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A GENERIC REVIEW OF  
THE ITHOMIINAE

(LEPIDOPTERA: NYMPHALIDAE)

BY

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A GENERIC REVIEW OF THE ITHOMIINAE

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(Plates V to VIII)

The lepidopterous subfamily *Ithomiinae* is a compact group of genera confined exclusively to the American tropics. It belongs to the family *Nymphalidae* and is related to the holotropic subfamily *Danainae*.<sup>1</sup> This paper recognizes thirty-five genera, two of which are new, and groups the genera into three tribes. The generic synonymy is summarized and each of the genera is defined with particular emphasis on the venation of the hind wings. The present paper is intended to serve as a study preliminary to a series of papers dealing comprehensively with the species.

An extensive examination of visible external characters of possible generic value has led to the conclusion that in the case of the *Ithomiinae* the scale patch of the males and the venation of the hind wings in both sexes offer characters sufficient for distinguishing each genus. It is not to be assumed, however, that venation is regarded as the only criterion. Venation is used here because it seems to be consistently and reliably correlated with other characters, thus fortunately affording a convenient uniform basis for generic determination and for keying. The venation of the fore wings appears to be somewhat less satisfactory for separating these genera. The male genitalia can be used usually to separate both species and genera, but must be employed judi-

<sup>1</sup> See Forbes, "Revisional Notes on the Danainae", *Ent. Amer.*, XIX, pp. 101-140, (1939). I concur with the introductory discussion on pp. 101-105 expounding the general problem. Referring to the genealogy map on p. 103, Dr. Forbes recently told me that he would derive *Ithomiinae* as a twig branching from the main trunk earlier than *Clothilda*.

ously and are not adequate alone; they are not discussed in this paper. Other characters of merit are to be found in the antennae and legs, but these are of assistance chiefly in dividing the genera into tribes. Wing color and pattern are virtually worthless for generic identification, due to that remarkable phenomenon, exemplified in the *Ithomiinae*, which has been called "mimicry".

The synonymy of the genera has been exhaustively explored. It is intended in this paper to account for every generic name proposed in *Ithomiinae* and to identify the genotypes correctly. No attempt is made to follow the many misapplications, especially of the older generic names, through the literature.

Genotypes are regarded as important only from the viewpoint of nomenclature. As defined here the genera by no means are based on genotypes alone. Certain genera, especially large ones, have considerable range of variation among the species with respect to any given character. An attempt has been made to diagnose genera for associating species on the basis of all pertinent characters, although the conclusions are summarized in terms of a comparatively few, though significant, features.

In more than one instance in the *Ithomiinae* two species, on which are based different generic names, can be separated easily with respect to normally generic elements, but a survey of other species demonstrates gradual intergradation and requires that the two be placed in the same genus in order to avoid artificial and arbitrary generic delineation. It is believed that the genera recognized here are all homogeneous. The conclusions are based on a study of the species available in the collections of the Academy of Natural Sciences of Philadelphia, the American Museum of Natural History, the United States National Museum, and the Cornell University collection; statistically, more than four-fifths of the named forms have been examined.

It is felt that this paper defines the genera more positively than has been done in any single study since Doubleday, Hewitson and Westwood's work<sup>2</sup> nearly a century ago, Godman and Salvin's Central American work,<sup>3</sup> and Schatz's summary.<sup>4</sup> In

certain cases the result is the shifting of species from traditional generic associations; those who may have occasion to use the keys here are warned that not all species will fit in the genera to which they were referred by Haensch,<sup>5</sup> Bryk<sup>6</sup> and other workers.

In order to more adequately reflect the present author's conceptions of generic scope, a list of species and subspecies follows each description of generic characters. These lists, in main, follow the specific synonymy found in Bryk<sup>6</sup> and intentionally represent nothing new in the way of species identifications; variations from Bryk's list occur in a few cases where recent studies or my own observations indicate the necessity. All species and subspecies listed have been examined by me where marked with the dagger (†); those not so marked are included tentatively as probably belonging to the genus under which they are found. As previously noted, it is hoped that this paper will be followed by a series of studies dealing with the species of each genus.

With the introduction of tribes, largely based on leg characters, an attempt is made to offer a generic sequence which will reflect phylogenetic relationship.

The primitive tribe, *Tithoreini*, is easily separable by the well developed tibia and tarsus of the male fore-legs. The female foretarsus is five-jointed. The venation is generalized, with no hint of reduction and is rather similar in both sexes. Godman and Salvin<sup>3</sup> first recognized these genera as being the most primitive. It is characteristic to find the species of most of these genera confined to the mountains and represented by only a few forms each; supposedly such genera are survival groups, probably isolated by glaciation.

The proper separation of the remaining genera is problematic and no pat character seems available. All have reduced or vestigial tibia and tarsus on the fore-legs of the males.

In general the *Ithomiini* have four joints in the tarsus of the female fore-leg, while in the *Oleriini* there are five. A single but important exception is *Dircenna*, which has four female fore-tarsal joints, but which certainly should be associated with *Corbulis* and *Oleria*.

<sup>2</sup> Genera of Diurnal Lepidoptera, (1846).

<sup>3</sup> Biol. Cent. Amer., Rhopalocera, (1879).

<sup>4</sup> Fam. Gatt. Tagfalt., (1886).

<sup>5</sup> In Seitz, Grossschm. Erde, 5, *Ithomiinae*, (1909).

<sup>6</sup> Catalogus Lepidopterorum, pars 80, *Ithomiinae*, (1937).

In the *Ithomiini* two main lines may be recognized. The series from *Xanthocleis* to *Scada* is rather homogenous, shares a tendency for the subcostal vein in the females to shorten and then to coalesce basad with the radius. The male hair patch and the discocellulars likewise exhibit kinship. *Aeria* and *Velamysta* are added to this series tentatively. The other line runs through *Ithomia* and *Hypothyris* to *Napeogenes*. These share the peculiar convexity of the radial vein near the base and exhibit the steps of development toward the festoon-arranged discocellulars of *Napeogenes*.

The *Oleriini* often show considerable difference between the venation of the males and of the females. There is a marked tendency for atrophy and vein reduction in the wings, yet all but one of these genera retain the primitive number of tarsal segments in the female. *Dircenna* must be regarded as having undergone leg reduction independently of the genera of the tribe *Ithomiini*.

It seems desirable not to subject the familiar names for larger categories to any change until the International Commission on Zoological Nomenclature sets up procedure for uniform practice, consequently the name *Ithomiinae* is here retained because of its wide acceptance.

While a number of familiar generic names are synonymized under less familiar but prior names, only one familiar name has been shifted from one group of species to another: Scudder's designation of a genotype for *Ceratinia* Hübner requires the usage employed by Bryk<sup>7</sup> and followed herein, by which the mistaken application used by some German authors is corrected.

#### VENATION CHARACTERS

The veins near the proximal part and the posterior part of the hind wing are more constant, those near the cell apex and the wing apex are quite variable.

The humeral vein (hum) is found in six different forms: It may be simple and unstalked as in *Aeria*, *Oleria*, *Eutresis*, *Episcada*, *Dircenna*, *Scada*, *Pseudoscada*, *Corbulis*, *Greta*, *Heterosais*; it may be bifid, but the distal arm so weakly developed as to

be a mere lobe, as in *Pteronymia*, *Ceratinia*, and *Callithomia*; it may be bifid with both arms weakly developed, as in *Placidula*, *Elzunia*, *Tithorea*, *Athyrtis* and *Olyras*; it may be bifid, both arms rather equally developed, as in *Thyridia*, *Hyposcada*, *Miraleria*, *Hypothyris*, *Patricia*, *Athesis*, *Xanthocleis*, *Mechanitis*, *Sais*, *Velamysta*, *Napeogenes*, *Ithomia*, *Godyris*, *Meclungia* and *Hypoleria*; in *Hyaliris* the distal arm of the bifid humeral is unusually long; in *Melinaea*, the humeral is bifid, the distal arm normally developed, but the proximal arm a little short. The humeral is found to be consistent to both sexes and throughout any given genus. Its importance first was noticed by Kremky<sup>7</sup> who recognized two types, bifid and non-bifid.

A hair patch unique to and characteristic of the *Ithomiinae* is found in the males at the costal side of the cell of the hind wing; in one genus only, *Thyridia*, it is found in the females as well. The hair patch is constant within a genus and represents a good character. In most of the genera there is one long patch which extends from the base to the cell apex, the hair scales arising just posterior of the radial vein and forming a tuft normally laid in a proximo-distal direction. Sometimes the wing directly under this tuft and between the subcostal and radial is raised ventrad, as in *Ithomia*. In a few genera there are two hair patches, always of unequal size, one at the base and one at the apex of the cell. In some the basal patch is large and brush-like, while the distal patch is fine and pencil-like; in other genera the reverse is true.

The anal veins (1A and 2A) and the cubital veins (Cu<sub>1</sub> and Cu<sub>2</sub>) exhibit too slight variation to be of much value. In this paper, however, the cubitals are used as points of reference in locating positions of curvature on the radial vein.

In the *Ithomiinae* the subcostal (Sc) and the radial (R) veins usually are closely associated near the base. In one or two presumably primitive genera (for example *Elzunia*) Sc and R separate proximal of hum, but usually Sc and R coalesce at least as far as hum. Often Sc and R do not separate for some distance distal of hum; proximal of their separation they are either wholly coalesced or they run side by side. By "coalesced" is meant merged and combined into one.

<sup>7</sup> Kremky, Ann. Zool. Mus. Pol. Hist. Nat., 4, (1925).

In the distal portion of the wing Sc and R offer valuable characters which need careful evaluation. As noted below in describing the venation of the various genera, Sc is found in several degrees of atrophy. The most marked reduction is found in *Pseudoscada* where Sc in males of some of the species is only a vestigial protuberance or a thread-like spur on R. More commonly Sc is reduced near the cell apex so that it fails to reach the margin. Mostly the degree of reduction of Sc may be taken as a consistent generic characteristic, but this is not always so; in the genera where Sc nearly but not quite reaches the margin, individuals are found in which Sc is complete, usually sharply up-curved in the part missing in more typical examples.

In the females Sc and R more frequently coalesce beyond hum than in the males. In the two closely related genera, *Mechanitis* and *Sais*, as well as in *Velamysta*, Sc and R are wholly merged in the basal part, separating only near the cell apex, where Sc angles off steeply to the costal margin. To a less degree this same kind of tendency is found in such genera as *Callithomia*, *Xanthocleis* and *Greta*. But terminal atrophy is not found in females at all, and Sc invariably reaches the margin.

In the genera related to *Hypothyris*, R curves down into the cell near the base, making to the cell a convex arch opposite the cubitals. R also undergoes various modifications at and beyond the cell apex. In some genera, *Thyridia* for example, it angles forward at the discocellulars. In *Godyris* it recurves into the first median and is coalesced with it from there to the margin. In *Mcclungia*, described in this paper as new, the terminal segment of R is entirely wanting. In a few other cases it is reduced so that it fails to reach the margin.

The first discocellular (1d) is often a generic character in its angle with R and in its length. When 1d is short, it tends in both sexes to be wanting in many individuals. The phrase "anterior side of the cell" refers to the distance from the base of the cell to the cell apex, which always is taken to be the point where R meets the discocellulars.

The second discocellular (2d) usually is present, but its angle and curvature are often only of specific value. In the females

of *Greta* it is wanting. In males of *Heterosais* 2d has no posterior connection and the cell is open.

The third discocellular (3d) usually is long and well developed, but in males of several presumably specialized genera (*Godyris*, *Greta*, *Hypoleria*, *Pseudoscada*) it is reduced at its anterior end and the cell is open.

Two recurrent veins appear in *Ithomiinae*, as for example in *Eutresis*, but commonly it is the median recurrent (Mr) only which is present. This varies considerably in position and size and may or may not be of generic value. The position of Mr usually is constant in a genus in relation to its distance from R and  $Cu_1$ , but without varying this relative position, may arise on 2d, on 3d or opposite  $M_2$ . When it is emitted by a discocellular, it usually is placed on the apex of an angle of that discocellular. While the length of Mr often is characteristic of a genus (as in *Mechanitis*, *Corbulis*), in such genera as *Ithomia*, both the length and position are matters of individual variation.

The first median vein ( $M_1$ ) tends to merge with R. When this occurs, 1d is wanting. In many genera it is characteristic, especially in females, for  $M_1$  to stalk with R at the cell apex. In females of *Godyris* and *Hypoleria*  $M_1$  normally stalks with R midway between cell apex and margin. In males of *Pteronymia*  $M_1$  is typically wholly merged with R; some species of that genus have a minute  $M_1$  branching from R at the margin. They are wholly merged in both sexes of *Heterosais*.

The second median ( $M_2$ ) is commonly present and arises at the discocellulars. In females of *Greta*  $M_2$  and  $M_1$  are stalked beyond the cell. In males of *Hypoleria*  $M_2$  is reduced distally and fails to reach the margin. In males of *Greta*  $M_2$  is reduced at its proximal end and is not connected with any other vein.

The third median ( $M_3$ ) is rather constant, never undergoes reduction and exhibits little variation. When the phrase "posterior side of cell" is used, it refers to the distance from the base of the cell to the proximal end of  $M_3$ .

For convenience the proximal portion of  $Cu_1$ , which bounds part of the cell, is called the fourth discocellular (4d).

## PREPARATION OF WING MOUNTS AND PLATES

For comparison and for the preparation of some of these plates, wings were bleached and mounted as slides. A word on the method may be of interest; the steps of preparation:

1. Detach wings on right side; label pinned remainder with a serial number to appear later on the slide label.
2. Wet detached wings in 95% alcohol.
3. Bleach in Labarague's solution (NaClO) until the desired transparency is reached, but not so long that the wing tissue becomes too soft for easy manipulation.
4. Dehydrate in alcohols (a few minutes each in 50%, 70% and 95%).
5. Clear in xylene.
6. Mount in damar or balsam.

For wings too large for ordinary microscopic slips, the thin glass oblongs manufactured for covers for lantern slides serve very well. Care must be taken to avoid tears or folds in the wings when mounting. Such mounts are convenient for study and often reveal venation details otherwise difficult to observe or to evaluate.

The venation figures with this paper all were drawn from enlarged projections, either of the prepared wing, or of undetached, unbleached wings through which very strong light was passed. The hair patch of the males is indicated diagrammatically by transverse lines.

## ACKNOWLEDGEMENTS

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Forbes kindly reviewed my notes, and made available his own notes, as well as the Cornell collection.

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## KEY TO THE GENERA

The key which follows is based on characters of the hind wings. While it is intended to cover all usual variations in venation, it is inevitable that abnormal specimens will occur which the key fails to cover. The great difference with respect to venation frequently found between the sexes of *Ithomiinae* requires the use of separate sections of the key for males and females. These keys are artificial.

## MALES

1. Two hair patches at the costal margin.....2  
One hair patch at the costal margin.....9
2. Cell open .....3  
Cell closed .....4
3.  $M_1$  and 2d wanting; 1d pointing basad, free at its posterior end, or represented by a slight projection below R; Sc atrophied at or before the apex of cell; 3d complete.

*Heterosais* Godman & Salvin (p. 204)

- $M_1$  present though often not reaching margin; 1d and 2d present, complete; Sc atrophied well beyond cell apex; 3d atrophied at its anterior end, not reaching  $M_2$ ....*Hypolevia* Godman & Salvin (p. 199)
- $M_1$  atrophied before reaching margin; terminal segment of R wanting; 1d present; Mr short, arising opposite  $M_2$ ; Sc atrophied near end of cell, strongly down-curved near its termination.

*Meclungia* new genus (p. 201)

4. Basal patch large, brush-like; distal patch small, pencil-like.....5  
Basal patch small, pencil-like; distal patch large, brush-like.....7
5. Non-bifid hum; anterior side of cell longer than posterior side; 1d shorter than 2d, which is curved.

