeister

COLPOPTERA MARGINALIS Burm.

Plates III, XII, XX

Burmeister 1835a: 156.

This is a large dark colored species with a large milky subhyaline spot on the costal margin and a small milky subhyaline spot on the sutural margin beyond the apex of the clavus.

There is an extensive series in the present collection taken at various points in the Canal Zone during July.

Tribe THIONIINI

The genera of this tribe have the hind wings well developed with a large anal fold which is frequently larger than the rest of the wing and

is separated from the rest of the wing by a distinct anal incision. This tribe contains several distinctly American genera.

Key to the Genera of the Tribe THIONIINI *Known to Occur in Mexico and Central America*

A. Hind tibiæ with two spines on the distal end.
  B. Median carina of the forehead or of forehead and clypeus strongly cristate.
    C. Forehead only cristate ..... *Thioniella* Metcalf
    CC. Both forehead and clypeus cristate *1*
      1. Crown and forehead narrow elongate, cristæ short triangular ..... *Thionissa* Metcalf
      1. Crown and forehead broad; cristæ elongate ..... *Thioniamorpha* Metcalf
  BB. Median carina of the forehead and clypeus simple not cristate .... *Thionia* Stål
AA. Hind tibiæ with four or five spines more or less uniformly distributed from proximal to distal ends ..... *Picumna* Stål

THIONIA Stål

(Stål 1859a: 321)

Logotype *Issus longipennis* Spin., Van Duzee 1916a: 81.

This is a large genus with 61 known species from North, Central and South America. In this genus the body is generally elongate oval, with the head broad, forehead broad with generally a distinct median and intermediate carinæ, the lateral areas with pustules. The tegminæ are elongate with simple longitudinal veins; media usually branching on the basal third; and all the veins connected by cross veins. The hind wings are large with the anal fold very large and folded on itself.

The chrotic characters used to separate the species are rather vague and very hard to define but the phallic characters seem to be reliable. But unfortunately I have not had an opportunity to examine the males of all species.

Key to the Species of THIONIA *Known from Mexico, Central America and Northern South America*

(Modified from Melichar)

A. Crown broader than long.
  B. Body more or less elongate.
    C. Forehead longer than broad, narrowed between the eyes ...*1*

1. Tegminæ with brown or black spots *2*
1. Tegminæ uniformly colored without spots . . . . . *prasina* (Spin.) Melichar 1906a: 273 (Brazil)
2. Forehead arched . . . . . *dissimilis* Schmidt 1910c: 206 (Colombia)
2. Forehead not arched . . . . . *variegata* (Stål) Melichar 1906a: 272 (Mexico)

CC. Forehead as broad as long, quadrangular . . . . . *stipes* Fowler 1905a: 127 (Panama)

BB. Body broad or oval.

C. Pronotal plates with a conspicuous impressed black spot . . . *1*
1. Forehead with a transverse ruga dorsad . *crucifera* Metcalf
1. Forehead without a transverse ruga dorsad *2*
2. Forehead with a conspicuous transverse blackish fascia . . . *schmidti* Schmidt 1910c: 207 (Costa Rica)
2. Forehead without a transverse fascia . . . . . *brevior* Fowler

CC. Pronotal plates without a conspicuous impressed black spot *1*
1. Forehead elongate . . . *humilis* Fowler 1904c: 124 (Mexico)
1. Forehead subquadrate *2*
2. Tegminæ spotted with black *3*
2. Tegminæ uniformly colored . . . . . *coriacea* (Fabr.) Stål 1869a: 102
3. Humeral callosities of the tegminæ strongly elevated . . . . . *fowleri* Metcalf
3. Humeral callosities not strongly elevated *4*
4. Intermediate carinæ of forehead forming a closed oval . . . *obtusa* Melichar 1906a: 279 (Mexico)
4. Intermediate carinæ indistinct not forming a closed oval . . *5*
5. On the crown a black circular mark . . . . . *maculata* Melichar 1906a: 279
5. Tegminæ marked with pale fasciæ or spots *6*
6. Tegminæ with a distinct transverse pale fascia . . . . . *ovata* Melichar 1906a: 280 (Brazil, French Guiana)
6. Tegminæ with irregular pale spots not forming a transverse fascia . . . . . *onerata* Melichar 1906a: 280 (Venezuela)

AA. Crown as long as broad or longer.

B. Forehead slightly arched transversely.

C. Forehead with a bright yellow transverse band . . . . . *transversalis* Melichar

CC. Forehead without a conspicuous transverse band *1*
1. Basal margin of the forehead deeply excavated between the eyes . . . . . *caviceps* Fowler 1905a: 125 (Panama)

1. Basal margin of the forehead not or only slightly excavated between the eyes 2
2. Vertex as long as broad .....
pehlkei Schmidt 1910c: 198 (Colombia)
2. Vertex elongate, produced, two or more times as long as broad ..... *naso* Fowler 1904c: 124 (Mexico)

BB. Forehead nearly flat transversely.

C. Median carina of forehead pectinate .....
carinata Melichar 1906a: 281 (Nicaragua)

CC. Median carina of forehead not pectinate 1

1. Apex of the femora with a black spot .....
maculipes Melichar 1906a: 282 (Mexico)
1. Apex of femora without a black spot 2
2. Vertex roundly produced anteriorly 3
2. Vertex angularly produced anteriorly 6
3. Pronotal shields with a large black spot bordered with white ..... *impressa* Melichar 1906a: 284 (Jamaica)
3. Pronotal shields without a black spot 4
4. Forehead black with conspicuous yellow spots .....
pictifrons Fowler 1905a: 125 (Mexico)
4. Forehead not black with conspicuous yellow spots 5
5. Forehead elongate, narrowed between the eyes .....
herbacea Melichar 1906a: 285 (French Guiana)
5. Forehead short and broad, not narrowed between the eyes
sordida Fowler 1904c: 124 (Mexico)
6. Vertex 5-angled, the lateral margins diverging anteriorly ..
soluta Fowler 1905a: 126 (Panama)
6. Vertex quadrilateral, lateral margins parallel 7
7. Tegminæ strongly spotted with black 8
7. Tegminæ uniformly colored, an oblique transverse dark band before the middle 9
8. Lateral areas of the forehead black, with light colored granules ..... *colombiæ* Melichar 1906a: 284 (Colombia)
8. Lateral areas of the forehead light, with dark granules ...
mexicana Melichar 1906a: 285 (Mexico)
9. Mesonotum with a row of dark points along the lateral borders. Length 6 mm .....
scutellata Fowler 1904c: 123 (Mexico)
9. Mesonotum without a row of dark points along the lateral borders. Length 4.5 mm .....
truncatella Melichar 1906a: 284 (Mexico)

Thionia transversalis Mel.

Plates XII, XIII

Melichar 1906a: 281.

This species was described from North America. There are two specimens in this collection which agree in essential details.

The crown is about as broad as long. The forehead is quadrangular; strongly arched transversally with the median carina strongly elevated dorsad and the intermediate carinæ fading out on the lower half; a distinct transverse yellow band on the upper half bordered dorsad with fuscous.

Thionia coriacea Fabr.

Plate XII

Stål 1869a: 102.

A single badly mutilated male specimen from Barro Colorado, 15 July 1924, N. B., is placed here with considerable hesitation. This species was described from females from Para and Brazil. The present example agrees very well with the description in all major points. The crown is about twice as long as broad; the forehead is dark fuscous; and the tegminæ uniformly brown.

Thionia carinata Mel.

Plate XIII

Melichar 1906a: 281.

There is a single female Barro Colorado, 25 July 1924, N. B., which agrees in all essential details. The crown is as long as broad; the forehead quadrangular the lateral margins nearly straight, the median carina percurrent, pectinate dorsally, the lateral row of pustules very conspicuous, bright yellow in color; the tegminæ expanded basally giving an oval appearance.

Thionia brevior Fowl.

Plates III, XIII

Fowler 1904c: 123.

A single female, Fort Davis, Canal Zone, 5 July 1924, N. B., which agrees with Fowler's short description and illustration in every particular save that no mention is made of the conspicuous round black spot on the pronotal plates. The tegminæ are inflated basally as shown

in the illustration; the crown is broad; the median frontal carina is incomplete, extending from the dorsal margin for about a third of the length of the forehead, with two indefinite diagonal fascia one starting at the middle of clavus and extending fairly definitely to the costal margin, the other starting at the apex of clavus and extending towards the apical angle.

Thionia crucifera spec. nov.

Plates XIV, XIX

This is a small oval species with a transverse crown, about twice as broad as long; with the posterior border deeply incised; and the posterior lateral areas deeply impressed. Forehead nearly as broad as long with a short but distinct median carina and a distinct transverse ruga dorsally.

Length to apex of tegminæ 4.5 mm.

Holotype, male, Barro Colorado.

Thionia fowleri nom. nov.

For *Thionia conspersa* Fowler 1905a: 125 (nec *Thionia* (*Issus*) *conspersa* Walker 1851a: 365) which seems to be a variety of *Thionia bullata* Say.

Thioniella gen. nov.

Orthotype *Thioniella rugosa* spec. nov.

This genus resembles *Thionia* Stål rather closely but differs in head characters and venation.

