Volume 52, Number 2 Summer 2010

NEWS OF THE LEPIDOPTERISTS' SOCIETY

THE LEPIDOPTERISTS' SOCIETY EST. 1947

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The **News of the Lepidopterists' Society** (ISSN 0091-1348) is published quarterly by The Lepidopterists' Society, c/o Los Angeles County Museum of Natural History, 900 Exposition Blvd., Los Angeles, CA 90007-4057, USA., and includes one or two supplements each year. The **Season Summary** is published every year as Supplement S1 and is mailed with issue 1 of the News. In even numbered years a complete **Membership Directory** is published as Supplement S2 and is mailed with issue 4 of that volume of the News. Please see the inside back cover for instructions regarding subscriptions, submissions to, and deadline dates for, the News.

Periodicals Postage paid at Los Angeles, CA and at additional mailing office (Lawrence, KS).

POSTMASTER: Please send address changes to **News of the Lepidopterists' Society**, c/o Los Angeles County Museum of Natural History, 900 Exposition Blvd., Los Angeles, CA 90007-4057.

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Issue Date: May 30, 2010 ISSN 0091-1348

Front Cover:

Bramble Hairstreak (*Callophrys dumetorum*), Charlton Flats, Angeles National Forest, Los Angeles County, CA, April 1, 2007. Photo by David Horner.

The Identities of *Papilio evarete* Cramer and *Papilio genoveva* Cramer (Nymphalidae), with Notes on the Occurrence of *Junonia evarete* in Florida

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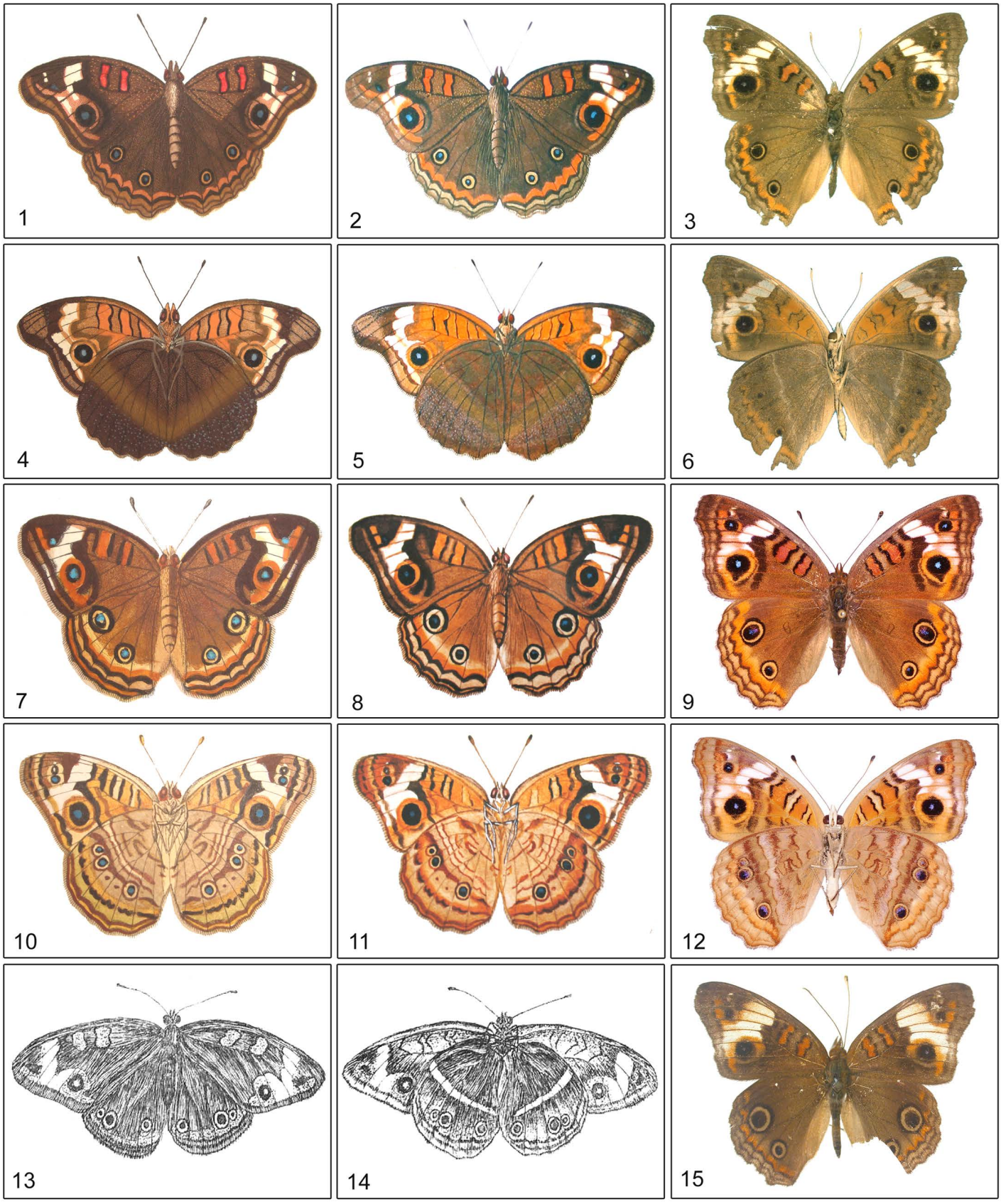
The true identities of *Papilio evarete* and *Papilio genoveva* have long been disputed. Now placed in the genus *Junonia* Hübner, they were originally described by the Dutch naturalist Pieter Cramer (1721-1776) in his multivolume publication (completed by Casper Stoll) on the butterflies of Asia, Africa, and America. Cramer's type specimens are lost, but he provided hand-colored engraved illustrations of each species (Pl. 203, figs. C & D and Pl. 290, figs. E & F) (Cramer [1779], [1780]). These names were subsequently used to recognize seasonal forms and subspecies. They were even combined into the subspecies *J. evarete genoveva* (see Schwartz 1989 for a review of their usage). Uncertainty also plagued other aspects of their status. Miller & Brown (1981) mentioned that the type locality of *P. genoveva* was "not stated" and "probably West Indian," yet Cramer indicated that both species were from "Suriname" (South America). The identities of these taxa are of particular interest to those who study the butterflies of the southern United States and Latin America.

A key investigation by Turner & Parnell (1985) confirmed that *evarete* and *genoveva* act as separate species in Jamaica, which corroborated the observations of Clench & Bjorndal (1980) in the Bahamas. After consulting Cramer's illustrations, Turner & Parnell concluded that *J. evarete* represented the species commonly known as the Mangrove Buckeye, while *J. genoveva* denoted the Tropical Buckeye. Most subsequent authors followed this usage, but the application of these names remained irregular. For his book on the butterflies of North America, Scott (1986) elected to follow the nomenclature of Clench & Bjorndal (1980), who applied these names to the opposite species (J. Scott pers comm.). This enduring doubt caused some authors (e.g. Opler & Malikul 1992) to transpose facts about each species. Based on an anticipated arrangement of *Junonia* by Lamas (2004), Opler and Warren (2002) also reversed the names of these species relative to Turner & Parnell (1985). This nomenclature was adopted for other publications, including the popular field guide by Brock & Kaufman (2003). Despite this trend, only anecdotal evidence supported its validity and online Lepidoptera talk groups continued to debate the issue. These conflicting interpretations left lepidopterists without a clear concept on which to base identifications of *evarete* and *genoveva.* This changed in 2008 with the publication of the second volume of the comprehensive series of guide books, *The Butterflies of Venezuela*, by Andrew Neild. In fact, the nomenclature employed by Opler & Warren (2002) and Lamas (2004) was based on Neild's unpublished research.

To better understand the status of *J. evarete* and *J. genoveva*, Neild (2008) "dedicated a disproportionate amount of time to Venezuelan and continental *Junonia* in an attempt to unravel the perceived enigma." Because Cramer purportedly based his descriptions and figures on specimens from "Suriname," Neild compared numerous specimens from that region of South America with the original drawings that served as the basis of Cramer's published illustrations. Rendered by the Dutch artist Gerrit Wartenaar Lambertz (1747-1803), these illustrations are generally more detailed than their engraved counterparts. Although Turner & Parnell (1985) stated that they consulted the "original drawings of Cramer," it does not appear that they examined the drawings by Lambertz, but rather used this phrase in reference to the published engravings. Neild (2008) also argued that several characters used to separate these species in Jamaica are "of limited or no value for specific distinction of the continental populations." He found that some of the characters used to identify these species in Jamaica apply to the opposite species in the vicinity of Suriname. Based on this evidence, Neild (2008) designated neotypes, which objectively defined these nominal species as *Papilio evarete*=Tropical Buckeye and *Papilio genoveva* =Mangrove Buckeye. This action overturned the interpretation of Turner & Parnell (1985). Although many of Cramer's references to "Suriname" are erroneous, the similarity of his *Junonia* illustrations to the butterflies of that region strongly supports Neild's conclusions. To help familiarize other lepidopterists with his research, Andrew Neild kindly granted me permission to write this brief article and include relevant images in a comparative format (Figs. 1-12). The original figures by Lambertz have not previously been published.