*Dircenna* Dbl., Hew. & Westw. (p. 196)

- Bifid hum .....6

6. Anterior side of cell shorter than posterior side; 1d longer than 2d, which is straight. . . . . *Tithorea* Dbld., Hew. & Westw. (p. 175)  
 Anterior and posterior sides of cell nearly the same length; Sc and R sharply recurved; thickened, forming an open rectangular auxiliary cell opposite the cell apex. . . . . *Velamysta* Haensch (p. 184)
7. Sc atrophied before reaching margin; 2d straight; Mr arising from angled 3d. . . . . *Patricia* new genus (p. 177)  
 Sc complete . . . . . 8
8. Mr arising from angled 2d, long, reaching into cell at least as far as 4d. . . . . *Melinoea* Hübner (p. 178)  
 Mr arising from angled 2d, short, not reaching basad as far as 4d. . . . . *Olyras* Dbld., Hew. & Westw. (p. 176)
9. Cell open, 3d atrophied anteriorad . . . . . 10  
 Cell closed . . . . . 12
10. Bifid hum; Sc atrophied near end of cell, not reaching margin; Mr arising from posterior extremity of 2d; R inosculating with  $M_1$  near margin, the two veins forming with 1d a closed auxiliary cell. . . . . *Godyrus* Boisduval (p. 200)  
 Non-bifid hum . . . . . 11
11. Sc atrophied near cell apex; R atrophied near margin or recurving into  $M_1$  forming an auxiliary cell;  $M_2$  proximally atrophied. . . . . *Greta* Hemming (p. 203)  
 Sc vestigial, usually a mere knob on R opposite  $Cu_2$ , sometimes a short, slender projection from Sc near base; R atrophied distally, but never inosculating with  $M_1$ . . . . . *Pseudoscada* Godman & Salvin (p. 203)
12. Hair patch raised ventrad, compactly ovate. . . . . 13  
 Hair patch if raised ventrad is well elongated, not ovate. . . . . 14
13. Hair patch over cell formed between Sc and R and closed distad with an auxiliary vein; anterior side of cell somewhat longer than posterior side; 3d convex to cell. . . . . *Ithomia* Hübner (p. 185)  
 Hair patch over cell open distad, no auxiliary vein present; anterior and posterior sides of cell nearly the same lengths; 2d and 3d both nearly straight, parallel. . . . . *Mivaleria* Haensch (p. 186)
14. Bifid hum long, both arms short. . . . . 15  
 Bifid hum with distal arm reduced to a mere lobe. . . . . 16  
 Non-bifid hum . . . . . 18  
 Bifid hum with both arms well developed. . . . . 26
15. Wings broad; posterior side of cell much longer than anterior side. . . . . *Elzania* Bryk (p. 176)  
 Wings narrow; anterior side of cell much longer than posterior side; Sc and R separate well beyond hum. . . . . *Placidula* d'Almeida (p. 187)  
 Wings narrow; anterior side of cell much longer than posterior side; Sc and R separate at hum. . . . . *Athyrtis* Felder (p. 180)
16.  $M_1$  wanting, or stalking from R at margin. . . . . *Pteronymia* Butler & Druce (p. 197)

- $M_1$  present, arising at cell. . . . . 17
17. Sc atrophied proximal of cell apex; cell nearly reaches margin; Mr always on the angle of 2d. . . . . *Callithomia* Bates (p. 194)  
 Sc complete; cell two thirds of wing length; 2d more than twice the length of 1d; Mr on 2d, 3d or opposite  $M_2$ . . . . . *Ceratinia* Hübner (p. 192)  
 Sc complete; cell about half the wing length; 2d and 1d nearly the same length; Mr always on the angle of 3d. . . . . *Hyposcada* Godman & Salvin (p. 193)
18. Sc atrophied near end of cell. . . . . 19  
 Sc complete . . . . . 20
19. Mr. very long, placed as a continuation of  $M_2$  or arising from the acute angle of 3d which is at the extreme anterior end of 3d; 2d nearly straight. . . . . *Corbulis* Boisduval (p. 195)  
 Mr longish, placed at the angle of 3d, the anterior arm of which is as long as 1d; 2d strongly convex to cell. . . . . *Dircenna* Dbld., Hew. & Westw. (p. 196)
20. Anterior and posterior sides of cell about the same length, or posterior side slightly longer. . . . . 21  
 Anterior side of cell definitely longer than posterior side. . . . . 23
21. 2d twice the length of 1d. . . . . *Oleria* Hübner (p. 193)  
 2d shorter than twice the length of 1d. . . . . 22
22. Sc opposite cell apex usually separated from R by a distance greater than the length of the shortest discocellular present; anterior angle formed by 3d with 4d acute. . . . . *Aeria* Hübner (p. 185)  
 Sc opposite cell apex usually separated from R by a distance less than the length of the shortest discocellular present; anterior angle formed by 3d with 4d obtuse. . . . . *Scada* Kirby (p. 183)
23. Mr. very long, arising opposite  $M_2$  or from the angle of 3d, the anterior arm of which is minute; often a second developed or vestigial recurrent on the midpoint of 3d. . . . . *Eutresis* Dbld., Hew. & Westw. (p. 179)  
 Mr arising from the angle of 3d, the anterior arm of which is at least as long as 1d; no vestige of another recurrent. . . . . 24
24. 2d straight; distal segment of R shorter than the greatest width of the cell; Mr quite short. . . . . *Oleria* Hübner (p. 193)  
 2d convex to the cell; distal segment of R longer than the greatest width of the cell; Mr longer. . . . . 25
25. R angled upward at 1d. . . . . *Dircenna* Dbld., Hew. & Westw. (p. 196)  
 R not angled at 1d. . . . . *Episcada* Godman & Salvin (p. 198)
26. Proximal end of  $M_1$  not distal of proximal end of  $M_2$ ; R and Sc stalk distal of hum; costal margin angled proximal of cell apex. . . . . *Thyridia* Hübner (p. 180)  
 Proximal end of  $M_1$  distal of proximal end of  $M_2$ . . . . . 27

27. Mr on angle of 2d or opposite  $M_2$ ; discocellulars not festoon-like...28  
Mr on angle of 3d; discocellulars not festoon-like.....32  
Mr usually wanting or vestigial, rarely present; 2d and 3d not angled;  
discocellulars arranged in a festoon.....*Napeogenes* Bates (p. 191)
28. R and Sc closely parallel to half the distance to cell apex.  
*Mechanitis* Fabricius (p. 181)  
R and Sc separate near base.....29
29. Sc sinuate, doubly curved.....*Athesis* Dbld., Hew. & Westw. (p. 177)  
Sc simply curved, not sinuate.....30
30. R deeply convex to cell opposite cubitals. *Hypothyris* Hübner (p. 188)  
R slightly if at all convex to cell opposite cubitals.....31
31. Opposite cell apex Sc separated from R by a distance shorter than 1d.  
*Sais* Hübner (p. 182)  
Opposite cell apex Sc separated from R by a distance greater than the  
length of 1d.....*Xanthocheis* Boisduval (p. 181)
32. Distal branch of hum unusually long, more than twice the length of  
the trunk of hum.....*Hyalothyris* Boisduval (p. 187)  
Distal branch of hum less than twice the length of the trunk of  
hum.....33
33. 2d twice the length of 1d; cell more than two thirds of wing length.  
*Hypothyris* Hübner (p. 188)  
2d and 1d about the same length; cell two thirds of wing length.  
*Athesis* Dbld., Hew. & Westw. (p. 177)

## FEMALES

1. Non-bifid hum .....2  
Bifid hum, both arms short.....10  
Bifid hum, distal arm shortened to a mere lobe.....13  
Bifid hum, both arms well developed.....15
2. Mr small, arising from angled 2d; Sc shorter than the greatest width  
of the cell, arising near end of cell.....*Scada* Kirby (p. 183)  
Mr arising from angled 3d, or Sc longer than greatest width of cell...3
3. 2d wanting,  $M_1$  and  $M_2$  stalked.....*Greta* Hemming (p. 203)  
2d present,  $M_1$  and  $M_2$  not stalked.....4
4. Sc and R stalked at hum, widely separated beyond their point of  
divergence; Mr shorter than 3d.....*Aeria* Hübner (p. 185)  
Sc and R stalked at hum, widely separated beyond their point of  
divergence; Mr longer than 3d, on the angle of which it arises;  
sometimes a second short recurrent on the unangled posterior arm  
of 3d.....*Entresis* Dbld., Hew. & Westw. (p. 179)  
Sc and R coalesce or run closely parallel for 5 or more mm. beyond  
hum.....5
5.  $M_1$  wanting, or present (one species) as an insculating loop on R.  
*Heterosais* Godman & Salvin (p. 204)  
 $M_1$  present .....6

6. Posterior side of cell longer than anterior side; Sc reaches margin  
nearly opposite cell apex.....*Pseudoscada* Godman & Salvin (p. 203)  
Posterior side of cell longer than anterior side; Sc reaches margin well  
beyond cell apex.....*Oleria* Hübner (p. 193)  
Anterior longer than posterior side of cell, or sides equal.....7
7. Sc and R separate at a point nearer apex than base of cell.....8  
Sc and R separate at a point nearer base than apex of cell.....9
8. Mr longer than 3d, from the angle of which it arises, reaching into  
cell as far as 4d.....*Corbulis* Boisduval (p. 195)  
Mr shorter than 3d, not reaching into cell as far as 4d; R and Sc often  
connected at the point of separation by a short, perpendicular auxil-  
iary vein.....*Dircenna* Dbld., Hew. & Westw. (p. 196)
9. 1d usually present; distal segment of R an arc broadly concave to  
 $M_1$ .....*Oleria* Hübner (p. 193)  
1d usually wanting; distal segment of R weakly curved or straight.  
*Episcada* Godman & Salvin (p. 198)
10. Anterior side of cell longer than posterior side, or sides equal.....11  
Posterior side of cell longer than anterior side.....12
11. Sc and R separate at hum; 1d nearly perpendicular to R.  
*Olyras* Dbld., Hew. & Westw. (p. 176)  
Sc and R separate distal of hum; proximal angle of 1d with R obtuse;  
1d one-half the length of 2d; Mr arises from the angle near the mid-  
point of 3d.....*Placidula* d'Almeida (p. 187)  
Sc and R separate distal of hum; 1d less than one-third the length of  
2d; Mr from the angle of 3d, very close to  $M_2$ .  
*Athyrtis* Felder (p. 180)
12. 1d placed as a continuation of proximal segment of R.  
*Elzunia* Bryk (p. 176)  
1d forming with R an obtuse proximal angle.  
*Tithorea* Dbld., Hew. & Westw. (p. 175)
13. Mr arises from angle of 2d.....*Callithomia* Bates (p. 194)  
Mr arises from angle of 3d.....14
14. Sc and R connected at their point of separation (midway between base  
and apex of cell) by a short auxiliary vein which is sometimes vesti-  
gial; R evenly curved concave to cell; 2d much longer than 1d.  
*Ceratinia* Hübner (p. 192)  
Sc and R never connected by an auxiliary vein; R angled concave to  
cell; basad of the apex of this angle Sc and R nearly coalesced; 2d  
much longer than 1d.....*Pteronymia* Butler & Druce (p. 197)  
Sc and R never connected by an auxiliary vein; R evenly curved con-  
cave to cell; 2d and 1d about the same length.  
*Hyposcada* Godman & Salvin (p. 193)

15. Sc shorter than the greatest width of the cell, separating from R beyond the middle of the cell.....16  
 Sc longer than the greatest width of cell, distinct from R from base...17
16. Sc stalked from R about half way to cell apex; Mr on angle of 2d.  
*Mechanitis* Fabricius (p. 181)  
 Sc stalked from R about half way to cell apex; 2d straight, Mr on angle of 3d or opposite  $M_2$ .....*Velamysia* Haensch (p. 184)  
 Sc stalked from R at apex of cell, opposite proximal end of  $M_2$ ; Mr when present arising from straight 3d; 2d often incurved.  
*Sois* Hubner (p. 182)
17. Sc reaches costal margin with an upward hook basad of or at cell apex; Mr arises on angle of 2d.....18  
 Sc reaches margin beyond cell apex, or lacks terminal hook.....19
18. Mr long, reaching into cell beyond anterior end of 4d.  
*Melinaea* Hübner (p. 178)  
 Mr shorter, not reaching basad as far as 4d.  
*Xanthocleis* Boisduval (p. 181)
19. Mr wanting, or discocellulars arranged in a festoon.....20  
 Mr present, discocellulars never festoon-like.....21
20. 2d and 3d on a line perpendicular to R and to 4d.  
*Miralera* Haensch (p. 186)  
 Proximal angle between 2d and 3d about 135°, the two not perpendicular to R; 1d and R forming a proximal angle of about 60°, or 1d wanting.....*Napeogenes* Bates (p. 191)
21. R convex to cell opposite cubitals.....22  
 R straight opposite cubitals, or slightly concave to cell.....23
22. Distal arm of hum twice the length of its trunk.  
*Hyaliris* Boisduval (p. 187)  
 Distal arm of hum less than twice the length of its trunk.  
*Hypothyris* Hübner (p. 188)
23. Costal margin angled proximal of cell; hair patch present.  
*Thyridia* Hübner (p. 180)  
 Costal margin not angled proximal of cell; no hair patch.....24
24. Sc and R separate at a distance from hum clearly greater than the length of 2d.....25  
 Sc and R separate at hum, or at a distance from it clearly less than the length of 2d.....27
25. 1d present or  $M_1$  stalked at cell; proximal end of  $M_3$  not distal of 1d.  
*Ithomia* Hübner (p. 185)  
 1d wanting,  $M_1$  stalked beyond the cell.....26
26.  $M_3$  arises much more distal than apex of cell, about as distal as origin of  $M_1$  and terminus of Sc; posterior arm of 3d longer than 4d.  
*Hypolevia* Godman & Salvin (p. 199)  
*Meclungia* new genus (p. 201)

- $M_3$  arises slightly more distal than apex of cell, but not as distal as origin of  $M_1$  or terminus of Sc; posterior arm of 3d equal to or shorter than 4d.....*Godyris* Boisduval (p. 200)
27. Cell length (to apex) less than one-half wing length.  
*Patricia* new genus (p. 177)  
 Cell length more than one-half wing length.  
*Athesis* Doub., Hew. & Westw. (p. 177)

## Tribe TITHOREINI

## TITHOREA Doubleday, Hewitson &amp; Westwood

*Tithorea* Doubleday, Hewitson & Westwood, Gen. Diurn. Lep., 1, pl. 14, fig. 1, (June 1847); pp. 99-100, (Aug. 1847). [Genotype: *Tithorea harmonia* (Cramer), by designation of Scudder, Proc. Am. Acad. Arts & Sci., x, p. 285, (1875).]

*Hirsutis* Haensch in Seitz, Grossschm. Erde, v, pp. 118-119, (1909). [Genotype: *Papilio harmonia* Cramer, by present designation.]

Since *Hirsutis* has lacked genotype designation, *Papilio harmonia* Cramer is herewith designated for the sake of establishing the synonymy. Haensch divided the genus into two groups according to the color of the patagia, but the venation is uniform.

The males (Fig. 54) bear two hair patches, the basal one large and brush-like, the distal one at the cell apex small and pencil-like. Sc and R branch at hum, which is bifid with both arms weakly developed. Sc is more or less doubly curved (nearly straight in some species) and reaches the margin before the apex of the wing. 1d is slightly longer than 2d, both short; the brief Mr arises from the angle of 3d, the posterior arm of which is long and curved, the anterior arm short, sometimes vestigial, making the anterior side of the closed cell shorter than the posterior side.

The females differ in that Sc reaches the margin in an up-curve and never is doubly curved; 1d is shorter than 2d; R is up-angled at 1d.

*bonita* Haensch†; *brunnea* Haensch; *cuparina* Bates; *duenna* Bates†, *d. monoscieta* Godman & Salvin; *furia* Staudinger† (Pl. VIII, fig. 54), *f. facilla* Godman & Salvin, *f. furina* Godman & Salvin†; *harmonia* (Cramer)†, *n. mopsa* (Fabricius)†, *n. megara* (Godart)†; *helicaon* Godman & Salvin†; *egaensis* Butler†, *e. melanina* Haensch†, *e. hermius* Godman & Salvin†, *e. neitha* Hopffer†; *hermia* Haensch†, *h. napona* Haensch; *hippochous* Godman & Salvin†; *irene* (Drury)†, *i. umbratilis* Bates†; *pinthias* Godman & Salvin†, *p. macanica* (Niepelt); *pseudethra* Butler†, *p. assimilis* Haensch†, *p. lateflava* (Haensch), *p. mira* (Neustetter), *p. pseudonyma* Staudinger†; *salvadoris* Staudinger†; *tegarna* Hewitson, *t. anachoreta* Thieme; *tarricina* Hewitson†, *t. hecalesina* C. & R. Felder†, *t. parola* Salvin†, *t. obscurata* (Haensch); *virginialis* (Köhler).



## ELZUNIA Bryk

*Elzunia* Bryk, Parnassiana, iv, p. 20, (1937). [Genotype: *Elzunia bonplandi* (Guérin), by original designation.]

*Tithorea* Doubleday, Hewitson & Westwood, Gen. Diurn. Lep., i, pl. 14, fig. 1, (June 1847); pp. 99-100, (Aug. 1847), (part).

When he separated *bonplandi* and allies from *harmonia* and allies, Haensch wrongly retained *Tithorea* for the present genus and placed in a new genus the genotype of *Tithorea*. Bryk noticed this while preparing the catalogue\* and proposed *Elzunia* for the group which Haensch correctly recognized as distinct.

The hair patch of the males and the position of the veins at the apex of the cell (Fig. 12) indicate a close relationship with *Thyridia*, although the shape of the wings is quite different—in *Elzunia* broader, less elongated. *Elzunia* seems to be quite generalized.