Head narrower than pronotum; crown slightly longer than broad, the lateral margins elevated and diverging anteriorly, the median line sulcate, anterior margin produced; forehead nearly as broad as long, produced above into an elongate triangular cristate callosity, the lateral margins below inflated into rounded slightly elevated callosities; clypeus elongate, medially carinate. Pronotum short and broad; posterior margin broadly sinuate; carinæ strongly diverging; two deeply impressed points near the median line; lateral fields of pronotum with four slightly elevated callosities. Mesonotum short and broad with a distinct transverse carina back of anterior margin. Tegminæ strongly rugulose. Venation not evident, subcosta, radius and first cubital sector unbranched, media bifurcate close to basal cell. Hind tibiæ with two spines on the apical third.

Thioniella rugosa spec. nov.

Plates III, XIII

Crown about as long as greatest width, two elongate impressed points either side of median sulcus at the base, diverging anteriorly. Forehead about as broad as long, narrowed above; the median dorsal callosity robust, somewhat pyramidal. Clypeus with a distinct median carina. Second segment of antennæ slightly longer than broad, cylindric. Pronotum with diverging carinæ following the contour of the head; with large oval callosities behind the diverging carinæ and two impressed points at the middle near the median line; posterior margin broadly sinuate. Mesonotum about as long as pronotum. Tegminæ strongly and coarsely rugulose, with a deeply impressed oval area on the basal angles, shoulders strongly elevated. Hind tibiæ with two spines on the apical half.

General color ochraceous tawny shading to ochraceous buff, irregularly marked with fuscous and testaceous. Head largely ochraceous tawny marked with ochraceous buff, with the carinæ and the clypeus irregularly marked with fuscous. Eyes and antennæ fuscous. Tegminæ largely ochraceous tawny with three irregular transverse fuscous fasciæ, one near the base, one before the middle and the other before the apex. Wings blackish fuscous, veins black. Anterior and middle femora and tibiæ ringed with tawny and buff; hind femora and tibiæ lineate with fuscous. Abdomen below tawny, the central area clouded with fuscous; and the pleural pieces red.

Length to apex of tegminæ 14.7 mm.

Holotype, female, Barro Colorado, 20 July 1924, N. B.

Thionissa gen. nov.

Orthotype *Thionissa acuta* spec. nov.

This genus has the general characters of *Thionia* Stål, but the median frontal carina is elevated into a prominent callosity. In this respect it resembles *Thioniella* Metcalf but the crown and forehead are narrow in *Thionissa* and the clypeus is elevated on the median line into a prominent cristate carina.

Head, including eyes, narrower than pronotum; crown narrow, lateral margins strongly elevated; forehead narrow, lateral margins strongly elevated, median carina strongly developed and triangularly cristate, two small lateral callosities near the clypeal margin; clypeus

cristate the median carina when viewed laterally broadly rounded. Tegminæ rather broad, nearly quadrangular, shoulders strongly produced, venation rather simple, the longitudinal veins connected by numerous cross veins; subcosta radius and first cubital sector unbranched, media four branched. Hind tibiæ with two spines.

Thionissa acuta spec. nov.

Plates XIV, XV, XIX

Crown more than three times as long as broad, faintly sulcate on the median line, sulcus deeply impressed on the anterior third. Forehead narrow distinctly narrowed between the eyes; dorsal callosity narrow triangular strongly produced; a pair of oval callosities on either side of the median carina at about the level of the antennæ. Median clypeal carina strongly cristate, the crista when viewed laterally broadly rounded. Pronotum shorter than mesonotum, disc of both smooth, ecarinate. Tegminæ with simple cross veins.

General color ochraceous buff heavily and irregularly marked with fuscous and testaceous. Carinæ of head and the surface of the forehead and clypeus largely fuscous. In some specimens the tegminæ are almost completely fuscous in others marked with irregular clouds of fuscous. Wings fuscous. Femora all once or twice ringed with testaceous, anterior and intermediate tibiæ similarly marked. Abdomen largely fuscous.

Length to apex of tegminæ 8.5 — 10 mm.

Holotype, male, Barro Colorado, 10 November 1930, H. F. Schwarz, American Museum of Natural History.

Paratypes, one male, Barro Colorado, 3 April 1929, S. W. Frost; one male, Barro Colorado, 5 July 1905, W. Robinson; one specimen sex not determined, Santa Carlos, Costa Rica, Schaus and Barnes, all in the U. S. National Museum.

Thioniamorpha gen. nov.

Orthotype *Thioniamorpha marmorata* spec. nov.

This genus resembles *Thionissa* Metcalf in a general way but the head is much broader and differs in other characters and the venation is different.

Head broad, nearly as broad as the pronotum; crown rather narrow, concave, the lateral margins well elevated; forehead narrowed between

the eyes, lateral margins elevated, median carina strongly developed, median callosity not developed not raised above the level of the median carina; ventral callosities conspicuous. Clypeus tricarinate, the median carina moderately cristate. Pronotum transversely impressed across the middle, with two minute punctures close together; lateral fields smooth. Mesonotum with distinct median and transverse carinæ forming a conspicuous T-shaped mark. Legs simple. Hind tibiæ with two stout spines on the apical half. Tegminæ quadrangular, inflated at the base; venation distinct, cross veins reticulate; subcosta, radius, media and first cubital sector arising from the basal cell, radius two branched on apical area, media with two sectors arising on the basal fifth, the first sector with three distinct branches apically, second medial sector unbranched, first cubital sector unbranched, hind wing with a broad anal fold.

THIONIAMORPHA MARMORATA spec. nov.

Plate XIV

General color dull ferrugineous. Crown and forehead ochraceous buff, heavily marked with fuscous. Tegminæ heavily marked with fuscous especially along the apical and sutural margins.

Length to apex of tegminæ 9.2 mm.

Holotype, female, Barro Colorado, 10 November, H. F. Schwarz, American Museum of Natural History.

PICUMNA Stål

(Stål 1864a: 52)

Logotype *Picumna varians* Stål, Van Duzee 1916a: 81.

[Includes *Cyclumna* Fowler 1904c: 116, haplotype *Cyclumna subrotundata* Fowler; and *Issomorphus* Melichar, logotype *Issomorphus maculatus* Van Duzee 1916a: 81.]

I have placed these three genera together because I have been unable to find any reliable characters to separate them. Melichar separates *Picumna* and *Cyclumna* from *Issomorphus* on the basis that the former group has four spines on the hind tibiæ while *Issomorphus* has five. In the former group the first cubital sector is forked in the middle of the corium while in *Issomorphus* the first cubital sector is unbranched. I believe that *Cyclumna* represents forms with short tegminæ while *Picumna* has slightly longer tegminæ and *Issomorphus* still longer.

One of the specimens in the present collection has five spines on one hind tibia and four on the other, while the first cubital sector is branched at the level of the union of the claval veins and the tegminæ are short and the body broadly oval.

Picumna subrotundata Fowl.

Plates III, XIV

Fowler 1904c: 116.

This is a light ochraceous buff species with two broad blackish fuscous fasciæ on the tegminæ, one near the base and the other beyond the middle. The anterior half of the crown, the disc of the pronotum and two longitudinal vittæ on the mesonotum are also blackish fuscous.

There is a single female from Mt. Hope, Canal Zone, 8 July 1924, N. B., in the Museum of Comparative Zoölogy.

Picumna testacea spec. nov.

Plates III, XIV, XIX

This species differs from *subrotundata* not only in color but in the following structural characters: Crown broader, less elongate; much smaller; pronotum longer and less angulate; face narrower, more elongate, median carina less elevated.

Crown quadrangular, fovea small. Forehead elongate, distinctly narrowed between the eyes. Pronotum short; posterior margin nearly straight. Mesonotum slightly longer than pronotum. Subcostal radial stem very short; media forked on the basal third; first medial sector again forked before apex; first cubital sector forked on the level with the union of the claval veins.

General color honey yellow. Tegminæ with a few fuscous spots and with slight irregular fuscous cloudings. Crown with the anterior margin blackish fuscous, the disc of the pronotum and two vittæ on the mesonotum of the same color.

Length to apex of tegminæ 5.5 mm.

Holotype, male, Las Sabanas, Panama, 7 July 1924, N. B.

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EXPLANATION OF PLATES

PLATE 1

PLATE 1

Adult Cixiidae, Derbidae and Araeopidae from Central America.

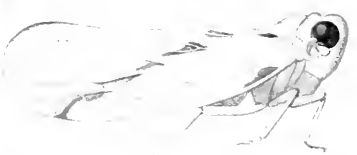
Pintalia germana Fowl.

Mysidia costata Fab.

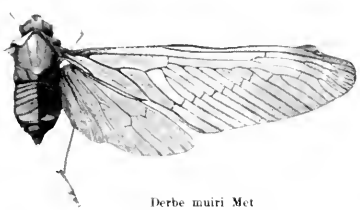
Pintalia tacta Fowl.

Amulopota fitchi Van D.

Muirolonia metallicus Fowl.



Syntames delicatus Fowl.



Derbe muiri Met

Persis fuscinervis Muir.

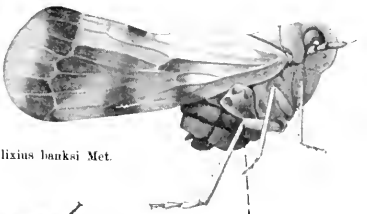
Eucanyra stigmata Craw

Neocnecbrea pallescens Met.

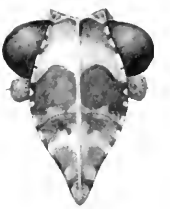
PLATE **2**

PLATE **2**

Adult Achilixiidae, Achilidae and Nogodinidae from Central America.

