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A TAXONOMIC REVIEW OF *CHLOSYNE ISMERIA* WITH DESCRIPTION OF A NEW *ISMERIA* SUBSPECIES FROM THE SOUTHERN APPALACHIAN MOUNTAINS

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ABSTRACT. The taxon Boisduval and Le Conte described in 1833 as *Melitaea ismeria* is examined as a historical entity and confirmed as a sister subspecies of the taxon *Chlosyne ismeria nycteis*. The *ismeria* populations in the southern Appalachian mountains are described as a new subspecies: *Chlosyne ismeria obsoleta*. In facies, this new subspecies is most similar to the western subspecies *Chlosyne ismeria drusus* in that it is dark and contrasting in its dorsal markings. It is known to range from the mountain region of extreme northern Georgia north in the Appalachians to near southwestern Virginia. It may range into southern West Virginia.

Additional key words: Appalachian peninsula, Ohio, *nycteis* type locality.

DETERMINING *MELITAEA ISMERIA*

HISTORICAL OVERVIEW

In 1833, Boisduval and Le Conte described *Melitaea ismeria* in a detailed text supplemented by an accompanying illustration based on a small 10½x 6½ painting by John Abbot. The illustrations of the *ismeria* imago in Boisduval and Le Conte have always been assumed, since publication, to be poor copies of the Abbot originals. This was assumed because the whereabouts of the original had been unknown to taxonomists until very recently (Cowan 1969, Calhoun 2003). Yet, from 1833 to today, these illustrations have been the focal point of all researchers in trying to determine the zoological identity of this species while the detailed written description has been virtually ignored.

Brown (1974) established what the taxon *ismeria* was not (not *gorgone* male Hübner, 1810), and Gatrell (1998) established what it was (a conspecific with *nycteis* Doubleday, [1847]). However, Calhoun (2003) revisited this name and contradicted the conclusions of both Brown and Gatrell, and returned this whole matter to instability. Calhoun did not present or examine the original description of *ismeria* nor did he give or weigh any information on the *nycteis* population at the *ismeria* type locality that Gatrell (1998) determined and established by neotypification to be Boisduval and Le Conte's *ismeria*. It is thus essential to herein present and weigh all evidence pertinent to *ismeria*'s taxonomic determination. Since the Abbot paintings have been the historical focal point, it is appropriate to begin with an examination of these.

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The Abbot original was among a folio of 148 paintings of the above small size format (Cowan, 1969). Calhoun (2003) states that the folio actually contains 149 paintings, of which 105 are attributable to Abbot. These paintings have a history of being “lost” and then “found”. This history is detailed in several publications and I will not repeat it again here. The best references are Cowan (1969), Brown (1974) and Calhoun (2003). Today, these paintings reside at the University of South Carolina, Columbia, SC in the Thomas Cooper Library. They are available for viewing on the Internet at: <http://www.sc.edu/library/spcoll/abbot/default.html>.

As stated, the published OD illustrations of the *ismeria* imago have always been assumed to be poor copies of their Abbot originals. This assumption existed for two reasons. First, the people of that era with a serious interest in natural history were accustomed to having lifelike paintings in the finer scientific books. The Boisduval and Le Conte *ismeria* illustrations are rather unrealistic looking. Second, the adult figures (from time of publication to today) don’t precisely match any known species. However, as can now be seen by comparing the original on the above website with the published copy (Fig. A), the two are virtually identical. Thus, we now know that both are equally poor, or equally accurate, renditions of the intended species. This sameness is significant in the taxonomic assessment of the name *ismeria*. This is because we now see that the published illustrations are sufficient as they are the same as their original.

In his paper on *ismeria*, Calhoun (2003) shows three “original” Abbot paintings that are surely different renditions of the same basic **template** (his figures 4, 5, & 6). They are: one from the Natural History Museum, London painted between 1790 / 1816, one from the Turnbull Library, Wellington, New Zealand painted between 1816 / 1818, and the Boisduval and Le Conte original of *ismeria* commissioned in 1813 (but perhaps painted a bit later) and deposited as above at the University of South Carolina.

Two things become immediately apparent when considering these paintings. First, all the adults figured are similar to, yet unlike, any one specific taxon known from the eastern US. Second, in looking at them together, the NHM and Turnbull copies look much alike, but the Boisduval and Le Conte original (and copy) differs in subtle but noticeable elements³. Since all of these were painted by Abbot himself, and apparently all about the same period, the question naturally arises as to why the one from which the published *ismeria* plate was duplicated is an obvious departure from the other two. Further, since they are all from his own hand, it would be total conjecture as to which is the most accurate representation of the living model. It is just as likely that the **original** utilized by Boisduval and Le Conte is the most representative. In fact, it is reasonable speculation that since Abbot knew this rendition was for Le Conte rather than simple commercial sale, he may have given more attention to accuracy than with the others. It would be illogical to think he gave less attention to this copy commissioned by and for Le Conte. The point is that it is completely subjective opinion on anyone’s part as to which version someone might consider to look more realistic – like the living model.

Abbot, like other artists of his day, utilized master templates from which they produced “original” copies. It was from such a master template that the above “original Abbot’s” (and doubtless others) were copied and produced. These master templates, which would have resided with Abbot, are apparently unknown. What we do know is that the *ismeria* paintings used by Boisduval and Le Conte (the original and the published copy) are clearly different from the other two renditions that Abbot painted. Thus, these two “versions” are the only ones that have technical relativity to the taxonomic taxon *ismeria*. Brown was the first to establish this technical point in his 1974 paper.

We thus have two obvious problems with these paintings. 1) All the adults figured are similar to, yet unlike, any one specific taxon known from the eastern US, and 2) there are subtle but noticeable differences between the Boisduval and Le Conte *ismeria* paintings and the others. There is a simple, and I think obvious, explanation for these artistic discrepancies – they are composites of two taxa.

³ The *ismeria* original has the legs, abdomen and wing shape altered from Abbot’s master template. This is evidenced by the significant differences in these areas from Abbot’s earlier paintings, and erased sketch marks (figs. 4 - 6 in Calhoun, 2003). How this occurred, by whom and why is speculative.

All previous researches have tried to fit the OD adult *ismeria* illustrations to a single taxon. This was the logical thing to do as the painting was presented as a single species. As the decades passed and the fauna of coastal Georgia began to be understood, it was assumed that only one species of *Chlosyne* occurred in that region. That species being *Chlosyne gorgone* (Hübner, 1810). This **assumption** eventually came to be presented as fact. Eventually, various workers just began to refer to the above NHM painting (and the *ismeria* plate) as “gorgone” (e.g. Doubleday; see Calhoun, 2003) as if it was a fact that this is what it represented. This assumption was the primary topic F.M Brown (1974) dealt with and unequivocally rejected. Brown concluded that the Boisduval and Le Conte plate was neither *gorgone* nor directly associated with the NHM Abbot painting which Brown was fully aware of and assessed. Calhoun (2003) revived the same misidentifications, assumptions and persons addressed by Brown, and throughout his paper utilizes the name *gorgone* in application to all of these paintings as if it was fact.