Sc and R stalk proximal of hum, which arises on Sc and is bifid, both arms weakly developed. Sc is well separated from R and runs close to the costal margin, recalling by its position the *Pieridae*. 1d and  $M_1$  are placed on a line with the basal segments of R, while the terminal segment of R is placed at an angle; 2d is short, straight; Mr arises from the angle of 3d, the posterior arm of which is long and curved; the anterior side of the closed cell is much shorter than the posterior side. The males bear a single hair patch.

Female venation is similar.

*bonplandi* (Guérin)†, *b. descendollesi* (Staudinger)†, *b. latreillei* (Staudinger)†, *b. faba* (Weymer); *cassandrina* (Srnka)†; *humboldtii* (Latreille)†, *b. albomaculata* (Haensch)†; *pavonii* (Stichel)† (Pl. V, fig. 12); *tamasea* (Hewitson), *t. lugubris* (Haensch); *regalis* (Stichel).

## OLYRAS Doubleday, Hewitson &amp; Westwood

*Olyras* Doubleday, Hewitson & Westwood, Gen. Diurn. Lep., i, p. 107, (1847). [Genotype: *Olyras crathis* Doubleday, Hewitson & Westwood, by monotypy.]

This is a genus of a few relatively rare mountain forms with a maculation pattern similar to that found in *Eutresis* and *Athesis*.

The males (Fig. 41) bear two tufts near the costal margin of the hind wing; the proximal patch, located near the base of hum, is small and pencil-like; the distal patch is broader and brush-like and is near the cell apex. Although neither arm is well developed, hum is bifid at its ex-

\* Cat. Lep., pars 80, (1937).

tremity; it is placed perpendicular to Sc. Sc and R stalk at hum and reach the margin close together at the wing apex; Sc is doubly curved to the shape of a Cupid's bow; 1d and 2d are short and straight; Mr arises from the angle of 3d, the two arms of which are nearly the same length; the cell is closed.

The females differ in the following respects: Sc reaches the margin with an up-curve opposite the cell apex; 1d is wanting,  $M_1$  and the terminal segment of R stalk at the apex of the cell.

The hind margin of the forewings in both sexes are deeply sinuate.

*crathis* Dbl., Hew. & Westw.†, *c. theon* Bates†; *montagui* Butler† (Pl. VII, fig. 41), *m. staudingeri* Godman & Salvin†, *m. sticheli* Haensch†; *praestans* Godman & Salvin†, *p. insignis* Salvin†; *translucens* Hewitson.

## ATHESIS Doubleday, Hewitson &amp; Westwood

*Athesis* Doubleday, Hewitson & Westwood, Gen. Diurn. Lep., i, p. 109, (1847). [Genotype: *Athesis clearista* Dbl., Hew. & Westw., by monotypy.]

The males (Fig. 3) have a single hair patch on the hindwing, extending from hum to the apex of the cell along R. Sc and R stalk at hum, which is bifid, both arms well developed. Sc is doubly curved, shaped like a Cupid's bow, reaching the margin at the apex of the wing with an upward curve. 1d is always present, short, straight. In *clearista* 2d is the same length and straight; 3d is sharply angled, the posterior arm slightly curved; Mr is short, arising from the angle of 3d. In *arisona* Doubleday 3d is shorter and slightly curved; Mr is short, emitted from the angle of 2d.

The females differ from the males mainly by the absence of 1d, with  $M_1$  and R stalked at the cell apex; Sc is evenly curved. The cell is closed in both sexes and is longer than half the wing length.

*arisona* Doubleday† (Pl. V, fig. 3), *a. deflavata* Niepelt; *clearista* Doubleday, Hewitson & Westwood†.

The other species, *hewitsonii* Srnka and *oligyrtis* Hewitson I place with *dercyllidas* Hewitson in a new genus, *Patricia*, (see below).

## PATRICIA new genus\*

This includes three species, *dercyllidas* Hewitson, *Athesis hewitsonii* Srnka, and *Athesis oligyrtis* Hewitson formerly placed in *Athesis*, from which the males differ by the presence of two hair patches rather than one, and by the reduced Sc. In the females the wing is longer, narrower than in *Athesis* and the cell is proportionately shorter.

\* This genus is named for my small daughter.

The proximal hair patch of the males (Fig. 43) is small, pencil-like and is located near hum; the distal patch is located near the cell apex and is broader, brush-like. Sc and R separate at hum, which is bifid with both arms well developed. Sc is doubly curved, as in *Athesis*, but beyond the cell apex is reduced and fails to reach the margin. 1d and 2d are short, straight; 3d is angled acutely, the posterior arm S-shaped; the cell is closed. Mr is longer than 1d or 2d, arises on the angle of 3d.

In the females (Fig. 44) the apex of the cell is at a point proximal of midway between the base and wing apex (in *Athesis* the cell is two-thirds of the wing length). Sc is complete, simply curved; 1d is wanting,  $M_1$  and R stalked at the cell apex, or 1d is minute. Other veins placed as in the male.

GENOTYPE: *Dircenna deryllidas* Hewitson.

*deryllidas* (Hewitson)† (pl. VIII, figs. 43, 44), *d. demylus* (Godman & Salvin); *hewitsonii* (Srnka); *olygrytis* (Hewitson)†.

#### MELINAEA Hübner

*Melinaea* Hübner, Verz. b. Schmetz., p. 11, (1816). [Genotype: *Melinaea egina* Cramer, by designation of Scudder, Proc. Amer. Acad. Arts & Sci., x, p. 215, (1875).]

*Czakia* Kremky, Ann. Zool. Mus. Pol. Hist. Nat., iv, pp. 179 and 192, (1925). [Genotype: *Czakia mediatrix* (Weymer), by monotypy.]

Unquestionably Kremky's *Czakia* is a synonym for *Melinaea*, to which *mediatrix* properly belongs. Senhor d'Almeida believes that Kremky's name was founded on a genitalic preparation from a *Tithorea* species wrongly attributed to a *mediatrix* specimen.

*Melinaea* can be distinguished easily from *Mechanitis* by the broader wings and especially by the fact that *Melinaea* males bear two hair patches and that *Mechanitis* females have a peculiar, short Sc. Superficially there is great similarity between species of the two genera.

The basal hair patch (Fig. 34, ♂) is small and pencil-like, the distal one broad and brush-like. Sc and R separate at or slightly proximal of hum, which is bifid. In males Sc is long, reaching the margin at the apex near the terminus of R, sometimes (*scylax* Salvin, *maconius* Hewitson) is doubly curved; in females Sc is short, terminating with an up-curve and reaching the margin at a point basal of the cell apex. In other respects the venation of the hind wing is similar in the two sexes. 1d and 3d both are short; 2d is angled, usually the anterior arm somewhat longer than the

posterior arm; Mr very long, arising from the angle of 2d and extending into the cell past the distal end of 4d; the cell is closed.

*agricola* Hall; *comma* Forbes; *egina* (Cramer)† (Pl. VII, fig. 34), *e. paraiya* Reakirt†; *cratosthenes* Hall; *ethra* (Godart)†; *idae* (Felder)†; *lilas* (Doubleday, Hewitson & Westwood)†, *l. dodona* Hopffer, *l. eura* Fox†, *l. imitata* Bates†, *l. flavicans* Hoffman†, *l. erica* Burg., *l. lateapicalis* Hall, *l. limitata* Hall†, *l. messalis* (Hewitson)†, *l. parallelis* Butler†; *maclus* (Hewitson)†, *m. cydon* Godman & Salvin†, *m. borealis* Hall†, *m. discurrens* Haensch, *m. madeira* Moulton†, *m. maconius* Hewitson†, *m. manga* Haensch, *m. purusana* Auriv., *m. zamora* Haensch; *manuelito* Tessimann; *maracrus* (Hewitson), *m. divisa* Staudinger, *m. lucifer* Bates†, *m. orestes* Salvin†, *m. phasiana* Butler†, *m. strigilis* Weymer; *mediatrix* Weymer†, *m. mauensis* Weymer†, *m. anina* Haensch; *menophilus* (Hewitson)†, *m. brunnea* Riley, *m. cocana* Haensch†, *m. flavosignata* Staudinger†, *m. hictas* Godman & Salvin†, *m. macaria* Godman & Salvin†, *m. messenina* Felder†, *m. zaneka* Butler†; *magnius* (Hewitson)†, *m. chincha* Drury†, *m. mothone* (Hewitson)†; *mnasias* (Hewitson); *mneme* (Linné)†, *m. satevis* (Doubleday, Hewitson & Westwood)†; *mnemopsis* Berg.†; *scylax* Salvin†.

#### EUTRESIS Doubleday, Hewitson & Westwood

*Eutresis* Doubleday, Hewitson & Westwood, Gen. Diurn. Lep., i, p. 111, (1847). [Genotype: *Eutresis hypercia* Dbl., Hew. & Westw., by monotypy.]

The forms placed in this genus are superficially similar to *Olyras*, but the hind margins of the forewings are not deeply sinuate. The two genera may be readily distinguished by the hindwing venation.

In the males (Fig. 24) only one hair patch is present, which extends from hum to the apex of the cell along R. Sc and R stalk at hum, which is non-bifid. Sc is simply curved, reaching the margin near the apex of the wing. Discocellulars all present, straight; 2d and 3d about the same length, twice the length of 1d; cell closed. Mr is long, arising opposite  $M_2$  and extending into the cell at least as far as 4d; often a second recurrent vein, small and vestigial, is placed at the middle of 3d.

The venation of the females is identical, except that 1d is minute or wanting.

*hypercia* Doubleday, Hewitson & Westwood† (Pl. VI, fig. 24), *h. hypsa* Godman & Salvin†, *h. imitatrix* Staudinger†, *h. theope* Godman & Salvin†; *peihoe* Gillot†.

## ATHYRTIS Felder

*Athyrtis* C. & R. Felder, Wien. Ent. Monats., vi, p. 413, (1862). [Genotype: *Athyrtis mechanitis* Felder, by monotypy.]

To this genus only a few rather scarce forms are referable. It resembles *Mechanitis* and *Melinaea* but the morphology is distinctive.

The males (Fig. 4) have a single hair patch extending from the base to the apex of the cell along R; Sc and R branch at hum, which is bifid, neither arm well developed; Sc reaches the margin with an upward curve at the apex of the wing; the anterior side of the closed cell is much longer than the posterior side; 1d is short, 2d is long, both straight; the well developed Mr arises from the angle of 3d, both arms of which are straight and the anterior arm short, sometimes minute.

The venation of the females is similar to that of the males, except for Sc, which runs with R for several mm. beyond hum, and which reaches the costal margin opposite the cell apex with an up-curve.

*distincta* Haensch; *mechanitis* Felder† (Pl. V, fig. 4), *m. amanga* Haensch†, *m. oberthuri* Srnka, *m. salvani* Srnka†, *m. similis* Tessen.

## THYRIDIA Hübner

*Thyridia* Hübner, Verz. b. Schmett., p. 9, (1816). [Genotype: *Thyridia psidii* Cramer, by designation of Scudder, Proc. Am. Acad. Arts & Sci., x, p. 283, (1875).]

*Melthona* Doubleday, Hewitson & Westwood, Gen. Diurn. Lep., i, p. 115, (1847). [Genotype: *Thyridia themisto* Hübner, by monotypy.]

This small genus of medium sized butterflies has generalized venation which is similar in both sexes. The male fore-leg hints to reduction. Probably ancient, this genus is remarkable in that the females bear a hair patch which is entirely similar to that of the males.

The hair patch (Fig. 55, ♂) is along R extending from bifid hum half way to the apex of the cell. Sc and R stalk just beyond hum; Sc is complete, reaching the margin just above the apex of the wing. 1d is placed so that it seems to be rather a continuation of R, while the terminal segment of R angles anteriorly at the apex of the cell; 2d is the same length as 1d, while 3d is angled, the arms being of nearly equal length, emitting a short Mr; the cell is closed. Females the same.

*confusa* (Butler) (= *psidii* Cramer)†, *c. denigrata* Talbot, *c. psamanthe* (Godman & Salvin)†, *c. curvifascia* (Weymer); *mystica* (Zikan)†; *themisto* Hübner† (Pl. VIII, fig. 55), *t. megisto* (Felder); *singularis* Staudinger.

## Tribe ITHOMINI

## XANTHOCLEIS Boisduval

*Xanthocleis* Boisduval, Cons. Lep. Guat., p. 30, (1870). [Genotype: *Xanthocleis aedesia* (Dbl., Hew. & Westw.), by designation of Scudder, Proc. Amer. Acad. Arts & Sci., x, p. 288, (1875).]

*Aprotopos* Kirby, Syn. Cat. Diurn. Lep., p. 19, (1871). [Genotype: *Thyridia aedesia* Dbl., Hew. & Westw., by designation of Kirby, Zoo. Rec., 1871, p. 359.]

The males (Fig. 57) have a single hair patch extending from base to apex of the cell along R; hum is strongly bifid; Sc and R branch at hum, Sc reaches the margin at the apex of the wing near the terminus of the down-curved R; 1d and 2d are short, straight; 3d emits from its angle a short Mr; the arms of 3d are about equal in length.

The females have a similar venation, but Sc is short, reaching the margin with an up-curve at a point opposite or proximal of the cell apex.

*aedesia* (Dbl., Hew. & Westw.)†; *ceto* (Felder); *melanthe* (Bates)†, *m. vandolis* (Haensch)†; *hippodamia* (Fabricius)†, *k. pallida* (Godman & Salvin)†; *psidii* (Linné)† (Pl. VIII, fig. 57), *p. ino* (Felder)†; *simplicior* (Röber).

## MECHANITIS Fabricius

*Mechanitis* Fabricius, Mag. f. Insektenk. (Illiger), vi, p. 284, (1807). [Genotype: *Mechanitis polymnia* (Linné), by designation of Scudder, Proc. Am. Acad. Arts & Sci., x, p. 212, (1875).]

*Nereis* Hübner, Exot. Schmett., i, pl. 1, fig. 2, 5-8 etc., (1806), (preoccupied Linné 1758). [Genotype: *Nereis polymnia* (Linné), by designation of Scudder, Proc. Am. Acad. Arts & Sci., x, p. 227, (1875).]

*Hymenitis* Anonymous (not Hübner 1816), Allgem. Lit. Zeitg. Halle (Jena), ii, p. 1180, (Dec. 19, 1807). [Genotype: *Papilio polymnia* Linné, by designation of Hemming, Gen. Nam. Hol. Butt., i, p. 27, (1934).]

*Epimetes* Billberg, Enum. Ins., p. 77, (1820). [Genotype: *Papilio polymnia* Linné, by designation of Hemming, Entomologist, LXVI, p. 199, (1933).]

The numerous and frequently common species in this genus exhibit maculations which all are variations on the general pattern theme termed by Haensch in Seitz (1909) the "Lycorea-habitus" and are closely similar to *Melinaea* as a whole, and to random species in various genera; venation serves to separate specimens properly.

On the hind wings the males (Fig. 35) have a single hair patch extending from the base to the apex of the cell along R. The hum is strongly bifid; Sc branches from R near hum, but runs closely parallel to R as far as one-

third to one-half the distance to the cell apex; 1d and 3d are straight; Mr arises from the angle of 2d and is short; the anterior arm of 2d tends to be longer than the posterior arm; the cell is closed.

In the females (Fig. 36), Sc is completely coalesced with R at least as far as the midpoint between the base and the cell apex; after stalking from R, Sc runs steeply to the costal margin and never is as long as the greatest width of the cell. Although 1d usually is present, sometimes it is vestigial or wanting; rarely R and  $M_1$  branch beyond the cell apex. In other respects the female venation is like that of the male.

Forbes<sup>9</sup> pointed out that *Scada* and *Sais* should be associated with *Mechanitis*. These three genera share many important characters, but perhaps their relationship is emphasized most dramatically by the unique Sc of the female hind wing.

*doryssus* Bates†, *d. labotas* Distant†, *d. saturata* Godman & Salvin†, *d. utamaia* Reakirt†, *d. veritabilis* Butler†; *doryssides* Staudinger†, *d. eurydice* Haensch†, *d. argentea* Prüfer†, *egaënsis* Bates†, *e. obscura* Butler, *e. plagigera* Butler†, *e. contracta* Riley, *e. septentrionalis* Apollinar; *elisa* (Guérin)†, *e. menacles* Hewitson†, *e. acaea* Drury†, *e. connectens* Coll. & Talb.; *equicola* (Cramer), *e. equicoloides* Godman & Salvin†, *e. sylvanoides* Godman & Salvin; *isthmia* Bates†, *i. lycidice* Bates†, *i. arcana* Haensch†, *i. ovata* Distant; *linnea* Forbest; *lysinnia* (Fabricius)†, *i. albescens* Haensch†, *i. sulphurescens* Haensch; *macrinus* Hewitson†; *mantineus* Hewitson†; *menapis* Hewitson†, *m. franis* Reakirt†; *mazaëus* Hewitson, *m. deceptus* Butler†, *m. fallax* Butler†, *m. meterus* Hewitson, *m. messenoides* Felder†, *m. nigroapicalis* Felder†, *m. jurimagnensis* Staudinger, *m. lucifera* Haensch, *m. phasianita* Haensch?, *m. pannifera* Butler†, *m. nessaea* (Hübner); *olivencia* Bates†, *o. hullaga* Staudinger?, *o. jantana* Haensch†, *o. truncata* Butler†; *polymnia* (Linné)†, *p. angustifascia* Talbot, *p. cusubronca* Haensch†, *p. caucasiensis* Haensch†, *p. climbazona* Bates†; *proceris* Weymer†; *visenda* Butler, *v. elevata* Riley.