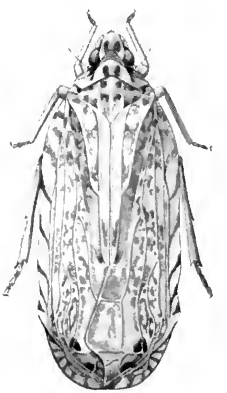


Muirilixius banksi Met.



Catonia sobrina Fowl.

Muirilixius banksi Met.

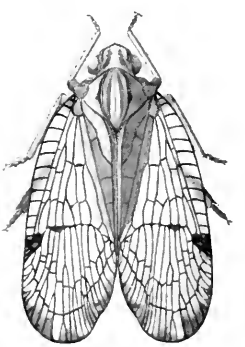


Elidiptera callosa Spin.

Ateson marmoratum Met

Ateson fuscum Met.

Koloptera callosa Met.

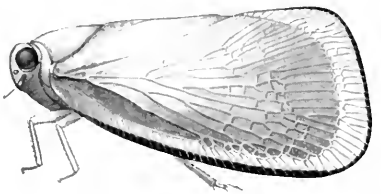


Biolleyana costalis Fowl.

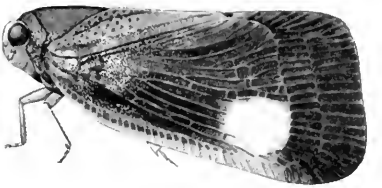
PLATE 3

PLATE **3**

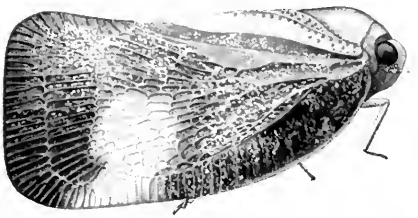
Adult Flatidae and Issidae from Central America.



Monoflata banksi Met

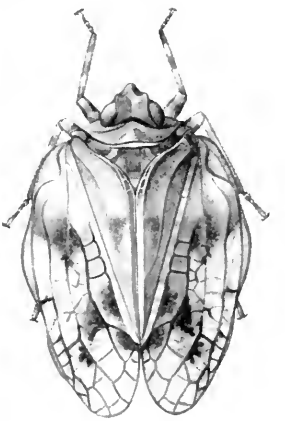


Flatormenis panamensis Schmidt

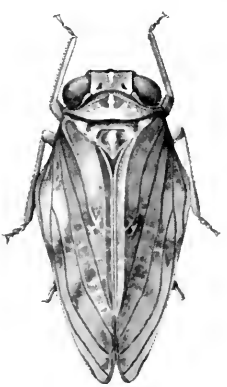


Anormenis discus Walk.

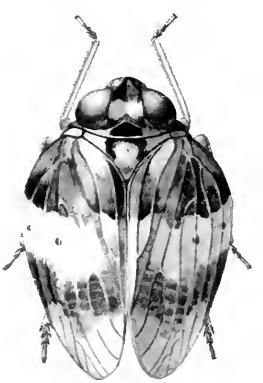
Colpoptera marginalis Burm.



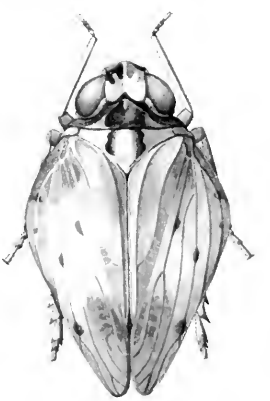
Thioniella rugosa Met.



Thionia brevior Fowl.



Picumna subrotundata Fowl.

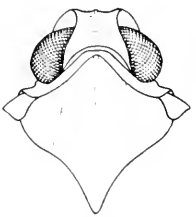


Picumna testacea Met.

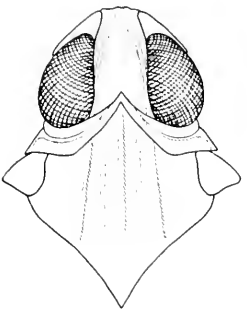
PLATE 4

PLATE 4

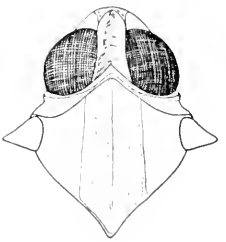
Dorsal and frontal views of head and thorax of Central American Cixiidae, Araeopidae and Derbidae.



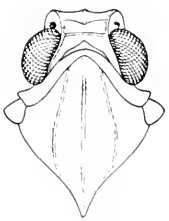
Pintalia germana Fowl.



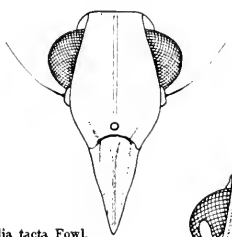
Oliarus excelsus Fowl.



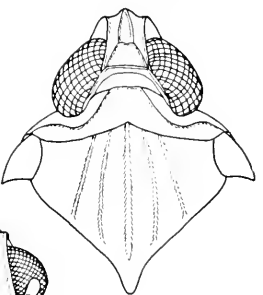
Oliarus omani Met.



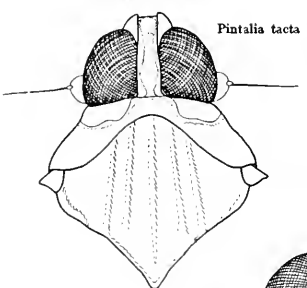
Pintalia tacta Fowl.



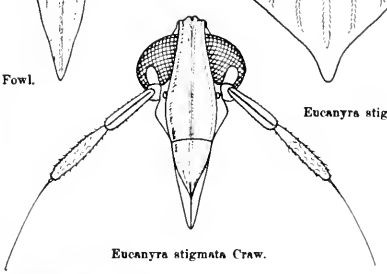
Pintalia tacta Fowl.



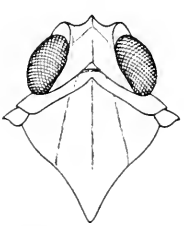
Eucanyra stigmata Craw.



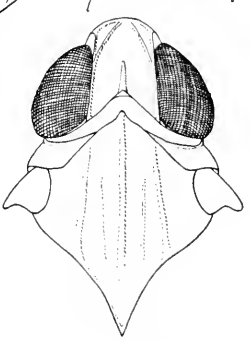
Oecleus concinnus Fowl.



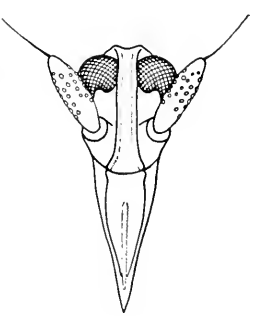
Eucanyra stigmata Craw.



Muirolonia metallicus Fowl.



Oliarus concinnus Fowl.

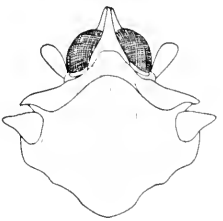


Myaidia costata Fab.

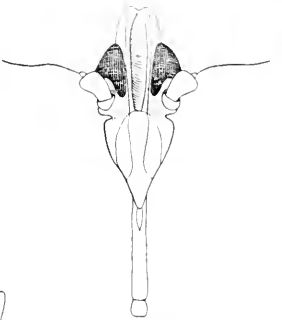
PLATE 5

PLATE 5

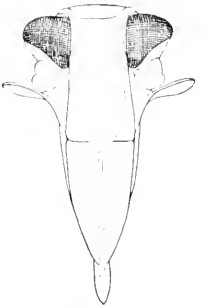
Dorsal, lateral and frontal views of Central American Derbidae.



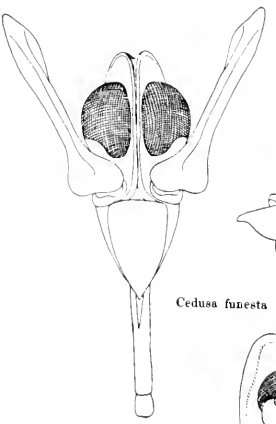
Pseudomysidia fuscovaria Met.



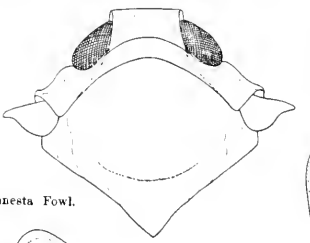
Persis fuscinervis Muir.



Cedusa funesta Fowl.



Platonax maculata Met.

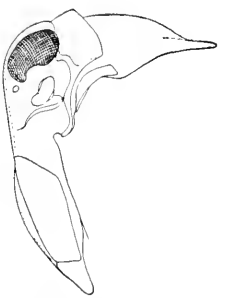


Cedusa funesta Fowl.

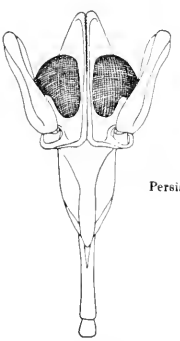
Persis fuscinervis Muir.

Antenna

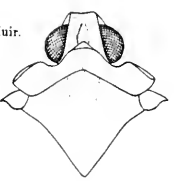
Platonax maculata Met.



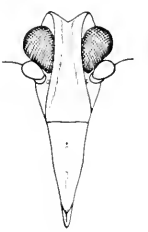
Cedusa funesta Fowl.



Anotia punctata Met.



Syntames fulva Van D.

