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## REVISION OF THE EUPTYCHIINI (SATYRIDAE)

### 3. *Megisto* Hübner

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This is the third in a series of papers leading to a complete revision of the Euptychiini, as defined by Miller (1968). The genus *Megisto* is another of the wholly Nearctic and northern Neotropical genera, and its coverage at this point in the revision is a matter of convenience and to make the results available to my colleagues in this country. The coverage of the genus near those of *Paramacera* and *Cyllopsis* should not be construed as implying close relationship of *Megisto* to these genera, other than tribal ones. In truth the present genus is far closer systematically to such totally Neotropical ones as *Cissia* Doubleday (1848: Appendix 33) and *Pharneuptychia* Forster (1964: 91). The closest Nearctic relatives of *Megisto* are *Neonympha* Hübner (1818: 8) and *Hermeuptychia* Forster (1964: 87-88), genera that will be covered in later parts of the revision. There are other species, all from the southern Neotropics, that have been assigned to *Megisto* by such as Forster (1964: 134), but these butterflies are not related to the Nearctic ones on structural grounds.

I have been able to examine more than 2000 *Megisto* from substantially the same sources as are mentioned in the previous two parts of the revision (Miller, 1972: 2, 1974: 1), and these collections are abbreviated in the same manner. The literature citations are also telescopic, but complete citations will be given only to those papers not already cited in previous parts. The justification for this approach is given in Miller (1974: 1).

The present genus contains but two species, one the most frequently encountered species in the eastern United States, the other perhaps the most prominent euptychiine in the American Southwest. The parameters of the species are not difficult to draw, and the taxonomy of the genus is fairly straightforward, but *Megisto* must be treated for the eventual completeness of the revision. The only knotty problems that will be solved will be with the Mexican populations of one of the species; another problem, long under study by another worker, will be left for him to solve.

***Megisto* Hübner, [1819]**

*Megisto* Hübner, [1819] (1816-1826): 54. Type-species: *Papilio eurytus* Fabricius (nec Linné, 1758; Clerck, 1764), 1775: 487, designated by Butler, 1868b: 14

(= *Papilio cymela* Cramer, [1777] (1775-1784): 55).

This genus begins the series of genera commonly thought of as "typical" *Euptychia*, even though they are but remotely related to that genus. The group of genera includes such diverse members as *Taygetis*, *Cissia* and *Neonympha* and is characterized genitally by freely articulated gnathos arms in contradistinction to the fixed arms of the gnathoi in *Paramacera*, *Cyllopsis* and their relatives and the virtual absence of gnathoi in *Oressinoma* and a few other genera. The group of genera in which *Megisto* and others fit is a rather tightly knit one superficially with many common pattern characters, but the genera are separable on various structural grounds.

The pattern consists of many of the same elements as shown in *Cyllopsis* (Miller, 1974: 2-3) with the exception of the "gray patch" and with the addition of *marginal lines* along the outer margins of both wings. The positioning of these pattern elements is different than in *Megisto*, and in this regard there is more similarity between *Megisto* and *Paramacera* than between either and *Cyllopsis*, but the pattern of *Megisto* is much more like that of *Cissia* than that of either *Paramacera* or *Cyllopsis*.

*Megisto* is closer to the main stock of the Euptychiini than are either of the two genera considered to date. These insects do not appear to be part of the "old" northern Neotropical fauna, suggesting rather a more recent arrival from the basic Neotropics. The genus could well have differentiated during the Pleistocene, as will be discussed later. *Megisto* may be characterized as follows:

Eyes naked to slightly hairy. Antenna about one-third length of forewing costa; club occupying distal third of antenna and inflated to slightly more than twice width of shaft. Palpus rather long and semiporrect (Fig. 3); third segment about two-fifths length of second; hairs of second segment long, about five times width of segment in *cymela* and three to four times width of segment in *rubricata*.

Thorax clothed with long hairs above and below. ♂ foreleg variable: that of *cymela* (Fig. 4) with tarsus nearly as long as tibia, that of *rubricata* (Fig. 5) with tarsus much reduced; femur and tibia of about same length in both species, long and slender in *rubricata*, shorter and stubbier in *cymela*. ♀ foreleg minaturized with a pentamerous tarsus weakly spined on the second through fourth subsegments (Fig. 6). Mid- and hindlegs slender and of moderate length; tibial spurs present on both legs (Miller, 1968: Fig. 203).

Wing venation (Figs. 1, 2) of a basic euptychiine pattern. Forewing radius arising from cell in two branches; veins Rs and M<sub>1</sub> moderately well separated; Sc and cubital stem noticeably inflated, 2A only slightly inflated basad. Hindwing venation as shown (Fig. 1 only); cell only slightly over half length of wing to end of M<sub>3</sub>; Cu<sub>1</sub> somewhat nearer M<sub>3</sub> than Cu<sub>2</sub>; humeral vein weak in both species and bent distad at tip.

There is no evident androconial patch, but androconial scales are scattered over the forewing discal area in *M. cymela* but absent in *rubricata*. Scales of *cymela* of the general euptychiine type (Figs. 13-15), differing chiefly in the ribbing of the thickened basal third. These ribs are not so distinctive as in either *Paramacera* or *Cyllopsis* (Miller, 1972, 1974) and rather unevenly spaced, not traceable throughout the length of the scale.

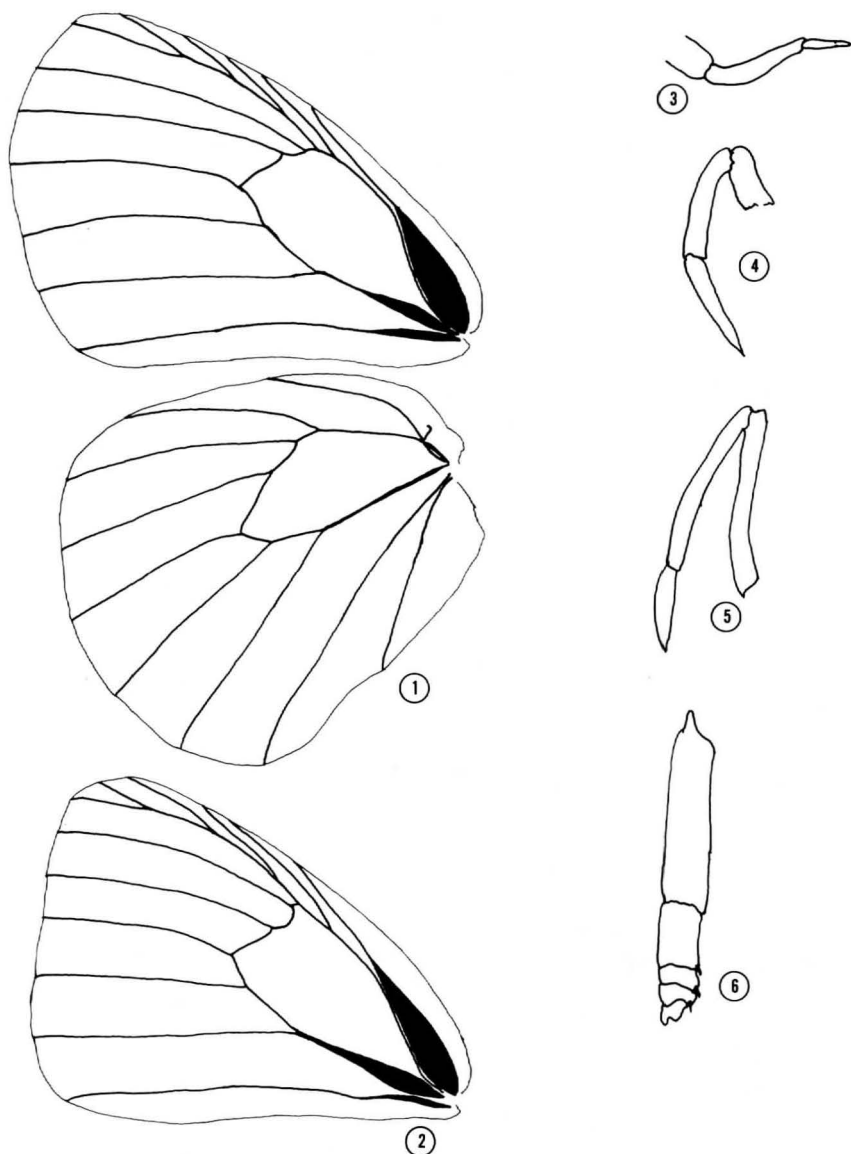
♂ genitalia (Figs. 11, 20, 15) with shieldlike tegumen, long tapered uncus, freely articulated gnathos arms, rather long saccus and simple tapered valvae with a minimum of terminal teeth. Penis somewhat contorted and fluted distally.

♀ genitalia (Figs. 12, 34) as shown and quite simple. The variations in these structures are not especially striking.

Most of what is known about the early stages of *Megisto* has been done on *M. cymela*, and a good account is to be found in the pages of Scudder (1889: 216-222). The larvae feed on various grasses, but we need much more information on just which grasses are utilized by which species.

Two species are recognized in this genus at present. *Megisto* is undeniably

close to *Cissia* Doubleday (1848) and *Neonympha* Huebner (1818). The present insects are restricted to the Nearctic and northernmost Neotropics. They are open woods dwellers and often exceedingly abundant where found. A key for the separation of the species follows:



Figures 1-6: *Megisto*. 1, *M. c. cymela*, ♂ venation. 2, *M. r. rubricata*, ♂ forewing venation. 3, *M. c. cymela*, ♂ palpus. 4, *M. c. cymela*, ♂ foreleg. 5, *M. r. rubricata*, ♂ foreleg. 6, *M. c. cymela*, ♀ foretarsus only.