However, it is now known that not one but two species of *Chlosyne* occur in Burke County, Georgia (Gatrelle, 1998). The first species of *Chlosyne* discovered in Burke Co., GA was not *gorgone*, but the taxon then known as *Chlosyne nycteis* (Doubleday, [1847]). This taxon was found there in 1989. Then, in 1993 *gorgone* was rediscovered there also (Gatrelle, 1998). This discovery of two fairly similar species of the same genus in Burke county in conjunction with the abstract elements found in all of these original Abbot paintings dictates that the most logical assessment of these distorted artistic imago renditions is that they are a composite of these two sympatric Burke County *Chlosyne* – *C. ismeria* (= *nycteis*) and *C. gorgone* (Hübner, 1810). This is evidenced by the fact that the adult paintings incorporate characters that are clearly possessed by one but not the other of these two species. It is also significant that the “nycteis” that occurs in Burke County is phenotypically (subspecifically) different from northeastern and Midwestern *nycteis*. This coastal Georgia and South Carolina subspecies is one that no one had ever seen between its description in 1833 as *ismeria* and its rediscovery in 1989.

If indeed these paintings of the adult morphs are to **any degree** composites of these two *Chlosyne* species, then they are unsuited in and of themselves, by their unscientific nature, for use in definitive taxonomic diagnosis and determination (i.e. lectotypification or diagnostic depictions). Unfortunately, these painting have been virtually the sole focus of workers down through the last century and an half. If argument is want to be made to try and establish the true identity of the taxon *ismeria* solely, or primarily, from these paintings, then taxonomists would be doomed to a never ending subjective debate over its taxonomic identity.

In my 1998 paper I dealt very little with any historical aspects and simply referred the reader to Brown (1974) as I agreed with his historical research completely relative to *ismeria* not being conspecific with *gorgone*. In hindsight, I see I was remiss in not offering more historical information and just moving ahead with defining *ismeria* by my field and biological data. Even there, I could have presented much more information on the immatures from my rearing efforts. I could have provided detailed data on the habitats of both *ismeria* and *gorgone* in Burke County. Since I thought the *ismeria* = *gorgone* issue was a dead one (per Brown), I focused mainly on the basic taxonomic issues and resolving any remaining possible confusion via the necessary neotypification of both *ismeria* and nominotypical *gorgone* from their mutual type locality. My realization this year that an undescribed subspecies of *ismeria* exists in the southern Appalachian Mountains provides the opportunity to revisit these issues, and in timely fashion in light of the recently published paper by Calhoun.

Fortunately, there is a fairly large body of factual evidence in the original description of *ismeria*, the notes of Abbot, the historical works of Cowan and Calhoun, and actual biological and field data by which we may know with a great deal of certainty to which taxon the epithet *ismeria* was applied by Boisduval and Le Conte. The definitive data whereby we may assess which living organism Boisduval, and especially Le Conte, intended is not found within the various paintings of Abbot – or the altered original used for the *ismeria* publication.

VERIFIABLE FACTS

Fact one. John Abbot was not a taxonomist and never authored any taxonomic act or described any species. He was a marketer in specimens, art, and data. He did this for money. The only name Abbot ever applied to the entity in these paintings was the common name Crop Wort Fritillary.

Fact two. The name *gorgone* was authored by Hübner in 1810 from specimens probably purchased from one of Abbot's European agents. While Hübner provided no verbal description, the paintings Hübner did of the specimens in his possession are so accurate as to leave no doubt of the taxon he had in hand (Fig. 4). Abbot had nothing to do with this taxonomic act.

Fact three. Boisduval and Le Conte authored *ismeria* 23 years after Hübner's *gorgone* in 1833 and also from specimens. This is evidenced by the detailed and accurate textual description they alone penned. (A description that apparently none of the historical researchers of *ismeria* have ever quoted or even considered until this present publication.) This description would have been impossible without specimens, because their verbal description differs definitively from the accompanying Abbot painting in several diagnostic characters, especially on the ventral hind wing. This description had nothing to do with Abbot, and he had nothing to do with the taxonomic act of authoring this name.

There are those who will dispute this as a fact. This is because it has commonly been assumed that Boisduval had no specimens. But it is not a fact that **they** had none, or had not seen any. It is just an entrenched assumption. Cowan (1969) stated on page 126: "*In that year [1828] J.E. Le Conte went to Paris with a large collection of North American insects, to study other material and with the idea of writing a book.*" This book became the 1833 volume coauthored with Boisduval in which *ismeria* was described verbally and in detail. Calhoun (2003) stated on page 212: "*Abbot may have collected natural history specimens in South Carolina (Sanders & Anderson 1999), but the reference to 'Carolina' in the original description of M. ismeria likely came from J.E. Le Conte, who traveled more widely in the Southeastern United States [than Abbot]*" Le Conte also often visited for periods on the family Plantation south of Savannah, Georgia.

How would Le Conte know *ismeria* occurred in South Carolina if he had personally never encountered it there? Obviously, from **his** locality citation, he had. As a collector with a scientific interest to describe new taxa, it would be wild speculation to assume he never collected any of this taxon he encountered, and if collected, that he would not have taken them among his "large collection" of American insects to Paris with him. If not fact, it is highly probable Le Conte had specimens, and if not, he certainly (for a fact) had a memory of what **he encountered and meant** as *ismeria*. This was Le Conte's concept not Abbot's. His and Boisduval's verbal description of the OD underside of *ismeria* (see below) with basal white spots on a tawny ground with pupiled marginal tawny semi-circles (precisely as in coastal "nycteis") is far different than the almost black and white stripped nominotypical subspecies described by Hübner as *gorgone*. It is also preposterous to think that if what Le Conte encountered personally in the Carolinas, and surely discussed with Abbot in their Georgia visits, was Hübner's 1810 *gorgone*, that Le Conte would not have recognized it as such and/or described it again as a new species in 1833.

I have found *ismeria* (=nycteis) in both upper coastal Georgia and South Carolina (Fig. 8). Thus establishing that Le Conte could have indeed found it in my home state of South Carolina. Both of my sites are near colonial road crossings of the Savannah River and thus may be the same areas Le Conte also found it. Le Conte mentioned the Carolinas first and then Georgia as the region to which **he** attributed it. Abbot's range notation says he found it **only** in Burke County. I agree with Calhoun, the attribution of this taxon to Carolina was Le Conte's doing. This necessitates he had personal experience with it there and thus: 1) factually saw it in nature, 2) with high probability collected it and 3) with equally high probability had specimens among his "large collection of American insects". This is why he described the ventral hindwing of *ismeria* as having basal white spots on a tawny background and marginal tawny half circles with dark pupils – which is totally unlike the dark brown and basally striped *gorgone* venter (Figs. 3c & 6).

Fact four. Both *ismeria* and *gorgone* in Burke County are found in the same habitats – open forested areas. Both feed as larvae on the same hosts – *Helianthus* (Sunflowers). *Gorgone* is specific to species *divaricatus* L. *Ismeria* likely feeds on a wider variety of *Helianthus* at their mutual type locality, but also on *divaricatus*. I did not find *ismeria* in Burke County in “swamp” habitat as was inferred by Calhoun (2003). (He did not communicate with me when doing his paper even though I have ten years of experience with the ecology and biology of these taxa at the type locality.) When I located *ismeria* in South Carolina it was also in dry, open, upland, wooded habitat.