Neild (2008) asserted that males of *J. evarete* and *J. genoveva* can generally be separated by the color of the ventral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surface of the antennal club. In *evarete* it is usually pale and similar in color to the ventral shaft, while that of *genoveva* tends to be dark brown or brownish-black, contrasting with the color of the shaft. In female *evarete* the ventral club is variable in color, yet the extreme distal tip is usually pale. The ventral club of female *genoveva* is usually like that of the male. Turner & Parnell (1985) did not discuss the genders of Cramer's figured specimens. Pelham (2008) identified both as males, but Neild (2008) concluded that they were likely females, though the figures of *evarete* possess some male characteristics. Despite this assessment, a male specimen was selected to serve as the neotype of *evarete*, as Cramer's written description was based on both sexes and the ventral antennal club of female *evarete* is occasionally darker, resembling that of *genoveva* (A. Neild, pers. comm.). Antennal coloration is seemingly reliable in most areas, but this and other diagnostic features reportedly break down in parts of Mexico (A. Warren pers. comm.) and possibly elsewhere. Hafernik (1982) suspected that these species are involved in a complex pattern of interrelationships that may not easily be reconciled through conventional taxonomic categories. Phylogenetic studies of the genus *Junonia* by Kodandaramaiah & Wahlberg (2007) support the separation of *evarete* and *genoveva* (at least between some West Indian and Brazilian populations), but evidence suggests that additional subspecies and/or species await description within this group (Brévignon 2004, Lamas 2004, Neild 2008). Images of these species from various geographic locations are available on the valuable website, *Butterflies of America* (Warren et al. 2010).

Junonia evarete (Tropical Buckeye) ranges throughout much of the Neotropics northward to the southwestern United States and Florida. Populations in southwestern North America are extremely variable and include the melanistic subspecies *J. e. nigrosuffusa* Barnes & McDunnough, whose status remains unclear (it may involve multiple species). Florida populations are considered to represent the subspecies *J. e. zonalis* (C. Felder & R. Felder). Neild (2008) designated a male lectotype of *Junonia zonalis* from among three syntypes that were collected in Cuba during the mid-19th century by Johannes (Juan) Gundlach (1810-1896). These specimens were mentioned in the original description of *zonalis* by Felder and Felder (1867). The first author to document this butterfly was Sloane (1725), who figured a specimen from Jamaica (Figs. 13, 14). Sloane used no name, but described the species as "A small dark brown colour'd Butterfly, with black spots like Eyes and some rusty marks." He also remarked, "'Tis to be met with plentifully in the Savannas where it frisks up and down taking no long Flight." Butterflies recognized as *J. genoveva* (Mangrove Buckeye) are found over a large portion of the Neotropics northward to Florida and Texas. It occurs locally in Florida along the coast of the central and southern peninsula in association with its hostplant, black mangrove (*Avicennia germinans* (L.)L., Avicenniaceae). Populations in Texas are confined to the southern coast near tracts of black mangroves, but these butterflies are poorly understood and often confused with phenotypes of *J. evarete*. Hybridization in this region between these taxa and *J. coenia* complicates their identification. Northern populations of *J. genoveva* are not taxonomically defined.

Andrew Neild has contributed much to

***Junonia evarete* and *J. genoveva*: Past and Present**

1) dorsal engraving of *Papilio evarete* from Cramer ([1779]). **2)** original dorsal drawing of *P. evarete* by G. W. Lambertz*. **3)** male neotype of *P. evarete* (dorsal) from Suriname. **4)** ventral engraving of *P. evarete* from Cramer ([1779]). **5)** original ventral drawing of *P. evarete* by Lambertz*. **6)** male neotype of *P. evarete* (ventral) from Suriname. **7)** dorsal engraving of *Papilio genoveva* from Cramer ([1780]). **8)** original dorsal drawing of *P. genoveva* by Lambertz*. **9)** female neotype of *P. genoveva* (dorsal) from French Guiana. **10)** ventral engraving of *P. genoveva* from Cramer ([1780]). **11)** original ventral drawing of *P. genoveva* by Lambertz*. **12)** female neotype of *P. genoveva* (ventral) from French Guiana. **13)** dorsal engraving of *J. evarete zonalis* from Sloane (1725). **14)** ventral engraving of *J. e. zonalis* from Sloane (1725). **15)** earliest known specimen of *J. evarete* (dorsal) from Florida. (*© The Natural History Museum, London). **16-18)** *Junonia evarete zonalis*, Miami-Dade Co., Florida: **16)** dorsal male. **17)** dorsal female. **18)** ventral male.

our basic understanding of *J. evarete* and *J. genoveva*. Additional studies of Neotropical *Junonia* will undoubtedly reveal more surprises. Visit *www.thebutterfliesofvenezuela.com* for more information about The Butterflies of Venezuela. A glowing review of the second volume of this book was published recently by Penz (2010).

***Junonia evarete* in Florida.** During November and December of 1981, *J. evarete* was found at several locations in the Florida Keys and in the vicinity of Homestead on the Florida mainland (Baggett 1982a, 1982b, pers. comm.). This was thought to be first documented occurrence of this species in Florida. However, I discovered in the University of Michigan Museum of Zoology a single male of this species from Key Largo, collected on 16 August 1961 by Thomas E. Pliske (Fig. 15). It is possible that *J. evarete* has long occurred in Florida as an irregular colonist, most likely from Cuba, but overlooked because of its similarity to *J. genoveva* and especially the abundant *J. coenia*. The 1961 specimen was found among a series of *J. genoveva*, thus other Florida specimens of *J. evarete* may be misidentified in collections. It is also conceivable that purported Florida hybrids between *J. coenia* and *J. genoveva* (Remington 1968, Scott 1986) include specimens of *J. evarete*. The individual of *J. evarete* found in 1961 was thought to be such a hybrid (T. Pliske, pers. comm.) and I initially mistook individuals of this species to be hybrids when I encountered them on Plantation Key in 1981. Rutkowski (1971) observed on Big Pine Key what he believed were "copulating pairs representing various intergradations" between *J. coenia* and *J. genoveva*. Despite this potential confusion, Marcus (2007) confirmed that the DNA of *J. genoveva* and *J. evarete* from Florida show evidence of hybridization with *J. coenia*.

Junonia evarete remains restricted in Florida to the extreme southern peninsula and Keys, where it inhabits weedy disturbed habitats in association with its hostplant, blue porterweed (*Stachytarpheta jamaicensis* (L.)Vahl; Verbenaceae). Several locations in the Keys where *J. evarete* occurred have been lost to development. This species is now most frequent along the grassy margins of drainage canals in western and southern Miami-Dade County. It is multivoltine and adults can be found throughout the year. They are mainly active during mid-afternoon, when they perch and bask beside low levees that parallel the larger canals (Figs. 16-18). Adults routinely settle on the ground, but are extremely wary and take flight at the slightest provocation. The butterflies briefly visit flowers, especially beggerticks (*Bidens alba* (L.)DC). In late afternoon I have observed both sexes retreating to brushier areas, presumably to rest for the evening. The origin of Florida populations remains under investigation (J. Marcus pers comm.).

Acknowledgements

Thanks are extended to Andrew Neild for his meticulous research, as well as for generously sharing his evidence and supporting this article. He also offered helpful comments on an early draft of the manuscript. Rienk de Jong granted permission to reproduce images of the *P. evarete* neotype. Mark O'Brien photographed the 1961 Florida specimen of *J. evarete* and Thomas Pliske recalled its capture. Linda Cooper provided the photos of living *J. evarete*. Nick Grishin, Jeffrey Marcus, Charlie Sassine, James Scott, John Shuey, and Andy Warren discussed their experiences with *Junonia*. Beverly Pope and John Heppner assisted in obtaining literature. Thanks also to Mark Salvato for directing me to areas in southern Florida where *J. evarete* was recently observed.

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Proposed Amendments to the Lepidopterists' Society Constitution

The following three amendments to the Constitution and By-Laws of the Lepidopterists' Society have been proposed by the Executive Council. A complete copy of the Constitution and By-Laws can be found in the 2008 Membership Directory. If any member has questions or concerns about the proposed amendments they should direct them to the members of the Executive Council. Mailing and email addresses for the Executive Council can be found in this issue on page 75.

Proposed Amendment A

Add to Article III Section 7 at the end of the last sentence:

", except that election of Charter Members, defined in Section 3 of this Article, shall not be limited by this maximum."

Add to Article V Section 3 at the end of the last sentence:

"except that election of Charter Members may exceed the stated limit of two in one year."

Proposed Amendments B

Article VII section 1 shall be amended as follows: In the first sentence delete: "in affiliation with the International Congress of Entomology or the annual meeting of the American Association for the Advancement of Science or at such other" and replace with "at such time and place as the Executive Council may determine."

Article IX, Section 1 shall be amended to include the Web Editor as part of the Editorial Board.

Article XI shall be amended to include the following new sections:

Section 3. The Archivist shall be appointed by the Executive Council. The Archivist shall serve for three years, or until a successor shall have been appointed.

Section 4. the Archivist shall have charge of the archives of Society and shall coordinate with the Librarian with respect thereto.

All uses of masculine pronouns in the Constitution shall be amended to include the feminine as well, i.e. references to "he" shall become "he or she," references to "him" shall become "her or him," etc.