#### SAIS Hübner

*Sais* Hübner, Verz. b. Schmet., p. 10, (1816). [Genotype: *Sais rosalia* (Cramer), by designation of Bates, Trans. Linn. Soc. London, 1862, p. 52.]

The males (Fig. 53) bear a hair patch located along R from hum to two-thirds of the distance of the cell apex. Sc and R stalk at the strongly bifid hum, but run in parallel courses close together to the margin; 1d is straight, perpendicular to R; 2d is weakly angled and bears a short Mr; 3d is straight. In both males and females Mr occasionally is found on the straight 3d, although 2d remains angled.

<sup>9</sup> Jour. N. Y. Ent. Soc., xxxii, pp. 146, 147, (1924).

The most important venation difference in the female (Fig. 52) is that R and Sc completely coalesce nearly to the cell apex. Usually the segment of R between Sc and 1d is shorter than 2d. Beyond its separation from R, Sc angles steeply to the margin and is shorter than the greatest width of the cell.

*rosalia* (Cramer)†, *r. badia* Haensch†, *r. camariensis* Haensch† (Pl. VIII, figs. 52, 53), *r. mosella* (Hewitson)†, *r. paraënsis* Haensch†, *r. virchowii* Dewitz†; *klagesi* Avinoff†; *sitella* (Hewitson)†, *s. promissa* Weymer†.

#### SCADA Kirby

*Scada* Kirby, Syn. Cat. Diurn. Lep., p. 23, (1871). [Genotype: *Oleria theaphia* Bates, by designation of Kirby, Zool. Rec., 1871, p. 359.]

*Heteroscada* Schatz, Fam. Gatt. Tagfalt., pp. 87, 89, 91, pl. 11, (1886). [Genotype: *Heteroscada gazoria* (Godart), by designation of Bryk, Lep. Cat., pars 80, p. 525, (1937), (= *Papilio karschina* Herbst).]

*Salacia* Hübner, Zutr. Exot. Schmet., II, p. 25, fig. 339, 340, (1823), (pre-occupied Lamouroux, 1816). [Genotype: *Salacia phyllodoce* Hübner, by monotypy.]

In the Zoological Record for 1871 Kirby designated *theaphia* genotype for his genus *Scada*; this reference, heretofore overlooked, invalidates Scudder's designation<sup>10</sup> of *phyllodoce*, but does not affect the usage of the name, as the two species are congeneric. Godart's *gazoria* was shown by d'Almeida<sup>11</sup> to be synonymous with *phyllodoce*, thus sinking the Schatz generic name.<sup>12</sup>

The males (Fig. 47) bear a single hair patch which does not extend distally to the apex of the cell. Sc separates from R at hum, which is simple and unbranched, and runs close to R to the margin, which it reaches well beyond the cell apex. In the females, Sc is completely merged with R at least as far as two thirds of the distance to the cell apex; after stalking from R, Sc runs steeply to the costal margin and never is as long as the greatest width of the cell. In this character and in the position of Mr, the venation of *Scada* resembles *Mechanitis*. Mr is short or vestigial and is placed on the angle of 2d, the arms of which are nearly the same length; 3d is short, the cell is closed.

<sup>10</sup> Proc. Am. Acad. Arts & Sci., x, p. 226, (1875).

<sup>11</sup> Lambillionea, 1939, p. 78.

<sup>12</sup> In the same paper d'Almeida pointed out that the only other species referred to *Heteroscada*, *fenella* Hewitson, belongs in *Hypothesis*. Having examined a female of "*fenella*" in the American Museum collection, I am able to verify this. In his *Mechanitis* paper Forbes (Jour. N. Y. Ent. Soc., xxxii, p. 147, (1924)) said "*Heteroscada* is synonymous with *Scada*, being based on males of *Scada* and females of *Episcada*."

In the females (Fig. 48) 1d is always present, usually about the same length as 3d; but in *sibia* Hewitson 1d is much longer than either 2d or 3d, and forms with the terminal segment of R a Y-shaped fork of radius, the apical angle of which is not much greater than 15°.

*ethica* (Hewitson)†, *e. quotidiana* Haensch†, *e. excellens* (Srnka), *e. kusa* (Hewitson)†; *ortygia* (Druce)†; *philemon* (Felder); *karschina* (Herbst)† [= *gatoria* Godart†; = *phyllodyce* Hübner†]; *rechia* (Hübner)†, *r. delicata* Talbot *theaphia* (Bates)†, *t. batesi* Haensch†, *t. majuscula* Haensch; *zenira* (Hewitson)†; *sibia* (Hewitson) (Pl. VIII, figs. 47, 48), *s. amplificata* Haensch†, *s. xanthina* (Bates)†.

#### VELAMYSTA Haensch

*Velamysta* Haensch, in Seitz, Grossschm. Erde, v, p. 158, (1909). [Genotype: *Ithomia cruzifera* Hewitson, by designation of Bryk, Cat. Lep., pars 80, p. 613, (1937).]

This is a genus of very scarce forms whose phylogenetic position is rather problematic. The females offer the best clues as to relationship, and on the basis of the *Mechanitis*-like Sc of the hindwing, and of the four-jointed fore tarsus, I am assigning the genus a place in the *Mechanitis* series. However, since *Velamysta* is so specialized and so developed from whatever its true antecedents might have been, it may be possible that this genus should be placed elsewhere on the theory that the female Sc and fore tarsus evolved independently. The angle of Sc and the swollen veins at the cell apex in the males make a formation unique among the *Ithomiinae* and not to be confused with any other genus.

The males (Fig. 56) bear two hair patches, a smaller proximal one near the base of R, a larger one at the cell apex; hum is strongly bifid; Sc and R run closely parallel for a distance, then separate gradually. Opposite the cell apex, Sc is angled and swollen, then diminishes in size as it reaches the margin near the wing apex. Paralleling the swelling of Sc, R and 1d also are swollen. The terminal segment of R is strongly angled and with Sc forms an open, somewhat rectangular cell-like space. 2d is straight; 3d is angled at its anterior end and emits a short Mr; 1d and 2d form an angle less than 90°.

In the females Sc is coalesced with R to at least half way to the cell apex, and is shorter than the greatest width of the cell; 1d is wanting, with M<sub>1</sub> stalked with R several mm. beyond the cell apex; 2d is straight, short; 3d is angled near its anterior end, where it emits a brief Mr, and the posterior arm of 3d is faintly S-shaped; M<sub>2</sub> at its proximal end is strongly curved.

*anomala* (Staudinger)†; *breyeri* Kohler; *cruzifera* (Hewitson)†; *pupilla* (Hewitson)†, *p. dispersa* (Weymer); *pardalis* (Salvin)†, *p. totumbra* Kaye; *peninna* (Hewitson)† (Pl. VIII, fig. 56), *torquatilla* (Hewitson).

#### AERIA Hübner

*Aeria* Hübner, Verz. b. Schmet., p. 9, (1816). [Genotype: *Aeria aegle* Hübner, by designation of Scudder, Proc. Amer. Acad. Arts & Sci., x, p. 103, (1875).]

This is a genus of small delicate forms which resemble in color and pattern the species belonging to *Scada*. With that genus *Aeria* shares the peculiar foreleg reduction in the male in which the femur is shorter than the coxa.

The males (Fig. 1) bear a hair patch along R from hum to the cell apex, sometimes along 1d as well; hum is non-bifid; Sc in both sexes separates from R just distal of hum, and in the males reaches the margin well beyond the cell apex, in the females (Fig. 2) just beyond the cell apex. 1d is present in some specimens, wanting in others; sometimes R and M<sub>1</sub> are stalked beyond the cell; 2d mostly is short and straight, but sometimes longer and angled, then emitting the brief Mr. Mostly Mr arises from the angle of 3d; 3d is straight when 2d is angled; as a rule Sc of the males is separated from R opposite the cell apex by a distance which is greater than the length of the shortest discocellular vein present; also the angle formed by 3d and 4d is acute. These two characters serve to separate this genus from *Scada*, with which some specimens might be confused. In the latter genus, the distance between Sc and R opposite the cell apex is shorter than the length of the shortest discocellular present, while the angle formed by 3d with 4d is obtuse.

*elara* (Hewitson), *e. clarina* (Oberthür); *elodina* Staudinger†; *eurimedia* (Cramer)†, *e. agna* (Dbl., Hew. & Westw.)† (Pl. V, figs. 1, 2), *e. pacifica* Godman & Salvin,†, *e. palmara* Haensch†; *olena* Weymer†.

#### ITHOMIA Hübner

*Ithomia* Hübner, Verz. b. Schmet., p. 9, (1816). [Genotype: *Ithomia drymo* Hübner, by designation of Butler & Druce, Cist. Ent., 1, p. 95, (1872).] *Pagyris* Boisduval, Cons. Lep. Guat., p. 34, (1870). [Genotype: *Pagyris ulla* (Hewitson), by monotypy.]

This is a large genus distributed throughout the continental American tropics; nearly every lot of tropical butterflies contains some examples. Many of the species are quite common.

The characteristic hair patch of the males (Fig. 31) in *Ithomia* is unique and serves to identify the genus. It is situated midway between hum and the cell apex; Sc and R completely coalesce as far as the patch, where Sc

curves anterior, R posterior, to detour around an oval area which is distinctly raised ventrad; the distal end of this oval is closed by a short auxiliary vein connecting Sc and R. *Ithomia* is the only genus having such an oval hair patch raised beneath and completely enclosed by veins. Beyond the patch Sc is separate from R and reaches the margin beyond the cell apex; hum is bifid, the distal arm being long and well developed; 1d is short, normally present; 2d is somewhat curved convex to the cell; 3d is angled, bearing a short Mr, or deeply curved with Mr wanting. In *hyala* Hewitson the tendency for Sc to coalesce with R is developed to the point that the two veins are merged distal as well as proximal of the hair patch, Sc being separate only where it encloses the anterior part of the patch.

In the females (Fig. 32) Sc separates from R at hum, but runs closely parallel as far as a point opposite  $Cu_2$ , beyond which it curves away; as Sc nears the wing apex, it recurves toward R and reaches the margin quite near it; 1d is wanting as often as it is present; 2d and 3d are straight when they do not emit the short Mr, which may be located on either discocellular, or opposite  $M_2$ ; when Mr arises from a discocellular, that vein is angled.

*aelia* Hewitson†; *agnosia* Hewitson† (Pl. VII, figs. 31, 32); *amarilla* Haensch; *aquinia* Hopf.; *ardea* Hewitson†; *avella* Hewitson†, *a. ellara* Hewitson†, *a. eleonora* Haensch†, *a. beata* Haensch; *bolivari* Schaust†; *celemia* Hewitson†, *c. candescens* Haensch†, *c. lurida* Haensch†, *c. splendens* Haensch; *cleora* Hewitson†; *diavia* Hewitson†; *drogheda* Weeks; *drymo* Hübner†, *d. napho* Her.-Schf.†, *d. pellucida* Weymer†; *epona* Hewitson†; *hamlini* Weeks†; *heraldica* Bates†, *h. plaginata* Butler & Druce†; *hippocrenis* Bates†, *h. morena* Haensch†; *hyala* Hewitson†; *galata* Hewitson†, *g. jucunda* Godman & Salvin†; *lagusa* Hewitson†, *l. hymettia* Staudinger†; *iphianassa* Doubleday, Hewitson & Westwood†, [= *lycaete* (Reakirt) (not Fabricius)]†, *i. anaphisa* Herrich-Schaeffer†, *i. panamensis* Bates†, *i. boucardi* (Druce)†, *i. pumensis* (Reakirt); *mira* Staudinger; *nigromargo* Butler; *oenanthe* Weymer†; *ossuna* Haensch†; *patilla* Hewitson†; *p. leila* Hewitson†; *peruana* Salvin; *phanessa* Herrich-Schaeffer†, *p. alienassa* Haensch†; *pseudooagalla* Rebel†; *salapia* Hewitson†, *s. detersa* Hewitson†, *s. travella* Haensch†; *salcata* Schaust†; *sarcinarius* Weeks; *terra* Hewitson†, *t. terrana* Haensch†, *t. vulcana* Haensch†; *theuda* Hewitson†, *t. linda* Hewitson†; *ulla* Hewitson, *u. dimidiata* Staudinger; *neglecta* Müller; *xenos* (Bates)†; *lichyi* d'Almeida†.

#### MIRALERIA Haensch

*Miraleria* Haensch, Berlin Ent. Zeit., XLVIII, pp. 211-212, (1903). [Genotype: *Miraleria cymathoë* (Hewitson), by original designation.]

The hair patch of the males is oval, raised ventrad as in *Ithomia*, but its distal end is open, there being no auxiliary vein at the end of the patch (fig. 33); hum is bifid, but the distal arm is not as strongly developed as

in *Ithomia*; Sc and R run side by side, nearly coalesced, as far as the patch, around which they arch; beyond the patch Sc runs to the margin which it reaches with a slight upward bend. In the females (Fig. 42) Sc runs closely parallel to R for a short distance, then separates evenly from it and reaches the margin a little distal of the cell apex. The discocellulars are similar in both sexes: 1d is short, always present, set at an angle of about 135° with R; 2d and 3d are on a line perpendicular to the costal margin, are straight or somewhat S-shaped; sometimes a vestigial Rc, a slight swelling, is to be found on either or both 2d and 3d.

*cymathoë* (Hewitson)† [= *flavomaculata* Haensch?]; *sylvella* (Hewitson)† (Pl. VII, figs. 33, 42), *s. ornata* Haensch†.

#### PLACIDULA d'Almeida

*Placidula* d'Almeida, Mcl. Lep., p. 67 (1922). [Genotype: *Placidula eurynassa* (Felder), by original designation.]

Of numerous generic names proposed for separation from the rather composite genus *Hypothyris* as used by Bryk (*Ceratinia* of authors) d'Almeida's *Placidula* is most evidently separate. *P. eurynassa* stands alone and unique, without any closely related form so far discovered.

The hair patch of the males (Fig. 49) is located along R from hum to a point about two-thirds of the distance to the cell apex; hum is bifid, but weakly so, both arms being very brief; Sc and R run together closely for several mm. beyond hum before they separate; Sc usually is complete, though in one specimen in the Academy collection, it just fails to reach the margin; 1d is long, usually longer than 2d, and the angle it forms with R is obtuse toward the cell; both 1d and 2d are straight; Mr is straight, arises from the bluntly angled 3d; the point between 1d and 2d is the most distal part of the cell;  $M_1$  is slightly concave to  $M_2$ ; the cell is closed.

In the females hum is similar and offers an important distinguishing character. Likewise, Sc and R run parallel for a short distance beyond hum before separating. Sc reaches the margin with an upward curve just distal of the cell apex; 1d is placed as in the male; 2d is straight, but more nearly perpendicular to R than in the male; 3d is angled and emits a brief Mr.

*eurynassa* (Felder)†, (Pl. VIII, fig. 49).

#### HYALYRIS Boisduval

*Hyaliris* Boisduval, Cons. Lep. Guat., p. 33 (1870). [Genotype: *Hyaliris coeno* (Dbl., Hew. & Westw.), by monotypy.]

*Oregenes* Stichel, Berlin Ent. Z., XLIV, pp. 321-2, (1899). [Genotype: *Napeogenes excelsa* (Felder), by original designation.]

*Hyaliris* as resurrected by Bryk in the *Catalogus Lepidopterorum* (1937) included species properly associated with *ninonia* in *Hypothyris*, not with *coeno*. A revised concept of *Hyaliris* is introduced here and is founded largely on the unique construction of the humeral vein.

The males (Fig. 15) bear a hair patch extending from hum to half the distance to the cell apex; hum is bifid, the distal arm unusually long, more than twice the length of the unbranched trunk of hum; Sc and R separate at hum but run to the margin parallel to each other; 1d is short, perpendicular to R;  $M_1$  is concave to R or straight; 2d and 3d are long; 2d is somewhat convex to the cell. The angle of 3d, sometimes located at the extreme end of the vein, emits the Mr; the posterior arm is concave to the closed cell.