Fact five. *Chlosyne ismeria* (= *nycteis*) is double brooded in coastal Georgia and South Carolina with the first brood appearing the end of May and June, and the second brood in August and September. First brood larvae mature in May and emerge the same year in June. It is recorded throughout the historical literature that the species Abbot reared and painted as reproduced by Boisduval and Le Conte was, according to Abbot’s own notes, from larvae he found in May and eclosed as an Adult **May 26** of the **same year**. This fits precisely with the first brood of *ismeria* (= *nycteis*), and is virtually impossible to be *gorgone* as follows.

Fact six. *C. gorgone* is univoltine in Burke Co., Georgia (its type locality). Adults fly during April and are absent by mid May and the rest of the year. I have gathered over 800 eggs and first instar larvae of nominate *gorgone* from Georgia and South Carolina with about 200 of these being found in several clutches on *Helianthus divaricatus* at the type locality. I sent some of these to Tom Allen in Virginia. I instructed Richard Boscoe of Pennsylvania where to find the Colony in South Carolina so he could rear them. It is virtually impossible to keep larvae from entering diapause. Both of these individuals and myself are very experienced at rearing Lepidoptera. Allen had no success breaking diapause and all died (personal communication). Boscoe only obtained adults by allowing diapause and adults emerged the next spring (personal communication). Gatrell was only able to induce 4 of these hundreds of larvae, from several different females, to not diapause. Of these, only two pupated and one of the two emerging Adults was deformed. The larvae of these two adults were obtained on 27 April and emerged 7 and 9 June, 1993. On their ventral hind wings they were both very atypically black with restricted white. Surely a result of forced and unnatural rearing. Both were females. Larvae were kept under intense continual light. Many were even nudged for hours after entering the 4th instar to try and keep them “awake”. Many died at that stage. The rest were returned to litter in the wild where they were taken from. It would have been virtually impossible for Abbot to rear same season *gorgone* even if he did know the “trick” of continual intense light. He would have had to have had so many (and close) candles or oil lamps that the heat from that kind of light would have dehydrated the host and the larvae. All of the larvae I gathered from the type locality and from South Carolina were all black to the 4th instar. The 4 mature larvae were all black except for a narrow rusty orange line on the dorsal and a medium gray band along the base of the body. These differ dramatically from the larvae painted by Abbot. Thus, it was not *gorgone* Abbot reared.

No one has seen the topotypical larvae of *C. ismeria*. *C. ismeria nycteis*, however is known to have black and yellow striped larvae – just as Abbot figured and as noted by Calhoun page 212, “*Grishin and Boscoe observed that the mature larvae of C. nycteis are black with broad yellow or orange lateral bands.*” (Calhoun neglected to show any larvae of *C. ismeria nycteis* or adults of *C ismeria ismeria* for analysis. He only presented one sided data and illustrations. He also completely omitted the text of the original description. Which, as we shall see, is the evidence that supports *ismeria* not being *gorgone* and being a *nycteis* the most.)

Fact seven. Artistic license is the term we use when an artist adds something to a picture that is not factual. The following is either a fact or artistic license. In these Abbot paintings which some have assumed to be “gorgone” and not “ismeria”, they include the mature host plant in full bloom with the adult male sitting on the blossom of the host. As mentioned above in fact six, *gorgone* is univoltine and only flies in **April**. At that time of year, the host is only a few to 18 inches high. *H. divaricatus* does not bloom in that region until late July to September. It is virtually impossible to find a *gorgone* on the flower of this

plant at the type locality! It is very likely to see *ismeria* (= *nycteis*) nectaring on it in its second brood. Thus, we either have to attribute this “painted situation” to artistic license **or** the species is **not** *gorgone*. Artistic license can not be allowed into taxonomic matters. Again, these paintings of adults on flowers has only two options – if Abbot really found this situation in nature (which I think he did), then the only species can be *ismeria* (= *nycteis*). But if this is to be considered a *gorgone*, then the painted situation is artistic license – not real. If an artist, in this case Abbot, has a propensity to “doctor up” or “fictionalize” in one area of a painting, they will utilize the same “license” in other elements of it. He was a dealer/artist after all and not a scientist. My research at the type locality over 10 years produced results that are entirely different than the situation literally portrayed by Abbot.

Fact eight. The concepts, assumptions, and identifications of Doubleday, Scudder, and others (as cited by Calhoun, 2003) are irrelevant to what the actual concept of *ismeria* was to its **authors** – Boisduval and Le Conte. The various non-OD paintings of Abbot are irrelevant as 1) none of them are undisputable presentations of a single living butterfly species and 2) the OD original differs from them in several characters. Brown pointed all this out in 1974. Brown also examined and discussed the NHM, London painting and correctly stated it had no Code relevance to the name *ismeria*.

Fact nine. Only the Abbot original (in the Thomas Cooper Library) and the OD plate of *ismeria* have any ICZN Code relevance to this name. All other Abbot paintings and specimens are outside the boundaries of what the Code allows relative to the typification of the taxonomic taxon *ismeria*. This is because only those specimens and data directly used by, or known to, Boisduval and Le Conte in formulating the taxonomic taxon *Melitaea ismeria* are factors upon which the taxon was based (Articles: 72.4.1, 72.5.6, 73.2.1). Now that we know that the “original” painting and that which was produced in the Boisduval and Le Conte *ismeria* description are virtually the same (except that the picture in the book is the most “nycteis” like of them all), it should begin to be considered that the published plate was just as Le Conte wanted it – conforming most to the specimens he had, or remembered, and that he knew were not Hübner’s *gorgone*.

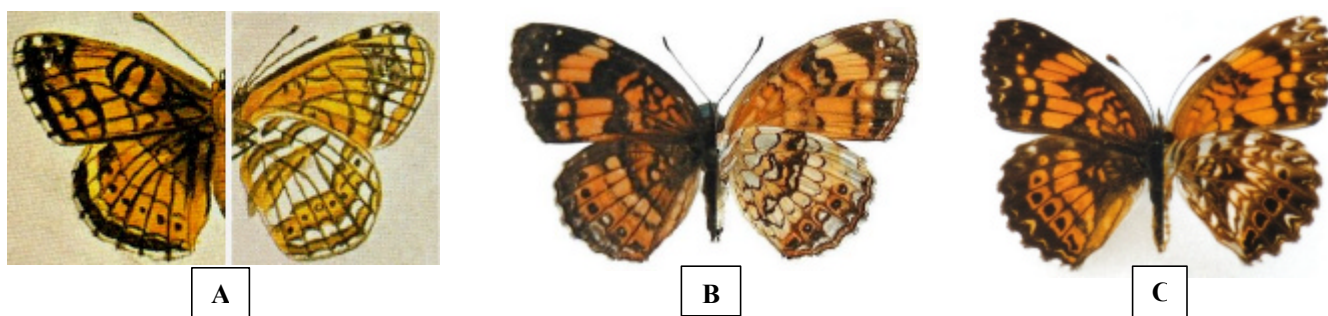
Conclusion. The only logical conclusion is that the *Chlosyne* Abbot reared was *ismeria* (= *nycteis*). Abbot described these larvae as primarily yellow **with** black lines and painted them thusly, many times. All of the early instar larvae of nominate *gorgone* I found were all black. The four mature larvae were all black except for a narrow rusty orange line down its dorsal midline and a medium gray band next to its black legs. No one has ever reared topotypical *ismeria* – except Abbot. This is the entity he reared and Boisduval and Le Conte named *ismeria*. The only scientific description and name ever applied to this entity Abbot reared and painted, and that Le Conte observed (and likely collected) in the Carolinas is the name *ismeria*. Hübner painted and named *gorgone*. Boisduval and Le Conte textually and explicitly described and named *ismeria*. Abbot had absolutely nothing to do with the naming or description of **either**.