Proposed Amendment C

Article VII of the Constitution shall be amended as follows.

Delete the current Section 2 and replace with the following:

Section 2. The Executive Council may conduct business of the Society between meetings. Actions and decisions of the Executive Council shall be made available to the Society as soon as practicable, but in no event later than the annual meeting following the actions or decisions.

Section 3. A quorum of the Executive Council shall consist of a majority of the active members of the Executive Council.

Section 4. In addition to the annual meeting of the Executive Council, meetings of the Executive Council may be held remotely via conference calls in lieu of in-person meetings. Between meetings, the Executive Council may take actions or make decisions by mail or electronic means, provided: if any member of the Executive Council requests that the matter to be decided or acted upon be put over to a meeting of the Executive Council, it shall not be decided or acted upon until the next meeting of the Executive Council.

Section 5. Whenever a matter is to be decided or acted upon by the Executive Council between meetings, there shall be seven days for discussion of the matter followed by seven days for the votes of the members of Executive Council to be cast. If a member of the Executive Council does not cast a vote during the seven day voting period, it shall be deemed an abstention.

Digital Collecting:

Butterfly Photography and the State of the Art

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Like many young boys I enjoyed exploring the woods, ponds and meadows on the fringes of a growing suburb, looking for any critters I could get my hands on. I brought home garter snakes, salamanders and even some Monarch caterpillars that were successfully raised in a large glass jar in our backyard. But my interest in the study of Lepidoptera came by accident decades later out of a simple but pressing need to organize a rapidly growing collection of digital photographs. For years I carried a camera and macro lens with me as I hiked the temperate rain forests of coastal British Columbia but I never had a particular subject in mind. When I first explored Southern California I struggled to interpret this new environment through my lens before stumbling onto a large colony of *Euphydryas chalcedona* in the San Gabriel Mountains. Surrounded by hundreds of butterflies each intricately patterned and coloured, I found my inspiration and it quickly became the primary subject of my photography.

Occasionally I find myself having to explain why I drove hundreds of miles to find an insect the size of a postage stamp, and it's in these moments I'm glad I take pictures. Nothing explains an obsession with butterflies quite like a well-executed photograph. Its appeal is universal.

The truth is butterfly photographers have it rough. If you're carrying a net or binoculars, you're up against a whole lot less. If we want to come home with decent photos we need to get up close and personal with our subjects. I shoot butterflies with a Digital SLR and have adapted various tools and techniques but my single most valuable gadget in the field is an angle finder. It's a little inverted periscope that attaches to the eyepiece and is responsible for more than half of my successful images. It allows me to approach from the ground up and work effectively mere inches above the earth and rocks where most of my subjects live. Of course the first thing I bought after the angle-finder was a pair of knee-pads… Once you have this ability a whole new world opens up photographically but it's a cruel place for grown-up knees. When I'm shooting Metalmarks for example, I shuffle through the hot gravel on my pads while cradling the camera in my hands, curled over the eyepiece. This creates one solid mass moving slowly towards the insect with no limbs or giant camera moving into their airspace. This is about ten times more effective than coming in from above and stretching out my hand. If I can pull this off and move like the wind, I can become a portrait photographer instead of a paparazzo. Since I won't have the opportunity to view this specimen on a spreading board I want to record the most detailed and complete view possible.

The angle finder lives on a strap around my neck and makes me look like a film director. However, as gadgets go, it's not exactly hi-tech. On the other hand, my GPS unit has no less than revolutionized my digital collection. It hangs off my backpack and all I have to do is turn it on, then connect it to my computer when I get home. Now I can click on an image I shot years ago and within seconds I'm printing out directions in Google Maps. I've even used this data to program proximity alarms into the GPS. Now when I'm traveling one of those long mountain roads where everything starts to look the same, I'll hear a beep and see "*Plebejus podarce cilla*" flashing in bright yellow as it counts down the yards. If you've ever lost track of a little spot you visited some time ago you'll love it as much as I do. Truth is I usually know where I'm going to stop before it beeps but I still think it's cool when it does…and it's saved me enough times to earn it's keep.

In fact Geotagging is just one kind of metadata that makes digital collecting exciting. There are endless possibilities for encoding valuable information, and with the right software tools you can customize this to your needs. I've re-tasked some of the database cells intended for press photographers to store common names, scientific names, gender and plant names. Now I think of it, I could make some to filter larvae and adults since they share the same name… The point is, it's up to me to decide what's important information and how to organize, retrieve and collate the data. The current trend in software design is so-called "Smart Filters" and I'm crazy about them. In Adobe Lightroom I have smart collections for each species by scientific name. As soon as I label a group of photos they automatically populate those collections. Since I'm mostly a weekend warrior I have my butterfly photographs tagged with a weekly number from 1 to 52. Before I head out next Sunday I can see what's been flying this week in previous years along with the locations and species photographed. With a couple mouse clicks I can bring

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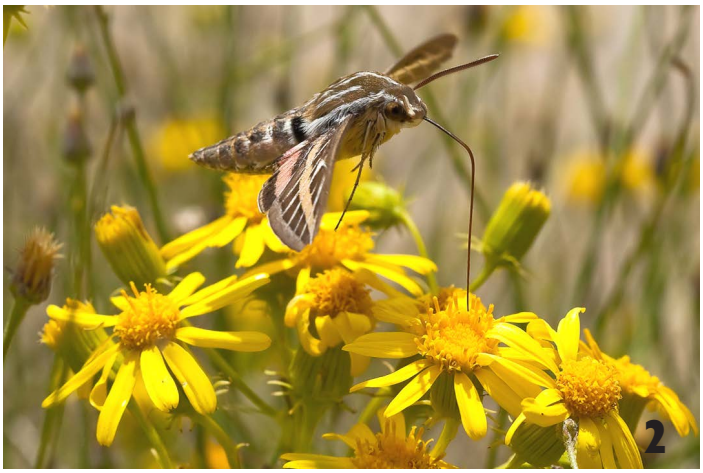

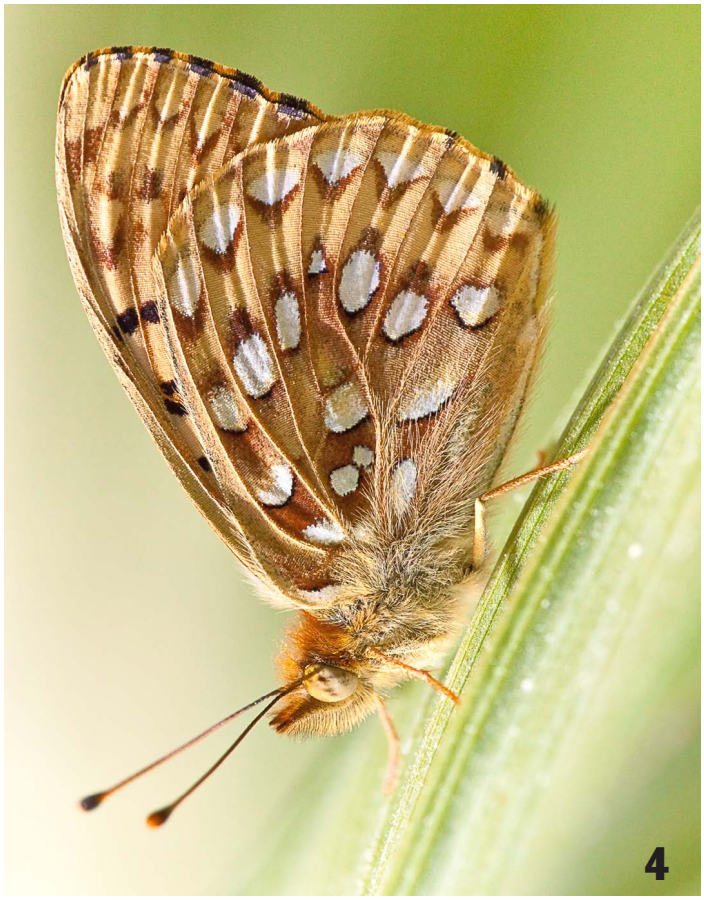

1) Sierra Nevada Blue (*Plebejus podarce cilla*), Sherman Pass, CA, June 28, 2009; **2)** White-lined Sphinx (*Hyles lineata*), Homewood Canyon, CA, April 13, 2009; **3)** Dainty Sulpher (*Nathalis iole*), Little Hell Canyon, AZ, September 8, 2007; **4)** Mormon Fritillary (*Speyeria mormonia*), Sherman Pass, CA, July 26, 2009; **5)** Mormon Metalmark (*Apodemia mormo cythera*) Grizzly Flat, Angeles National Forest, LA Co. CA, July 27, 2008. All photos: David Horner. See back cover for more photos.

Conservation Matters:
Contributions from the Conservation Committee

Under Their Own Steam: The Biogeographical Case Against Butterfly Releases

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Who among us cannot recall a butterfly encountered where we least expected to find it? A range extension, a county or maybe even a state record, a species found way outside our experience of its habitat, elevational limits, or flight period? Such anomalous findings are not only exciting, intriguing, and fun, they are the very stuff of biogeography: the science of what occurs where, and why, or if it doesn't, why not. No branch of biology is more critical these days to conservation, interpretation of climate change and its impacts, and the overall response of organisms to a dynamic world, than biogeography. And few activities are less helpful to biogeographical studies than the deliberate shifting of animals and plants from hither to yon.