In both sexes the hind wings are unusually broad, the apices rather blunt.

In the females (Fig. 16) Sc separates from R just beyond the bifid hum, beyond which the distance between them increases evenly as far as the cell apex, where Sc recurves and reaches the margin near R. R is only slightly convex to the cell; 1d usually is wanting, with  $M_1$  stalked at the cell apex; when present 1d is short, perpendicular to R; 2d and 3d are of equal length; 2d is in-angled and emits a longish Mr; 3d is obtusely out-angled.

*coeno* (Dbl., Hew. & Westw.)† (Pl. VI, figs. 15-16), *c. latalimbata* (Weymer)†; *excelsa* (Felder)†, *c. decumana* (Godman & Salvin)†; *lurida* (Butler)†, *l. tricolor* (Salvin)†; *norella* (Hew.)‡, *n. nora* (Haensch)‡; *oena* (Herrich-Schaeffer)†; *statilla* (Hew.)†, *s. atagalpa* (Haensch)†.

#### HYPOTHYRIS Hübner

*Hypothyris* Hübner, Index, p. 5, (1821). [Genotype: *Hypothyris ninonia* (Hübner), by monotypy.]

*Tritonia* Geyer in Hübner, Zutrage Exot. Schmet., iv, p. 25, (1832), (pre-occupied Cuvier, 1792). [Genotype: *Tritonia eupompe* Geyer, by monotypy.]

*Ceratinia* Dbl., Hew. & Westw. (not Hübner, 1816), Gen. Diurn. Lep., I, p. 127, (1847).

*Dynothea* Reakirt, Proc. Ent. Soc. Philad., v, p. 222, (1865). [Genotype: *Dynothea lycaste* (Fabricius), by designation of Scudder, Proc. Amer. Acad. Arts & Sci., x, p. 34, (1875).]

*Epityches* d'Almeida, Brasil Medico, III, p. 112, (1938). [Genotype: *Tritonia eupompe* Geyer, by original designation.]

*Rhodussa* d'Almeida, Rev. Ent. Brasil, x, p. 278, (1939). [Genotype: *Ceratinia pamina* Haensch, by original description.]

There is no predicting color and pattern among the *Ithomiinae*. Superficially *eupompe* shows little similarity with *ninonia*; in venation, however, careful examination reveals not only certain differences, but also many fundamental similarities. Were genera based on genotypes only, *Epityches* would survive, but so many intergrades in venation are available that I am forced to recognize the two names as belonging to the same genus.

At first I was inclined to accept *Rhodussa* as a good genus, but when I recently examined females of *pamina* in the Cornell collection, I realized that this was only a slight variant of the normal *Hypothyris* venation; the females are not unusual. Then I compared again the genitalia, and now feel justified in placing *Rhodussa* in the synonymy.

Should Hübner's Index be given the same fate as the unlamented Tentamen, *Hypothyris* would be available under the next date of publication, which, as far as I can discover, is Scudder, 1875, and would fall as a synonym to Reakirt's *Dynothea*.<sup>13</sup> The insect determined by Reakirt as *lycaste* of Fabricius and upon which he erected *Dynothea* really was *Ithomia iphianassa panamensis* Bates.<sup>14</sup> If Hemming's recommendation is to be followed,<sup>15</sup> *Dynothea* is a synonym for *Ithomia*. However, if it becomes the practice to associate a generic name with the true identification where the author of a genus finds his name on a misidentification, what is to be done where the author of a generic name founds his genus on a heterogeneous series? Not only does it seem simpler, then, to associate a generic name with the insect which the author thought he had, but it seems to be the only practice which logically can avoid confusion.

The retention of *Ceratinia* to apply to this genus according to the mistaken usage perpetrated by Schatz and Haensch, would require the bulky mechanics of a "conservanda" ruling by the Commission. *Ceratinia* has been used in literature to denote

<sup>13</sup> See d'Almeida, Rev. Ent. Brasil, x, p. 278, footnote (1939). However, the Index is published until a contrary ruling is obtained.

<sup>14</sup> Fox, Ent. News, I, pp. 141-144 (1939).

<sup>15</sup> Hemming, Gen. Nam. Holo. Butt., p. 10, (1934) on "Genera in which the type is a species misidentified by the original author."

*Papilio nise* Cr. and allies by Hübner, Doubleday, Hewitson, Bates, Kirby, Scudder and Bryk. The alternative is for workers to ignore *Hypothyris* as well as Scudder's genotype designation for *Ceratinia*. This latter alternative denotes chaos, since it opens the door to workers of every sort to ignore names that do not happen to strike their fancies, and to preserve names for which they might have sentimental attachment.

The males (Fig. 21) bear a hair patch along R from hum to a point two thirds of the distance to the cell apex; hum is bifid, the arms long and well developed; Sc and R branch at hum; R is strongly convex to the cell opposite the cubitals, complete, the terminal segment curved downward, usually reaching the margin somewhat above the wing apex. Sc, beyond its separation from R usually is sinuate, its course not uniformly parallel to that of R, and reaches the margin quite near to R; 1d is always present, short, rather perpendicular to R;  $M_1$  is more or less concave to R; 2d usually is gently in-curved, longer than 1d; rarely (*pamina* for example) 2d is angled and emits Mr. Usually 3d is angled, emitting Mr, which varies in length but generally is rather long; posterior arm of 3d curved, mostly strongly so, away from the closed cell; anterior arm one third the length of the posterior arm, sometimes much shorter; when 2d is angled, 3d as a whole is curved away from the cell. The line formed by 2d and 3d points in the general direction of the terminus of Sc in most typical species.

The females (Fig. 22) exhibit many variations in venation, especially at the distal end of the cell. Sc and R separate at hum, as in the male; Sc curves away from R, then runs to the margin which it reaches well beyond the cell apex, usually but not always well distant from R. In the majority of examples 1d is wanting, with  $M_1$  branching several mm. beyond the cell apex; but many specimens have a short, perpendicular 1d; this variation is not specific and may be found in any long series of females of a given species. The line formed by 2d and 3d varies in its direction, in *ninonia* nearly perpendicular to R, in *eupompe* its proximal angle with R is about 45°; various angles between these extremes are to be found. 2d is straight or slightly convex to the cell, in a few individual cases obtusely angled, giving rise to Mr; sometimes Mr arises opposite  $M_2$ ; mostly it arises from 3d which then is angled, the posterior arm usually strongly concave to the cell, infrequently nearly straight. When Mr does not arise from 3d, the latter always is bent concave to the cell.

*anastasia* (Bates)†, *a. anastasina* (Staud.)†; *angelina* (Haensch)†; *antea* (Hew.)†; *antonia* (Hew.)†; *appolinis* (Staud.)†; *cana* (Haensch)†; *cantabrica* (Hew.)†; *catilla* (Hew.)†; *daeta* (Boisduval)†, *d. vallonis* (Hew.)†; *dionaea* (Hew.)†; *eupompe* (Geyer)†; *fenestella* (Hew.)†, *f. intermedia* (Butler)†, *f. peruviana* (Staud.)†, *f. valora* (Haensch)†; *fibra* (Hew.)†; *fluonia* (Hew.)†; *frater* (Salvin)†; *fulminans* (Butler)†, *f. satura* (Haensch)†;

*herbita* (Weymer)†, *h. viola* (Haensch)†; *honesta* (Weymer)†; *ignorata* (Haensch)†; *lepicarii* (Feisthabel)†; *leucania* (Bates)†, *l. cleis* (Bates)†, *l. callispila* (Bates)†, *l. mylassa* (Druce)†; *maenas* (Haensch)†; *mansuetus* (Hew.)†, *m. moebiusi* (Haensch)†; *lycaste* (Fab.)†, *l. mergelena* (Hew.)†; *mutilla* (Hew.)†, *m. pellucida* (Haensch)†; *nina* (Haensch), *n. callanga* (Haensch)†; *ninonia* (Hübner)† (Pl. VI, figs. 21, 22), *n. barii* (Bates)†, *n. completa* (Haensch)†, *n. euclea* (Godart)†, *n. latefasciata* (Haensch)†; *ouhita* (Hewitson)†, *o. metella* (Hopffer)†; *pamina* (Haensch)†; *pardalina* (Hopffer)†, *p. pantherina* (Staud.)†; *philetactra* (Hew.)†; *porsema* (Srnka)†; *pyrippe* (Hopffer)†, *p. tenna* (Haensch)†, *p. napona* (Haensch)†, *p. calva* (Haensch)†; *rowena* (Hew.)†, *r. oculata* (Haensch)†; *thea* (Hew.)†; *tigrina* (Druce)†.

#### NAPEOGENES Bates

*Napeogenes* Bates, Trans. Linn. Soc. London, xxiii, p. 533, (1862). [Genotype: *Napeogenes cyrianassa* (Dblid., Hew. & Westw.), by designation of Scudder, Proc. Amer. Acad. Arts & Sci., x, p. 224, (1875).]

*Chordis* Boisduval, Cons. Lep. Guat., p. 33, (1870). [Genotype: *Chordis peridia* (Hew.), by monotypy.]

*Ceratomia* Boisduval, Cons. Lep. Guat., p. 32, (1870), (preoccupied Costa, 1839). [Genotype: *Ithomia stella* Hew., by designation of Kirby, Zool. Rec., 1870, p. 383.]

*Garsawitis* d'Almeida, Brasil Medico, LI, p. 112, (1938). [Genotype: *Ceratinia xanthostola* Bates, by original designation.]

It is possible that *Garsawitis* might be used for a subgenus, for in *xanthostola* several minor differences from typical *Napeogenes* can be discovered, for example, the developed recurrent and the shortened  $M_2$ ; the female is rather typical of *Napeogenes*, however.

The venation of the hindwings in this genus is characteristic and readily recognizable by the festoon-like arrangement of the discocellulars.

The males (Fig. 37) bear a long hair patch extending from hum to 1d along R; Sc and R stalk at the strongly bifid hum; R is convex to the cell opposite the cubitals; Sc is distinctly separate from R beyond their stalking and reaches the margin at the wing apex. The anterior side of the cell is very long, extending nearly to the margin so that the terminal segment of R is shorter than the greatest width of the cell; 1d is perpendicular to R; 2d and 3d are not angled, often gently curved, and form with the cubital segments a characteristic festoon; Mr is wanting in most species; sometimes there is a vestigial Mr, little more than a swelling of 3d, often found on the wing of one side and not on the other; in a very few species Mr is always present.



The venation of the females (Fig. 38) differs in several respects: Sc is somewhat more separate from R distal of their stalking, and reaches the margin with an upward curve; the anterior side of the cell is proportionately shorter than in the males, being about two-thirds of the wing length. The proximal portion of R is not so deeply convex to the cell and sometimes is nearly straight; 1d is sometimes present and short, often wanting, in which case R and  $M_1$  may be stalked beyond the cell apex. The festoon arrangement of the discocellulars is found also in females, but proportionately compressed and made steeper by the shorter female cell.

*apulia* (Hewitson)†; *corena* (Hewitson)†; *cranto* Felder†, *c. paedaretus* Godman & Salvin†; *cyraneassa* (Dbl., Hew. & Westw.)†, *c. adulta* Haensch†, *c. dilutata* Haensch†; *duessa* (Hew.)†; *flossina* Butler†, *f. hypsaea* Staud.†; *glycera* Godman†; *hemisticta* Schaus†; *inachia* (Hewitson)†, *i. adelpha* Bates†, *i. moles* Haensch†; *larilla* (Hew.)†; *peridia* (Hew.)†, *p. hemimelaena* Godman & Salvin†; *pharo* (Felder)†, *p. avila* Haensch†; *stella* (Hew.)†, *s. aster* Gorman† (Pl. VII, figs. 37, 38); *tolosa* (Hew.)†, *t. amara* Godman†; *verticilla* (Hew.)†; *xanthone* Bates†, *x. richardi* Fruhst.†; *xanthostola* (Bates)†, *x. desmora* (Haensch)†.

#### Tribe OLERIINI

##### CERATINIA Hübner

*Ceratinia* Hübner, Verz. b. Schmett., p. 10, (1816). [Genotype: *Ceratinia neso* (Hübner), by designation of Scudder, Proc. Amer. Acad. Arts & Sci., x, p. 138, (1875). (= *Papilio nise* Cramer 1782).]

*Callotera* Godman & Salvin, Biol. Cent. Am., Rhop. 1, pp. 33-34, (1879). [Genotype: *Ithomia tutia* Hewitson, by original designation.]

*Epilera* Rebel, Weymer & Stichel, Berl. Ent. Zeit., XLVI, pp. 292-3, (1901). [Genotype: *Ithomia singularis* Rebel, by monotypy.]

The males (Fig. 7) have a single hair patch extending from the base to the apex of the cell along R; hum is bifid, the distal arm not well developed; Sc and R run closely parallel to about half the distance to the cell apex, then separate gradually; Sc reaches the margin at the apex with an up-curve. In two specimens of *cayana* Salvin in the Academy's collection the terminal segment of R is angled upward and merges with Sc just away from the margin. 1d usually is present, although it may be wanting, in which case  $M_1$  and R stalk beyond the apex of the cell; 2d is gently curved convex to the cell; a short Mr arises from the angle of 3d, the posterior arm of which is concave to the cell.

The females (Fig. 8) are similar except Sc, which often is connected with R at their point of separation by a short auxiliary vein, a character also found in *Dircenna*.

*cayana* (Salvin)†; *doto* (Hübner)†; *hopferi* (Weymer)†, *h. onoma* (Haensch); *iolata* (Hewitson)†, *i. conveniens* (Haensch)†; *melanoptera* (Hewitson); *nise* (Cramer)†, (Pl. V, fig. 8, ♀), *n. espriella* (Hewitson)†,

*n. peruensis* (Haensch)†, *n. terapolis* (Haensch)†, *n. tucumana* (Köhler); *poecila* (Bates)†, *p. poecilana* (Haensch)†, *p. calliokroma* (Staudinger), *p. azarina* (Weymer), *p. nigronascens* (Haensch); *porrecta* (Haensch); *radiosa* (Haensch); *robusta* (Haensch); *selenides* (Weymer)†; *singularis* (Rebel)†; *tutia* (Hewitson)†, (Pl. V, fig. 7, ♂), *t. azara* (Hewitson)†, *t. chanchamaya* (Haensch)†, *t. dorilla* (Bates)†, *t. tosca* (Schaus)†.

##### HYPOSCADA Godman & Salvin

*Hyposcada* Godman & Salvin, Biol. Cent. Amer., Rhop. 1, p. 35, (1879). [Genotype: *Ithomia adelphina* Bates, by original designation.]

The males (Fig. 19) bear a hair patch along R from base to cell apex; Sc separates from R at hum, which is bifid, and reaches the margin at the wing apex with an upward curve. In the females (Fig. 20) this terminal curve is wanting on Sc, which is evenly arched. In other respects the venation is similar in both sexes. 1d and 2d are short, same length, the proximal angle formed by them about 135°. A well developed Mr arises from the acute angle of 3d, the posterior arm of which is concave to the closed cell.

*abida* (Hew.)†; *aesion* (Godman & Salvin)†; *anchiala* (Hewitson)†; *consobrina* (Godman & Salvin)†; *fallax* (Staud.)†; *illinissa*†; *kezia* (Hew.)†, *k. rezia* Haensch†; *similia* (Herrich-Schaeffer)†; *virginiana* (Hew.)†, *v. evanides*†, (Pl. VI, figs. 19, 20).

I suspect that many of the species referred to *Leucothyris* in the past should be placed in this genus, but lacking complete material I have not attempted a shift. The key difference between *Hyposcada* and *Oleria* is to be found in the humeral vein of the hind wings.

##### OLERIA Hübner

*Oleria* Hübner, Verz. b. Schmett., p. 9, (1816). [Genotype: *Oleria astraea* (Dbl., Hew. & Westw.), by designation of Scudder, Proc. Amer. Acad. Arts & Sci., x, p. 232, (1875). (= *Papilio astraea* Cramer 1779).]

*Leucothyris* Boisduval, Cons. Lep. Guat., p. 32, (1870). [Genotype: *Leucothyris ileridina* (Hewitson), by monotypy.]

It is regrettable, perhaps, that the familiar Boisduval name for this large genus must be sunk before the little known Hübner name, but there seems no point to perpetrating a usage contrary to priority.

The males (Fig. 39) bear a patch of long hairs arranged in a thin brush arising near the base of the wing above R; hum is non-bifid; Sc and R run side by side for a short distance beyond hum and never are the two veins much separated. The short 1d is close to the margin, so that the

distal segment of R is shorter than the width of the cell; 2d is long, tends to approximate being parallel to R; 3d is long, acutely angled, gives rise to the short Mr; the posterior arm of 3d is concave to the closed cell; the general shape of the cell is like a fist with index finger pointing toward the wing apex; the anterior side of the cell often reaches nearly to the margin. But in a small group of less characteristic species the cell is shorter, 1d being only a little distad of 2d, which is shorter; between these and the numerous long-celled forms there are many intergrades. It is possible that most of these short-celled forms should be referred to *Hyposcada*.