Hypothesis. It is my belief that Abbot found *C. gorgone* in Burke County. The evidence for this are the specimens acquired by Hübner that Hübner painted. Abbot also found a “nycteis” in Burke County, Georgia as evidenced by 1) his painting of what he reared and 2) notes on the timing of its life cycle. It is highly likely he attempted to rear *gorgone* and, given the nature of the beast, failed. He then found similar (esp., in early instars) congeneric larvae on the same plant (*H. divaricatus*) (and also on Crop Wort) and reared it out thinking it was the same species. At this point it would be easy for Abbot to consider the two “forms” as one species. The greatest proof of this is the Abbot paintings of the adults. Abbot is a fine artist and all of these paintings have confused workers from the beginning – especially the ventral hind wings, because, as should be obvious, they are a composite of two taxa he thought were one. The base of the ventral hind wing looks like *gorgone* but from the middle to margin just like the “nycteis” in that region. However, the ventral forewing is a good depiction of that area’s “nycteis”. The dorsal forewings look like nothing – and differ from the NHM paintings which do look more like *gorgone* above. The dorsal hindwing looks most like Burke County “nycteis” (Figures 1- 3).

ORIGINAL DESCRIPTION

Fact ten. The written original description. This is an exact match for coastal Georgian and Carolinian “nycteis”. Boisduval & Le Conte could not have produced this without specimens in front of them or one of them having seen it in nature. (Conjecture: I do not believe that these well informed and expert scientists were unaware of Hübner’s *gorgone* published 23 years earlier. It is highly probable they had seen his work. Since they had specimens, or at least Le Conte’s personal experience, they would have immediately recognized these are Hübner’s species (as nominate *gorgone* is so unlike anything else) and would not have described it again by another name - *ismeria*.)

Here is the Original Description translated into English. I have never seen this presented in any of the literature examining this situation. I have added bold and words in brackets for clarity. Figure A is the painting accompanying the OD, B & C for are for comparison ⁴. Translation by Martin Bailey, Alex Grkovich, myself and confirmed by Don Lafontaine and Jocelyn Gill of the Canadian National Collection. Note that the description of the ventral hindwing matches only figure B.



Ismeria Original Description (female)

The species has the size and the appearance of [the species] *cinxia* of Europe. The top [upperside] of all its wings are tawny yellow [fulvous] with a lot of black splotches [stain like spots]; these are positioned randomly in the basal area and form zigzag lines, the others forming two winding lines that traverse veins on the dorsal forewings and one on the dorsal hindwings which is followed by a row of points of the same color [black]. The marginal borders of all four wings are black, divided on the forewings by tawny splotches, and on the hindwings by a cord of whitish fulvous lunules. In addition to this, the apex of the forewings are marked with four or five white dots.

The underside of the forewings differ from the upperside in that, before the edge of the margins, there is a **band** of **white** spots preceded by three or four spots of the same [white] colour.

The underside of the hindwings are **tawny** with white spots near the base, then an irregular [tawny] band traversing the median area, and then marginal lunules [semi-circles] of the **same color** [as the median band]. These [lunules/semi-circles] are punctuated by a series of black points corresponding to those that appear in the same location dorsally. The fringe of all wings are black rimmed punctuated by white.

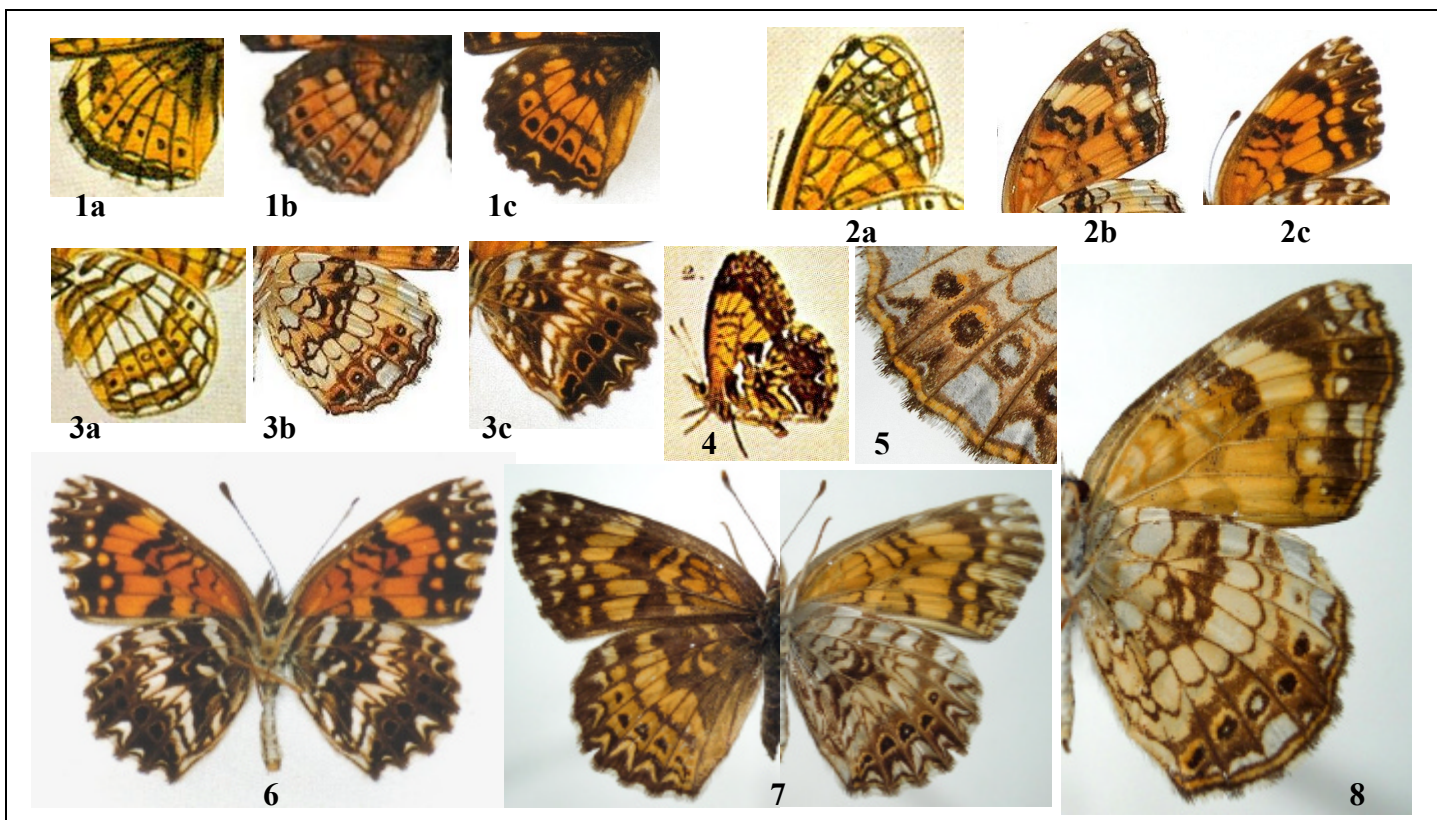
The body and the antennae are the same as other of that species.