We who study butterfly distribution labor today under the thoroughly unhelpful and disruptive practice of commercial butterfly releases. In this activity, mercantile breeders rear livestock to sell for release by schools, at weddings, funerals, and other ceremonies, and the like. Such releases are represented as educational and "green"' to unwitting customers. For example, Anderson (2008) quoted Esther Novis of The Young Scientists Club, "a company that makes a variety of nature kits," as saying "Children want to be more involved with 'saving their earth.'" In the same source, Vanessa Toews, the suitably named representative of Insect Lore, the major shipper of painted lady butterflies, says: "After the metamorphosis has occurred inside the habitat (indoors) [sic], we encourage our customers to release the insect into a natural environment." Never mind that the natural environment might not be suitable for such releases.

Butterfly releases have long been controversial and generally ill-received by both amateur and professional students of Lepidoptera. In an early act of resistance, the presidents of the Lepidopterists' Society, the Xerces Society, and the North American Butterfly Association collaborated to write a letter protesting this practice. Their letter was ultimately edited by NABA, posted on its website, and augmented with additional discussion (Glassberg et al, 2005). Subsequently, Xerces Society staff members and this writer studied the issue in detail and promulgated a new policy on releases, which also summarizes the breeding trade and the overall topic (Pyle et al, 2010). While both of these statements refer to potential genetic, disease, ethical, and other considerations pertaining to releases, the Xerces policy recognizes that the primary problem is biogeographical confusion. This essay concerns only that aspect of the issue.

Proponents of butterfly releases, chiefly those engaged in the activity commercially, argue that their opponents lack data to back up their complaints. They say there is no evidence to prove our contentions. In the case of genetic disruption or diseases, such evidence would entail damage already done, so perhaps the precautionary principle should apply. But when it comes to interference with our understanding of butterfly distribution, the evidence is empirical, ipso facto, and irrefutable: when you take a butterfly from point A and release it at point B, our perception of which butterflies normally occupy point B is automatically skewed: this point cannot logically be argued against: if you want to know what flies where, you don't mess with it.

This has nothing to do with any moralistic view of "natural" vs. "unnatural" distribution. Everything humans do affects the existence of other organisms, and in one important sense, if we consider ourselves part of the biological community, all we do is part of natural history. That doesn't mean that everything we do is acceptable, by standards we establish for ourselves out of our sense of what is good for society and its individuals, and what is not. My argument is that when we knowingly manipulate animals' whereabouts, we lose the opportunity to understand where they occur on their own; and that this has potential consequences worth considering (Pyle, 1998).

USDA policy permits nine species (*Agraulis vanillae*, *Danaus plexippus*, *Heliconius charitonius*, *Papilio cresphontes*, *Papilio polyxenes*, *Nymphalis antiopa*, *Vanessa atalanta*, *V. cardui*, *V. virginiensis*) to be released across state lines, according to a specified matrix that is supposed to keep species within their native ranges (Wehling, 2003). But some of the permitted, so-called "native" territory lies at or beyond the edge of normal distribution of the species involved, so releases there may confuse strays, vagrants, and colonists with resident

"natives." Furthermore, while a species may indeed have been historically recorded from the release destination, that does not mean it occurs there at the time of release: biogeography has a temporal dimension as well as a spatial one, and this is often ignored or forgotten. For example, several years ago a spate of very rare gulf fritillaries (*Agraulis vanillae*) turned up in Ohio (J. Peacock,. pers. comm.), causing great excitement among butterfly recorders. Did they get there on their own, or did they have help? The USDA matrix permits gulf frit release in Ohio. It is easy to see how releases could perturb butterfly monitoring transects, annual butterfly counts, our society's Season's Summary, and many other measures of presence and absence.

The breeders contend that the vast proportion of their trade involves only two species, the monarch (*Danaus plexippus*) and the painted lady (*Vanessa cardui*). That fact fails to comfort me. Let's look first at monarchs. In 1996, I showed that a certain proportion of monarchs found west of the Continental Divide actually migrate into Mexico, against fifty-plus years of received wisdom to the contrary (Pyle, 1999; Brower and Pyle, 2004). Subsequent studies with wild monarchs have confirmed this (Chris Kline, pers. comm.), showing that the western monarch picture (and thus the overall monarch conservation picture) is much more complex than long imagined: we must consider the entire North American migratory monarch phenomenon as an integrated system. Where did that long-held yet erroneous shibboleth of the Continental Divide as Berlin Wall for monarchs come from, anyway? From releases! As shown in Urquhart (1977), it was largely California monarchs, transferred, tagged, and released in British Columbia, and recovered back in California, that gave rise to the notion that all western monarchs winter on the California coast. Urquhart, a great monarch pioneer, ignored other recoveries of wild Idaho monarchs that pointed toward Mexico, while overvaluing those fictive West Coast release recoveries (Pyle, 1999). To this day, certain of his former collaborators fail to grasp the straightforward fact that a monarch taken from A, released at B, and recovered at C, says nothing about what wild monarchs originating at B might actually do, or where they really go.

One of the sensible aspects of USDA release policy disallows mixture of eastern and western monarchs, thanks to a paper by key monarch scientists (Brower et al, 1995). Some have tried to use my results to break down that smart legal barrier. But just because some western monarchs go to Mexico does not mean that the entire East and West monarch kingdoms are panmictic! Clearly, they maintain substantially different evolutionary patterns, and to mix them willy-nilly could be disastrous. At a time when the entire future of the North American migratory monarch phenomenon is more threatened than ever (lowest winter numbers ever recorded in both Mexico and California (Monarch Watch), illegal logging in Mexico (Brower et al, many papers), Roundup-Ready soy and BT corn in the North, development and spraying of milkweed stands (Cherubini, pers. comm.), prolonged drought, climate change, and on and on), it has become crucial for us to understand their continental movements—under their own steam!

When celebrants are misled into thinking that they are doing something ecologically acceptable, even positive, by tossing monarchs into the void at their events, they are in fact party to scientific vandalism; rather than acting "green," they are helping to undermine our ability to correctly interpret the response of wild monarchs to all the challenges they face. This is particularly true in the West, where monarchs are fewer, more scattered, and far less well understood in their migration than in the Midwest and farther east. For just one example, consider the Willamette Valley of Oregon. Showy milkweed (*Asclepias speciosa*) is indigenous north to about Salem. A vigorous program to restore milkweed stands has been underway, at wineries and other open space reserves, to receive summer monarch immigrants. But how can those in charge gain any clear idea of how their efforts are faring, when wedding monarchs are dumped into the environs of Eugene, Salem, and Portland? For all these reasons, it is my strong opinion that monarch transfer and release beyond their county of natural origin should be illegal.

So what about painted ladies? Many people, even among those who despise releases in general, see little harm in the industrial painted lady trade, since "they occur everywhere." But really, they don't. Painted lady immigrations (from a U.S./Canada standpoint, emigrations from a Mexican view) are events of great subtlety and wild annual fluctuations. Most years, painted ladies are absent to uncommon in most places, while other years they close freeways with their sheer numbers. I contend that *Vanessa cardui* comprises one of the great scientific mysteries in American biology, with a great deal still to be learned—except that the system has been utterly compromised by the release of millions of ladies each year by schoolchildren. Eric Metzler (pers. comm.) informs me that in Alamogordo, NM, every year at the Earth Day celebration, hundreds (if not thousands) of painted ladies are released by the local schoolchildren, who reared them for the purpose. Though on a lesser scale, this activity is mirrored across the country. This remarkable migrant and scientifically fecund organism has been reduced to an industrial animal, like *Bombyx mori* or *Gallus gallus domesticus*. Unlike silk moths or chickens, there are still wild painted ladies; but how to tell them in the field from domestic stock, blithely tossed around like so many beads at Mardi Gras? We have, in effect, lost this animal to biogeographical science.

But what I consider a loss to science, others consider a gain in classroom terms. Do the educational benefits of industrial *V. cardui* make up for their

sacrifice in the wild? The answer seems to lie in the eyes of the beholder. I have visited many second-grade classrooms where children loved their painted ladies, and have seen their smiles for myself. But I have seen their tears, too, when disappointed by butterfly death and morbidity from inbreeding depression and disease; and I've heard teachers tell of painted ladies thrashed back and forth on windshield wipers in March sleet after planned but infelicitous release events. I also question the quality of the educational experience. Caterpillars arriving in a box, feeding on agar, pupating indoors, then released at a time and place they may not belong—is this any optimal way to learn about leps? It strikes me as a sadly second-rate take on butterfly lives, compared to local animals subsisting on real plants.

It is indeed harder for teachers to bring wild insects indoors than it used to be: habitats have retreated, administrators discourage field trips, their time is taken with standard tests, and so on. And yet, as Richard Louv shows in *Last Child in the Woods* (1995), children's direct contact with the more-than-human in the out-of-doors is dramatically declining, with baleful consequences (hence our society's Outernet Project). "No child left behind" should be no excuse to give up on "no child left inside." I know teachers who learn the local fauna well enough to expose their pupils to all stages of metamorphosis without resorting to spending scarce district dollars on virtual lab clones masking as butterflies. It may be up to NABA chapters and Lep Soc volunteers, but we should not give up on wild, plant-eating Lepidoptera in our classrooms and schoolyards in place of commercial simulacra, whenever possible. Local wooly bears work fine!