The females (Fig. 40) have a much shorter cell than the males, with 2d and 1d the same length; in other respects the sexes are alike in venation.

*aegle* (Fab.)†, *a. zarepha* (Hew.)†; *agarista* (Felder)†, *a. janarilla* (Hew.)†; *alexina* (Hew.)†, *a. quintina* (Felder)†; *amalda* (Hew.)†, *a. amaldina* (Haensch)†; *amazona* (Haensch)†, *a. ramona* (Haensch)†; *aguata* (Weymer)†; *astrea* (Cramer)†, *a. antaxis* (Haensch)†, *a. flora* (Cramer)†, *a. thimoi* (Oberthür)†; *attalia* (Hew.)†; *athalina* (Staud.)†, *a. santinosa* (Haensch)†, *a. tremona* (Haensch)†; *baizana* (Haensch)†; *bioculata* (Haensch)†; *caucana* (Staud.)†; *crispinilla* (Hopffer)†; *deronda* (Hew.)†; *egra* (Hew.)†; *estella* (Hew.)†; *fumata* (Haensch)†; *ilerdina* (Hew.)†(?); *lota szamuculata* (Haensch)†; *lubilerda* (Haensch)†; *makrena* (Hew.)†, *m. makrenita* (Haensch)†; *manara* (Schaus)†; *modesta* (Haensch)†, (Pl. VII, figs. 39, 40); *onoga* (Hew.)†, *o. epicharme* (Felder)†, *o. perspicua* (Butler)†; *phemonoe* (Doubleday)†; *quadrata* (Haensch)†; *rubescens* (Druce)†; *solida* (Weymer)†; *susiana* (Felder)†, *s. susanna* (Staud.)†; *tigilla* (Weym.)†; *victorina* (Guérin)†, *v. graciella* (Oberthür)†, *v. padilla* (Hew.)†, *v. paula* (Weym.)†; *zea* (Hew.)†, *z. vicina* (Salvin)†; *zelica* (Hew.)†, *z. pagosa* (Druce)†.

#### CALLITHOMIA Bates

*Callithomia* Bates, Trans. Linn. Soc. Lond., XXIII, p. 522, (1862). [Genotype: *Callithomia alixirrhoë* Bates, by designation of Scudder, Proc. Am. Acad. Arts & Sci., X, p. 132, (1875).]

There is considerable difference between the venation of the sexes in this genus. In both, however, is found the bifid hum, the proximal arm of which is well developed, while the distal arm is short.

In the males (Fig. 5) Sc branches from R gradually, running closely parallel as far as a point opposite  $Cu_2$ , never much separated from R and finally atrophied proximal of 1d; anterior side of cell very long, reaching nearly to the margin; 1d short, perpendicular to R; Mr well developed, its proximal end nearer than the distal end to R and arises from acutely angled 2d; anterior arm of 2d more than thrice the length of posterior

arm; 3d short; cell closed. The hair patch is small, although the hair scales are long, and is located at the base of the cell on R, never extending distally beyond a point opposite  $Cu_1$ .

In the females (Fig. 6) Sc is complete, running closely parallel with R for a distance as in the males, but distal of their separation, it angles to the costal margin which it reaches with an up-curve; anterior side of cell little if any longer than the posterior side, cell apex being less than two thirds of the distance to the wing apex; 1d wanting; 3d straight; Mr from the angle of 2d, the arms of which are nearly the same length; Mr parallel R. At the cell apex R is angled.

*alixirrhoë* Bates†; *hezia* (Hew.)†, (Pl. V, figs. 5, 6), *h. hedila* Godman & Salvin†, *h. tridactyla* Dewitz†; *hydra* Felder†, *h. panamensis* Godman & Salvin†; *megaleas* Godman & Salvin; *phagesia* (Hew.)†; *proene* Godman & Salvin; *villula* (Hew.).

#### CORBULIS Boisduval

*Corbulis* Boisduval, Cons. Lep. Guat., p. 32, (1870). [Genotype: *Ithomia agrippina* Hewitson, by designation of Kirby, Zool. Rec., 1870, p. 383.]

*Epithomia* Godman & Salvin, Biol. Cent. Am., Rhop. 1, pp. 32-33, (1879). [Genotype: *Dircenna callipero* Bates, by original designation.]

Kirby's designation of *agrippina* as genotype for *Corbulis* was overlooked by Bryk, who incorrectly designated *gephiria* Hewitson.<sup>16</sup> Bryk's application of the name must be corrected and Godman and Salvin's familiar *Epithomia* must be relegated to the synonymy.

The males (Fig. 9) have a hair patch along the basal half of R; hum is simple, not bifid; Sc and R run closely parallel for a short distance beyond hum, then separate gradually; proximal of the cell apex Sc is atrophied; the short 1d is near the margin, so that the distal segment of R is shorter than the greatest width of the cell;  $M_1$  is curved concave to R; 2d is nearly straight; Mr is very long, reaching into the cell beyond the anterior end of  $Cu_1$ , and usually is located opposite  $M_2$ ; 3d is straight or, when Mr arises from its anterior part, is angled.

In the females Sc and R are closely parallel, nearly merged, for two thirds of the distance to the cell apex; beyond its separation from R, Sc curves to the margin which it reaches nearly opposite the discocellulars; 1d is wanting;  $M_1$  stalks beyond the cell; the long Mr arises from the angle of 3d; 2d is rather straight.

*agrippina* (Hew.)†, *a. fumantis* (Haensch)†; *alpo* (Felder)†, *a. nikita* (Haensch)†; *xantho* (Felder)†, (Pl. V, fig. 9), *x. hulda* (Felder), *x. methonella* (Weymer)†.

<sup>16</sup> Lep. Cat., pars 80, p. 615, (1937). Discovery of Kirby's bizarre practice of designating genotypes in his Zoological Record should be credited in this case to d'Almeida. See Rev. Ent. Brasil, X, p. 277, (1939).

**DIRCENNA** Doubleday, Hewitson & Westwood

*Dircenna* Doubleday, Hewitson & Westwood, Gen. Diurn. Lep., 1, pl. 17, fig. 2, (Aug. 1847); pp. 119-121, (Nov. 1847). [Genotype: *Dircenna iambe* Dbld., Hew. & Westw., by monotypy, pl. 17, Aug. 1847, (= *Ceratinia jemina* Geyer, 1837).]

There can be little doubt that this genus is closely related to *Corbulis*, hence should be associated with the tribe *Olerüini*, despite the reduction to four tarsal joints in the female fore-leg, rather than with the tribe *Ithomiini*. Although this prevents the use of the female fore-tarsus as a pat character for separating the two tribes, it is easy to understand *Dircenna's* position when one realizes that in the *Ithomiinae* evolution takes the form of reduction both in venation and in the forelegs of both sexes. The reduction in the fore-legs of the females of this genus is independent of and indicates no relation to the *Ithomiini*.

With respect to the hair patch of the males *Dircenna* might be divided into two species groups each containing about the same number of species. The genotype, *jemina*, has a single patch which extends from hum nearly to the cell apex. This is true also of *visina* Haensch, *varina* Hewitson, *zelie* (Guérin), and *lenea* (Cramer) among the forms which I have examined. The other group, including *klugii* (Geyer), *olyras* (Felder), *suna* Haensch, *marica* (Felder) and *vandona* Haensch has in addition to the long proximal patch a small tuft at the apex of the cell at 1d. Although I regard this as a fundamental character, I do not erect a new genus because the presence of one or two patches in this case does not seem to be correlated with other characters in the males, and I have been unable to obtain parallel separation of the females, although the many variable characters mentioned below have been studied with this in mind.

In both sexes Sc and R separate at the simple, non-bifid hum. In the males (Fig. 10) the two veins are distinctly separated beyond hum; usually Sc is atrophied proximal of the cell apex, but this is not always so and in a few species and a few specimens Sc reaches with an upward curve the margin at the wing apex. The anterior side of the cell is long, the exact proportional length varying with the species. The terminal segment of R usually is shorter than the greatest width of the cell; Id is mostly present, short, sometimes vestigial or absent; 2d is more or less strongly curved convex to the cell; the longish Mr is located on 3d near  $M_2$ , but 3d is often not strongly angled.

In the females (Fig. 11) the cell is proportionately shorter, the terminal segment of R longer than the greatest width of the cell; Id if present is short, often absent and  $M_1$  branches from R beyond the cell; 2d straight; 3d and Mr similar to the analogous structures of the males; Se runs closely parallel to R to a point opposite the cubitals, then angles away toward the margin which it reaches beyond the cell apex. At the point where Se and R separate there often is a short auxiliary vein connecting them, a vein analogous to the one found in females of *Ceratinia*.

*devo* (Hübner)†, *d. rhoso* Felder†; *euteles* (Erschow); *hanrathi* (Srnka); *lugia* Schaust; *jemina* (Geyer)†, *j. bairdii* Reakirt†, *j. euchytra* (Felder)†, (Pl. V, figs. 10, 11); *klugii* (Geyer & Hübner)†, *k. chiriguensis* Haensch; *lenea* (Cramer)†; *loreta* Haensch†; *lorica* Weymer; *mantura* (Hew.)†; *marica* (Felder)†, *m. steinheili* Staud.†; *obfuscata* Butler; *phagesia* (Hew.); *relata* Butler & Druce†, *r. lonera* Butler & Druce†, *r. olyras* (Felder)†; *suna* Haensch†; *vandona* Haensch†, *v. immaculata* (Haensch)†; *varina* (Hew.)†; *visina* Haensch†; *xanthophane* Hopffer†; *zelie* (Guérin)†, *z. epidero* Bates†.

**PTERONYMIA** Butler & Druce

*Pteronymia* Butler & Druce, Cist. Ent., 1, p. 96, (1872). [Genotype: *Ithomia aletta* Hew., by original designation.]

*Ernicornis* Capronnier, Ann. Soc. Ent. Belg., xvii, p. 22, (1874). [Genotype: *Papilio euritea* Cramer, by present designation.]

*Parapteronymia* Kremky, Ann. Zool. Pol. Mus. Hist. Nat., iv, p. 238, (1925). [Genotype: *Pteronymia antisao* (Bates), by monotypy.]

*Parapteronymia* was proposed as a subgenus, is synonymous with *Pteronymia* and was founded on trifling variation of the genitalia. *Ernicornis* appeared without diagnosis in a list of Brazilian butterflies and included two species, one of which, *Papilio euritea* Cramer, is herewith designated genotype.

Both sexes of *Pteronymia* may be separated from *Episcada* by the structure of the humeral vein, which in *Pteronymia* is vestigially bifid, having a lobe on its distal side; in *Episcada* hum is clearly non-bifid. Great confusion exists in literature regarding the proper association of the species in these two genera. Godman and Salvin<sup>17</sup> pointed out that in *Pteronymia* the female fore-tarsus bears setae on the first, second and third joints, while in *Episcada* the setae are only on the second and third joints, not on the first.

<sup>17</sup> Godman & Salvin, Biol. Cent. Am., Rhop. 1, p. 40, (1879).

The males (Fig. 50) have a single hair patch along R from the base to the cell apex; hum is vestigially bifid, the distal arm a mere lobe; Sc and R run side by side for a short distance beyond hum, then separate gradually; Sc reaches the costal margin near the wing apex with an up-curve. In the genotype and in most of the species properly referable to this genus, 1d and  $M_1$  are entirely wanting; however a few forms must be included which have  $M_1$  very short, branching from R near the margin; 2d is nearly straight; 3d emits a short Mr from its acute angle, the posterior arm of which is about as long as 2d.

In the females (Fig. 51) the venation is the same, except for hum, as in females of *Episcada*. However, Sc has a tendency to be slightly longer in *Pteronymia* reaching the margin nearer the wing apex; also 1d is almost never present and  $M_1$  tends to stalk with R more distal of the cell apex. These two tendencies in no way serve for separating females as individuals into their proper genera; the structure of hum is the only reliable venation character I have found.

*adina* (Hew.)†; *agalla* (Godman & Salvin)†; *alcmena* (Godman & Salvin)†; *a. tigranes* Godman & Salvin†; *alotta* (Hew.)†; *alissa* (Hew.)†, *a. alissana* Haensch†, *a. alope* Godman & Salvin†; *antisao* (Bates)†; *artena* (Hewitson)†; *asellia* (Hopffer)†; *aselliata* Haensch†; *barilla* Haensch†, (Pl. VIII, figs. 50, 51); *cotylo* (Guérin)†; *donata* Haensch†; *euritea* Cramer†; *fulvescens* Godman & Salvin†; *fulvimargo* Butler & Druce; *latilla* (Hew.)†; *laura* (Staud.)†; *illa* (Hew.)†; *insera* (Herrich-Schaeffer)†, *l. alina* Haensch†; *notilla* Butler & Druce†; *oneida* (Hew.)†; *pronuba* (Hew.)†; *simplex* (Salvin)†; *veia* (Hew.)†; *vestilla* (Hew.)†; *zertina* (Hew.)†, *z. hava* (Hew.)†.

#### EPISCADA Godman & Salvin

*Episcada* Godman & Salvin, Biol. Cent. Am., Rhop. 1, pp. 40-41, (1879).  
[Genotype: *Ithomia salvina* Bates, by original designation.]

The males (Fig. 23) have a single hair patch along R from hum to the cell apex; hum is simple, non-bifid; Sc and R separate a short distance distal of hum, run parallel, but do not touch, to the margin which Sc reaches with an up-curve; 1d usually is present, short, but sometimes is wanting, in which case R and  $M_1$  stalk at the cell apex; 2d is straight or slightly convex to the cell; 3d is about the same length as 2d.

Females can be separated from *Pteronymia* only by the non-bifid hum. Sc and R separate gradually, both complete; 1d mostly wanting, with R and  $M_1$  stalked at the cell apex. In other respects venation resembles that of the males.

*apia* (Felder)†; *asopo* (Felder)†; *carcinia* Schaust; *hymenaea* (Pritt-witz)†; *mira* (Hew.)†; *primula* (Bates)†; *salvinia* (Bates)†, (Pl. VI, fig. 23); *sylva* (Hübner & Geyer)†.

#### HYPOLERIA Godman & Salvin

*Hypoleria* Godman & Salvin, Biol. Cent. Am., Rhop. 1, pp. 52-53, (Section A), (1879). [Genotype: *Hypoleria libera* Godman & Salvin, by original designation, section A.]

*Pigritia* d'Almeida, Mel. Lep., p. 92, (1922), (preoccupied Clemens 1861).  
[Genotype: *Rhadinoptera umbraticola* d'Almeida, by monotypy.]

*Pigritina* Hedicke, Deutsche Ent. Zeit., p. 72, (1923). [Published to replace *Pigritia* d'Almeida.]

*Herringia* d'Almeida, Bol. Soc. Ent. Brasil, p. 14, (1923), (preoccupied Rondani, 1856). [Genotype: *Rhadinoptera umbraticola* d'Almeida, by original designation.]

*Corbulis* Bryk, (not Boisduval, 1870), Lep. Cat., pars 80, p. 615, (1937).  
[Genotype: *Corbulis gephiria* (Hewitson), by original designation.]

Bryk overlooked Kirby's genotype designation for *Corbulis* and named *gephiria*. As noted elsewhere *Corbulis* properly applies to another genus; accordingly, *Hypoleria* is retained for application to Godman and Salvin's group A, as Bryk's limitation of the name to group B does not affect its availability as presently used.

I am indebted to Senhor d'Almeida for supplying me with a sketch of the hindwing venation of his *umbraticola*; I am therefore able to affirm that, as he suggested in his letter to me, *Pigritia* d'Almeida and associated names must be subsumed as synonyms for *Hypoleria* Godman and Salvin. Hedicke's publication of *Pigritina* is a pathetic example of a deplorable practice followed by certain Continental "students", that of going over the literature with a fine-toothed comb in order to find preoccupied genus names and suggested species defined but not named; Herr Hedicke, as far as can be learned, never studied specimens of *Ithomiinae*.

The males (Fig. 17) of *Hypoleria* have two hair patches at the costal margin of the hind wing; one is located at the base and is larger, brush-like; a pencil-like patch is near the cell apex; hum is strongly bifid; Sc and R run so closely parallel as to be nearly coalesced as far as a point opposite  $Cu_2$ ; beyond this point Sc curves away from R, recurves toward it beyond the cell, and is atrophied before reaching the margin; 1d always is present, and like 2d is quite short;  $M_1$  is atrophied before reaching the margin, sometimes near the cell;  $M_2$  is complete, prolonged into the cell as a short Mr; 3d is atrophied at its anterior end, so that the cell is open; the posterior side of the cell is longer than the anterior side in both sexes.