The caterpillar is **yellow** with spines and **three** black tinted longitudinal stripes. The head is black as well as the scaly legs [probably the true legs] and the underside; the other legs are yellow.

The chrysalis is a cinder gray with many pale spots and small almost white dorsal tubercles.

This Melitoea is found in the Carolinas and Georgia. It is rarely **in collections**.

⁴ All: females. All: dorsal/ventral. **A.** OD *ismeria* . **B.** *ismeria* (=nycteis). **C.** Topotype *gorgone*.



Figs. 1-3: all females. **a:** OD illustration of *ismeria*; **b:** Louisiana *ismeria*; **c:** topotype *gorgone*. **Fig. 4.** Hübner's OD of *gorgone*. **Fig. 5.** Chevrons on ventral margin of NC paratype female of *C. ismeria obsoleta*. **Fig. 6.** Ventral, neotype male *C. gorgone*, Burke County, GA. **Fig. 7.** Typical female *C. gorgone carlota* (ex. Iowa) (dorsal / ventral). **Fig. 8.** Ventral, SC *C. ismeria ismeria*. Note orange marginal line and tawny hindwing ground. All leg. R. Gatrell except **b**. Photos by Joe Mueller.

The most pronounced character on the ventral hind wing of *gorgone* are the white arrowhead shaped spots. Not only was this not mentioned in the *ismeria* OD, but the ventral hind wings are described as **tawny** with a tawny marginal band of lunules with black spots – precisely as in *ismeria* (= *nycteis*) in coastal GA. Coastal GA males and females of *ismeria* (= *nycteis*) usually have a narrow but bright marginal orange line on the ventral side of the wings which is never the case with *gorgone gorgone*. Some *ismeria* individuals have orange nudums on the antennal clubs as in the OD picture.

Nominotypical *gorgone* have very dark ventral hind wings in most individuals (especially when fresh) of both sexes. Dorsally, I have only two of 30 *C. g. gorgone* females that are broadly fulvous above whereas it is common for *C. gorgone carlota* (Reakirt, 1866) females to be quite fulvous dorsally. *Gorgone* males rarely and females seldom have the white pupil in the marginal spot band on the ventral surface; I have never seen this spot on the DHW of males and it is rare on the DHW of females. This white spot is common in males and usual and often large in females of *C. g. carlota* (both dorsally and ventrally). *Carlota* is also usually much lighter on the ventral surface. *Carlota* females (Fig. 7) nearly always and males usually have a complete row of VHW marginal white chevrons. In nominotypical *gorgone*, only females frequently have this while in males it is unusual to find individuals with even most of these marginal chevrons present. Perhaps less than 5 persons have ever seen nominotypical *gorgone*. Thus, most people have only seen subspecies *carlota* and think of that image when the name “gorgone” is put forth.

(I consider the *gorgone* specimen figured by Calhoun (2003) which he purports to be from Abbot and Georgia to actually be subspecies *carlota* (as labeled) and likely from Ohio. This specimen was clearly collected by Dyson as it bears his characteristic label (Calhoun 2003). Which label, is the only original label on the specimen as all the others were later additions. Further, because Dyson was illiterate, the word “Georgia” on that label was added later. It is certain the inscription was not by Abbot as it is not

in his hand (see Calhoun 2003: his fig. 25). I have long series of both subspecies *gorgone gorgone* and *gorgone carlota* males. The NHM specimen is most definitely the *carlota* phenotype, and conversely, not the nominotypical phenotype. What this specimen looks like says more, and more factually, than any speculation on the old labels associated with it – when were they put on, by whom, did any get mixed up in decades of handling.)

What Abbot reared was a “nycteis”. The adults he painted are a composite of *nycteis* and *gorgone*. It is possible Le Conte had Abbot’s painting adjusted to be more like his concept, *nycteis*. But for almost two centuries most workers (except F.M. Brown) assumed these were *gorgone* – even though the Abbot original painting produced for Le Conte and the published copies don’t look like that taxon. In 1974 Brown stated *ismeria* was not *gorgone* but might be *nycteis*. He was correct.

MODERN ASSESSMENT

The recognition that there is a subspecies of *C. ismeria* (described herein) inhabiting the southern Appalachian mountains segregates subspecies *ismeria ismeria* from subspecies *ismeria nycteis*. Calhoun (personal communication) states that the “type” of *nycteis* exists in the NHM, London and that the type locality is Ohio. The taxon *nycteis* was described from a single specimen painting (Fig. 29). As can be seen from the figure, the nominate subspecies has well developed and extensive dorsal spotting. *Ismeria* is also a broadly spotted taxon dorsally, however, the basic patterns differ, and primarily so, on the hind wing where in *ismeria* the median and submarginal spot bands are separated by a thin black line (Figs. B, 25, 27) while on *ismeria nycteis* this black area is usually wider and looks more like part of the dark ground and not a bisecting “line” (Fig. 13, but note Fig. 15). *Ismeria ismeria* also differs in that the black margin of the dorsal hind wing is usually wide and thus invasive into the submarginal spot band to the extent that it partially obliterates the distal third or even half of this band (Fig. 25).

To some, these differences would not be sufficient to consider Ohio *nycteis* and coastal Georgia *ismeria* as distinct subspecies. But bisecting the range of these two is an Appalachian endemic subspecies which has very restricted fulvous above. This tells us that different evolutionary processes have been at work and that the two light subspecies (while similar) has each evolved uniquely as separated by this third eastern US mountain taxon. This situation is evolutionarily complex and I have by no means even begun to deal with any details of it. I am only stating the most observable manifestations of this situation and describing the Appalachian herein as new to science. There is thus fertile opportunity for others, especially geneticists, to investigate the evolutionary path of these three subspecies in detail.

In assessing the range of this new subspecies, I have had to also assess the ranges of the other eastern *ismeria* subspecies. I now consider *ismeria ismeria* to have a fairly wide, but narrow, range from the entire Piedmont region of South Carolina south through southern Georgia and west through coastal Louisiana and possibly into southeastern Texas. *Ismeria* is rare to uncommon throughout this range.

On the venter, *ismeria* is (like all *ismeria* subspecies) highly variable. But in general, *ismeria* has three distinguishing ventral characters – all on the hind wing. 1) a complete row of marginal white or silvery crescents, 2) fulvous submarginal lunules (especially in females) and suppressed brown marginal patch (but in some *ismeria* males this area can be quite dark), and 3) a prominent post basal irregular fulvous band. The hind wing ground is light fulvous not whitish.

Ismeria is found in varying habitat and is host associated/limited not environment associated/limited. I have also found this to be true with *ismeria nycteis* in Iowa: dry prairie to wet bottomland; and the new subspecies, *C. ismeria obsoleta*, in the southern Appalachian region: xeric serpentine barrens to mesic hardwood bottomland. Human activity is both a benefit and detriment to this species. *Ismeria* taxa need clearings where its host plants can flourish but not overly managed land where “weeds” are mown or sprayed. Minimally attended rural roadsides afford good habitat.