In the meantime, industrial painted ladies may be better than nothing, especially in the city. Respected lepidopterists who subscribe to most of the precepts in this piece believe that *V. cardui* kits furnish valuable exposure for students to butterfly life cycles (D. Wagner, F. Sperling pers. comm.). Maybe so. But would it not be possible to utilize them so, without releasing them? Of course the act of release is cathartic and sentimentally rewarding—I have experienced it myself, and I understand its appeal. For some adults, rearing a butterfly without release is tantamount to *coitus interruptus*. But for kids, keeping them indoors until they die naturally would be a far better lesson than releasing them into inhospitable conditions, or reinforcing that it's OK to plunk critters here and there—bullfrogs out of range, anyone? Should we release classroom koi and cichlids into local ponds? After all, if it is okay to release ladies where we will, why not everything else? It seems to me that setting painted ladies free far from their point of origin just reinforces the idea that animal chess is A-OK. Surely children should learn to respect biotic integrity as a matter of course.

Another good reason to resist transfers of vanessids is that they may be highly instructive of climate change. One recent, mild February, Thea Pyle found an American painted lady along the Columbia River estuary in Washington, and Mike Patterson recorded a *V. cardui* across the river in Oregon: the first Northwest winter records for both. Overwintering red admirals are also increasing in incidence. All three of these highly vagile species can be expected to advance to the north as winters ameliorate. But to what avail their monitoring for such change, in view of releases? When I saw a painted lady in 2008 at Coldfoot, Alaska, on the way to the North Slope, did it get there on its own? (Ken Philip, pers. comm., has very few Alaskan records, and trusts none of them.) The painted lady may already be lost, and I am not naive enough to think the industry based on it will be constrained. I would like to urge responsible teachers, however, not to release them, and to use that decision as a teachable moment in their classrooms.

John Calhoun (pers. comm.) shared a compelling example of the "falsified distribution" that can result from releases, involving *Dryas iulia* in Florida. During a meeting in Gainesville, he and Lee Miller observed a Julia longwing feeding on flowers. As the species is extremely rare in northern Florida, Calhoun captured it with his hands. Later they saw another Julia flying around the present site of the McGuire Center. Soon they discovered that someone had released some butterflies prior to the meeting that "may have included some julias." Challenged on it, the person argued that "the species occurred in Florida, so he didn't see why it was such a big deal." As Calhoun wrote, "Had we not been aware of this release, these specimens would surely be pinned in the McGuire Center and considered to be valuable captures." And what about the cluster of queens that appeared at Tri-Cities, Washington, along the Snake River, not long ago—vanguards of expansion, or mere releases? Such edge-of-range records, if genuine, may sign responses to warming trends. They hold the capacity to teach us a great deal about our shifting climate—unless well-meaning but misguided people mangle the available data through releases.

One misconception often trotted out is that the number of released individuals likely to be recorded must be so low as to be statistically insignificant. Google "butterfly releases," then tell me whether you think the chances of spotting one are "insignificant." Regardless, this attitude belies an ignorance of basic biogeographical practice: biological distribution is not a statistical condition. The basic unit of biogeography is the dot on the map. When the reliability of any one datum is suspect, then no datum can be fully trusted. Thus, every single instance of a released butterfly apprehended means "garbage in" to the data base. Ergo, all releases potentially matter.

Jonathan Pelham, author of the *Catalog of the Butterflies of the United States and Canada* and co-coordinator of the Northwest Lepidoptera Survey, will no longer accept any records of monarchs

from Washington because of their fundamental unreliability thanks to releases. That fact alone should make the case. If not, consider the integrity of our state butterfly surveys, which serve as cornerstones of natural heritage programs and conservation planning. The release of songbirds has been illegal for decades; many feel it is high time to accord equal regard for our butterflies and their unmonkeyed ranges. One breeder told me that since plants are already so mixed up, why not butterflies? Why not indeed? Do we really want our butterfly fauna to suffer the same tossed-salad treatment that our native flora has withstood? If so, release away. The plain fact is, we do not respect and promote the understanding of our native fauna and flora by moving them about like pawns on the landscape map.

Of course, legitimate releases for conservation and reestablishment purposes do occur. These include Oregon Zoo's rearing program for the threatened Oregon silverspots, and endangered mission blue reintroductions in San Francisco. But such exercises will always be rare, well planned, carefully controlled, and fully documented exercises, conducted with full knowledge of the historical range of the species. John Calhoun (pers. comm.) intercepted a nature center's plans to "re"introduce *Eumaeus atala* in a county where it had never actually been known to occur. The project was aborted, but not without expense and embarrassment for the planners More than thirty years ago, the Joint Committee for the Conservation of British Insects adopted a policy against insect introductions, unless carefully researched, planned, and recorded. It is far past time to adopt a similar policy here; but so far, IBBA seems to have USDA's ear more than NABA, Xerces, or the Lepidopterists' Society. That money talks should be no surprise, but that scientific opinion should be ignored is unfortunate. At the very least, a vigorous and open-minded dialogue should ensue, and USDA policies be thoroughly revisited.

In an editorial based largely (and admittedly) on information furnished by commercial butterfly suppliers, the prominent Australian insect conservationist T. R. New (2008) wrote, "there seems to be little confirmed conservation concern arising from…ceremonial releases of butterflies." I hope the present essay suggests to my colleague, friend, and sometime co-author that this statement of his was off the mark. Applied biogeography is one of the greatest tools of conservation, and as such, any activity that interferes with it, as releases do, is a serious concern.

I do not demonize the butterfly breeders and releasers, some of them admired friends. In fact, I am going willingly into the lion's maw this fall, during my book tour for *Mariposa Road*, to speak to the International Butterfly Breeders' Association on the subject of common ground. As well as sharing with me some of the above viewpoints, the president of IBBA, Dale McClung (pers. comm.) has also indicated his and his colleagues' willingness to discuss mutual concerns. Perhaps there are ways we can work together, by making sure all their stock is raised from truly local, wild sources and not shipped outside the county of origin, as the Xerces policy suggests; or maintained indoors in schools. While some breeders are merely in it for the money and might as well be peddling widgets, I believe most of them really love butterflies, as we do. But most did not begin as collectors, and therefore lack our sense of excitement based on butterflies' natural whereabouts. I believe they simply fail to understand the real concerns their activities raise.

Speaking of *Mariposa Road*, when I undertook the first Butterfly Big Year across the USA throughout 2008, it mattered very much to me whether each butterfly I encountered could be trusted to have landed where it was, *under its own steam*. I believe it should matter to us all.

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New Terminology for Describing Mate-Locating Behavior of Butterflies (and Moths), with Examples in Colorado

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Mate-locating behavior is an important, but poorly-reported, subject. Effective mate-locating behavior allows butterfly species to exist at a low density that would lead them to extinction without it. So it is key to the existence of most of the 17000 butterfly species on earth. Yet mate-locating behavior of most of those species is still unknown.

Because of confusion in current names for mate-locating behavior, new unambiguous, simple, and practical names are required. The new names are used here to describe new mate-locating-behavior for some Colorado butterflies, and then are used to describe interesting new mate-locating behavior in some day-flying moths that seem to be involved in mimicry.

Following are the new names for describing mate-locating behavior, first proposed by Scott (2006).

RAIT—males rest (land), wait, and watch at a genetic mating site for females to arrive at that rendezvous site for mating, where males fly out to investigate passing individuals to see if they are receptive females.

FLAIT—males fly around a small genetic mating site (and may occasionally land), to wait for females to arrive at that rendezvous site for mating.

FLEEK—males fly farther (a substantial portion of the habitat) to search for receptive females for mating. Males of both these types investigate individuals they see while flying.

FLENT—males in most moths fly (often far) to find a scent (pheromone) that the female emits to lure the male for mating. (In Hepialidae, the females flent to find the pheromone-emitting males.)

These new names are based on simple combinations of words (Rest to awAIT females=RAIT; FLy to awAIT females=FLAIT; FLy to sEEK females=FLEEK; FLy to locate the female by scENT=FLENT). Each name can be used as adjectives, nouns, or verbs: one can discuss raiting species (or flaiting, fleeking, flenting species) or raiting etc. behavior. Species doing that behavior are raiters (others are flaiters, fleekers, flenters), or one can say that those species or their males rait (while others flait, fleek, flent).

Moths are important too!, as butterflies are just day-flying Ditrysia moths. Most moths flent, as the female emits a scent (pheromone), usually at night, when the male flies around (across the wind to first pick up the scent) to detect the scent, then he zigzags upwind through the scent plume (using the "stereo" scent-detection capability of his two antennae) until he reaches the female, whereupon he releases another aphrodisiac pheromone to convince the female of his conspecificity, and mating ensues. Day-flying males like *Hemileuca* flent to locate females, and can be lured to cages containing virgin females.

These four new words cannot be confused with other words because none are in Webster's unabridged english dictionary, and none are in german or french or spanish or latin dictionaries. So these words are unambiguous, precise, simple, and practical, and will provide a good system for describing the mate-locating behavior of butterflies and other insects, without the ambiguity that now plagues the literature.