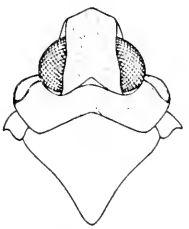


Syntames fulva Van D

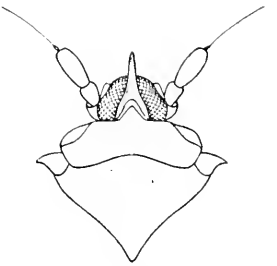
PLATE 6

PLATE 6

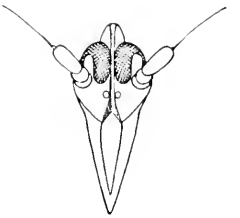
Dorsal and lateral views of Central American Derbidae, Achilixiidae and Dictyopharidae.



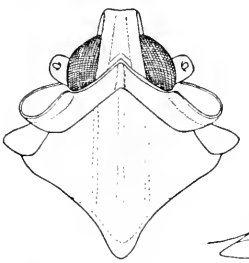
Syntames albida Met.



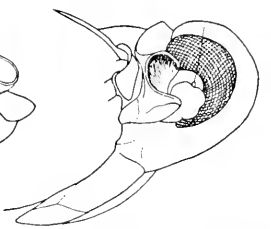
Muirilixius banksi Met.



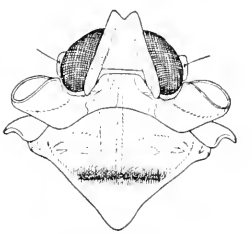
Muirilixius banksi Met.



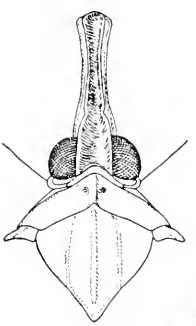
Neocenchrea pallescens Met.



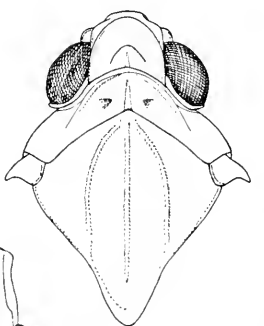
Neocenchrea pallida Met.



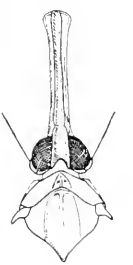
Neocenchrea pallida Met.



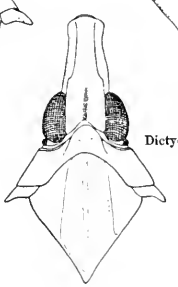
Lappida fusca Met.



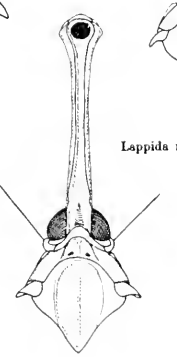
Dictyophara nigronotata Stal.



Lappida rubrovitta Met.



Lappida cholorochroma Walk.

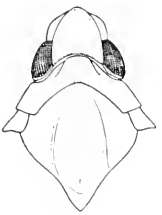


Lappida ferocula Dist.

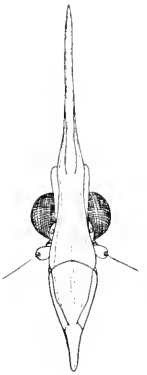
PLATE 7

PLATE 7

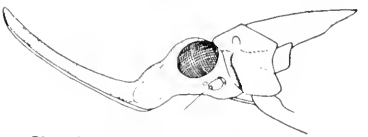
Dorsal, lateral and frontal views of Central American Dictyopharidae, Fulgoridae and Achilidae.



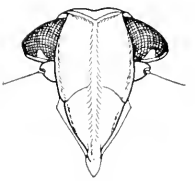
Dictyophara herbida Walk.



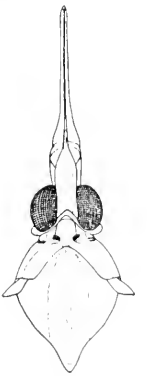
Dictyopharoides tenuirostris Fowl.



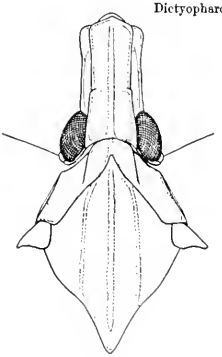
Dictyopharoides tenuirostris Fowl.



Messeis aspor Fowl.

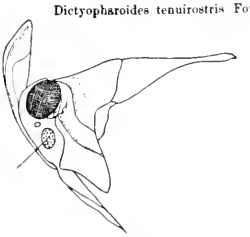


Dictyopharoides tenuirostris Fowl.

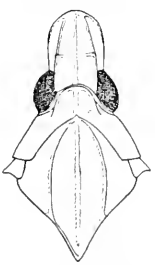


Dictyophara brachyrhina Walk.

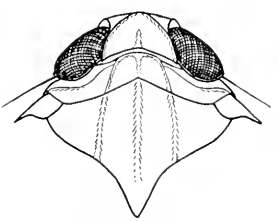
Odontoptera carrenoi Sign.



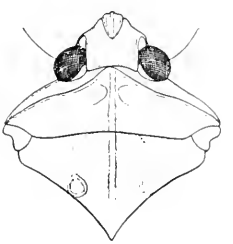
Copidocephala ornando Dist.



Dictyophara obtusifrons Walk.



Messeis asper Fowl.

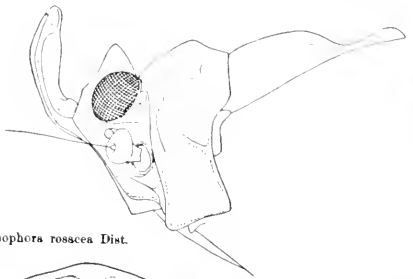


Copidocephala ornando Dist.

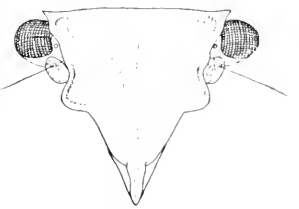
PLATE 8

PLATE 8

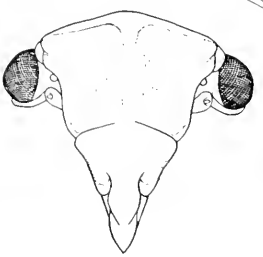
Dorsal, lateral and frontal views of Central American Fulgoridae and Achilidae.



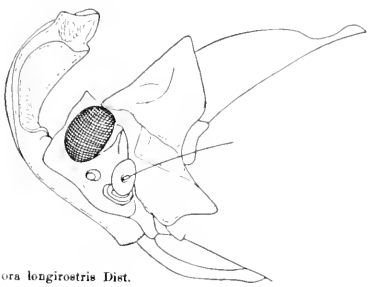
Enchophora rossea Dist.



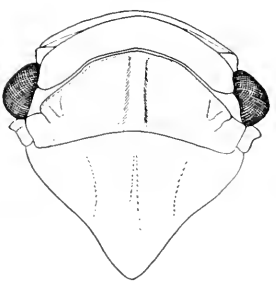
Crepusia ornata Met.



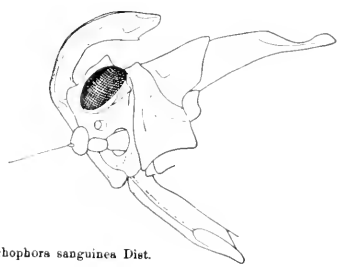
Calyptoproctus elegans Spin.



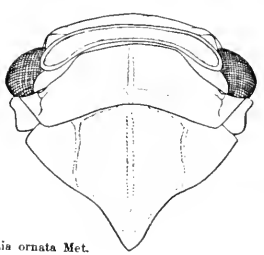
Enchophora longirostris Dist.



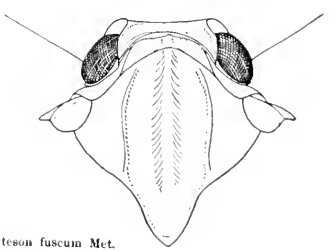
Calyptoproctus elegans Spin.



Enchophora sanguinea Dist.



Crepusia ornata Met.

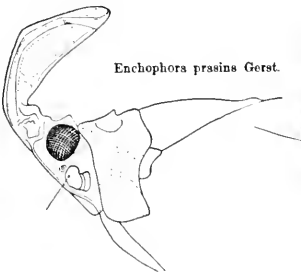


Ateson fuscum Met.

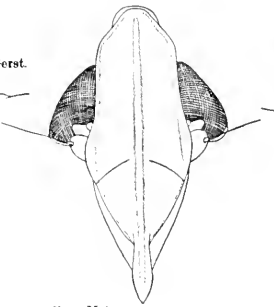
PLATE 9

PLATE 9

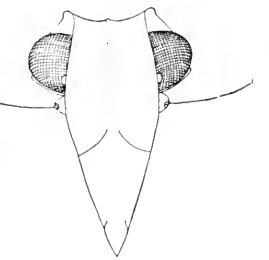
Dorsal, lateral and frontal views of Central American Fulgoridae and Achilidae.



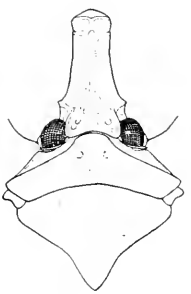
Enchophora prasina Gerst.



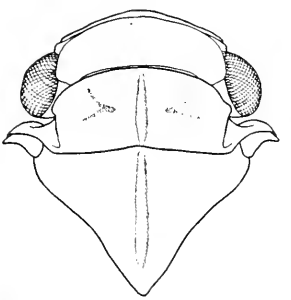
Koloptera callosa Met.