KEY TO THE SPECIES OF *Megisto* HÜBNER

(Note: Both included species have more than one subspecies; these are keyed at the beginning of the species discussions)

1. Upper surface rather uniform dark brown with no trace of red and two ocelli on forewing, one on hindwing; under surface with no trace of red; U. S. and southern Canada east of 100th Meridian south to central Florida, south Texas and (?) northeastern Mexico.....*M. cymela* (Cramer).
- 1'. Upper and under surfaces with more or less prominent red patches or suffusion, single ocelli on both fore- and hindwing; southwestern U. S. through west and central Mexico to at least Guatemala .....*M. rubricata* (Edwards).

***Megisto cymela* (Cramer) [1777]**

This species is the commonest euptychiine in the eastern half of the United States and the only one that extends its range into Canada. It is characterized by the brown coloration above and below and the two ocelli on the upper surface of the forewing (a rare character in the Euptychiini).

The taxonomy of this species is somewhat confused. Dr. C. L. Remington of Yale University long has been working on a possible sibling species in the northeastern United States. Accordingly, *cymela* is being mentioned here, along with its subspecies in the Southeast, but detailed study is not being done on the insect out of deference to Remington's work.

As presently defined, there are two subspecies recognized in *cymela*, characterized as follows:

KEY TO THE SUBSPECIES OF *Megisto cymela* (CRAMER)

1. Smaller (length of ♂ forewing less than 20 mm.), both surfaces duller and darker; yellow rings of ocelli not so prominent; southern Canada to central Georgia and eastern Texas (exclusive of northern Gulf Coast) and (?) northeastern Mexico.....*M. cymela cymela* (Cramer).
- 1'. Larger (length of ♂ forewing more than 20 mm.), both surfaces brighter, under surface ground color somewhat gray-violet tinged; yellow rings of ocelli prominent; central Florida to central Georgia and Gulf coastal area to easternmost Texas.....*M. cymela viola* (Maynard).

***Megisto cymela cymela* (Cramer), [1777]**

Figures 7, 8 (♂), 9, 10 (♀), 11 (♂ genitalia), 12 (♀ genitalia),  
13-15 (androconial scales)

*Papilio eurytus* Fabricius, 1775: 487 ("Jamaica"). Type BM. Preoccupied by *Papilio eurytus* Linné, 1758: 487.

*Papilio cymela* Cramer, [1777] (1775-1784): 55 ("Cape of Good Hope"). Type probably lost.

*Papilio eurytris* Fabricius, 1793: 157 (probably a misspelling of *eurytus*).

*Papilio eurythris* Godart, [1824] (1819-1824): 494 (misspelling of either *eurytus* or *eurytris*).

*Euptychia eurytis* dosPassos, 1964: 100 (misspelling of *eurytris*).

This species is the best-known Nearctic member of the tribe and perhaps the commonest euptychiine in collections. It cannot be mistaken for any other North

American satyrid, at least as presently defined: should there be a sibling species, discrimination of what is or is not *cymela* will be more difficult. The two subspecies differ more in clinal characters than in discreet ones and are poorly defined at best, except in the extremes of their ranges. A redescription of nominate *cymela* follows:

**Male:** Head, thorax and abdomen dark, slightly greenish, brown above, grayish-tan beneath. Palpus dark brownish-black dorsally, white laterally and clothed with dark hairs ventrad; tip black. Antenna brown above ringed with white, reddish-brown beneath; club brown above, reddish-brown below. Legs clothed with long grayish-tan hairs.

Upper surface of wings rather dark brown, often with a slightly grayish cast, with ocelli as follows: forewing ocelli with doubled silver pupils and yellow to tan rings in  $M_1$ - $M_2$  and  $Cu_1$ - $Cu_2$  and hindwing ocellus with doubled silver pupil and yellow to ochreous ring in  $Cu_1$ - $Cu_2$  (usually one, much smaller, in  $Cu_2$ -2A without the ring); three fuscous marginal lines present on both wings, the proximal one slightly undulate. Fringes above grayish-tan.

Under surface ground color warm brown with darker, slightly reddened trans- and extracellular bands, the latter slightly curved distad toward costa, three marginal dark brown lines, the inner one slightly undulate; at end cell of both wings a narrow, distinct brown bar; forewing with two black, doubly silver-pupilled ocelli with yellow rings in  $M_1$ - $M_2$  and  $Cu_1$ - $Cu_2$  and a series of silver ocellar points between them; hindwing with three black, doubly silver-pupilled ocelli with yellow rings  $M_1$ - $M_2$ ,  $Cu_1$ - $Cu_2$  and  $Cu_2$ -2A and a silver point with a yellow outer ring in  $Rs$ - $M_1$  along with silver ocellar vestiges without rings in  $M_2$ - $M_3$  and  $M_3$ - $Cu_1$ . Fringes tan, darker toward costa of both wings.

♂ genitalia as shown, distinguished from those of *rubricata* by the more finely drawn valva and the shorter gnathos.

Androconial scales scattered over discal portion of forewing and not confined to a distinctive patch. The scales are typical brush-tip scales, not very dissimilar to those of *Cyllopsis* or *Paramacera* (Miller, 1974, 1972, respectively). The terminal fimbriae are not so closely packed as in most members of those genera, but structurally they are very similar. The windows are more unevenly distributed than in the other genera, and the longitudinal ridges are not so definite as in most other Euptychiini, in fact, these structures appear and disappear seemingly at random from and into the surface of the scale. Terminology for scale morphology follows Downey and Allyn (1975).

Lengths of forewings of males at hand range from 16 to 19.5 mm., averaging about 17.5 mm. Material from the southern part of the range of this subspecies averages larger than do specimens from more northerly localities.

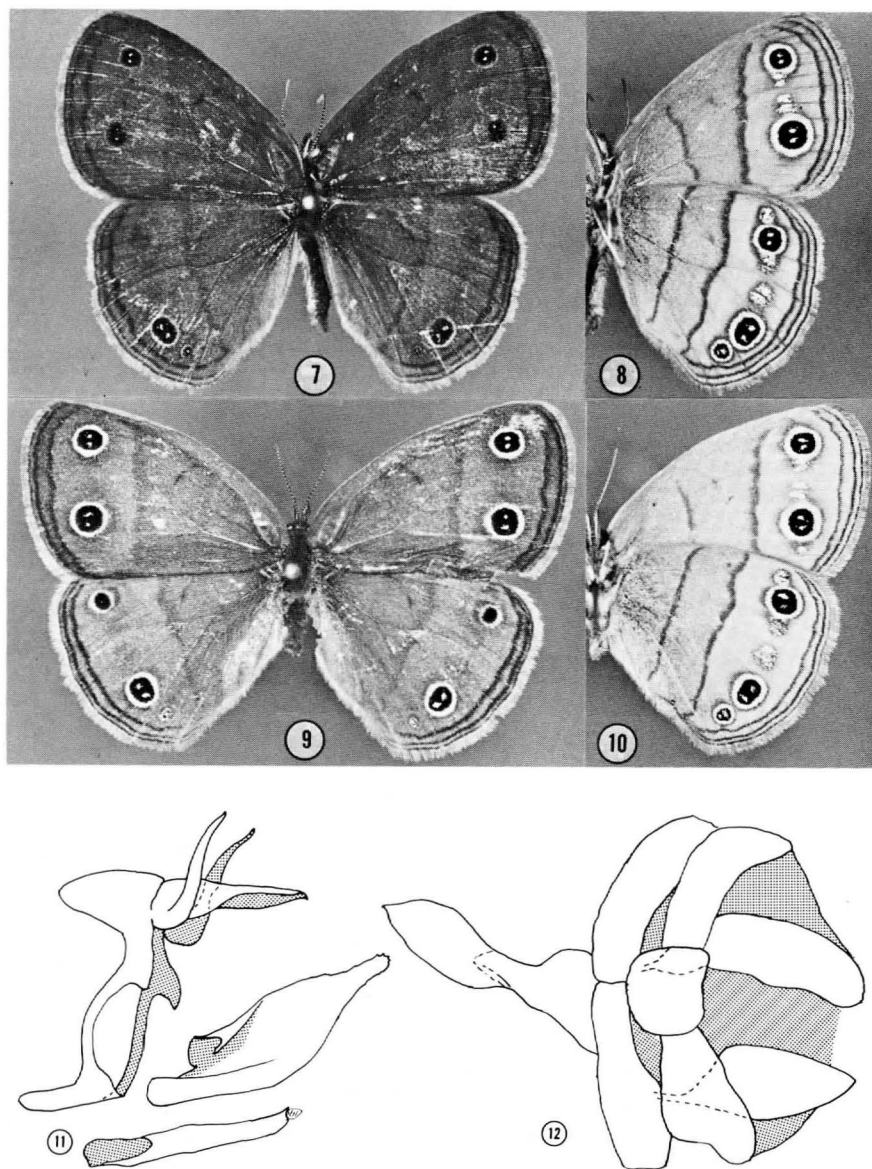
**Female:** Superficially similar to ♂, but the ground color is paler, a second hindwing ocellus in  $M_1$ - $M_2$  of the hindwing is present above and the yellow rings around the ocelli are more prominent.

♀ genitalia as illustrated, differing from those of *rubricata* chiefly in the heavier overall appearance and reduced bursa copulatrix.

Lengths of the forewings of the ♀ specimens before me range from 17 to 20.5 mm., the larger specimens coming usually from the more southern parts of the range.

The early stages have been described in some detail by Scudder (1889: 216-222), and his illustrations have been copied by subsequent authors. The larvae feed upon various grasses, the one being positively identified being twisted yellow-eyed grass, *Xyris torta*. Scudder (1889: 219) made mention of the fact that he had obtained oviposition on clovers (*Trifolium*). This statement was taken by subsequent authors as indicating that the insect feeds as a larva upon clover, but no such claim was made. I suspect that the oviposition obtained on clover was done under stress conditions in the laboratory and does not reflect natural situations.