But a complete description of the mate-locating behavior of a species includes THREE parts: the method used to bring the sexes together described by the above words (do males rait, flait, fleek, or flent?), where in the habitat they do it, and when they do it. Where do the sexes come together?, on hilltops?, in gulches?, on top of the hostplant bushes?, on rocks at the bottom of a cliff?, for example. When do the sexes come together?, in early morning?, all day?, or late afternoon-evening? To determine these three parts, one must watch males, especially when the males investigate or chase other butterflies or other animals or objects, and note what the male was doing before the investigation (resting or flying?) and where he did it and when.

Why do we need new names? Existing names have problems. I published two papers in 1974 and 1975a on mate-locating behavior of butterflies that introduced names for mate-locating behaviors, and used those names on butterfly species mostly from Colorado. Some other people used those names in print. Unfortunately, I gave names to the main behaviors—"perching" and "patrolling"—that proved unfortunate, because those names have other dictionary meanings, causing great confusion as many people now use those names for different behaviors. And those words are dull, leading many lepidopterists to ignore those names and seek out and use more charismatic words taken from vertebrate behavior that are generally inappropriate for insects (such as territoriality, leks, etc., see below).

The term "perching behavior" was proposed in 1974 for male butterflies that wait at certain sites for females to arrive, and fly out to investigate passing butterflies to see if they are receptive females. But many people use the word "perching" for merely resting (Webster's Dictionary gives half a dozen meanings for "perch", and "vantage point" is only part of one of them), so they use the word "perch" for any insect that sits or rests on a substrate. Or they use the word perch merely to describe the resting substrate (such as a leaf), without intending any description of mate-locating behavior at all. Considerable confusion has resulted, as one does not know what people mean when they write the word "perch".

The term "patrolling behavior" was proposed in 1974 for male butterflies that continuously fly considerable distances to actively seek out receptive females. Again, many people use the word "patrolling" for merely flying (Webster defines "patrol" mainly for a security guard's route, such as a rifle-toting guard walking around his camp perimeter to repel vandals, or an army soldier traveling his route to eliminate revolutionaries). Much confusion resulted, as many people consider patrolling to be merely flying, or they could even use patrolling for a female looking for flowers.

Also, those two terms failed to provide a word for species whose males fly continuously about a small area, where they wait for females to arrive (for instance *Papilio eurymedon*, noted below). One author of several books aggravatingly claims that males of many species patrol to find females, when the male was really just flying about a tiny rendezvous site as does *P. eurymedon*, or he was just doing raiting behavior to await females and then just flew around a bit before settling down to await more passerbys. The new word flaiting provides a precise word for this behavior to avoid confusion with raiting and fleeking.

So those 1974 words perching and patrolling were a failure, because they confusingly have multiple meanings, so they fail to unambiguously communicate the actual behavior, and many people have looked elsewhere for words to describe what they see, creating chaos.

In my 1986 book (Scott 1986) I tried to fix the words, by phrasing them "perch to await females" and "patrol to seek females" to explain them better, but that fix was not enough, as the confusion continued unabated in the literature.

Perching and patrolling words wrongly make it seem that only males are involved in mate-locating. Raiting, flaiting, fleeking, and flenting correctly describe the entire process of locating mates, which involves the males AND the females in a highly-evolved choreographed procedure. In raiters and flaiters, females genetically fly to places where males mate-locate in order to quickly mate so that they can get on with the time-consuming oviposition process. Whole species can be described as raiters, flaiters, fleekers, or flenters.

Another problem with the words perching and patrolling is that they are dull, so they don't excite people into studying or reporting mate-locating behavior. People are naturally drawn to charismatic words, so many people ignore those words and prefer charismatic words such as "territoriality" to describe butterflies, even though such words apply best to animals with actual fighting capability, as noted below.

Unfortunately, most lepidopterists completely ignore the study of mate-locating behavior, so a set of simple precise unambiguous interesting words are needed to encourage its study. Mate-locating behavior has not been reported in European butterfly books, evidently because the old perch and patrol words did not excite Europeans, and did not translate to their languages well. The new words—which should be used unaltered in other languages—will enable precise unambiguous reporting of mate-locating behavior worldwide.

The distraction of "territoriality".

The word territoriality has been a distraction that has prevented lepidopterists from properly reporting butterfly mate-locating behavior. Back in 1974-1975, I argued that butterflies should not be called territorial, because they lack offensive weapons with which to fight, and they are not "pugnacious" or "aggressive" as some people write. And despite a hundred papers since then that either claim butterflies are territorial or use the word to describe their behavior, I still object to the word's use on butterflies.

The basic job of a male butterfly is to approach other objects and determine if they are a receptive female, and then mate with those females. The approach of the male toward a passing individual is basically an investigative maneuver to determine whether it is a receptive female or not (male butterflies need to approach closely because their vision for shapes is not great and they need to get close to use odor especially for identification). The male has no intention of being fierce, he just wants to mate. Obviously, butterflies are not morphologically equipped for any kind of physical attack or defense, with their fragile wings, easily broken-off legs and palpi, long proboscis rather than jaws, non-pinching claspers, weak antennae, etc. Of all the animals on earth, a butterfly is about the least-equipped to fight. If the butterfly even brushes against a tough leaf or twig, scales fly off and part of the wing breaks off, a leg pops off, or a labial palp breaks off. Butterflies have to avoid contact to keep from falling apart. After flying for a few weeks the average butterfly is a wreck, and if it lives for 3-4 weeks its wings are battered stumps. In contrast, real territorial vertebrates have lots of weapons for fighting, including beaks, spurs, feet, big bodies, hard heads, horns, claws, strong tails, trunks, tusks, teeth, venom, poisonous spines, loud noises, etc.

Any statement that mate-locating behavior of butterflies (such as territoriality) is like that of vertebrates

such as bull elephant seals is ridiculous, because there are many differences. A 2000-pound bull elephant seal lumbering down the beach to intercept interloping males that try to mate with females in his harem, and viciously biting them, is obviously actively defending his territory and his females that live there too. The male butterfly is waiting for his female and doesn't have any females there. Butterflies are small in size and have weaker vision, and most of their mate-locating behavior serves to bring them into areas of the habitat where mating success is better than random, which is actually a form of cooperation, unlike the vertebrate system of deliberate interference and competition among large animals that can see and hear where their competitors are and what they are doing. Scott (1974) showed how the behaviors that have been interpreted as territorial (pursuits, vertical flights, raiting males returning to the same spot after a chase, previously-present males remaining longer than new males, etc.) have simpler explanations in terms of mate-locating behavior, such as desire to mate, flight inertia, genetic site choice, predator-avoidance behavior, learned resting site, etc. Many papers claim that if a raiting male butterfly spends more time interacting with another male of his species than with another species, that means they are territorial; but there are simpler explanations for that too. The literature lacks careful study of the details of visual and odor communication when butterflies come close to each other. For example, scientists who claimed *Papilio machaon*-group males are territorial failed to identify and study the perfumelike male pheromone (which females presumably like, whereas a male that smelled that pheromone would not know whether if it was from his own wings so could not use it to distinguish male from female).

Some people have even used the "lek" word on butterflies, which means that they think that butterfly behavior is similar to that of Prairie Chickens or ungulates such as the African Kob, in which males pick an arena and fight to see who can be in the best central position, where the females go to mate. I don't see much similarity between those animals and butterflies either. Those vertebrates are large so they watch each other easily and fight and jockey for position, and the females can see all the males and compare them, in what amounts to a thinking game of strategy. Vertebrates have long lives, and are comparatively intelligent, so they become involved in a game of strategy and intimidation and conquest with others they can see and identify as distinct individuals, who understand and play the same game. Butterflies can't see others of their species too well because they are small and their vision for pattern and shapes is inferior to the vertebrate eye, and they have short lives and their brainpower is rather weak, so they do not recognize each other as distinctive individuals, they are trying to minimize the time it takes to find a mate, they are not trying to win those vertebrate games.

Anthropomorphism is a problem in mate-locating behavior, as people who write about butterflies naturally assume that butterflies have the same motives as humans. That's why we need names for mate-locating behavior that apply to insects, and are not inappropriately lifted from vertebrates. (Anthropomorphism plagues all aspects of entomology, as insect conservation is regulated by inappropriate deer laws that misapply hunting limits to punish collectors rather than provide the insects with the land that they really require to survive.)

Of course, if someone's definition of territoriality is so loose—permitting cooperative avoidance or slight time-and-motion interference to substitute for active fighting defense of a territory—then butterflies do qualify as being territorial under that loose definition. However, readers of papers will not know what is meant by the word "territorial" when the definition of it varies so much from that weak butterfly extreme to the bull elephant seal, so the "territorial" word conveys almost no useful information.

There is another problem with the word territoriality in butterflies: *The word territoriality is not practical for butterflies,* because a laborious mark-recapture study is required to prove it. It is not "operational". A casual observer could call all the raiting species "territorial", but mark-recapture study shows that many of these are NOT territorial even with the most liberal definition of the word. When I marked and released butterflies of eleven raiting "perching" species and fleeking "patrolling" species, I found that population movements of the raiting species differed, and in some species were as great as some fleeking species (Scott 1975b). Rutowski et al. (1988, 1991, 1997) found that the raiting butterfly *Asterocampa leilia* looks territorial at first glance but the males stay at one spot only ~30 minutes. So to label a butterfly territorial, you must not only show that males rait or flait to await females, you must also do a laborious mark-resighting study to actually prove that the males stay in one spot. Mark-recapture studies were popular in the 1970s and 1980s, but are rarely done now. A very loose definition of territoriality would be required to label a male as "territorial", when he then flies dozens or hundreds of meters away and repeats the same "territorial" behavior there.