In the females (Fig. 18) Sc is complete, reaching the margin somewhat beyond the cell apex after running close to R as in the males; 1d is invariably wanting, with  $M_1$  branching from R beyond the cell; 2d is short, straight; 3d is angled, emitting the short Mr; the posterior arm of 3d is curved, almost S-shaped, the posterior end of which is much more distal than the cell apex and the terminus of Sc, though proximal of the branching of  $M_1$  and R.

*cassotis* (Bates)†, *c. rheve* (Godman & Salvin)†, *c. cajona* Haensch†; *cidonia* (Hewitson)†, *c. chrysodonia* (Bates)†, *c. karschi* Haensch†; *cymo* (Hübner)†; *pephira* (Hewitson)†; *mirza* (Hewitson)†, (Pl. VI, figs. 17, 18), *m. rissarthi* Haensch†; *ocala* (Doubleday, Hewitson & Westwood)†; *quadrona* Haensch†; *proxima* Weymer†; *orianna* (Hewitson)†, *o. lamina* Haensch†; *orolina* (Hewitson)†, *o. oculata* Haensch†; *vanilia* (Herrich-Schäffer)†, *v. libera* Godman & Salvin†; *veronica* Weymer†; *virginia* (Hewitson)†; *umbraticola* (d'Almeida)†.

#### GODYRIS Boisduval

*Godyris* Boisduval, Cons. Lep. Guat., p. 33, (1870). [Genotype: *Godyris duillia* (Hewitson), by monotypy.]

*Dismenitis* Haensch, Berlin Ent. Zeit., XLVIII, p. 207, (1903). [Genotype: *Dismenitis zavaleta* (Hewitson), by original designation.]

The males (Fig. 20) bear a single hair patch along R from base to apex of the cell; hum is bifid; Sc and R virtually are coalesced as far as a point opposite  $Cu_2$ , beyond which Sc runs evenly curved toward the apex, which it fails to reach, being atrophied opposite the cell apex; R and  $M_1$  reach the wing apex as a single vein, uniting near the margin to form with the short, straight 1d an auxiliary cell; 2d is slightly longer than 1d and nearly at a right angle to it; Mr when present, may be as a continuation of  $M_2$ , or may be on 2d; 3d is curved, atrophied at its anterior end so that the cell is open.

In the female (Fig. 30) Sc reaches the margin just distal of the cell apex; the posterior side of the cell is longer than the anterior side, but the posterior end of 3d is as distal as the termination of Sc or the branch of  $M_1$  and R; 1d is wanting invariably; Mr arises from the angle of 3d, the posterior arm of which is S-shaped.

*cleonica* (Hewitson)†; *crinippa* (Hew.)†; *diracenna* (Felder)†, *d. piltheis* (Weymer)†; *diversivoca* (d'Almeida)†; *duillia* (Hew.)†; *gonussa* (Hew.)†, *g. petersii* (Dewitz)†; *hewitsoni* (Haensch)†; *pseudodiversivoca* (d'Almeida)†; *sosunga* (Reakirt)†, (Pl. VII, figs. 29, 30), *s. zygia* (Godman & Salvin)†; *theoudelinda* (Hew.)†, *t. zalmanna* (Hew.)†; *zavaleta* (Hew.)†, *z. amaretta* (Haensch)†, *z. telesilla* (Hew.)†.

#### MCCLUNGIA new genus\*

Males may be distinguished from *Pseudoscada*, in which *salonina* formerly was placed, by the bifid hum, by the two hair patches, and by the absence of the terminal segment of R; distinguished from *Hypoleria* by the shorter Sc and by the absence of the terminal segment of R, this last a remarkable character unique among the *Ithomiinae*. The females differ from *Pseudoscada* in the venation at the end of the cell and by the humeral vein. I do not possess enough material to make a satisfactory key difference from *Hypoleria*, which the only *Mcclungia* female in the Academy collection closely resembles. However, the anterior arm of 3d seems longer in proportion to 2d, and Mr seems longer; in the forewing both recurrents are present and well developed, while in *Hypoleria* only one is generally present.

Males (Fig. 28) have two hair patches, one from the bifid hum to half way to the cell apex, the other at the cell apex, small and pencil-like; Sc runs closely parallel to R for a distance, then arches away and is atrophied just beyond the cell apex; the round, raised place under the basal hair patch around which Sc detours in *Hypoleria* is wanting in *Mcclungia*. The terminal segment of R is wanting, vestigially present in some examples as a slight thickening at the juncture of R and 1d; in one specimen examined it is present, 3 mm. long; 1d and 2d both short, the same length;  $M_1$  atrophied short of the margin;  $M_2$  and  $M_3$  complete; Mr short, opposite  $M_2$ ; 3d nearly straight, its anterior half wanting; cell open.

Females with bifid hum; Sc and R closely parallel to a point opposite  $Cu_2$ , where Sc angles sharply away and reaches the margin just beyond the cell apex; 1d wanting,  $M_1$  stalked 3 to 4 mm. beyond the cell; 2d very short, less than half the length of the anterior arm of 3d; Mr long, from the angle of 3d, the posterior arm of which is "S"-shaped.

GENOTYPE: *Ithomia salonina* Hewitson, Exot. Butt., 1, Ithomia 86, (1855).

#### *Mcclungia salonina praeceptorix* new subspecies

Male: Both wings transparent with a yellowish tinge, borders brown-black. On the dorsal surface of the forewing the dark marginal color extends between R and the costal margin from base to cell apex; a thinly scaled brown-black triangular half-band covers the discocellulars; an opaque yellow spot, about 3 x 1 mm., indents the marginal stripe just distal of the cell apex. This spot forms the anterior end of a yellow band which extends down to  $M_2$ ; within this band the veins  $M_1$  and  $M_2$  are yellow, while the band between the veins is faintly and transparently yellow. The

marginal band is wider at the apex of the wing, gradually narrowing toward the anal angle. The area between  $Cu_2$  and the anal margin is black-brown. The inner side of the marginal band is even, except for three short, faint streaks from the margin running proximal, respectively between  $M_1-M_2$ ,  $M_2-M_3$ ,  $M_3-Cu_1$ . Except where they are crossed by the yellow discal band, the veins all are dark. Additional yellow-transparent areas are between  $Cu_1-Cu_2$  and faintly in the cell.

The hind wing dorsal surface is margined by a band 1.5 mm. wide, brown-black, running from the base along the costal margin to the apex, down the outer margin to the anal veins, where it narrows and disappears. All veins in the hind wing are dark. There is a slight yellow-transparent sealing throughout the hind wing, stronger in the cell.

On the ventral surface the marginal band of the fore wing is solidly dark near the base on the costal margin and along the entire anal margin. On the costal margin, from near the base to the apex and along the distal margin the band is brown-orange edged distal with black, faintly so proximal. The discocellular band and the opaque yellow costal spot are repeated from above. At the apex against the distal side of the brown-orange band are two silver-white oblong spots between  $R_4-R_5$ ,  $R_5-M_1$ . These spots are about 1.5 x .5 mm. and are bordered with fine black lines. A third spot, similar in color but much smaller and not well defined is between  $M_1-M_2$ .

Ventrally the hind wing has the band at the costal margin anterior of  $Sc$  brown-orange. Under the hair patch the band is black. The rest of the marginal band is brown-orange edged strongly on the distal side with black, faintly so on the proximal side. Three elongated, black-edged, silver-white spots appear in the margin at the distal edge of the brown-orange band; they are between  $M_2-M_3$ ,  $M_3-Cu_1$ ,  $Cu_1-Cu_2$ . The veins are brownish-yellow in the discal area.

The antennae are dark brownish-black; palpi white with a black stripe on the sides toward the eyes, which are circled with white scales; frons black; white spots on shoulders; legs striped black and white; fore-legs with tibia and tarsus much reduced; abdomen ashen ventrad, brown-black dorsad.

*Type*.—Male; "Upper Rio Marañon, Peru; Nov. 19, 1924; H. Bassler Col." [American Museum of Natural History; type No. 28,700.]

Two male *paratypes*: One with data as in the type, in collection of the Academy of Natural Sciences of Philadelphia. The other paratype: "2°-4° S 78° W, xi-xii, 1934, altitude 875 M. Ecuador, W. Von Hagen", in collection American Museum of Natural History.

\* This genus and this subspecies are named in honor of Dr. Clarence E. McClung, Professor of Zoology at the University of Pennsylvania.

*salonina* (Hew.)†, *s. arcuata* (Tessmann), *s. subtilis* (Haensch), *s. praeceptrix* new subspecies†, *s. trepotis* (Haensch).

#### PSEUDOSCADA Godman & Salvin

*Pseudoscada* Godman & Salvin, Biol. Cent. Am., Rhop. 1, p. 55, (1879).

[Genotype: *Ithomia pusio* Godman & Salvin, by original designation.]

*Languida* d'Almeida, Mel. Lep., p. 92, (1922). [Genotype: *Rhadinoptera genetyllis* d'Almeida, by monotypy.]

Senhor d'Almeida kindly supplied me with a sketch of the hindwing venation of his *genetyllis*, and I agree with the suggestion contained in his letter to me that *Languida* ought to be a synonym for *Pseudoscada*.

The males (Fig. 45) bear a single brush-like hair patch along R, base to cell apex; hum simple, non-bifid;  $Sc$  coalesced with R as far as a point opposite  $Cu_2$ , beyond which  $Sc$  is immediately atrophied; in some specimens it is a mere prominence on R; usually it is a few millimeters long, but very slender and weakly developed; in no case does it reach the margin; 1d and 2d are short, straight; in some examples 2d is reduced posterior and fails to reach  $M_2$ ; 3d is long, curved, atrophied anterior so that the cell is open; Mr is present.

The veins in the female (Fig. 46) all are complete.  $Sc$  and R run side by side, touching but not coalesced, as far as a point opposite  $Cu_2$ ; beyond this point  $Sc$  runs gradually to the margin which it reaches slightly distal of the cell apex, while R is gently convex to the cell; 1d often is wanting, with  $M_1$  stalked well beyond the cell; when present 1d is, like 2d, short and straight; 3d is long, angled, the posterior arm curved; a definite though often minute Mr arises from the angle of 3d.

*adasa* (Hew.)†, *a. erruca* (Hew.)†; *egla* (Hew.)†, *e. aureola* (Bates)†; *genetyllis* (d'Almeida)†; *lavinia* (Hew.)†, *l. troetschi* (Stand.)†; *timna* (Hew.)†, *t. arzalia* (Hew.)†, *t. seba* (Hew.)†; *utilla* (Hew.)†, (Pl. VIII, figs. 45, 46).

#### GRETA Hemming

*Greta* Hemming, Gen. Nam. Hol. But., 1, p. 28, (1934). [Genotype: *Hymenitis diaphane* Hübner, by original designation.]<sup>18</sup>

*Hypoleria* Godman & Salvin, Biol. Cent. Am., Rhop. 1, pp. 52-53, section B, (1879). [Genotype: *Ithomia polissena* Hewitson, by original designation, section B.]

*Hymenitis* Hübner, Verz. b. Schmet., p. 8, (1816), (preoccupied Anonymous, 1807). [Genotype: *Hymenitis diaphane* Hübner, by designation of Scudder, Proc. Am. Acad. Arts & Sci., x, p. 193, (1875).]<sup>18</sup>

<sup>18</sup> Whatever be the true identity of *H. diaphane* Hübner, for purposes of genotype fixation, it is synonymous with *Papilio diaphanus* Drury, since Hübner himself thought he was dealing with the Drury insect, as his synonymy on p. 8 of the Verzeichniss indicates.

As originally used by Godman and Salvin, the genus *Hypoleria* was divided into sections A and B, which correspond respectively to two separate genera according to modern definition. For either of the genera to which the name might apply, *Hypoleria* would have precedence, but it is here used for the original group A, which would be otherwise without name; for group B, the present name, Hemming's *Greta*, applies.

The males (Fig. 27) have a single hair patch along R, base to cell apex, hum simple, non-bifid and reaching well into the humeral lobe; Sc, though not coalescing with R, runs close beside it for a distance, then branches away and is atrophied short of the margin and proximal of the cell apex; R is atrophied before reaching the margin, or infrequently combines with  $M_1$  to form an axillary cell; Id is always present, short; 2d likewise is short and straight, often unconnected at its posterior end;  $M_2$  usually is atrophied at its proximal part, but always definitely present near the margin; 3d is curved, atrophied anteriorad; the cell open.

In the females (Fig. 26) Sc reaches the margin proximal of the cell apex; Id is short, straight; 3d is angled and usually gives rise to a short Mr; 2d is wholly wanting,  $M_1$  and  $M_2$  stalk well beyond the cell, sometimes nearly at the margin.

Superficially the species in this genus are extraordinarily similar to those of *Godyris*. Although there are half a dozen or so different maculation and color patterns in *Greta*, nearly every one has an identical counterpart in *Godyris*; sometimes this similarity is so perfect to the most minute detail that color and pattern characters cannot separate them. The genera can be distinguished in both sexes by means of the venation; in *Greta* hum is non-bifid, in *Godyris* hum is distinctly bifid.

*alpesiboea* (Hew.)†; *andromica* (Hew.)†, (Pl. VI, figs. 26, 27), *a. andania* (Hopffer)†, *a. dromica* (Haensch)†, *a. lyra* (Salvin)†; *anette* (Gnérin)†; *cubana* (Herrich-Schaeffer)†; *decectis* (Dbl., Hew. & Westw.)†, *d. libethris* (Felder)†, *d. ochretis* (Haensch)†; *diaphanus* (Drury)†; *esula* (Hew.)†; *kedema* (Hew.)†, *k. albinotata* (Butler)†; *morgane* (Geyer)†, *m. moschion* (Godman & Salvin)†; *nero* (Hew.)†; *nerina* (Haensch)†; *ortygia* (Weymer)†; *oto* (Hew.)†; *polissena* (Hew.)†, *p. umbrana* (Haensch)†; *quinta* (Staudinger)†.

#### HETEROSAIS Godman & Salvin

*Heterosais* Godman & Salvin, Biol. Cent. Am., Rho. I, p. 60, (1880).

[Genotype: *Ithomia nephele* Bates, by original designation.]

*Rhadinoptera* d'Almeida, Mel. Lep., p. 78, (1922). [Genotype: *Heterosais nephele* (Bates), by designation of Riley, Entom., LVII, p. 68, (1924).]

The males (Fig. 13) bear two hair patches, the basal one extending from the stalk of Sc and R to about two-thirds of the distance to the cell apex, and is raised ventrad; the distal patch is small, pencil-like, and is located at the apex of the cell; hum simple, non-bifid; Sc and R run side by side just distal of hum, then stalk; distal of their separation, Sc curves away, then recurves to be atrophied proximal of the cell apex; R is strongly convex to the cell along the proximal hair patch; 2d is short, unconnected with  $M_1$ ; Id entirely wanting; cell open;  $M_2$  and 3d complete, the latter sharply angled near its anterior end, and bearing a short Mr.

In the females (Fig. 14) Sc and R run side by side to half the distance to the cell apex, then Sc gradually runs to the costal margin which it reaches just distal of the cell apex; 2d is short, straight; Id and  $M_1$  wanting; 3d angled, emitting a short Mr. A specimen of *H. cadra* Godman & Salvin in the Academy collection has a small loop like a needle's eye on R beyond the cell; the posterior part of this loop probably is a vestige of  $M_1$ .

*cadra* Godman & Salvin†; *edessa* (Hew.)†, *e. gedera* (Hew.)†, *e. nephele* (Bates)†, (Pl. V, figs. 13, 14); *giulia* (Hew.)†; *pallidula* Haensch†.

#### AN UNRECOGNIZED NAME

*Pseudomechanitis* Röber, Ent. Zeitschr., XLIV, pp. 20-21, (1930). [Genotype: *Pseudomechanitis paradoxa* Röber, by monotypy.]

Whether or not this name can stand I am unable to say. The genotype was described from a single male specimen. No other form has been referred to the genus; there is no other reference in literature either to this genus or to this species beyond the original description. No example from any of the large collections I have examined seems to belong to the name. Röber claimed his specimen has the wing shape of *Mechanitis* but the venation of *Epithomia* (*Corbulis*); his description is inadequate with respect to venation, making no reference to humeral or subcostal of the hind wing, or to any other character of generic value. Possibly Röber's insect was merely a *Mechanitis* with aberrant venation—a not uncommon event. Lacking pertinent material, I can only suggest that *paradoxa*, if it is a good species, probably may be subsumed in some other genus and that *Pseudomechanitis* is not needed; however I cannot at present decide its position in synonymy. The type specimen is in Röber's collection in Germany and has not been available to me for study.

## EXPLANATION OF FIGURES

## Venation of hind wing

(All specimens from the collection of the Academy of Natural Sciences of Philadelphia, except where noted.)