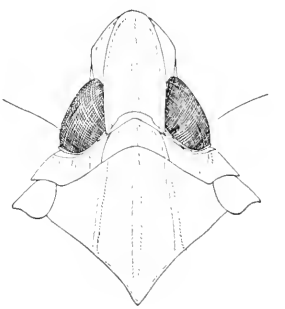
Ateson fuscum Met.



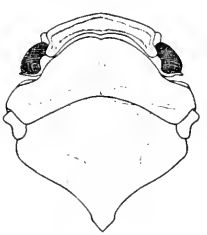
Diareusa conspersa Schmidt



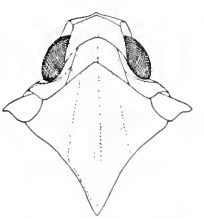
Cyrpoptus obscurus Met.



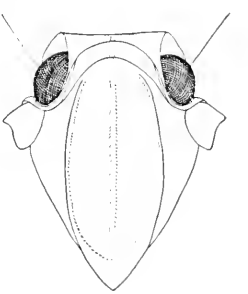
Koloptera callosa Met.



Scaralis neotropicalis Dist.

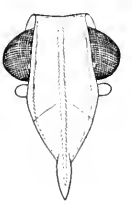


Rhotella punctata Met.



Apateson albomaculatum Fowl.

Scaralis neotropicalis Dist.

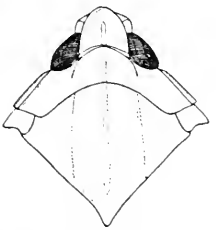


Rhotella punctata Met.

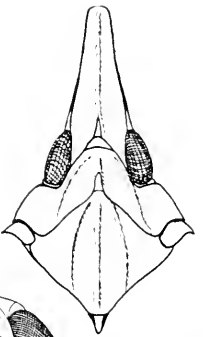
PLATE 10

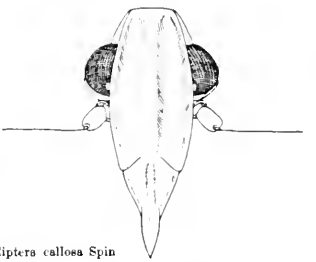
PLATE **10**

Dorsal and frontal views of Central American Achilidae and Tropiduchidae



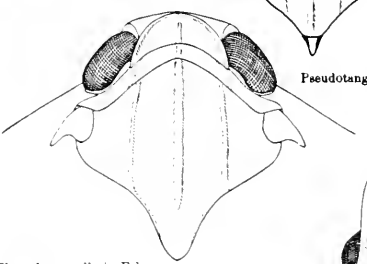
Messoides uniformis Met.



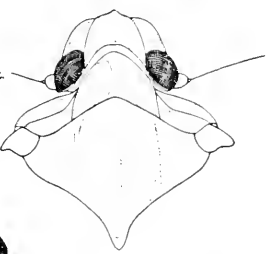


Elidiptera callosa Spin

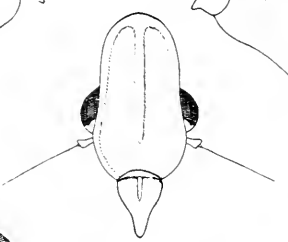
Pseudotangis sponsa Met.



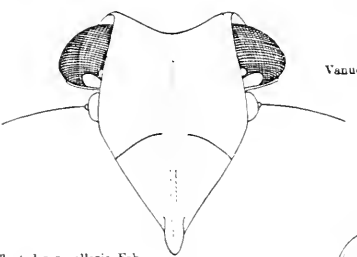
Plectoderes collaris Fab.



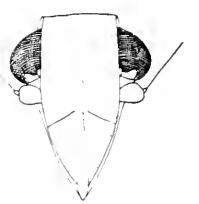
Elidiptera callosa Spin.



Vanuoides pallescens Met.

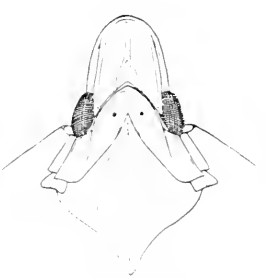


Plectoderes collaris Fab.

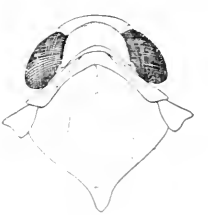


Amblycratus fuscolineatus Fowl.

Amblycratus fuscolineatus Fowl.



Vanuoides pallescens Met.

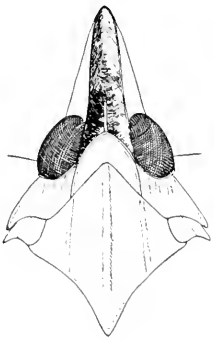


Plectoderes scapularis Met.

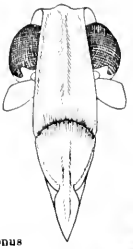
PLATE 11

PLATE 11

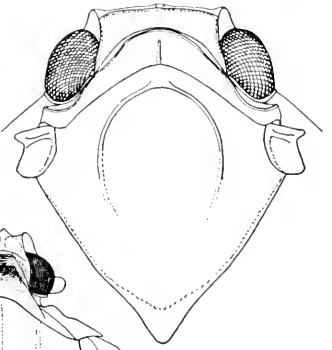
Dorsal and frontal views of Central American Achilidae and Nogodinidae.



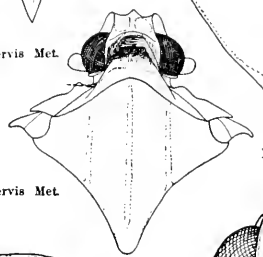
Karpodocephalus lineatus Met.



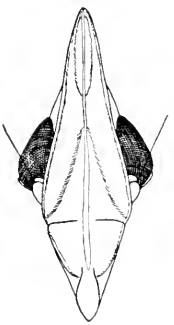
Myconus conspersinervis Met.



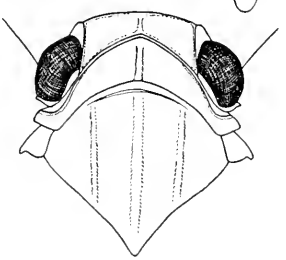
Nogodina reticulata Fab.



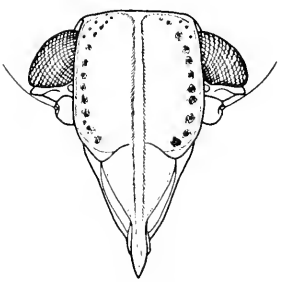
Myconus conspersinervis Met.



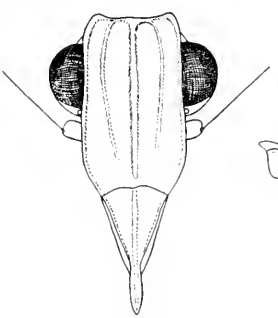
Karpodocephalus lineatus Met.



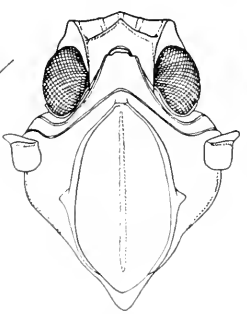
Bladina magnifrons Fowl.



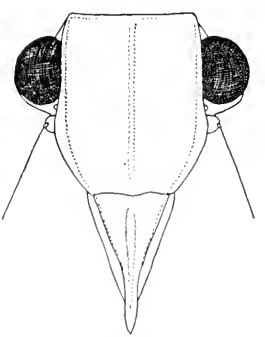
Bladina magnifrons Fowl.



Biolleyana costalis Fowl.



Biolleyana costalis Fowl.

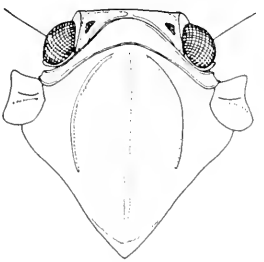


Nogodina reticulata Fab.

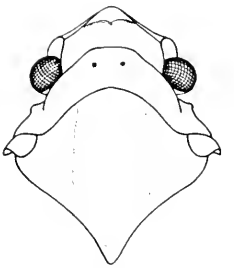
PLATE **12**

PLATE **12**

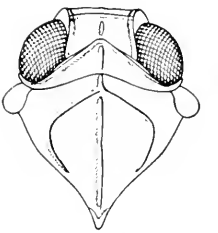
Dorsal and frontal views of Central American Nogodinidae, Flatidae and Issidae.



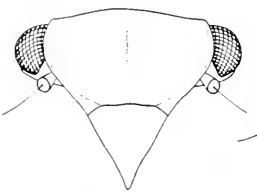
Vutina bipunctata Met.



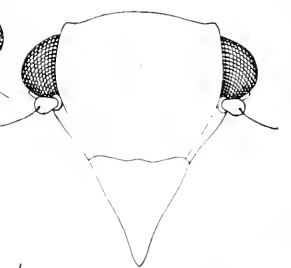
Flatoidinus occidentalis Walk.



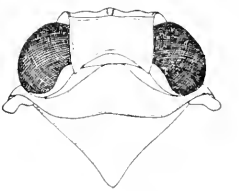
Colpoptera marginalis Burm.