The eggs are very pale yellowish-green, about twice as tall as broad and are laid either on blades of grass or even on the ground (W. H. Edwards, in Scudder,



Figures 7-12: *Megisto cymela cymela* (Cramer). 7-8, ♂ upper (7, photo no. 111775-9) and under (8, photo no. 111775-10) surfaces; IOWA: Pottawattamie Co.: 3 mi. S Loveland (A). 9-10, ♀ upper (9, photo no. 111775-11) and under (10, photo no. 111775-12) surfaces; SOUTH DAKOTA: Minnehaha Co.: Sioux Falls (A). 11, ♂ genitalia (Slide M-2720); IOWA: Pottawattamie Co.: 3 mi. S Loveland (A). 12, ♀ genitalia (Slide M-3144); MINNESOTA: Aitkin Co.: Laurel Lake (A).

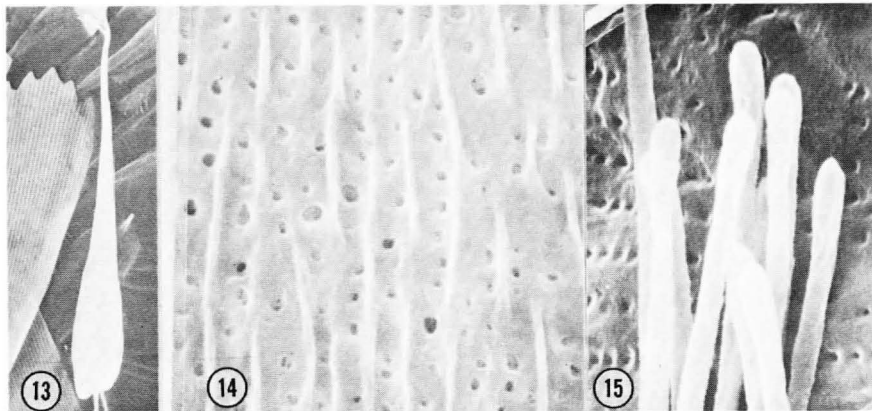
1889: 218). The mature larva is basically pale brownish-green with narrow dark longitudinal stripes, and the head, its tubercles and the body tubercles whitish. The pupa is brownish with whitish carinae. The larvae hibernate in the northern states as third instar larvae, but at least some of the southern populations do not undergo diapause. In the northern states there is but a single brood, but adults may be found from June through mid-July. Further south there may be *cymela* on the wing at other times, but the early summer brood is always the largest.

I have examined hundreds of specimens from the eastern half of the United States (exclusive of the Gulf coastal strip) and adjacent southern Canada. The furthest west that I have seen material roughly parallels the 100th Meridian. Emmel (1975: 106) mentioned northeastern Mexico as being in the range of *cymela*, but I have never seen specimens that were unquestionably from there. The butterfly is not mentioned by Hoffmann (1940), and there were no specimens in the Escalante collection. There is no good reason why the present species should not occur in Mexico, especially in view of the fact that it is not uncommon around San Antonio, Texas (and presumably further south), but records from Mexico must be questioned pending authenticated specimens from there.

Not too surprisingly there is some variation within series of *cymela*, especially with regard to supernumerary ocelli on the upper surface. The most frequently encountered ones are in hindwing spaces  $M_1$ - $M_2$  (in males, these are normal in females) and  $Cu_2$ -2A of either sex; there may be an ocellus in forewing space  $M_2$ - $M_3$  on the forewing of very exceptional individuals. The under surface pattern is less subject to variation than is that of the upper side, but some variation in intensity of the ground color is frequently seen, and the strength of the bands may vary as well.

There is a blend zone between this subspecies and *viola* where specimens must be assigned arbitrarily to one or the other. This zone lies through much of Georgia, the central portions of Alabama, Mississippi and Louisiana and extreme coastal eastern Texas. The presence of such a zone where material cannot be definitely assigned to one subspecies or the other suggests that the concept of the two subspecies must be reexamined. Such a task is the province of a thorough, detailed revision including all of "*cymela*", and as explained earlier, this is not the task of this paper. It is left for another to do the job of sorting out possible sibling species and the designation of a neotype for the nominate subspecies.

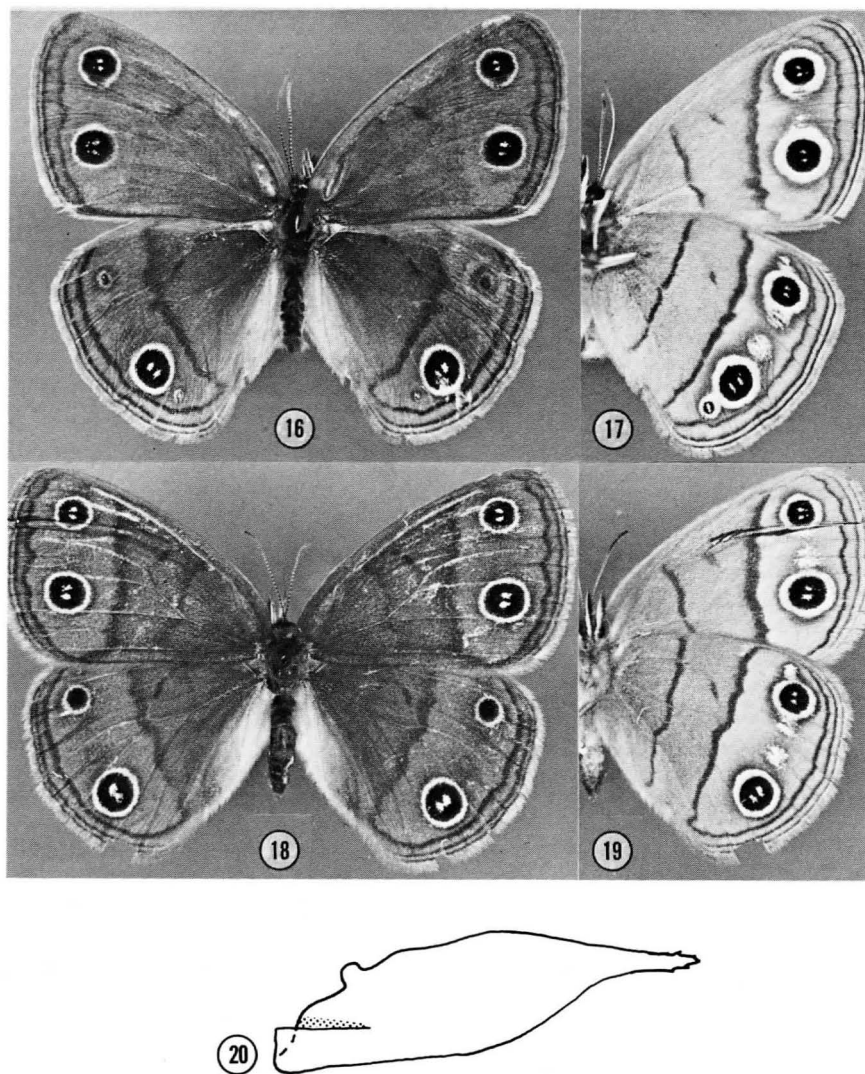
These little butterflies are abundant in their season in open deciduous wood-



Figures 13-15: androconial scales, *Megisto cymela cymela* (Cramer). 13, entire scale, approx. 270 x (SEM photo no. 0723). 14, rib structure on upper surface of scale, approx. 6700 x (SEM photo no. 0724). 15, detail of tip of scale, approx. 6700 x (SEM photo no. 0725).



lands. The flight is erratic, but not elusive. Often specimens will be seen during the early morning sunning themselves on the ground or on low vegetation with the wings half-opened and the body oriented so that it receives these early rays.



Figures 16-20: *Megisto cymela viola* (Maynard). 16-17, ♂ upper (16, photo no. 111775-13) and under (17, photo no. 111775-14) surfaces; FLORIDA: Clay Co.: Gold Head Branch State Park (A). 18-19, ♀ upper (18, photo no. 111775-15) and under (19, photo no. 111775-16) surfaces; FLORIDA: Volusia Co.: New Smyrna (A). 20, ♂ valva (Slide M-2722); FLORIDA: Volusia Co.: New Smyrna (A).



**Megisto cymela viola** (Maynard), 1891

Figures 16, 17 (♂), 18, 19 (♀), 20 (♂valva)

*Neonympha eurytris viola* Maynard, 1891: 71 (Enterprise, Florida). Type MCZ.

This subspecies, if subspecies it be, is distinct in Florida and along a narrow strip of the Gulf Coast as far west as Louisiana. Elsewhere in the southeastern United States scattered specimens can be found that could be referred to *viola* in the midst of material that is more typically the nominate race. This blend zone extends through the central part of Georgia, thence westward as far as easternmost Texas.

Typical *viola* can be distinguished from typical *cymela* by its brighter coloration both above and below and by its larger size. The under surface of the present subspecies is also somewhat grayer than in *c. cymela*, but this character is by no means diagnostic, some typical *cymela* being grayed on the under surface.

*Male-female*: Both sexes differ from *c. cymela* in the following pattern characteristics (based on "typical" Florida specimens): upper surface warmer brown with ocelli of both wings more strongly ringed with yellow (especially in the ♂); under surface likewise brighter with broader, somewhat redder trans- and extracellular bands and stronger yellow rings to the ocelli of both wings. Supernumerary ocelli not as common as in *c. cymela*, and the illustrated ♀ exemplifies situation where hindwing ocellus in Cu<sub>2</sub>-2A of the under surface is wanting.

♂ genitalia as in *c. cymela*, but the valva is more attenuated distally in the present insect.

Lengths of forewings of ♂ examples at hand range from 20 to 23 mm, averaging 21.6 mm.; those of the ♀ specimens examined range from 23 to 26.5 mm., averaging 24.5 mm.

I have examined nearly a hundred specimens of this subspecies and quite a number of intermediates from blend zone areas. The actual records are not given here, but the specimens of true *viola* are from Florida and southern Georgia westward to southern Louisiana. Blend zone material is at hand from just north of this area and into easternmost Texas. The difficulty of assigning material from the blend zone subspecifically must cast grave doubts upon the validity of the two subspecies.