Chlosyne ismeria obsoleta new subspecies

Common butterflies can be overlooked and understudied. For over 20 years I have been making almost annual (and often multiple) research trips into western North Carolina. *Chlosyne ismeria* is a common component of the mountain fauna. As such, I often encountered, but seldom collected individuals of this species in this area. In 2003, I segregated the individuals of these mountain specimens into one series and also relaxed and spread a few I had in papers. I ended up with a series of 15 specimens from a wide assortment of dates and locations that were amazingly similar, and quite distinct from any other regional populations I had ever seen or encountered.

Normally, I would not recommend describing a new subspecies from only 15 specimens of a widely distributed entity. But this series represents a totally unbiased survey sampling over such a long time and area that the starkly similar, and totally randomly collected individuals, can only be taken to indicate that if nothing else, the populations in the southern Appalachian region are mostly of this distinct phenotype. My view is that if just 60% of individuals in this region were of this unique dark phenotype that the genetic high frequency of this phenotype warrants its subspecific recognition. It is an evolutionally significant departure from the norm of eastern US *ismeria* in general. It is also important to note that all Lepidoptera in the southern Appalachian region tend to melanic facies (J.F. Gates Clarke personal communication). In other words, this *ismeria* segregate is significant as part of a larger regional evolutionary trend, and as such, should to be noted and distinguished as such by formal subspecific description.

Chlosyne ismeria obsoleta Gatrell, New Subspecies

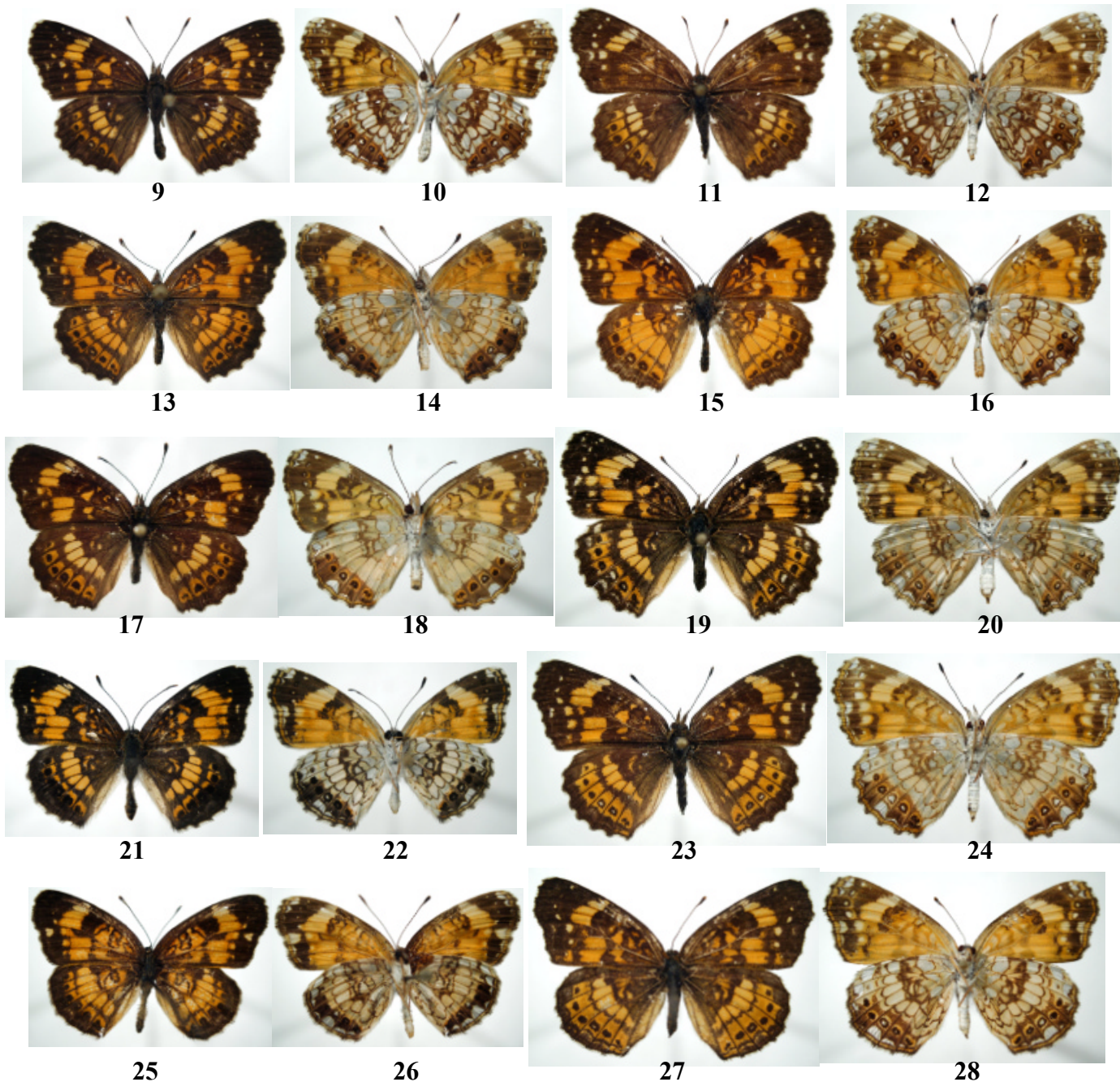
Diagnosis and description. The *obsoleta* photos (Figs. 17-24) well illustrate this new subspecies. **Dorsally:** both sexes of *obsoleta* adults are darker than either *ismeria* or *nycteis* with all fulvous spots and banding greatly reduced; hind wing median and postmedian bands are distinctly colored differently in *obsoleta* (median: yellowish; postmedian: orange), these bands are the same color (shades of orange) or only subtly different in *ismeria* and *nycteis*. Generally, *obsoleta* is similar dorsally to subspecies *drusius* but not as dark, especially in females. **Ventrally:** males: early season *obsoleta* can be boldly patterned on the hind wing, later broods can be quite lightly patterned; hind wing marginal whitish silver spots are not well developed; marginal orange line can be well developed and similar to subspecies *ismeria*. Generally, very similar to subspecies *nycteis* but markedly lighter patterned than subspecies *drusius*. Females: early season *obsoleta* can be boldly patterned on the hind wing, later broods are usually very lightly patterned on both wings; dark hind wing marginal patch indistinct to almost absent; row of six submarginal dark spots all with white pupils. **Overall:** *obsoleta* is unique in that while the wings are dorsally melanistic they are ventrally washed out and lightly patterned, especially in females.

Types. *Holotype* ♂ (Figs. 17-18): NORTH CAROLINA: Macon County, Jones Knob 4200', 8 July 1989. *Allotype* ♀ (Figs 19-20): NORTH CAROLINA: Macon County, Franklin Greenway, 16 May 2002. *Paratypes:* 10 ♂♂, 3 ♀♀: **NORTH CAROLINA:** Macon County: Jones Knob: 2 ♂♂, 1 ♀, 8 July 1988 (Figs. 23-24), 1 ♂, 8 July 1989, 2 ♂♂, 27 June 1992, 1 ♂, 9 June 1993. Clay County: Buck Creek: 1 ♂, 27 May 2003, 1 ♀, 25 May 2002; Chunky Gal: 1 ♀, 27 May 2003; Alleghany County: Rock Creek Rd off Farmers Rd, 2100': 1 ♂, 13 August 2003. **GEORGIA:** Union County: Jct. Hwy 180 & 126: 1 ♂, 9 May 2003 (Figs. 21-22). **VIRGINIA:** Grayson County: Fox Knob, FS Rd. 852, 1 ♂, 22 August 2003. All leg R. Gatrell. The holotype and all paratypes are currently in the TILS Museum of the Hemispheres' collection, Goose Creek, South Carolina. Some paratypes will be deposited in other institutions.