## PLATE V

- Figure 1—*Aeria eurimedia agna* Gdm. & Slv. ♂. Guapiles, Costa Rica.  
 Figure 2—*Aeria eurimedia agna* Gdm. & Slv. ♀. Costa Rica.  
 Figure 3—*Aithesis acrisone* Hew. ♂. Ecuador.  
 Figure 4—*Athyrtis mechanitis salvini* Srnka ♂. Upper Amazons.  
 Figure 5—*Callithomia hezia* Hew. ♂. Guapiles, Costa Rica.  
 Figure 6—*Callithomia hezia* Hew. ♀. Costa Rica.  
 Figure 7—*Ceratinia tutia* Hew. ♂. Eden, Nicaragua.  
 Figure 8—*Ceratinia nise* Cr. ♀. Aveirs, Para, Brazil.  
 Figure 9—*Corbulis xantho* Felder ♂. Santa Catharina, Brazil.  
 Figure 10—*Dircenna jemina euchytna* Felder ♂. Chiriqui, Costa Rica.  
 Figure 11—*Dircenna jemina euchytna* Felder ♀. Eden, Nicaragua.  
 Figure 12—*Elcunia pavonii* Butler ♂. Dos Puntos, Ecuador.  
 Figure 13—*Heterosais edessa nephele* Bates ♂. Pejivalle, Costa Rica.  
 Figure 14—*Heterosais edessa nephele* Bates ♀. Naranjapata, Ecuador.

## PLATE VI

- Figure 15—*Hyaliris coeno* Dbld., Hew. & Westw. ♂. Cebrada, Cotiza, Venezuela (U. S. N. M.).  
 Figure 16—*Hyaliris coeno* Dbld., Hew. & Westw. ♀. Caracas, Venezuela (d'Almeida).  
 Figure 17—*Hypoleria mirza* Hew. ♂. Naranjapata, Ecuador.  
 Figure 18—*Hypoleria mirza* Hew. ♀. Dos Puntos, Ecuador.  
 Figure 19—*Hyposcada evanides* Haensch ♂. Guapiles, Costa Rica.  
 Figure 20—*Hyposcada evanides* Haensch ♀. (No data.)  
 Figure 21—*Hypothyris ninona* Hübner ♂. British Guiana.  
 Figure 22—*Hypothyris ninona* Hübner ♀. Para, Brazil.  
 Figure 23—*Episcada salvina* Bates ♂. Rosario, San Juancto Mts., Honduras.  
 Figure 24—*Eutresis hyperia* Dbld., Hew. & Westw. ♂. Colombia.  
 Figure 25—*Episcada salvina* Bates ♀. Rosario, San Juancto Mts., Honduras.  
 Figure 26—*Greta andromica* Hew. ♀. Huigra, Ecuador.  
 Figure 27—*Greta andromica* Hew. ♂. Dos Puntos, Ecuador.  
 Figure 28—*Meclungia salonina praeceptorix* new subspecies, ♂. Ecuador.

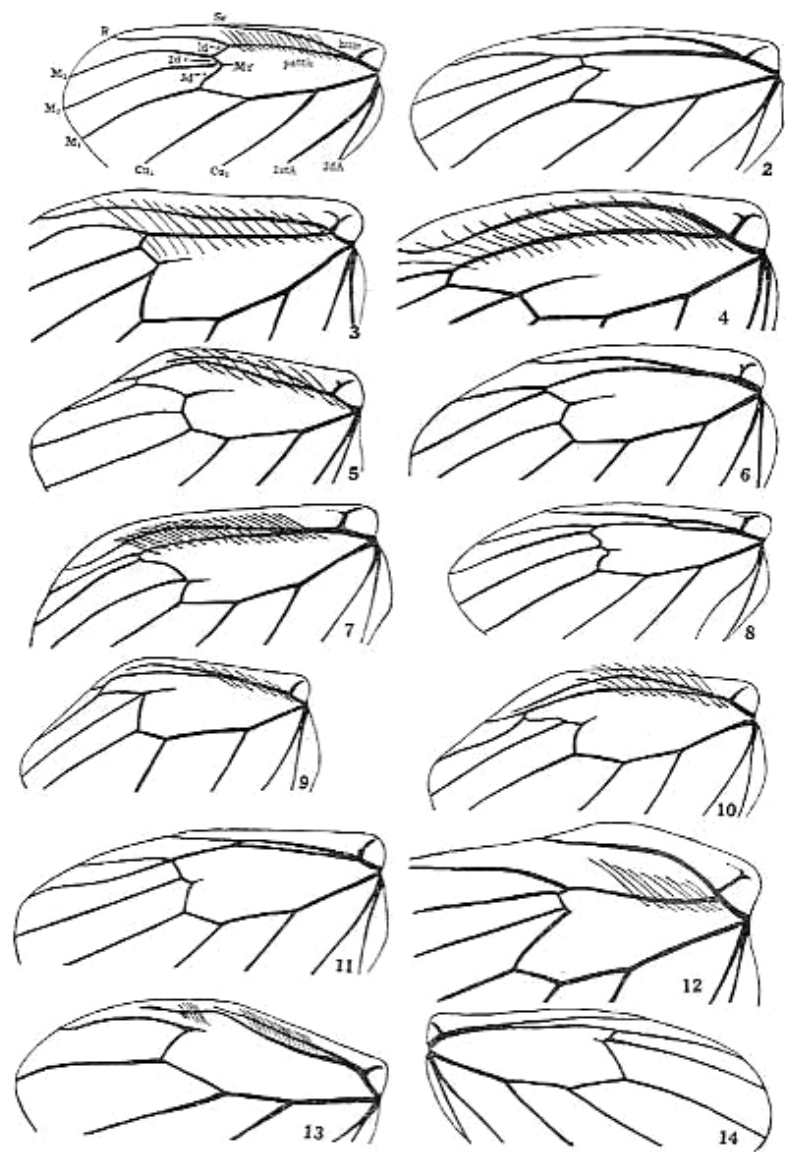
## PLATE VII

- Figure 29—*Godyris sosunga* Reakirt ♂. Costa Rica.  
 Figure 30—*Godyris sosunga* Reakirt ♀. Eden, Nicaragua.  
 Figure 31—*Ithomia agnosia* Hew. ♂. Venezuela.  
 Figure 32—*Ithomia agnosia* Hew. ♀. Venezuela.  
 Figure 33—*Miraleria sylvello* Hew. ♂. Dos Puntos, Ecuador.  
 Figure 34—*Melinaea egina* Cr. ♂. Upper Amazons, Brazil.  
 Figure 35—*Mechanitis polymnia* L. ♂. Parambribo, Dutch Guiana.  
 Figure 36—*Mechanitis polymnia* L. ♀. Parambribo, Dutch Guiana.  
 Figure 37—*Napeogenes stella aster* Godman ♂. Naranjapata, Ecuador.  
 Figure 38—*Napeogenes stella aster* Godman ♀. Bucay, Ecuador.  
 Figure 39—*Oleria modesta* Haensch ♂. Dos Puntos, Ecuador.  
 Figure 40—*Oleria modesta* Haensch ♀. Bucay, Ecuador.  
 Figure 41—*Olyras montagui staudingeri* Gdm. & Slv. ♂. Cachi, Costa Rica.  
 Figure 42—*Miraleria sylvello* Hew. ♀. Bucay, Ecuador.

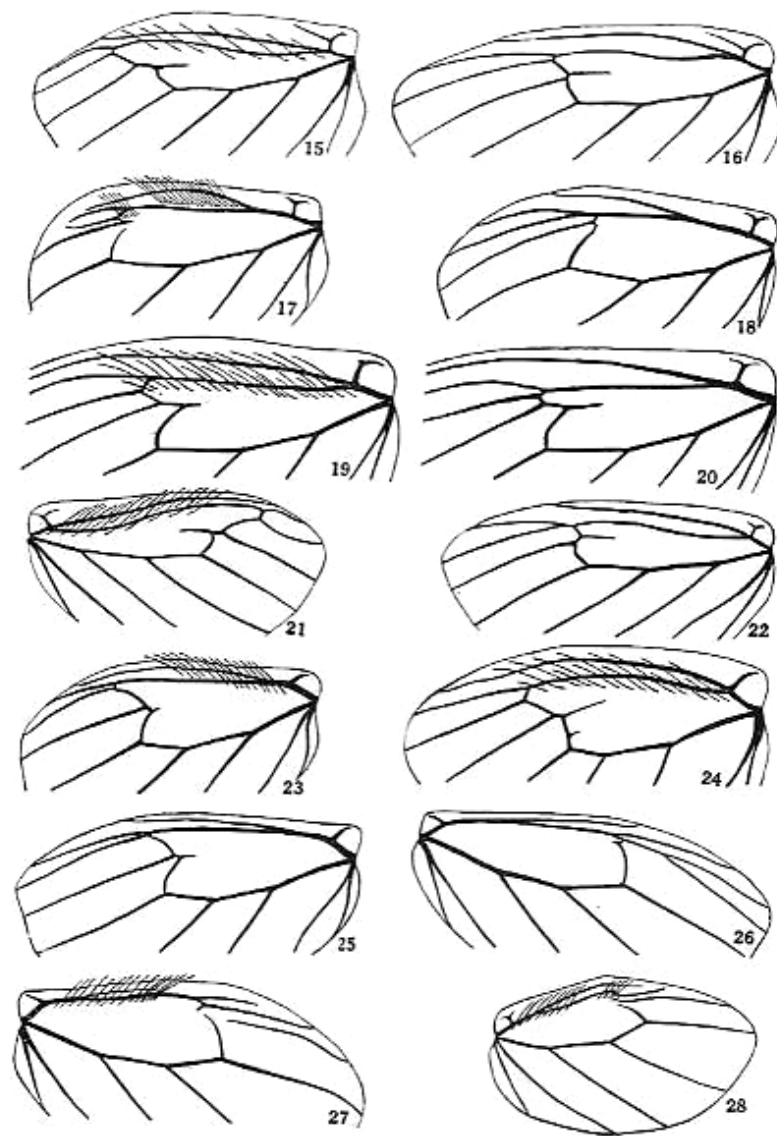
## PLATE VIII

- Figure 43—*Patricia deryllidas* Hew. ♂. Huigra, Ecuador.  
 Figure 44—*Patricia deryllidas* Hew. ♀. Huigra, Ecuador.  
 Figure 45—*Pseudoscada utilla* Hew. ♂. Dos Puntos, Ecuador.  
 Figure 46—*Pseudoscada utilla* Hew. ♀. Dos Puntos, Ecuador.  
 Figure 47—*Scada zibia* Hew. ♂. Bucay, Ecuador.  
 Figure 48—*Scada zibia* Hew. ♀. Ventura, Ecuador.  
 Figure 49—*Placidula eryanassa* Felder ♂. Santa Catharina, Brazil.  
 Figure 50—*Pteronymia barilla* Haensch ♂. Naranjapata, Ecuador.  
 Figure 51—*Pteronymia barilla* Haensch ♀. Naranjapata, Ecuador.  
 Figure 52—*Sais rosalia camariensis* Haensch ♀. British Guiana.  
 Figure 53—*Sais rosalia camariensis* Haensch ♂. British Guiana.  
 Figure 54—*Tithorea furia* Staud. ♂. Venezuela.  
 Figure 55—*Thyridia themisto* Hübner ♂. Villa Rica, Paraguay.  
 Figure 56—*Yelmysta peninna* Hew. ♂. Bolivia.  
 Figure 57—*Xanthocleis psidi* L. ♂. Rio Madeiro, Brazil.

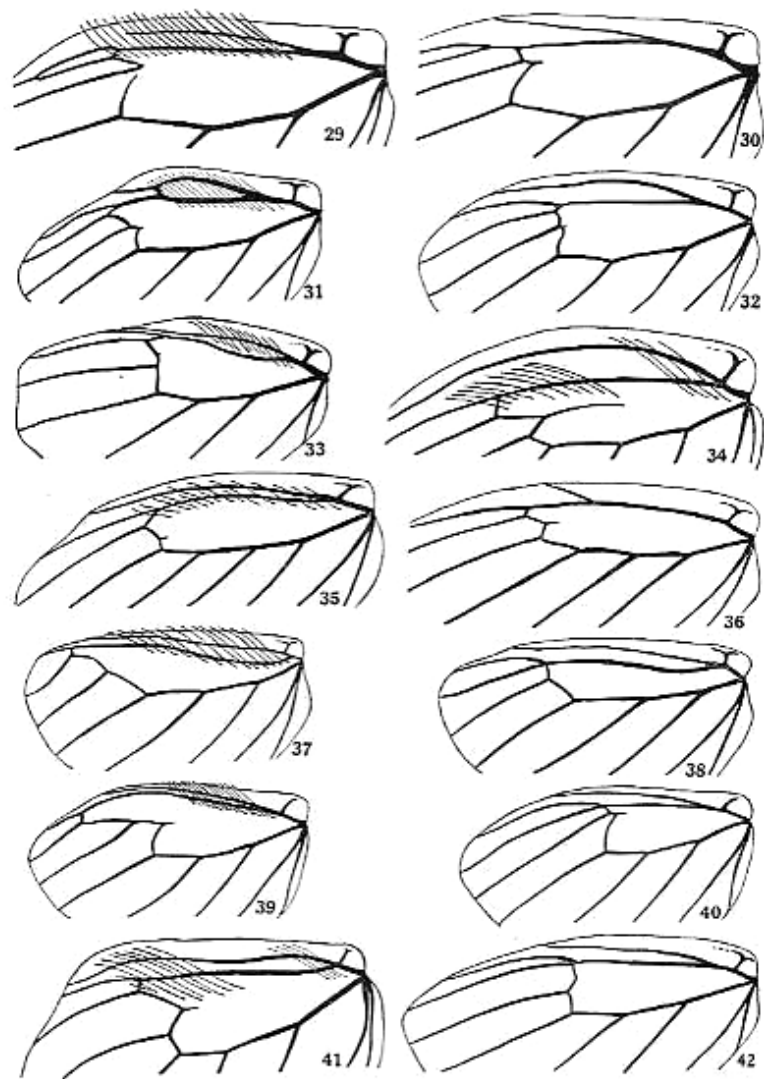




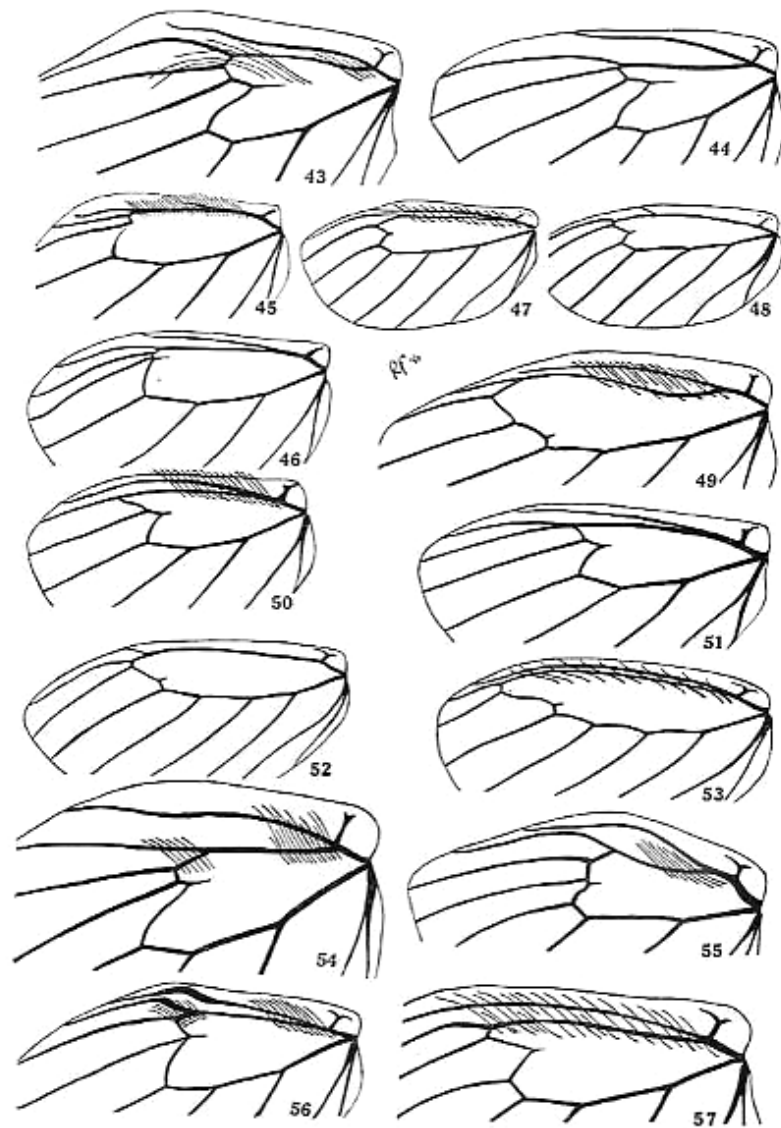
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