**Megisto rubricata** (Edwards), 1871

This species is found from the southwestern United States through Mexico to at least Guatemala. It seems rather sensitive to local conditions and has subspeciated quite extensively throughout its range, five subspecies being recognized in the present work. Four of these geographic isolates are known from Mexico, and since *r. smithorum* is known from the Big Bend region of Texas, it is expected that it, too, will be found within the Mexican borders. Surprisingly, the three heretofore recognized subspecies, *rubricata*, *smithorum* and *cheneyorum*, are less distinct from one another than any are from the two more southerly races named in this paper.

It was tempting, because of the similarity of *rubricata* and *cymela* in almost all characters except the reddish flush of the present species, to consider that they might be geographic subspecies of one another, but Roy O. Kendall (*pers. comm.*) informs me that the two butterflies occur together in the San Antonio area, and the Allyn Museum collection contains specimens of both taken on the same day at the same place, near Fort Worth.

*M. rubricata* readily may be distinguished from *cymela* and all other Nearctic euptychiines by the reddish flush on both the upper and under surfaces. Additionally, the present species shows an almost complete absence of the transcellular band on the forewing under surface. A key to the subspecies of the present species

follows:

# KEY TO THE SUBSPECIES OF *Megisto rubricata* (EDWARDS)

1. Ocelli of hindwing beneath poorly defined and usually without silver pupils (Figs. 40, 42), may be absent; central Mexico to Guatemala.  
..... *M. rubricata anabelae*, n. ssp.
- 1'. Ocelli of hindwing beneath well formed and with silver pupils (except in ♀ *pseudocleophes*) ..... 2.
2. Hindwing above without or with very much reduced red patch, never approaching cell ..... 3.
- 2'. Hindwing above with much larger red patch, almost reaching cell ..... 4.
3. Forewing red patch on upper surface large and entering discal cell; Texas and Oklahoma to northeastern Mexico.  
..... *M. rubricata rubricata* (Edwards).
- 3'. Forewing above with red patch restricted to a few scales in  $M_3$ - $Cu_2$ ; Guerrero, Mexico ..... *M. rubricata pseudocleophes*, n. ssp.
4. Red patches of fore- and hindwings above of about the same size, forewing patch not or only slightly entering cell; western New Mexico and southern Arizona to Coahuila and Chihuahua, Mexico  
..... *M. rubricata cheneyorum* (R. Chermock).
- 4'. Red patch of forewing much larger than that of hindwing and encompassing much of distal portion of cell; western Texas and eastern New Mexico.  
..... *M. rubricata smithorum* (Wind).

## *Megisto rubricata rubricata* (Edwards), 1871

Figures 21, 22 (♂), 23, 24 (♀), 25 (♂ genitalia)

*Euptychia rubricata* Edwards, 1871: 212 (near Waco, Texas). Neotype CM, designated by Brown (1964: 335).

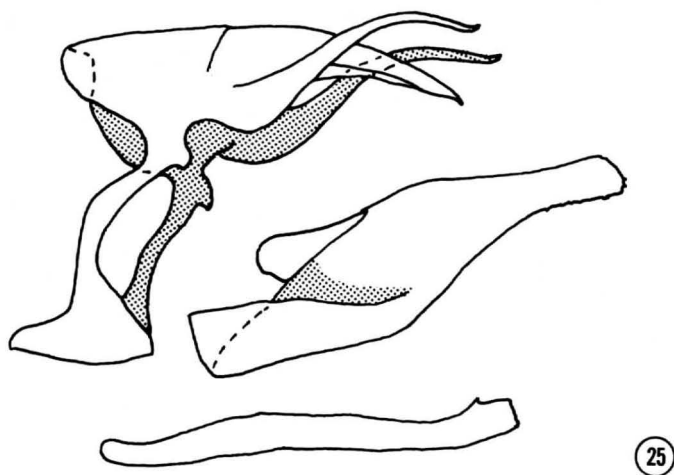
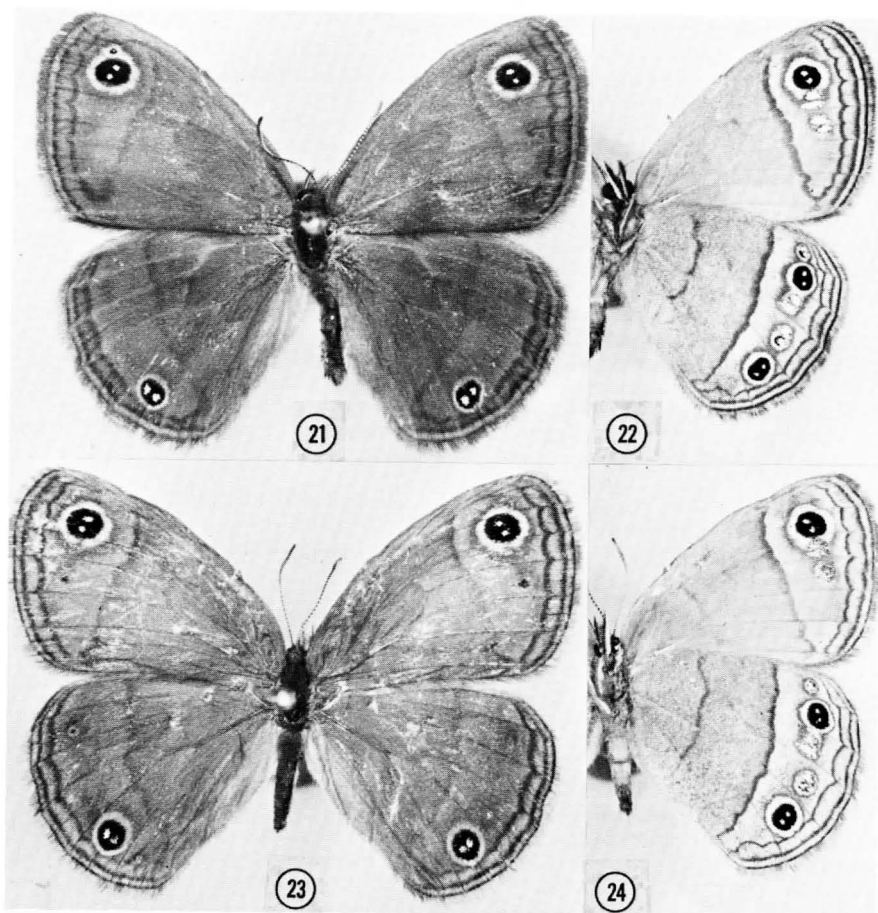
The nominate subspecies is known only from Texas and Oklahoma in this country and Nuevo Leon and Tamaulipas, Mexico. There is an outside possibility that the insect may be found in Louisiana, Arkansas or Kansas, but I have seen no specimens or records from these states. *M. r. rubricata* is well separated from the following two subspecies by Brown (1964: 336).

**Male:** Head, thorax and abdomen clothed with fuscous dorsal and grayish-tan ventral hairs. Palpus clothed with fuscous hairs, darkest at tip, except whitish scales along lateral margin. Antennal shaft ringed with brown and dull fulvous; club brown above, reddish-brown below and darker at tip. Legs clothed with gray-brown hairs, except along median edge of femur where hairs are pale gray.

Forewing above with fuscous ground color, three dark brown marginal lines (the middle one nearer the outer one than the inner line), the extradiscal band of under surface showing through above and meeting with the proximal marginal line near tornus and forming a loop; rusty flush prominent in distal part of cell and in at least  $M_2$ - $Cu_2$  outside cell; single large black ocellus in  $M_1$ - $M_2$  bearing a double silver pupil and prominently outlined with an ochreous ring.

Hindwing above with ground color fuscous, three dark brown marginal lines (the median again nearer the outer line), rusty flush restricted to area outside cell in  $M_2$ - $Cu_2$ ; extradiscal band of under surface showing through on this surface and meeting inner marginal line near anal angle; single black ocellus in  $Cu_1$ -

Figures 21-25: *Megisto rubricata rubricata* (Edwards). 21-22, ♂ upper (21, photo no. 070175-1) and under (22, photo no. 070175-2) surfaces; TEXAS: Tarrant Co.: Lake Worth, Ft. Worth (A). 23-24, ♀ upper (23, photo no. 070175-3) and under (24, photo no. 070175-4) surfaces; TEXAS: Tarrant Co.: Trinity River floodplain at River Oaks (A). 25, ♂ genitalia (Slide M-2130); TEXAS: Lake Worth, Ft. Worth (A).



Cu<sub>2</sub> with double silver pupil and ochreous ring.

Forewing beneath grayish-brown with rusty flush of upper surface repeated and transcellular band obsolete to absent; extradiscal band well developed, reddish-brown and strongly diverted toward tornus; single black ocellus in M<sub>1</sub>-M<sub>2</sub> with doubled silver pupil and ochreous inner and fuscous outer rings; other incipient ocelli indicated by doubled silver spots in M<sub>2</sub>-M<sub>3</sub> and M<sub>3</sub>-Cu<sub>1</sub> without ochreous rings.

Hindwing beneath grayish-brown, paler between extradiscal band and ocelli; transcellular band poorly developed and curved around base; extradiscal band well developed, fuscous and more or less straight to near tornus; dark brown marginal lines somewhat crenulate, the inner one meeting the extracellular band near tornus; well developed black ocelli in M<sub>1</sub>-M<sub>2</sub> and Cu<sub>1</sub>-Cu<sub>2</sub> with double silver pupils and inner ochreous and outer fuscous rings; incipient ocelli represented by double silver spots in Rs-M<sub>1</sub>, M<sub>1</sub>-M<sub>3</sub> and M<sub>3</sub>-Cu<sub>1</sub>.

Fringes grayish-brown throughout.

♂ genitalia as illustrated, differing chiefly from the closely related *cymela* in the more spatulate, broader tipped valva.

Androconial scales not present in this species.

Lengths of forewings of ♂ specimens examined between 16.5 and 18.5 mm., averaging 17.2 mm.

*Female*: Very similar to the ♂ in all respects, but the colors duller and both wings beneath more shaded with gray.

Forewing lengths of the ♀ specimens at hand range from 21 to 23 mm., averaging 22.1 mm.