Etymology. *Obsoleta* is derived from the obsolescence of the dorsal fulvous and the ventral dark markings.

Remarks. There is a tendency in females to have the ventral marginal whitish silver spots form chevrons (Fig. 5). This is present in 2 of the 4 females. Because the sample is so small, this may or may not have taxonomic significance. Those who encounter or collect this taxon should assess specimens for the presence of this "gorgone like" character. The dates of the type series encompass the entire flight season and the altitudinal range is from 2000 to almost 5000 feet. While indeed a very small sample, it is none the less a good indicator of the presence of this subspecies in what I refer to as the Appalachian Peninsula. This mountain range dips deep into the otherwise hot lower austral zone in North Carolina and Georgia. It is indeed a unique faunal peninsula in the same manner as peninsular Florida in its biotic uniqueness.

Range. The range of this taxon needs to be established. It is in extreme north Georgia and apparently ranges into extreme western Virginia (Grayson County paratype). It should be expected in the eastern mountains of Tennessee and southern West Virginia and is likely in eastern Kentucky. However, I assume none of this. It is definite only in northeast Georgia and southwestern North Carolina. It is a striking subspecies, especially the first brood females.



Figures 9-28. *Chlosyne ismeria* subspecies. **Figs. 9-10** (D/V): ♂ *C. i. drusus*: 14 July 1975, Boulder Co., Colorado (leg. unknown). **Figs. 11-12** (D/V): ♀ *C. i. drusus*: 30 July 1948, Boulder Co., Colorado (leg. Don Eff). **Figs. 13-14** (D/V): ♂ topotype *C. i. nycteis*: 9 August 1984, Dayton, Ohio (leg. Andy Anderson). **Figs. 15-16** (D/V): ♀ *C. i. nycteis*: 18 July 1966, Shelby Co., Iowa. **Figs. 17-18** (D/V): ♂ holotype *Chlosyne ismeria obsoleta*: 8 July 1989, Jones Knob, Macon Co., North Carolina. **Figs. 19-20** (D/V): ♀ allotype *C. i. obsoleta*: 16 May 2002, Franklin, Macon Co., North Carolina. **Figs. 21-22** (D/V): ♂ paratype *C. i. obsoleta*: 9 May 2003, Hwy. 180, Union Co., Georgia. **Figs. 23-24** (D/V): ♀ paratype *C. i. obsoleta*: 8 July 1988, Jones Knob, Macon Co., North Carolina. **Figs. 25-26** (D/V): ♂ *C. ismeria ismeria*: 23 May 1963, Marianna, Jackson Co., Florida (leg. Fuller). **Figs. 27-28** (D/V): ♀ *C. ismeria ismeria*: 11 June 2002, visc. Johnson's Landing, Allendale County, South Carolina. All leg. R. Gatrell unless otherwise noted. Photos by Joe Mueller.

ORIGINAL DESCRIPTIONS AND SUBSPECIES COMMENTS

Melitaea ismeria (*Chlosyne ismeria ismeria*)

The original description of *Melitaea ismeria* is presented herein on page 7 and discussion on page 8 under Modern Assessment. I here add additional comment. It is possible that subspecies *nycteis* does not occur in the deep South (Mississippi to South Carolina) at all. It all depends on how narrowly or broadly a taxonomist defines these taxa. As I stated above, I do not just consider phenotype but also the known or likely biogeographical evolutionary path these taxa have taken to arrive at their current state of being. For example, I now view *ismeria* more broadly than I did in 1989 in now considering it the subspecies of the southern Gulf coast region, lower Georgia and all of South Carolina except the far northwest SC mountain edge area. How this taxon transitions (if it does) east of the Appalachians up the eastern seaboard into subspecies *nycteis* remains to be investigated (see discussion under *obsoleta* below). How it transitions (if it does) west of Louisiana, and north in Mississippi and Alabama needs to be investigated also.

Melitaea nycteis (*Chlosyne ismeria nycteis*)

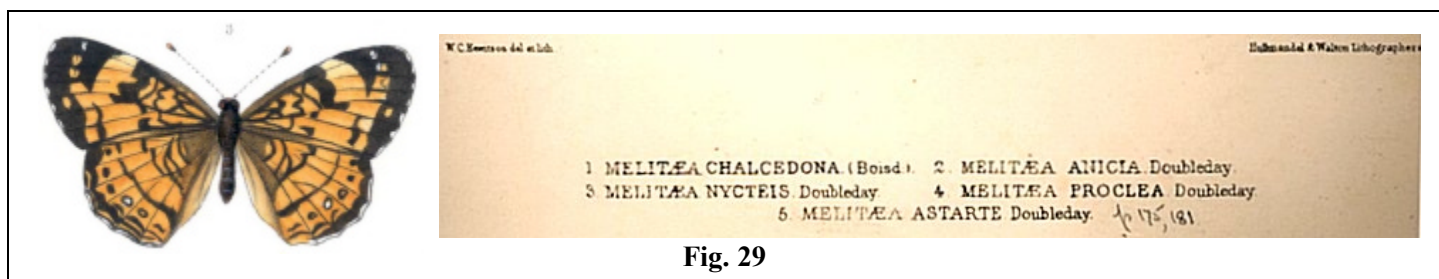


Fig. 29

The original description of *Melitaea nycteis* Doubleday, [1847] consists of a figure and caption (Fig. 29). John Calhoun has stated in personal communication that he is preparing a paper in which he will formalize the type locality as Ohio (and perhaps more localized) and figure the “type” specimen in the NHM, London and discuss its typification status (holotype or syntype). In 1848 a text was published to accompany this painting. It was very brief and is as follows. (Don Lafontaine provided the following additional comment. “This text was presented in the second entry under Section II. *Phyciodes*. Which would effectively make it *Melitaea (Phyciodes) nycteis*, but since this wasn't done for the plate, which was published the previous year, then the OD is *Melitaea nycteis*.”)

23. MEL. NYCTEIS Doubleday & Hewitson, t. 23, f. 3 (1847).
United States (Middle States). B. M.

Subspecies *nycteis*, like all *ismeria* subspecies, should be assessed by two criteria weighed together: phenotype and biogeographical evolution. The geographic range and phenotype of *nycteis* are both broad and variable. It might be most accurate to define the range of *nycteis* as being where the other subspecies are not, and its phenotype as being that which is not characteristic of the other subspecies. Thus, *nycteis* ranges in the west eastward from the ranges of *drusius* and *reversa*; in the east, north of the range of *ismeria* and west, north, and northeast of the range of *obsoleta*. Correspondingly, its phenotype “blends” at the range periphery into all of the other subspecies. Add to this the tendency to local and regional variation, and *nycteis* becomes a rather ambiguous taxon. This broadness is what defines and delimits it.