In contrast, the words raiting, flaiting, fleeking, and flenting are practical and operational, as well as precise and unambiguous, so are easily applied to butterflies with minimal fuss. One must merely observe males in nature and watch them investigate/chase/pursue others, and note whether the male was resting or flying prior to the interaction, and note the location where they did that, and the time of day when they did it. It doesn't take weeks; it may take just a day or two if bugs are common and weather is good. The most difficult part of the complete description of a species' mate-locating behavior is determining the time of day of mate-locating behavior, because afternoons

might be cloudy or too hot to observe normal behavior for instance, so it may take time to accumulate suitable observations during all parts of the day. (Some butterflies such as *Vanessa* and *Polygonia* only mate-locate late in the day and early evening, while others such as *Neominois* and *Poladryas* and *Notamblyscirtes* only mate-locate in morning.)

There is another practical reason why the use of the word "territorial" on butterflies is objectionable. Many of the people who use this word on butterflies manage to describe in their publication how males look for females (now termed raiting, flaiting, or fleeking), but they often fail to describe where in the habitat they do it, and they usually fail to state the hours during the day when the butterflies mate-locate. These authors are so focused on proving the existence of territoriality, that they fail to give an adequate description of mate-locating behavior. So the word *territoriality seems to be a definite distraction*, an impediment to proper reporting.

Thus the word territoriality as used in vertebrates very doubtfully applies to butterflies in an informative way, is totally impractical to use so can't be part of regular lepidopterological practice anyway, and frequently distracts from the proper reporting of mate-locating behavior. If you want to do a mark-recapture study to prove what you consider to be territoriality, great. But don't let it be just a distraction; make sure that you report the basics of butterfly mate-locating behavior: the method used (raiting, flaiting, or fleeking), where they do it, and when they do it.

Examples of these mate-locating behaviors in Colorado butterflies, including new findings. Scott (1975a, 1986) reported mate-locating behavior for most Colorado species. Interesting phenomena were found, for instance several dozen pairs of sympatric species are known in which one butterfly species mates on hilltops, and the close relative mates in gulches, which speeds mate-location and avoids mating interference. *Neominois ridingsii ridingsii* males rait on small ridgetops in early morning, and I recently named *Neominois ridingsii wyomingo*, which also raits in early morning but does it in swales (these butterflies overlap in range by 500 miles so are often considered species, though they fly two months apart so there is no evidence of reproductive isolation). Also, *Oeneis chryxus* recently proved to be two separate species: *chryxus* raits on hilltops all day, and females oviposit on twigs above sedge turf beneath trees, whereas the new butterfly I recently named *altacordillera* raits in swales all day and females oviposit on meadow grasses/sedges; *altacordillera* ranges throughout the Rocky Mountains sympatrically with *O. chryxus*. These new taxa were discovered in no small part because of their distinctive mate-locating behavior.

Flaiting behavior has proven to be typical of some species, proving that we really do need this flait word. The classic example in Colorado is *Papilio eurymedon*, whose males flait in little forest lanes among trees on ridgetops and hilltops. The males fly all day approximately 2 m above ground, slowly, about little clearings among Ponderosa Pine/Douglasfir trees, and wait for females to arrive there for mating. *Pyrgus communis* often raits on low vegetation in low weedy spots all day in Colorado, but most often seems to flait 5-15 cm above ground at those spots, whereas in the Sacramento Valley California, Shapiro (2007) describes them as raiting well above ground up to waist height; this difference is intriguing, in a confusing species perhaps containing the uncertain-status taxon *albescens* (which Shapiro notes has non-concordant mtDNA similar to Sierra Nevada *communis*).

Fleeking behavior is typical of many or most butterflies. Most Pieridae fleek, including *Colias scudderii* which fleeks rapidly about open valleys with shrub willows and *Vaccinium* all day, and *Pontia beckeri* which fleeks in gulches all day, whereas *P. callidice occidentalis* fleeks on hilltops/ridgetops all day. Nearly all blues (Polyommatini) fleek about the habitat near their hostplants. However, *Plebejus glandon rustica* is rather uncommon in the foothills of the Front Range in Colorado, where at Tinytown males generally rait all day near the ground in slight depressions on the lower end of open slopes where their host *Androsace septentrionalis* occurs. Similarly, *Plebejus melissa* and *P. atrapraetextus sublivens* often fleek about the host, but males often (frequently in the latter) rait near the ground in tiny gulches in valley bottoms (sometimes on hillside trails) all day. And *Leptotes marina* males fleek about their host in alfalfa fields etc., but also rait on ~70 cm tall plants in a small valley bottom meadow all day in Wheatridge Colorado (every year I can find a male there, when no others can be found). And *Cupido "Everes" amyntula* males fleek about their habitat, but also rait near the ground in small depressions in valley bottoms, all day.

In most fleeking species, males search throughout the habitat near the hostplants. But many species fleek in gulches, for example *Papilio multicaudata* and *Anthocharis sara* (& *A. julia*) fleek in gulches all day. *Papilio glaucus rutulus* fleeks high about the canopy of riverside *Salix* and *Populus* host trees, and fleeks about north-facing slopes where *Populus tremuloides* grows, but it then frequently arrives at the hilltop above, and there it flies slowly in a small wooded lane or along a line of trees for a time before departing downslope (fleeking behavior rather than flaiting as it soon departs)(*P. glaucus glaucus* has been reported to hilltop like this also in eastern U.S.); thus its behavior shows hints of the behavior of both *Papilio eurymedon* (which flaits in ridgetop/hilltop forest clearings) and *P. multicaudata*.

Raiting (and flaiting) species generally choose rather specific sites in the habitat to mate-locate, because that strategy genetically places males in

those special sites and then sends virgin females to the same spots to mate, increasing mate-location efficiency. The sites chosen may be hilltops, or gulches, or tall treetops, or special nooks in vegetation or topography that may be highly characteristic of the species yet difficult to describe in words.

Hilltopping has gotten a lot of publicity as a mating site, while other mating sites have been unfairly ignored. Actually, for every butterfly mating on hilltops there are others that mate in other sites such as gulches. For example *Phyciodes pallida*, *Paratrytone snowi*, *Hesperia juba* and *H. viridis* rait in gulches all day (the similar *H. nevada* and *H. pahaska* rait on hilltops) as do all the true *Amblyscirtes* (I renamed "*Amblyscirte*s" simius as *Notamblyscirtes*, because it raits on hilltops from 7:40-10:50, and has many other huge differences from real *Amblyscirtes*). *Epargyreus clarus* males rait in gulches (and backyard clearings) from 7:30-13:15, then later in afternoon they just hang from leaves of bushes to save energy. Hilltopping is an accepted word, so analogous words such as "gulching" should be used also.

Hilltops are the preferred mating sites for many butterfly species, especially raiters, and for some flaiters and fleekers also. But a few of the raiters mate-locate not on the very top, but just off the top: *Papilio indra* males rait preferably on rocky places just below the hilltop or mesa top (frequently on the side or below a cliff) all day. Similarly, *Aglais milberti* raits usually on rocky places just below a hilltop, from late morning to 17:00 (if there are no rocky places both species will choose the middle of a clearing off the hilltop). *Thorybes pylades* raits all day among shrubs or small trees typically a few meters off the very top of the hill. *Stinga morrisoni* males rait all day on hilltops, but not on the very top, generally near the ground next to shrubs or trees near the hilltop.

Some hairstreaks rait on top of prominent trees (on hilltops when available), such as *Atlides halesus* from ~12:00-19:30, *Erora laeta quaderna* at least in afternoon, and *Callophrys spinetorum* all day. Tropical workers complain that most hairstreaks there are rare; probably most of the males are raiting on top of the tallest nearby trees, frequently late in the day, and one would need a giant crane to see them. *Strymon melinus* males rait on small trees & shrubs especially on hilltops from 13:00 to dusk. *Satyrium californica* males rait on top of trees on hilltops from 14:00 to dusk, while its relative *S. sylvinus* males rait on low plants near their hosts (and seldom patrol about their hosts) in valley bottoms from 9:50-15:00. Other hairstreaks fleek: *Hypaurotis crysalus* males fleek over the canopy of their oak hostplants from 14:00-18:30, mostly in cloudy conditions, and look for the violet-ultraviolet color of basking females. *Phaeostrymon alcestis* fleek over the canopy of their host trees from about 14:00-18:00, mostly in sunnier conditions, looking for their drab females.

The *Papilio machaon* group species (*polyxenes*, *zelicaon*, *machaon bairdii*, etc.) rait and flait on hilltops all day; they usually flait if there are frequent disturbances/chases, when males are in flight most of the time.

Nymphalis antiopa generally raits in gulch (or backyard) clearings, from late morning to late afternoon, but males also rait in little clearings in woods just N of a hilltop (maybe such sites partially resemble a gulch on the hilltop side).