♀ genitalia as illustrated for *r. cheneyorum* (Fig. 34).

The larvae feed upon various grasses, but have not been described in detail. Foodplants definitely recorded include *Stenotaphrum secundatum* Kuntze and *Cynodon dactylon* Pers. (R. O. Kendall, on specimens in AMNH). Pupa probably like that described for *cheneyorum*.

I have examined 130 specimens from the following localities:

**U. S. A.:** OKLAHOMA: Comanche Co.: Mt. Scott, ix, 2♂ 4♀ (UCB). Woods Co.: Cedar Canyon, viii, 2♂ 2♀ (UCB). TEXAS: Randall Co.: Palo Duro Canyon State Park, v, 14♂ 4♀ (LACM). Armstrong Co.: Palo Duro Canyon, iv, viii, 5♂ 2♀ (AMNH). Montague Co.: 2.5 mi. SW Forestburg, v, 2♂ (MCZ). Walker Co.: Dodge, 4♂ (CM, MCZ). Bandera Co.: Bandera, iv, viii, 9♂ (AMNH). McCulloch Co.: no further locality, viii, 6♂ 2♀ (AMNH). Palo Pinto Co.: Palo Pinto, v, vi, 4♂ 3♀ (AMNH); 9 mi. ENE Cadroon, v, 1♀ (AMNH). Bexar Co.: no further locality, vii (*ex ova* on *Stenotaphrum secundatum* Kuntze), viii (*ex ova* on *Cynodon dactylon* Pers.), 3♂ (all AMNH). Blanco Co.: Round Mountain, iv, v, vi, viii, 14♂ 4♀ (AMNH, CM). Kerr Co.: Kerrville, v, vi, 5♂ (AMNH, CM); Comfort, 1♀ (CM); no further locality, v, 3♂ (CM). Childress Co.: Childress, viii, 1♂ (AMNH). Travis Co.: 13 mi. W Jct. U. S. Hwys. 71 & 290, v, 1♂ (AMNH). Tarrant Co.: Lake Worth, Fort Worth, viii, ix, 7♂ 5♀ (A); Trinity River floodplain at River Oaks, v, 3♀ (A). County (?): Shovel Mountain, v, 1♂ 1♀ (AMNH, MCZ); Oasis Creek, v, 1♀ (CM). "W. Texas", v, 5♂ 1♀ (LACM). "Texas", viii, 3♂ (CM, MCZ).

**MEXICO:** NUEVO LEON: Ojo de Agua, Sabinas Hidalgo, 1000', vi, 1♂ (A); Hda. Vista Hermosa, Villa Santiago, 1500', vi, 1♀ (A); 50 mi. N Monterey, iv, 1♂ (AMNH). TAMAULIPAS: mtns. SW Cd. Victoria, vi, 1♂ (AMNH).

No locality: 1♀ (CM)

Apparently this butterfly is bivoltine in many parts of its range. First brood specimens have been taken from April to June, depending on the locality, whereas the second brood is on the wing during August and September. I suspect that this situation holds elsewhere in the range, but I have seen no second brood specimens from Mexico. Possibly there the butterfly may be more or less continuously brooded, as are the subspecies from further south, and these insects may depend more upon available rainfall than on temperature. Specimens of the Texas populations show little or no seasonal dimorphism, such as is shown by the more southerly popula-

tions.

The very much restricted hindwing red patches will serve to separate this subspecies from *smithorum*, and the red, not brassy, coloration of these patches serves as an immediate character for discriminating nominate *rubricata* from *cheneyorum*. The more southerly subspecies are characterized in the descriptions of them and cannot be confused with the present race.

These woodland butterflies have rather similar habits to the northern *cymela*, even though the woods in which they fly may be quite different.

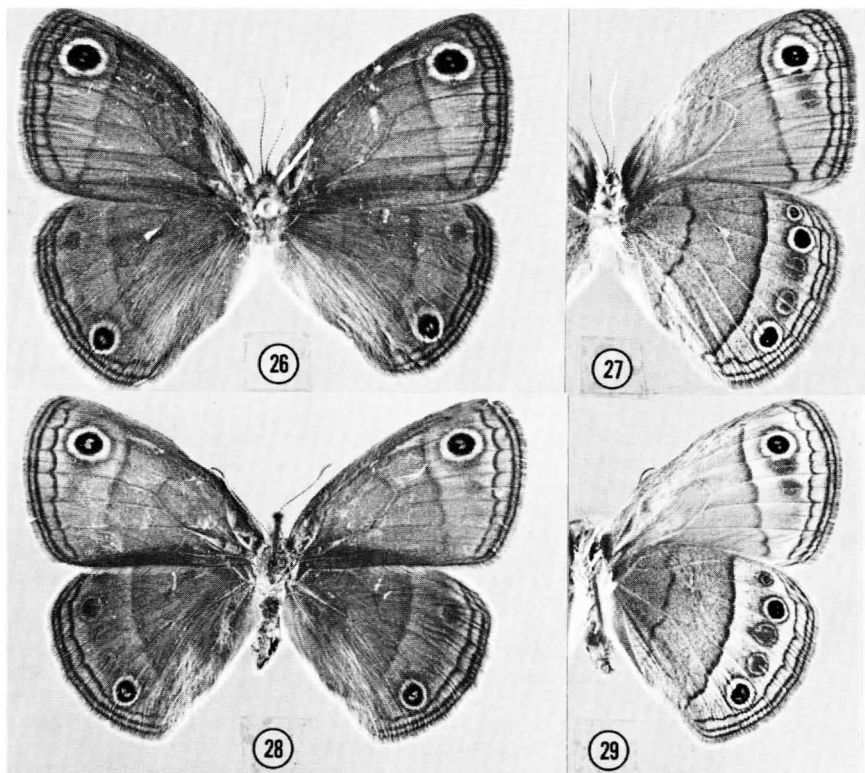
***Megisto rubricata smithorum* (Wind), 1946**

Figures 26, 27 (♂), 28, 29 (♀)

*Euptychia rubricata smithorum* Wind, 1946: 26 ("Marfa-Alpine", Texas).  
Type presumably in collection Wind.

To date this subspecies has been found from western Texas to South-eastern New Mexico and is, perhaps, the most restricted race of *rubricata*.

*Male*: Head, thorax, abdomen and appendages as in *r. rubricata*.



Figures 26-29: *Megisto rubricata smithorum* (Wind). 26-27, ♂ upper (26, photo no. 070175-5) and under (27, photo no. 070175-6) surfaces; TEXAS: Brewster Co.: the Basin, Chisos Mtns., Big Bend Natl. Park (KR). 28-29, ♀ upper (28, photo no. 070175-7) and under (29, photo no. 070175-8) surfaces; TEXAS: Brewster Co.: Alpine (AMNH).

Wings above with ground color paler than in the nominate subspecies and with the rusty patches of both wings enlarged, that of the forewing covering the apical half of the cell.

Forewing beneath paler than that of *r. rubricata* and with greatly expanded reddish patch covering the entire cell and the extradiscal area almost to the level of the ocellus and the inner marginal line. Hindwing below also paler than in typical *rubricata* with a stronger contrast in color between the discal and limbal areas of the wing.

♂ genitalia as in nominate subspecies.

Length of forewings of ♂ specimens examined range from 18 to 21 mm., averaging about 20 mm.

*Female:* Differs from the ♀ of *r. rubricata* in the same respects as does the ♂.

Length of forewings of the few ♀ examples before me range from 22.5 to 24 mm.

Material examined, 102 specimens from the following localities:

U. S. A.: TEXAS: Brewster Co.: iii, vi, 14♂ 1♀ (AMNH, MCZ); nr. Alpine, ix, 1♂ (LACM); The Basin, Chisos Mtns., Big Bend Natl. Park, 3000-5200', v, vii, ix, 6♂ 2♀ (AMNH, CM, KR); canyon behind Pulliam Bluff, Chisos Mtns., Big Bend Natl. Park, 4600-5000', ix, 1♂ (AMNH); Panther Pass, 6000', vii, 1♀ (CM); Chisos Mtns., vii, 1♂ (paratype, MCZ); no specific locality, vii, 2♂ (LACM). Jell Davis Co.: Madera Canyon, Davis Mtns., vii, 1♂ (AMNH); Mt. Locke, Davis Mtns., 6700', vii, 15♂ 2♀ (CM). Culberson Co.: Pine Springs, Guadalupe Mtns., 5500', vii, 3♂ 5♀ (CM); 2 mi. N Pine Springs, 5700', vii, 24♂ 13♀ (CM). Brewster (?) Presidio (?) Co.: "Marfa-Alpine", vii, 1♂ (paratype, MCZ). NEW MEXICO: Eddy Co.: Big Canyon, Guadalupe Mtns., vii, 2♂ (AMNH); nr. Dark Canyon, Guadalupe Mtns., vii, 1♂ 1♀ (AMNH). Otero Co.: High Rolls, Sacramento Mtns., 6350', vii, 1♂ (CM). Chaves Co.: 3 mi. W Elk, 6000', vii, 1♂ (CM). "Ariz.", 1♂ (CM).

This subspecies has not been found in Mexico to date, but it should be sought in the area just below the Big Bend National Park in the sparsely settled portion of western Coahuila and eastern Chihuahua. A good place to begin seeking *smithorum* in Mexico might be the Sierra del Carmen of the former state. Other subspecies are known from east and west of this area, and *smithorum* cannot be found as far south as Monclova, from whence there are specimens of *cheneyorum* in collections. Northwestern Coahuila is a fascinating area with regard to zones of possible contact of the three *rubricata* subspecies that occur in the United States; perhaps intermediates will be found in some area of that Mexican state, especially between *cheneyorum* and *smithorum*.