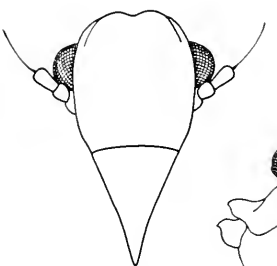
Flatormenis panamensis Schmidt



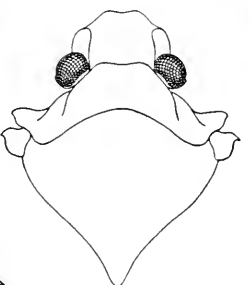
Anormenis diacus Walk



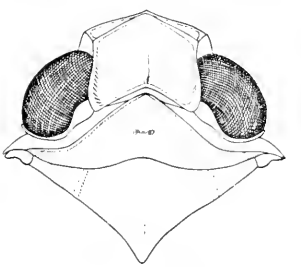
Thionia coriacea Fab.



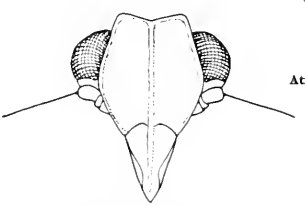
Atracis humeralis Walk.



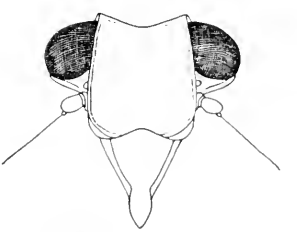
Atracis humeralis Walk.



Thionia transversalis Mcl



Colpoptera marginalis Burm.

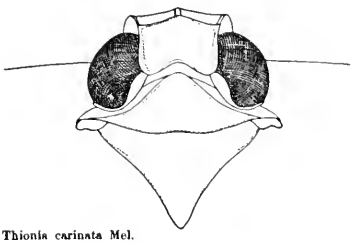


Thionia coriacea Fab

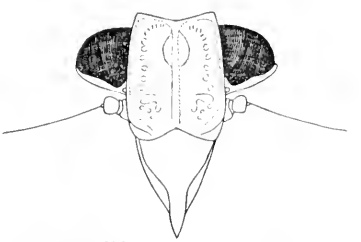
PLATE **13**

PLATE 13

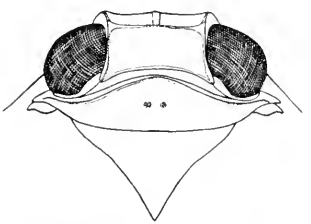
Dorsal, frontal and lateral views of Central American Issidae.



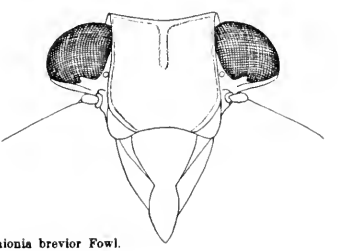
Thionia carinata Mel.



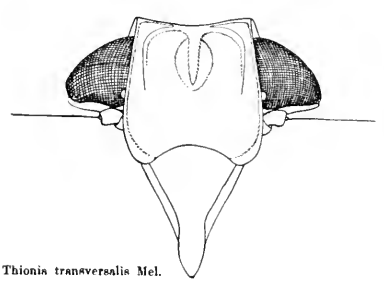
Thionia carinata Mel.



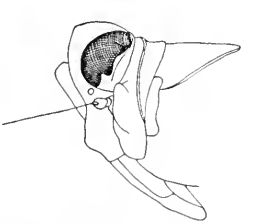
Thionia brevior Fowl.



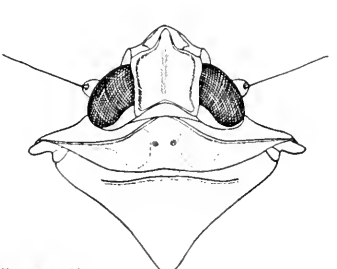
Thionia brevior Fowl.



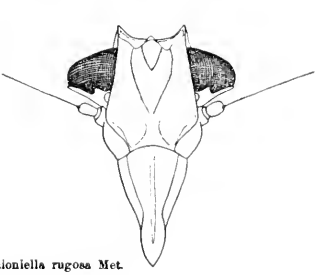
Thionia transversalis Mel.



Thioniella rugosa Met.



Thioniella rugosa Met.

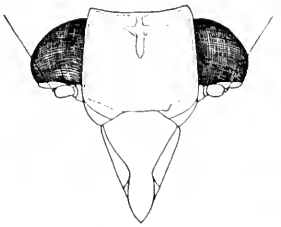


Thioniella rugosa Met.

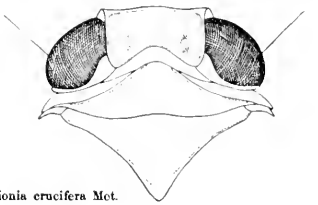
PLATE **14**

PLATE 14

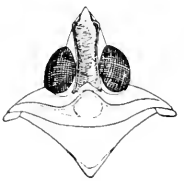
Dorsal, frontal and lateral views and wing venation of Central American Issidae and Derbidae.



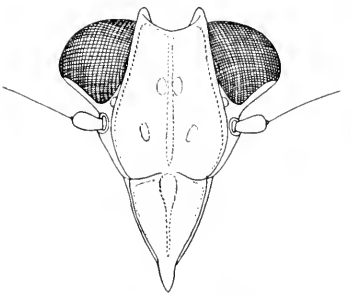
Thionia crucifera Met.



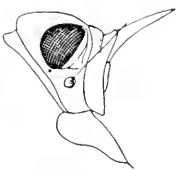
Thionia crucifera Met.



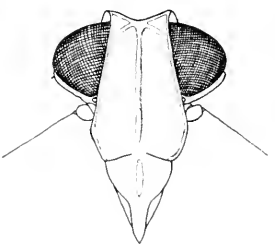
Thionissa acuta Met.



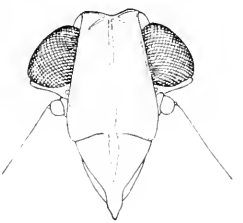
Thioniamorpha marmorata Met.



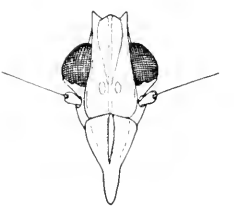
Thionissa acuta Met.



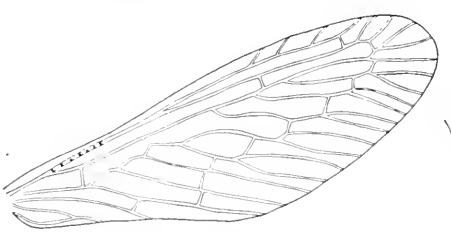
Picumna testacea Met.



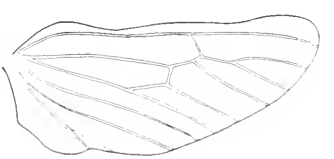
Picumna subrotundata Fowl.



Thionissa acuta Met.



Pseudomysidia fuscovaria Met.



Pseudomysidia fuscovaria Met.

PLATE 15

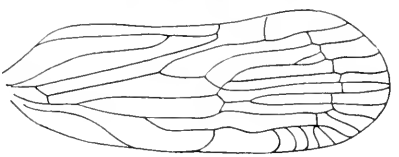
PLATE 15

Wing venation of Central American Cixiidae, Achilidae, Derbidae and Tropiduchidae.

Bothriocera bicornis Fab.

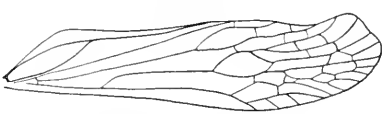
Bothriocera basalis Met.

Mnemosyne planiceps Fab.

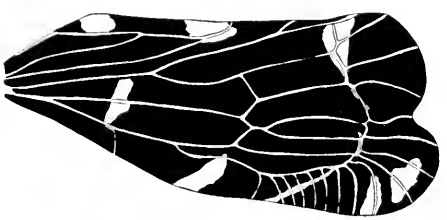


Ateson marmoratum Met.

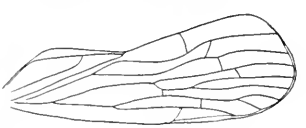
Rhotella punctata Met.



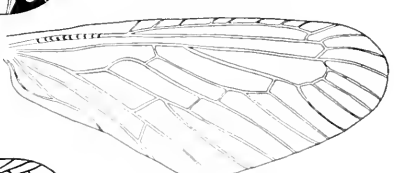
Dictyopharoides tenuirostris Fowl.



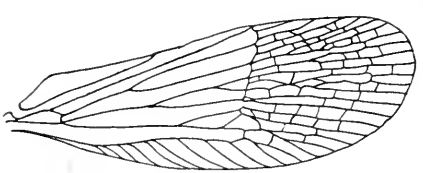
Apateson albomaculatum Fowl.



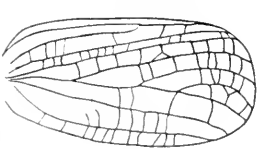
Amblycratus fuscolineatus Fowl.



Mysidia punctifera Met.



Pseudotangia sponsa Met.

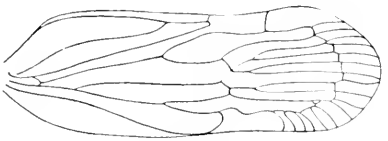


Thionissa acuta Met.

PLATE **16**

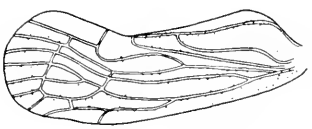
PLATE 16

Wing venation of Central American Achilidae, Achilixiidae, Tropiduchidae and Flatidae.