I have consulted many books on this but will only refer to those I consider most pertinent. The two males (page 125) figured in *Butterflies of Michigan* (Nielsen, 1999) reflects the above very well. The female depicted on that page can be said to be “typical” of the *nycteis* phenotype. “Typical”, with *nycteis*

means: average. In *Butterflies of Manitoba* (Klassen et. al. 1989), *nycteis* is attributed to the south central and southeastern part of that province. Subspecies *reversa* is limited to the western Riding Mountain region of the province with *reversa* phenotype specimens being found as far east as Winnipeg. In *Butterflies of Virginia* (Clark & Clark 1951), the text and illustrations can now be applied to reveal that *nycteis* may only exist in that state at the northern and northeastern regions. It is also likely that in much of Virginia populations are not technically referable to subspecies and represent a “blend zone”. In *Butterflies and Moths of Missouri* (Heitzman & Heitzman 1987), the male figured is mostly the *obsoleta* phenotype dorsally (too much fulvous at base of wings) and the female the *nycteis* phenotype dorsally. Ventrally, the female is mostly the *obsoleta* phenotype (note the marginal spots are all white pupiled, but post basal tawny band fairly bold) and the male the *nycteis* phenotype. This is not only not surprising but might be expected due to the well known affinity of taxa in the Ozark plateau with the southern Appalachian fauna. The range of subspecies *nycteis* in Missouri may well be limited to the northern and northeastern part of that state. The populations in the remainder of the state (and into Arkansas) need taxonomic assessment.

***Phyciodes nycteis drusius* (*Chlosyne ismeria drusius*)**

The original description of *Phyciodes nycteis drusius* W.H. Edwards, 1884 was in Papilio, 4: 57, 1884 and is as follows. There were no illustrations. F.M Brown (1966) restricted the TL to Turkey Creek Junction, Jefferson Co., Colorado and designated a lectotype in the Carnegie Museum.

Phyciodes Nycteis, var. *Drusius*. - I give this name to the Western form of the species; distinguished by the excess of black on upper side, and consequent restricted fulvous spaces. The fulvous is dull, and the black pale. This is the Colorado and Arizona form of *Nycteis*.

This taxon ranges from New Mexico into Montana and perhaps southwestern South Dakota. James Scott (personal communication) states this is an east slope Rocky Mountain taxon and that the west slope (in Colorado) populations are more like subspecies *nycteis*. (This surely calls for taxonomic investigation.) In *Butterflies of the Rocky Mountain States* (Ferris & Brown 1980), it is stated that specimens from the Black Hills in South Dakota are intermediate between *drusius* and “the northeastern Minnesota phenotype”. I take this to mean intermediate to *nycteis*. South Dakota is a transitional region and, like Virginia, will have populations not technically referable to a specific subspecies.

***Phyciodes nycteis reversa* (*Chlosyne ismeria reversa*)**

Phyciodes nycteis reversa F. and R. Chermock, 1940 was described in the Canadian Entomologist, 72: 83, 1940. The OD is as follows.

Phyciodes nycteis reversa new race

In *nycteis*, there exists a parallelism to *Melitaea harrisi* and its forms; *Melitaea harrisi*, *Phyciodes nycteis*; *Melitaea harrisi liggetti* (Avinoff), *Phyciodes nycteis drusius* (Edwards); and *Melitaea harrisi albomontana*, *Phyciodes nycteis reversa*. This new race, although displaying the same general characters as typical *nycteis*, may be easily separated by the abbreviation and omission of black markings as in *Melitaea harrisi albomontana*. The under surface has the characteristic markings of *nycteis*, but less distinct.

Holotype- ♂, June 27, Riding Mountains, Manitoba.

Allotype- ♀, June 27, Riding Mountains, Manitoba.

Paratypes- 1 to 50, Sand Ridge, Manitoba, and Riding Mountains, Manitoba.

The holotype and allotype were taken in copulo.

I have never seen specimens of this outside of the literature. The evolutionary parallelism mentioned in the OD is noteworthy in my view. It appears from the comments of Klassen (1989), various photos in the literature, and the OD that this is a localized subspecies endemic to the Riding Mountain region of Manitoba, Canada. Because the tendency of both the populations surrounding *reversa* and other mountain populations of *ismeria* is toward darker phenotypes, the light bright *reversa* phenotype is surely a genetic character trait and evolutionarily significant.

Chlosyne ismeria obsoleta

Described herein, *Chlosyne ismeria obsoleta*'s evolutionary origin is unknown. The presence of *obsoleta* like specimens in the Ozark region of Missouri and Arkansas would indicate this to be a taxon of older rather than newer origin dating back to when these two regions were connected ecologically and biologically (e.g. 28,000 B.P. Ice Advance, or 161,000 BP Ice Advance). It is possible that subspecies *obsoleta* is present in the Ozark region as a remnant of this former continual range. An indication of this would be the presence of *obsoleta* phenotypes across northern Alabama and Mississippi.

The status of *obsoleta* in Virginia needs assessment. The female figured in Clark & Clark (1951) from Lunenburg County in south central VA is certainly at least transitional to *obsoleta* if not *obsoleta*. That region of VA is apparently about as far east as species *ismeria* ranges in that state. If *obsoleta*, and or a near *obsoleta* intermediate, ranges all across southern VA, then it isolates subspecies *ismeria* east of the Appalachians from subspecies *nycteis* of the northeastern US. I have determined from specimens I have collected in the South Carolina piedmont of Spartanburg County (north central SC), that the subspecies of SC is *ismeria* (except for the narrow edge of mountains in northwest SC). Piedmont and upper coastal North Carolina would then be the region of transition between subspecies *ismeria* and *obsoleta*. Subspecies *nycteis* would then not be present in NC, SC, GA, far eastern TN, southern WV, northeast AL, southern and southwestern Virginia.

CONCLUDING STATEMENTS

Definition. Subspecies: Any regional population of a species that has evolved into a **unique** reproductively stable component of that species.

Chlosyne ismeria is a wide spread species composed of a complex set of five known subspecies. We have the choice to simplify (lump) and basically ignore the past evolution and present reality of these subspecies, or, to delve into this complex more specifically. The regional populations of all Lepidoptera (species or subspecies) did not come into being in situ where we encounter them in our modern age. Thus, just because any two populations (species or subspecies) are now in close geographic proximity, it does not follow that evolutionally they came into being **either** from each other or biogeographically near each other. I do not see a "cline" of any kind with any of these taxa at this point. I see five uniquely evolved taxa which, at this stage in their evolution, are still the same "species". I see that where they come into current geographic contact there is phenotypic transition – genetic flux exists. This means nothing more than the obvious, that these are regions of subspecifically interactive contact.

There have been objections to the use of *ismeria* as the binomial for this species rather than *nycteis* even though the use of *ismeria* is Code compliant per Article 23.9. Those who favor *nycteis* as the binomial may appeal to the Commission per Article 23.9.3. This is acceptable to me. However, any attempt to sink *ismeria* is not acceptable as it is the available and valid name of a subspecific taxon. This name is not a nomen dubium as is clear from the OD text, this paper and my 1998 neotypification; nor is it a synonym of *gorgone* as absurdly proposed by Calhoun (2003) without any examination of the OD description or any specimens of "nycteis" from anywhere. Calhoun simply compared *gorgone* with *gorgone* and then with irrelevant Abbot art and declared it to all be *ismeria*.

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