Chermock (1948: 173) placed *smithorum* in the synonymy of nominate *rubricata* on the basis of a reported "West Texas" type of the latter in Carnegie Museum. The specimen that was labelled as the "type of *rubricata* by Holland was actually a specimen of *cheneyorum* (see Brown, 1964: 334-335, for details). The synonymization by Chermock of the present insect is not tenable, if this action was based upon the Holland pseudotype, and it is difficult to imagine Chermock's action, since he described *cheneyorum* in the same paper. Neither can the present subspecies be equated to *cheneyorum* (*smithorum* would have priority), and application of the name is best retained in its original manner.

I have not seen the Holotype of *smithorum* and a search of the late Mr. Wind's collection has failed to uncover it. Should the specimen be lost, I would suggest that a Neotype be designated from the original Paratypes. These were to have been in Wind's collection, the California Academy of Sciences and the Museum of Comparative Zoology. I have located two male Paratypes in the MCZ and suggest that the Neotype be selected from these, if necessary.

*M. r. smithorum* is not dramatically, but is consistently, different than typical *rubricata* in the extended rusty flush of both wings above and of the forewing beneath. *M. r. cheneyorum* is a brassier organism and lacks the expanded forewing flush on the upper surface. The characteristics cited by Brown (1964: 336) do separate *smithorum* from the other Nearctic subspecies, but the rusty spot of the forewing above is not so insignificant as he indicates.



**Megisto rubricata cheneyorum** (R. Chermock), 1948

Figures 30, 31 (♂), 32, 33 (♀), 34 (♂ genitalia)

*Euptychia rubricata cheneyorum* R. Chermock, 1948: 172 (Madera Canyon, Sta. Rita Mtns., Pima Co., Arizona). Type Cornell University (?), but not stated in original description.

This is the commonest subspecies of *rubricata* in the collections that I have examined. *M. r. cheneyorum* is found from southwestern New Mexico and southern Arizona to at least the states of Chihuahua and Coahuila in Mexico. As yet nothing is known about what *rubricata*, if any, fly from these states to Guerrero and Hidalgo, but I would suspect that at least those from the westernmost states would prove to be the present subspecies.

**Male:** Head, thorax, abdomen and appendages substantially as in *r. rubricata*, but the hairs of the dorsal elements of head, thorax and abdomen somewhat grayer.

Forewing upper surface with paler ground color than in nominate race, the rusty patch more restricted (not, or only slightly entering cell) and this patch not bright rusty red, but of a more "brassy" hue.

Hindwing above also with paler ground color than in *r. rubricata* and with brassy rust colored patch more extensive and almost entering cell (the patches on fore- and hindwings of about the same size).

Under surface of forewings similar to that of *smithorum*, but the reddish area is more brassy than in that race.

Hindwing below with ground color grayer than in either of the preceding subspecies and the incipient ocelli are neither as well formed nor as significantly ringed with ochreous in the present subspecies; transcellular band usually better developed than in the nominate population.

♂ genitalia as in *r. rubricata*.

Lengths of forewings of ♂ specimens examined range from 20 to 21.5 mm., averaging slightly over 20.5 mm.

**Female:** Varies from the ♀ of *r. rubricata* in the same manner as does the ♂.

♀ genitalia as illustrated and not differing from those of other subspecies. From *cymela* the present species may be distinguished by the finer general appearance and the enlarged bursa copulatrix.

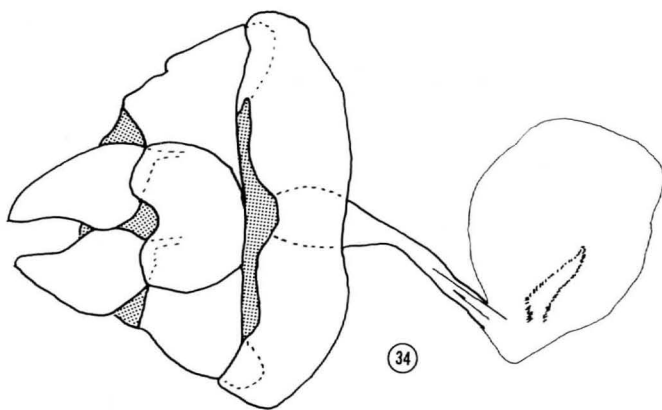
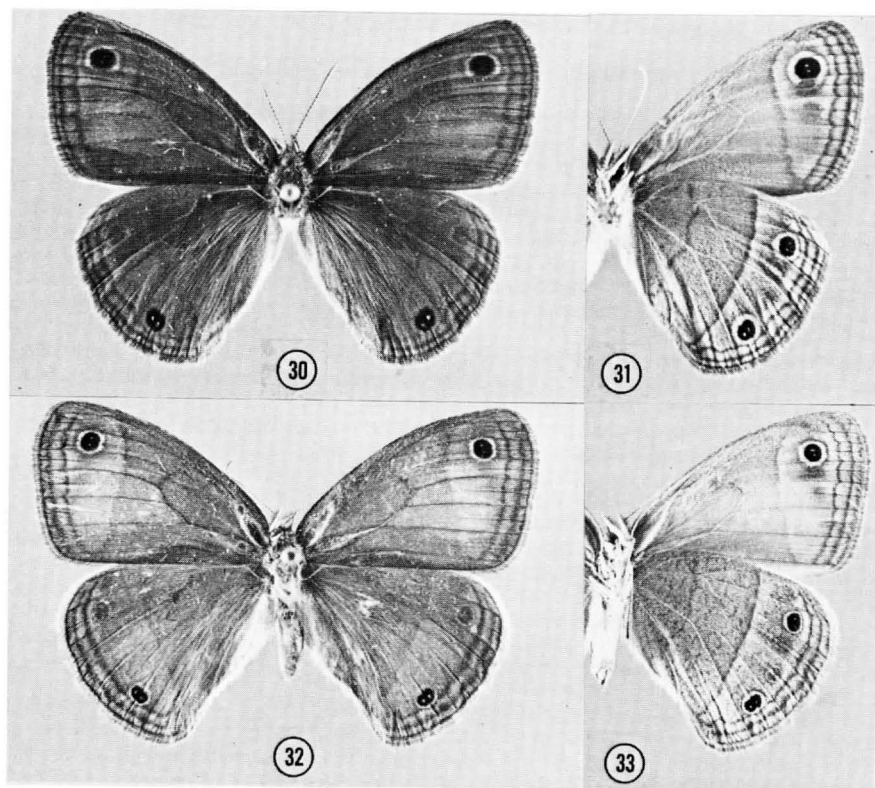
The lengths of the ♀ forewings examined range from 19.5 to 22.5 mm., averaging 21 mm.

I have seen no reports on the early stages of *cheneyorum*, but there are two pupal shells without data in the LACM collection that apparently refer to this insect. These pupae are rather shrivelled and dark brown, perhaps from age, perhaps naturally, but structurally they are quite like what has been illustrated for *cymela* by Boisduval and Leconte (1833) and subsequent authors.

I have examined 446 specimens of *cheneyorum* from the following localities:

U. S. A.: ARIZONA: Cochise Co.: Huachuca Mountains, v, vi, vii, 130♂ 5♀ (AMNH, CM, LACM); Ramsey Canyon, Huachuca Mtns., v, vi, vii, 33♂ 3♀ (A, AMNH, LACM, UCB); Miller Canyon, Huachuca Mtns., vi, viii, 2♂ 1♀ (AMNH, LACM); Carr Canyon, Huachuca Mtns., vi, 1♂ (Paratype, AMNH); Chiricahua Mountains, v, vi, vii, 9♂ 8♀ (A, AMNH, CM, LACM, MCZ); Sunny Flats, Chiricahua Mtns., 4600', 8♂ 1♀ (LACM); Chiricahua Mtns., between Herb Myrtyr Dam and Ash Springs, viii, 1♂ 4♀ (AMNH); Pinery Canyon, Chiricahua Mtns., 5000', vi, 39♂ (UCB); Portal, v, vi, 4♂ (LACM); SWRS, 5 mi, W Portal, 5400', vi, vii, 2♂ 3♀ (AMNH); Dragoon Mt., Cochise Stronghold, vii, 1♂ (AMNH); North Canyon, Sierritas, vii, 1♀ (AMNH); Paradise, 1♀ (LACM); Garces, v, vi, vii, 9♂ 2♀ (CM); undecipherable locality, vi, 2♂ (LACM); "Cochise Co.", vi, 1♂ 1♀ (AMNH). Santa Cruz Co.: Santa Rita Mountains, v, vi, vii, 2♂ 3♀ (A, CM); Madera Canyon, Santa Rita Mtns., 5600-5800', vi, vii, viii, 9♂ 10♀ (A, AMNH, KR, LACM, including one Paratype); Roundup Campground, Madera Canyon, Santa Rita Mtns., 5800',





Figures 30-34: *Megisto rubricata cheneyorum* (R. Chermock). 30-31, ♂ upper (30, photo no. 070175-9) and under (31, photo no. 070175-10) surfaces; ARIZONA: Yavapai Co.: Prescott (A). 32-33, ♀ upper (32, photo no. 070175-11) and under (33, photo no. 070175-12) surfaces; ARIZONA: Cochise Co.: Ramsey Canyon (A). 34, ♀ genitalia (Slide M-3136); ARIZONA: Yavapai Co.: Prescott (A).

vi, 12♂ 7♀ (LACM); Ruby, 4200', vi, 1♂ (Paratype, LACM). Pima Co.: Baboquivari Mountains, vi, ix, 7♂ 1♀ (AMNH); Brown's Canyon, Baboquivari Mtns., vi, x, 6♂ 2♀ (AMNH, LACM); Kitts Peak, Rincon, Baboquivari Mtns., viii, 1♀ (AMNH); Mud Springs, Santa Catalina Mtns., vii, 1♂ (AMNH); Sabino Canyon, Santa Catalina Mtns., viii, 1♂ (AMNH); Sabino Basin, vii, 1♀ (AMNH); Tucson, 1♂ (CM). Graham Co.: Mt. Graham, 4♂ 1♀ (AMNH, CM). Gila Co.: Norman Creek, Sierra Ancha, 6000', vii, 1♂ (UCB). Yavapai Co.: Prescott, v, vi, 5♂ (A). Coconino Co.: Grand Canyon, vi, 4♂ 4♀ (UCB); Lake Mary, 2 mi. E Flagstaff, 7100', vii, 1♀ (A). Greenlee Co.: Upper Blue Camp, 1 mi. S Alpine, 6000', vii, 1♂ (AMNH); Clifton, 1♂ (CM). County?: "White Mtns.", vi, 3♂ (AMNH); "Pontano", 1♂ 1♀ (CM). "S. Ariz.", vi, 3♂ 1♀ (CM, MCZ). "Arizona", 10♂ 5♀ (CM, MCZ). NEW MEXICO: Hidalgo Co.: Skelton Canyon, Peloncillo Mtns., 4900', viii, 1♀ (AMNH); Guadalupe Canyon, 4200', vi, 1♂ (A). Catron Co.: 2-3 mi. E Mogollon, 7200-7600', vii, 1♀ (AMNH). Grant Co.: Silver City, vi, 1♂ (LACM); 13 mi. N Silver City, 6800', vii, 1♀ (AMNH).