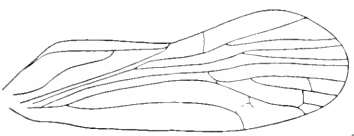
Ateson fuscum Met.

Elidiptera callosa Spin.

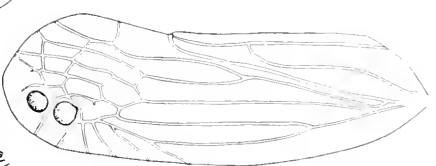


Messeis asper Fowl.

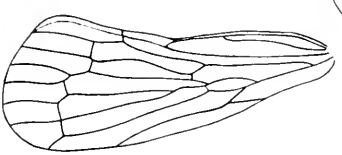
Koloptera callosa Met.



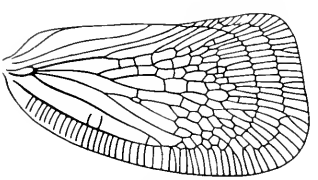
Plectoderes scapularis Met.



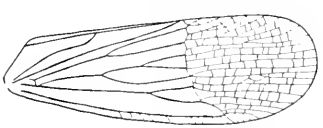
Karpodocephalus lineatus Met.



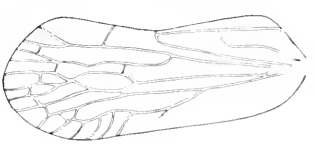
Muirilixius banksi Met.



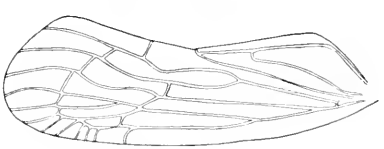
Anormenis media Mel.



Vanuoides pallescens Met.



Myconna conspersinervis Met.



Plectoderes collaris Fab.

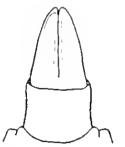
PLATE 17

PLATE 17

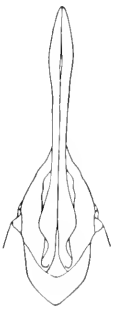
External and internal male and female genitalia of Central American Cixiidae and Araeopidae.

Bothriocera bicornis Fab

Bothriocera bicornis Fab



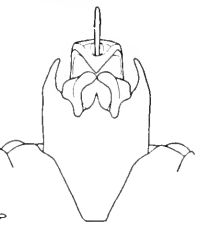
Murrolonia metallicus Fowl



Murrolonia metallicus Fowl

Bothriocera tinealis Fab

Bothriocera tinealis Fab



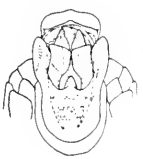
Muremosyne planiceps Fab

Bothriocera westwoodi Stal

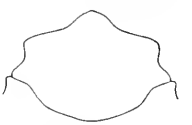
Myaidia nebulosa Germ

Myaidia punctifera Met

Eucanyra stigmata Craw

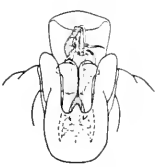


Bothriocera westwoodi Stal

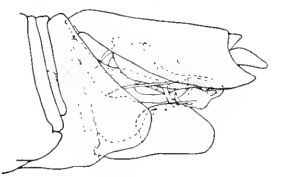


Myaidia costata Fab

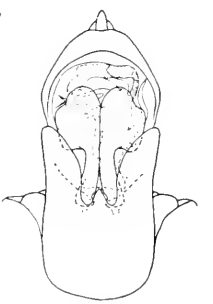
Bothriocera basalis Met



Bothriocera basalis Met



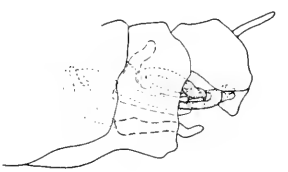
Oliarus omani Met



Oliarus omani Met

Pintalia fusca Met

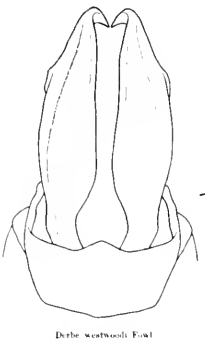
Pintalia germana Fowl



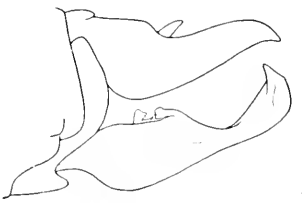
Eucanyra stigmata Craw

PLATE 18

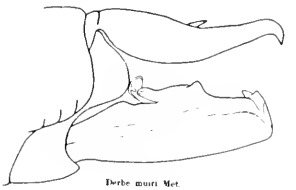
External male and female genitalia of Central American Derbidae.



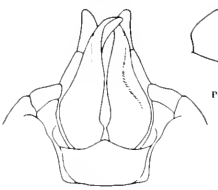
Derbe westwoodi Fowl



Derbe westwoodi Fowl



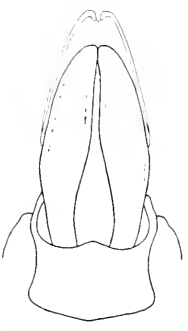
Derbe muiri Met.



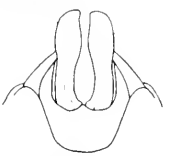
Myaidia punctum Fab

Pseudomyaidia fuscovaria Met

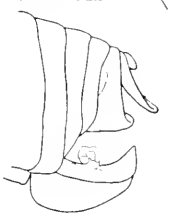
Myaidia fasciata Met.



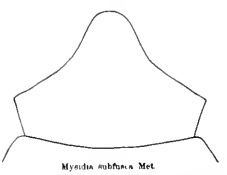
Derbe muiri Met



Myaidia nigropunctata Met.



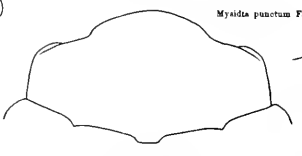
Myaidia costata Fab



Myaidia subfusca Met.

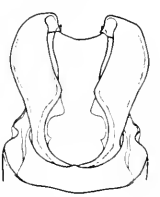
Myaidia punctum Fab

Myaidia nigropunctata Met.



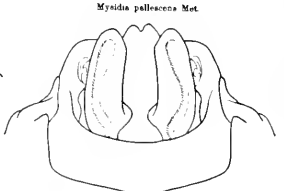
Myaidia pallescens Met.

Myaidia nebulosa Germ



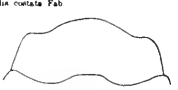
Anotia punctata Met

Derbe muiri Met



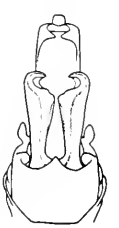
Myaidia costata Fab

Myaidia nigropunctata Met.



Myaidia obscura Met.

Anotia kirkaldyi Ball



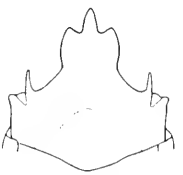
Persia fuscinervis Muir

PLATE **19**

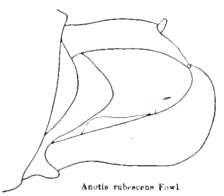
PLATE 19

External and internal male and female genitalia of Central American Derbidae, Issidae and Achilixiidae.

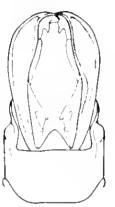
Derbe muiri Met



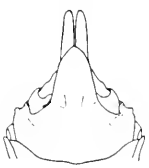
Derbe curranti Met



Anotia rubacens Fowl



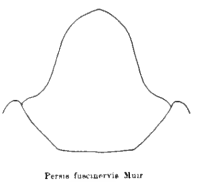
Amalopota fitchi Van D



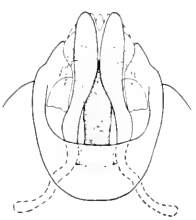
Derbe buecki Met

Amalopota fitchi Van D

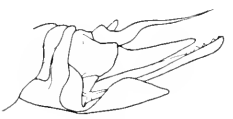
Anotia invalida Fowl



Persis fuscinervis Muir

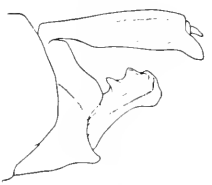


Pseudomysidia fuscovaria Met

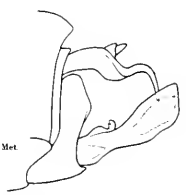


Derbe buecki Met

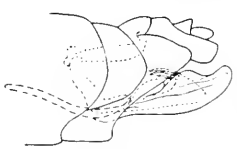
Platonax maculata Met



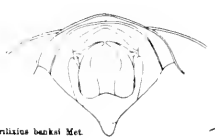
Persis fuscinervis Muir



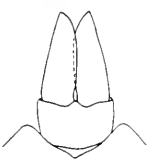
Platonax maculata Met



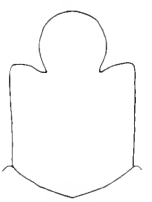
Pseudomysidia fuscovaria Met



Muirilixius banksi Met

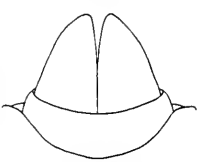


Thionia crucifera Met



Syntames delicatus Fowl

Anotia punctata Met



Picumna testacea Met

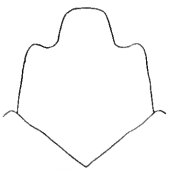
Thionissa acuta Met

Thionissa acuta Met

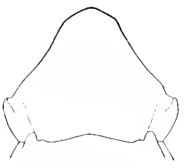
PLATE **20**

PLATE 20

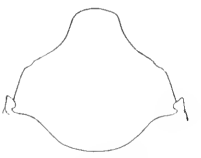
External and internal male and female genitalia of Central American Derbidae, Dictyopharidae and Fulgoridae.