**MEXICO:** CHIHUAHUA: Primavera, 5500-6000', vi, 20♂ 21♀ (AMNH); Santa Barbara, 6300', vii, 1♀ (AMNH); Santa Clara, vi, 1♂ (AMNH). COAHUILA: Cuatras Cienagas, vi, vii, 3♀ (A); La Gloria, S Monclova, 3300', viii, 1♀ (AMNH); 1 mi. S Cedritos, vi, 1♀ (AMNH).

Data suspect: "Texas", 1♂ (Pseudotype of *rubricata* as mentioned by Brown, 1964: 334-335).

No data, 4♂ 2♀, 2 pupae (CM, LACM).

This subspecies may be distinguished immediately from all others by the brassy appearance of the rusty patch of the upper surface. Additionally the subequal patches of the fore- and hindwings is characteristic of the present subspecies, at least among Nearctic populations.

Material from south-central New Mexico would be very interesting to determine whether *cheneyorum* or *smithorum* occurs there, or possibly whether the two subspecies intergrade in the area. Likewise, specimens from the Mexican states north of Hidalgo and Guerrero and south of Chihuahua and Coahuila would be informative to delimit the ranges of *cheneyorum* and the more southern subspecies.

In a few localities it appears that this subspecies is bivoltine, but in other localities I have seen material that suggests that *cheneyorum* may be continuously brooded and on the wing from April or May through October. Unfortunately, I suspect that the records of dates give a better temporal distribution of collectors than of *cheneyorum*, and collecting in "off times" could be very informative.

### **Megisto rubricata pseudocleophes, new subspecies**

Figures 35, 36 (♂), 37, 38 (♀)

**Male:** Head, thorax, abdomen and appendages as in *r. rubricata*.

Upper surface of wings as dark as in nominate subspecies, but red patches of both wings much reduced in size and restricted to  $M_3-Cu_2$  of each wing. The very much restricted forewing patch is especially diagnostic.

Under surface also as in nominate *rubricata*, but the forewing rusty patch lies completely outside cell in  $M_3-Cu_2$ .

♂ genitalia as in *r. rubricata*.

Length of forewing of Holotype ♂ 17.5 mm., that of the ♂ Paratype 17 mm.

**Female:** Differs from the ♀ of nominate *rubricata* in the same manner as does the ♂.

Length of forewing of the single ♀ Paratype 20 mm.

Described from three specimens, two males and a female, from the low mountainous areas of Guerrero, Mexico.

**HOLOTYPE** ♂: MEXICO: GUERRERO: 4 mi. E Chilpancingo, 1680 m., in dense grassy scrub, 30.viii.1967 (Lee D. Miller specimen no. 1967-1164); ♂ genitalia

slide no. M-2116 (Lee D. Miller).

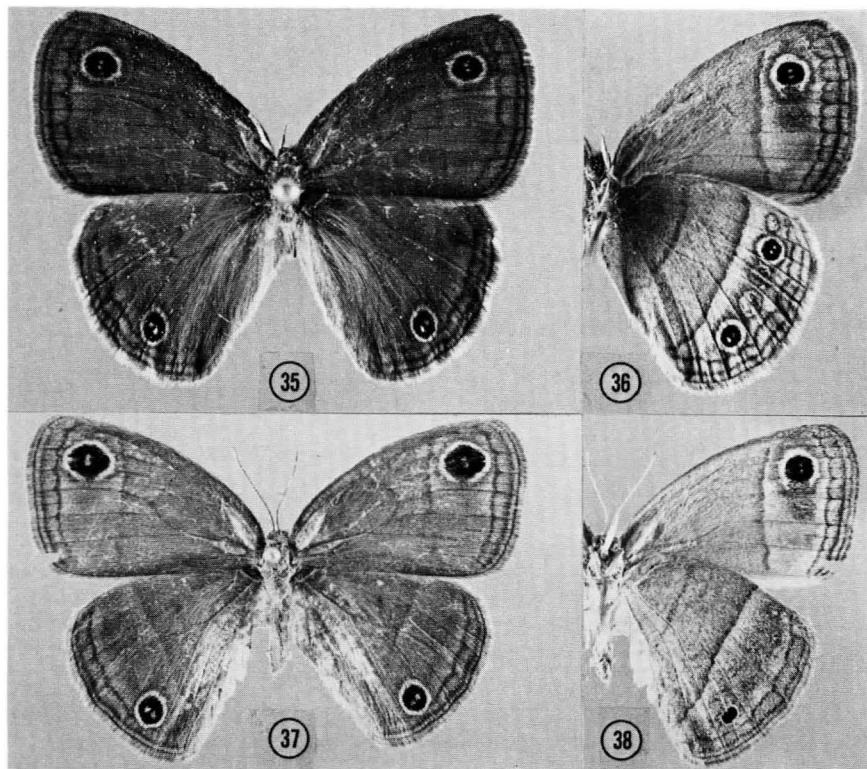
PARATYPES: MEXICO: GUERRERO: same locality and date as Holotype, 1♂; "Sierra de Guerrero", iv, 1♀,

*Disposition of type material*: Holotype and ♂ Paratype (A); ♀ Paratype (USNM).

This subspecies is now known from Guerrero only, but it may be found in adjacent parts of Morelos, Michoacan and possibly Oaxaca.

This series, small as it is, suggests the seasonal dimorphism that is so well illustrated in the next subspecies. The rainy season specimens, the two males from Chilpancingo, have the under surface of the hindwing complete with a full complement of silver-pupilled ocelli, whereas the single dry season female has these ocelli much reduced and with almost absent silver pupils. This seasonality is only suggested by these specimens: a much longer series must be examined before definitive statements can be made on the tendency.

The reduction of the red patches on both the fore- and hindwings above, however, is a significant characteristic, apparently unaffected by climatic conditions. There are no specimens of any of the other races that I have examined that have approached this condition. There is, nevertheless, one insect with which the present subspecies may be confused, and this butterfly flies with it. This species is "*Euptychia*" *cleophes* Godman and Salvin, a member of a totally different



Figures 35-38: *Megisto rubricata pseudocleophes*, new subspecies. 35-36, Holotype ♂ upper (35, photo no. 070175-13) and under (36, photo no. 070175-14) surfaces; MEXICO: GUERRERO: 4 mi. E Chilpancingo (A). 37-38, Paratype ♀ upper (37, photo no. 070175-15) and under (38, photo no. 070175-16) surfaces; MEXICO: "Sierra de Guerrero" (USNM).

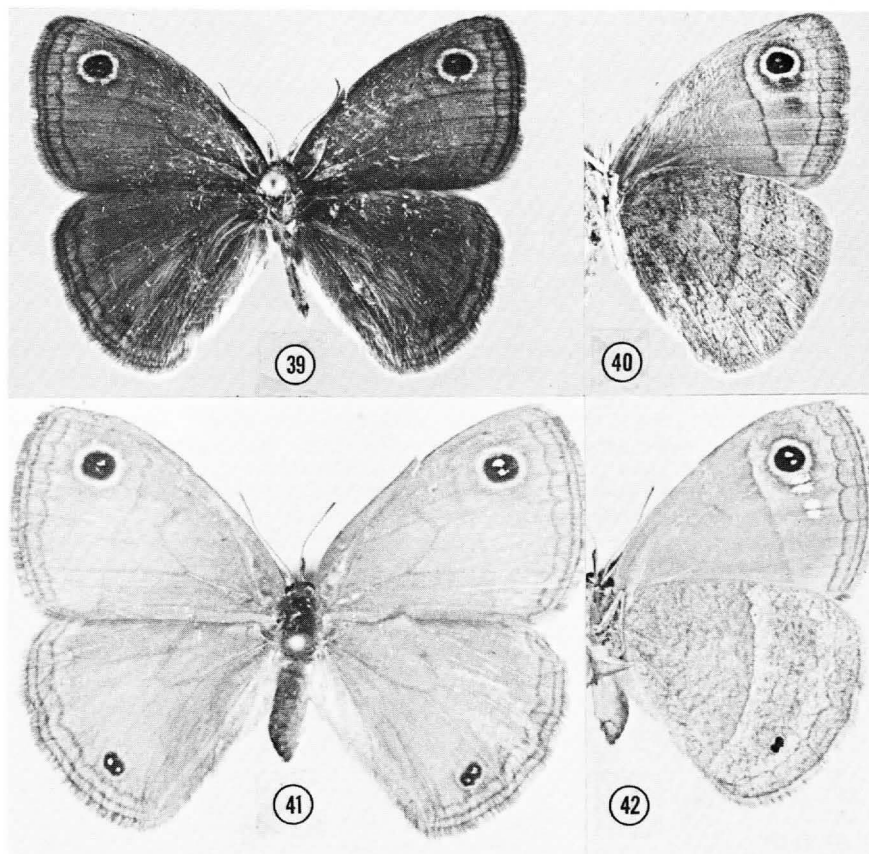
genus that will be dealt with in a future part of the revision. The present subspecies may most easily be distinguished from *cleophes* by the reduction or absence of the forewing transcellular band on the under surface. The similarity of the present subspecies to *cleophes* (perhaps they are parts of a mimetic association of some sort) is what gives *pseudocleophes* its name.

***Megisto rubricata anabelae*, new subspecies**

Figures 39, 40 (♂), 41, 42 (♀)

*Male*: Head, thorax, abdomen and appendages as in *r. rubricata*.

Upper surface of wings also resembling nominate *rubricata*, differing chiefly in that the transverse bands of the under surface showing through less extensively, the hindwing red patch more extensive (nearly entering cell) and the hindwing ocellus in  $Cu_1$ - $Cu_2$  less well developed (occasionally obsolete).



Figures 39-42: *Megisto rubricata anabelae*, new subspecies. 39-40, Holotype ♂ upper (39, photo no. 070175-17) and under (40, photo no. 070175-18) surfaces; MEXICO: CHIAPAS: San Carlos (A). 41-42, Paratype ♀ upper (41, photo no. 070175-19) and under (42, photo no. 070175-20) surfaces; MEXICO: CHIAPAS: Oxchuc (A).

Under surface of forewing differing from that of *r. rubricata* in the slightly redder median patch, the weaker extracellular band, the more diffuse subapical ocellus and the grayer marginal area. Hindwing below quite different: entire surface heavily irrorated with gray and most of pattern elements obscured; submarginal ocelli may be totally obliterated as in Holotype (Fig. 40) or at the very least they are greatly reduced and seldom with any indication of silver pupilling (as in Fig. 42).

♂ genitalia as in nominate subspecies.

Length of forewing of Holotype ♂ 19 mm., those of the ♂ Paratypes range from 17.5 to 19.5 mm., averaging 18.7 mm.

*Female*: Differs from the ♀ of *r. rubricata* in the same ways as does the ♂; genitalia similar.

Lengths of forewings of the ♀ Paratypes range from 17.5 to 22 mm., averaging 19.8 mm.

Described from 137 specimens, 88 males and 49 females, from montane central and southern Mexico. Five additional specimens have been examined, but not included in the type series (see below).

HOLOTYPE ♂: MEXICO: CHIAPAS: San Carlos, 15.iii.1969 (Robert Wind).

PARATYPES: MEXICO: HIDALGO: Jacala, 4600', vi, 2♂ 3♀. PUEBLA: Tehuacan, iv, viii, 3♂ 7♀. OAXACA: Tamazulapan, viii, 4♂; Rio Hondo, viii, 1♂; Haujapan de Leon, ix, 10♂ 7♀. CHIAPAS: same locality as Holotype, iii, iv, v, vii, viii, ix, 38♂ 17♀; Campet, viii, 2♂; Oxchuc (or Ochuc), v, viii, ix, x, xii, 13♂ 11♀; Lagos de Montebello, 4800', v, 1♂; 4 km. N Teopisca, iii, 4♂ 1♀; Comitán, v, vi, vii, viii, 6♂ 3♀; Vertica de Santiago, ix, 3♂.

*Disposition of type material*: Holotype, 84♂ and 42♀ Paratypes (A); two ♂ and four ♀ Paratypes (AMNH); one ♂ and three ♀ Paratypes (USNM). These series may be further subdivided later.

There are an additional five females in various collections that have not been included in the type series of *anabelae*, even though they appear to refer to that taxon. Four of these are from Cd. Guatemala, Guatemala, ix (USNM), and they differ in some significant respects from Mexican specimens. The ocelli on the hindwings of these specimens are weakly pupilled with silver, a condition not seen in type series specimens, and the extradiscal band of the hindwing beneath is somewhat crenulate, rather than straight as in Mexican specimens. These specimens could represent yet another subspecies of *rubricata*, but I hesitate to name a subspecies on the basis of very few females: additional material, including some males, should show whether or not this population requires separate designation. The other female bears the following label: "Box Canyon, Highrolls, New Mexico, iv.1.'02" (AMNH). It is a perfectly typical *anabelae*, and I suggest it is mislabelled; other material from Highrolls is referable to *smithorum*. This specimen, too, has been excluded from the type series.

Table I: *Megisto rubricata anabelae*, new subspecies; character states of the ocelli of the hindwing under surface (see text).

Locality and date	ocelli absent		ocelli weakly developed		ocelli well developed	
	♂	♀	♂	♀	♂	♀
Hidalgo, vi					2	3
Puebla, iv			2	4		
Puebla, viii			1			3
Oaxaca, viii-ix	1		3	1	11	6
Chiapas, i-iii	4	1	2			1
Chiapas, iv-vi	7	6	16	5		3
Chiapas, vii-ix	2		16	5	18	6
Chiapas, x-xii			3	1		4
Guatemala, ix						4

There is some evidence of the presence of seasonal forms in *anabelae*, with the immaculate hindwing forms as in the Holotype (Fig. 40) being most prevalent in the dry (winter) season and the ocellated one (as in Fig. 42) being most commonly found during the wetter (summer-fall) season. The situation is by no means clearcut, and specimens of all forms may be found flying together. I have tabulated the type series and the Guatemalan females in Table I with regard to this trait. The terms "ocelli absent" and "well ocellated" refer to the conditions typified by Figures 40 and 42, respectively, and "weakly ocellated" refers to an intermediate condition.

It is with great pleasure that I name this subspecies in honor of my mother in partial recognition of her long-suffering patience and forbearance of a son's interest in natural history.

The distribution of the various subspecies of *M. rubricata* is shown in Fig. 43.

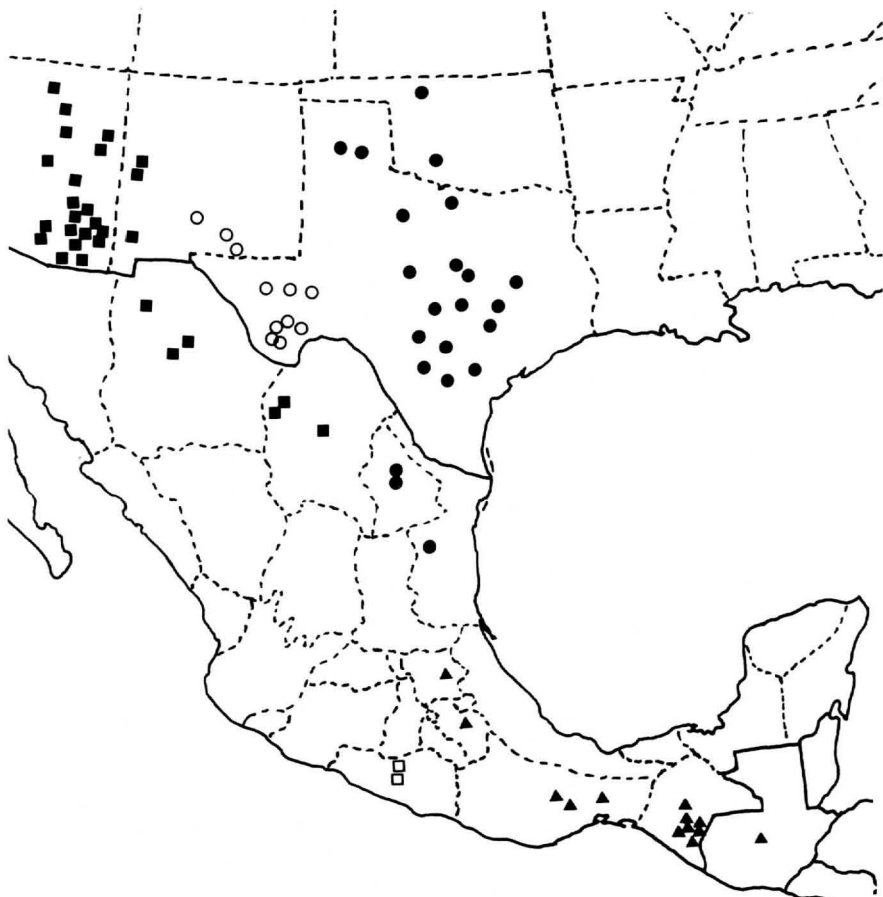


Figure 43, distribution of *Megisto rubricata* subspecies: closed circles, *M. r. rubricata*; open circles, *M. r. smithorum*; closed squares, *M. r. cheneyorum*; open squares, *9M. r. pseudocleophes*; closed triangles, *M. r. anabelae*.

## PHYLOGENETIC AND ZOOGEOGRAPHIC CONSIDERATIONS

The ancestors of *Megisto* were in the group of primeval euptychiines that evolved free gnathos arms. This ancestor was responsible for the majority of the Neotropical members of the tribe and a significant number of those which reached the Nearctic. Since *Megisto* is not far removed from some of the present-day Neotropical "free-armed" euptychiines, it is probable that the genus has not been in existence for as long a time as have *Paramacera* and *Cyllopsis*, neither of which have close relatives today.

The two species likely were different by the advent of the Pleistocene, since distributional patterns seem to indicate that *cymela* survived the Pleistocene in northern refugia while *rubricata* was confined to more southern areas. The subspecies are likely of Pleistocene origin with the possible exception of *M. rubricata anabelae*, the most differentiated *Megisto* subspecies.

## ACKNOWLEDGMENTS

I am deeply grateful to the following for the loan of materials: Dr. Frederick H. Rindge (AMNH), Mr. Harry K. Clench (CM), Mr. Julian P. Donahue (LACM), Dr. Peter Robinson (UCB) and Dr. J. F. Gates Clarke (USNM, Neotropical specimens only). Messrs. Kilian Roever, Stephen R. Steinhauser and H. L. King collected material that was included in the revision, and the late Mr. Robert Wind collected the vast majority of the type specimens of *anabelae*.

Photographs for this paper were taken by Amanda Goethe, and Mr. A. C. Allyn was responsible for the scanning electron micrographs of the androconial scales. Mr. Allyn and my wife and colleague, Jacqueline, read and commented upon the manuscript.

To all of these individuals I owe a great debt of gratitude.

## LITERATURE CITED

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