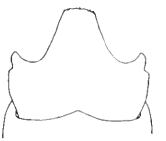
Syntames fulva Van D



Neocenchrea pallescens Met

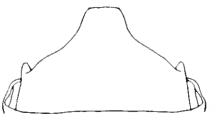


Syntames brunnea McA



Neocenchrea pallida Met

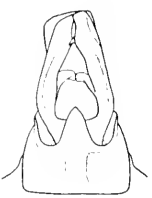
Syntames albida Met



Syntames fusca Met

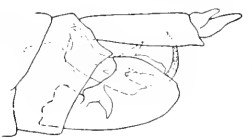
Colpoptera marginalis Burm

Colpoptera marginalis Burm.

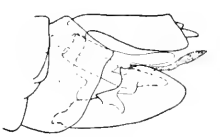


Syntames delicatus Fowl

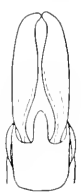
Syntames delicatus Fowl



Lappida rubrovitta Met

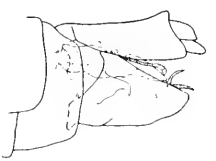


Lappida fusca Met



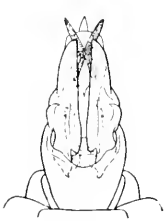
Syntames fusca Met

Syntames fusca Met



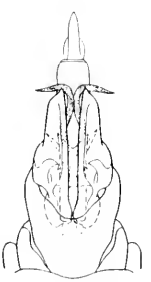
Dictyophara nigronotata Stal

Phricton tripartitus Met



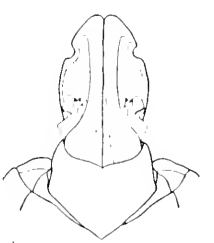
Lappida fusca Met

Dictyophara nigronotata Stal



Lappida rubrovitta Met

Phricton quinquepartitus Fowl



Eurybrachys tomacea Dist

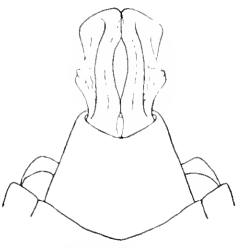
PLATE **21**

PLATE 21

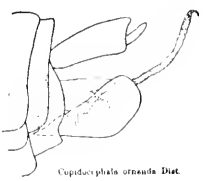
External and internal male and female genitalia of Central American Fulgoridae.

Calyptoproctus elegans Spin.

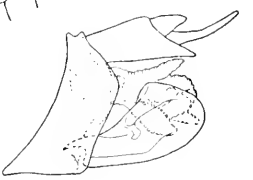
Dictyophara obtusifrons Walk.



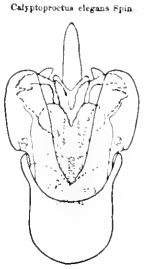
Enchophora prasina Gerst.



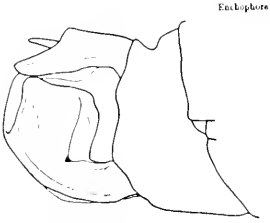
Copidocephala ornanda Dist.



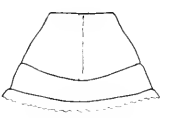
Phrictus diadema Linn.



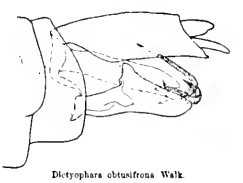
Phrictus diadema Linn.



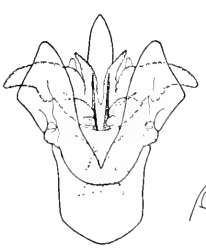
Enchophora prasina Gerst.



Scarabia neotropicalis Dist.

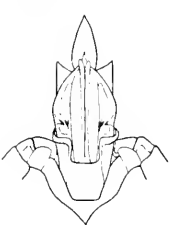


Dictyophara obtusifrons Walk.

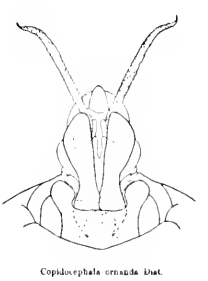


Phrictus tripartitus Mot.

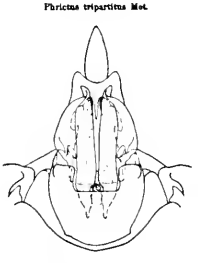
Odontoptera carrenoi Sign



Enchophora longirostris Dist.

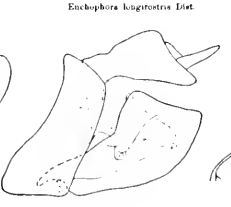


Copidocephala ornanda Dist.

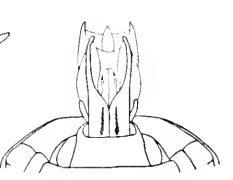


Enchophora sanguinea Dist.

Enchophora sanguinea Dist.



Phractus quinquepartitus Fowt

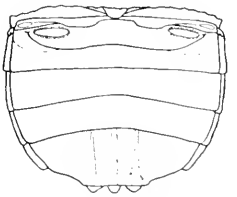


Diarrusa conspersa Schmidt

PLATE **22**

PLATE 22

External and internal male and female genitalia of Central American Fulgoridae, Nogodinidae, Achilidae and Flatidae.



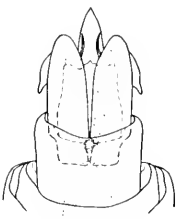
Alphina glauca Met.

Plectoderes scapularis Met.

Biolleyana costalis Fowl.

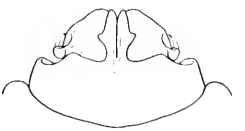
Amblycratus fuscus Met.

Ateson fuscum Met.

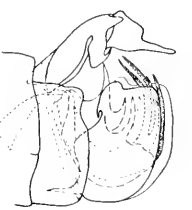


Bladina magnifrons Fowl.

Ateson marmoratum Met.

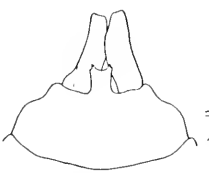


Messeis asper Fowl.

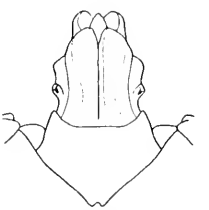


Bladina magnifrons Fowl.

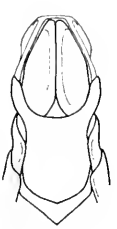
Amblycratus fuscolineatus Fowl.



Karpodocephalus lineatus Met.

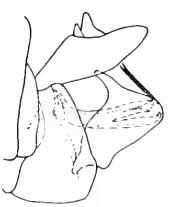


Cyrpoptus obscurus Met.

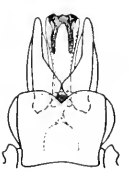


Nogodina reticulata Fab.

Biolleyana costalis Fowl.



Poekilloptera phalaenoides Linn.

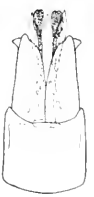


Poekilloptera phalaenoides Linn.

PLATE **23**

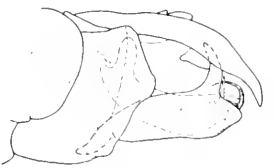
PLATE 23

External and internal male and female genitalia of Central American Flatidae and Cixiidae.

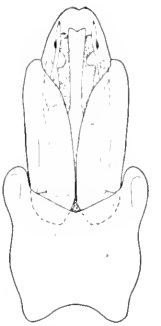


Ormenis roscida Germ

Atracis humeralis Walk

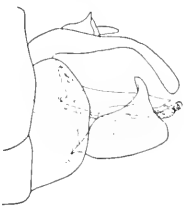


Flatoidinus occidentalis Walk



Flataloides oblique Walk

Anormenis media Mel



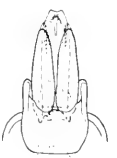
Ormenis roscida Germ

Anormenis media Mel

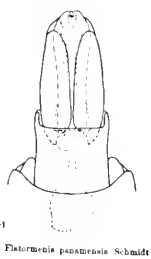
Flatormenis silbescens Fowl

Flatormenis grisealba Fowl

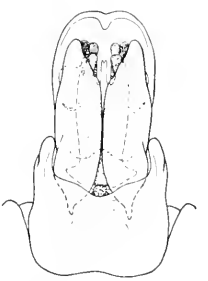
Pintalia erecta Mel



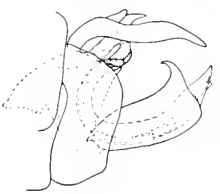
Flatormenis grisealba Fowl



Flatormenis panamensis Schmidt



Flatoidinus occidentalis Walk



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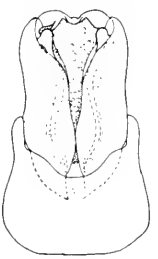
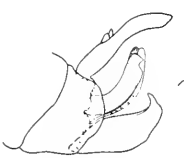
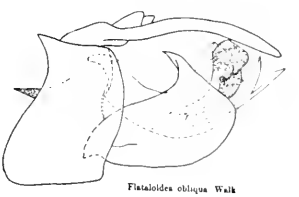


Atracis pollutus Fowl



Atracis humeralis Walk

Pintalia erecta Mel



Flataloides oblique Walk