Apodemia nais males mate-locate from about 8:50 to 14:30, by raiting in small gulch mouths & hillside depressions, and also fleek about the host *Ceanothus* bushes. *Erynnis pacuvius* & *E. martialis* usually rait on hilltops all day, but where hillside forest has burned and host *Ceanothus* and butterflies are common, they fleek about the host.

Finally, *Atrytone arogos* is a peculiar species, because it is nearly always observed looking stupified clinging and sucking on flowers such as *Asclepias* and alfalfa. Many days of effort finally revealed that males rait on short (10 cm) vegetation at the gently-sloping bases of hillsides covered with the host *Andropogon gerardi*, only in late afternoon (13:20-17:45) in cloudy weather, when they vibrate their wings to get warm and their investigative flights are astonishingly fast (usually too fast to follow with the eye).

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Flaiting Behavior on Hilltops in Day-Flying *Alypia* species (Noctuidae, Agaristinae) that form a Mimicry Complex with *Anania funebris* (Pyralidae) and Bumblebees

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Abstract. *Alypia langtoni* & *A. ridingsi* males flait on hilltops in Colorado to await females, by flying slowly over bushes (mostly *Juniperus*) on the very top of the hill, in late morning through afternoon in *A. langtoni*; in early to late afternoon in *A. ridingsi*. In contrast, *Alypia octomaculata* males flait over special bushes at the side of a gulch, or fleek over the hostplant in valley bottoms. These species seem to be involved in a mimicry complex with bees that have pollen baskets on their hind legs, and with *Anania funebris* (Pyralidae).

During 50 years of observing butterflies, mostly in Colorado, I have studied dozens of butterfly species and a few species of flies etc. that mate-locate on hilltops. But only a few moths were observed to do so, specifically several small day-flying white-and-black Agaristinae. The behavior of these is discussed here, along with their possible participation in mimicry with bees and a Pyralid moth.

Improved mate-locating terminology is used (see the previous note, and Scott 2006): raiting behavior involves males resting at characteristic sites and flying out at passing objects to see if they are females, while females fly to those rendezvous sites to mate; flaiting behavior involves males flying about small characteristic sites to see if they are females, while females fly to those rendezvous sites to mate; fleeking behavior involves males flying about a larger area to seek females for mating. No matings were seen of these moths, but chases between males were observed for all *Alypia* species. Times are 24-hour standard time. Samples of these moths were collected for identification and deposited in the Gillette Museum of Arthropod Diversity, Colorado State University, Fort Collins, Colorado.

Alypia langtoni Couper is a small black moth with large spots, which are yellowish on the forewing and whitish on the hindwing. Twenty-six *A. langtoni* were collected: May 15-July 22 (mostly in June) in Jefferson Co. Colo. (Mt. Lindo near Tinytown, Crawford Gulch, Mt. Falcon, Indian Gulch, Eldorado Mtn.); Hideaway Park, Grand Co. Colo., July 2, 1996; Rabbit Ears Pass, Routt Co. Colo. July 7, 1989 1f; Coffee Park, Sioux Co. Neb. June 25, 1994. About 50 or more *A. langtoni* males were observed in flaiting behavior in Jefferson Co. Colo. Males flew over the canopy of bushes on the top of hilltops, usually *Juniperus scopulorum*, but sometimes over *Juniperus communis*, *Quercus gambelii*, or a combined *Q. gambelii*/*Prunus virginiana* bush (growing together), except three males flew near the ground on the hilltop, one of them under a *Pinus ponderosa* tree. Like butterflies that choose small sites for mate-locating, the peculiar choice of preferred bushes seems to be a genetic characteristic of the species. For instance the same *Juniperus scopulorum* bush was chosen over many years on Mt. Lindo. The *A. langtoni* males performed this flaiting mate-locating behavior from late morning through afternoon (recorded times were 11:30, 11:32, 12:20-13:43, 12:27, 12:31, 12:52, 13:00, 13:00-15:00, 13:43, 13:50, 14:13, 14:25, 14:47). *A. langtoni* was seldom seen doing other behavior. A male was observed on a yellow *Aletes acaulis* flower on a hilltop. A male was observed associated with *Parthenocissus inserta* in Indian Gulch, perhaps a hostplant? (*Vitis riparia* also occurs in that gulch). A female was observed flying around a *Prunus virginiana* bush in a gulch at Tinytown. Hostplants are *Epilobium* (Covell, 1984).

One male tentatively identified as perhaps *A. langtoni*? was found flying over a *Juniperus* bush in the town of Boulder, Colo., May 3, 1993.

Alypia octomaculata Fabricius is very similar in appearance to *A. langtoni*, although the yellowish spots are larger on the forewing, and the yellowish tegulae are larger. This species has large orange leg segments that resemble the pollen basket of a bee or bumblebee, presumably in Batesian Mimicry to avoid being eaten. Males of this species were observed to flait over special bushes in valley bottoms. At Indian Gulch, Jeff. Co., June 18, 1994, numerous males were observed flaiting, as they flew over the canopy of a small flat-topped *Celtis reticulata* tree on the S-facing side of the gulch bottom about 4 m from the gulch bottom, and chasing each other there, from 12:15 to 14:00. They seemed to like just this one tree and I learned to place myself on the slope just above that tree in order to finally catch a few for identification. At Wheatridge, Jeff. Co., I found several adults July 11-14, including one nectaring on a *Cirsium arvense* flower. A hostplant, *Vitis riparia*, occurs at both these sites. In a valley bottom E

of Ralston Res., Jeff. Co., June 13, 1991, numerous adults of both sexes were fleeking over a *Vitis riparia* plant growing on a fence, plus *Humulus lupulus* and *Clematis* plants also growing on a fencerow. Similar behavior was seen in Nebraska (I-80 SE Cozad, Dawson Co.), where males fleeked over two *Vitis riparia* vines and an adjacent *Salix exigua* bush on a fencerow at 15:30. (The word fleeking is used rather than flaiting, on the presumption that males fly on to other such hostplants in the habitat [though such movements have not been studied], and the flaiting behavior noted above was apparently a genetic site for mate-location and not a host.) Grapes (*Vitis*) and *Parthenocissus quinquefolia* are reported to be hosts (Covell, 1984), but I have never found it on the latter, which is a common vine growing on fences and poles and bushes and buildings in metropolitan Denver, Colo.

Alypia ridingsi Grote looks roughly similar to *A. octomaculata*, but all the wing spots are whitish, and the three forewing spots are crossed by black veins. Nearly 100 were seen mate-locating, and 35 were caught for identification (at Tinytown, Mt. Falcon, and ridge E of Crawford Gulch, all Jefferson Co. Colo., from May 11-June 26 [mostly mid May-early June]; at Jarre Can., Douglas Co. Colo. Apr. 30, 1981; and Rush Creek, 4300', Washoe Co. Nev., May 25, 1974). Like *A. langtoni, A. ridingsi* males flaited over the canopy of small trees on the top of hilltops in Colo., usually over *Juniperus scopulorum,* but over *Juniperus communis* on Mt. Falcon, and over a *Prunus virginiana* bush just N of a hilltop cliff (next to the top) E of Crawford Gulch. The mate-locating period of *A. ridingsi* is clearly shorter than *A. langtoni*, early to late afternoon from 12:10-14:40 (based on 16 recorded times: 12:13-14:40, 12:10-14:40, 12:13, 12:20-13:43, 12:14, 12:13, 14:19, 14:04, 12:48, 12:30-13:10, 13:54, 14:30, 13:02, 12:13, 14:36), except for one anomalous record of a male flying over *J. communis* on Mt. Falcon at 10:15 (which perhaps was not mate-locating behavior). About six males were seen to nectar on pink *Ribes cereum* flowers near a hilltop. Two females were found, one in a gulch bottom, the other flying erratically in a meadow.

Androloma maccullochii Kirby (Agaristinae) is similar to *A. ridingsi*, but the hindwing spots (as well as those on the forewing) are also crossed by black veins. Six males were found (3 in a gulch at Tinytown in Jeff. Co. May 11-26, 1984-89; 3 on a flat area E of Buffalo Pass, Jackson Co. Colo., July 12, 1996), but none were seen mate-locating. One was on a yellow *Barbarea orthoceras* flower at Tinytown. Hostplants are fireweed (now called *Chamerion* by some botanists) and other *Epilobium* (Covell, 1984).

Mimicry with Bees and the Pyralid *Anania funebris*. The legs of *A. octomaculata* resemble the legs of bumblebees that have conspicuous pollen baskets on their hindlegs (the basket consists of several comblike rows of setae into which the bees stuff pollen collected by their anterior legs, in order to store it to transport it back to their nest), which suggests that adults of these moths may be involved in some kind of Batesian mimicry complex with pollen-collecting bees. All four of the Agaristinae species herein are similar in wing appearance, but that might be due to close taxonomic relationship. Their wing pattern evidently serves as camouflage in flight, because the wing beats of these moths are fairly rapid, which together with the black-and-white coloration seems to make these moths fairly difficult to see when they are flying in tortuous paths just above the canopy of the trees and bushes. As a result, they are not easy to catch with a net.

I caught a dozen other species of small partially-white moths in the foothills of the Front Range during the daytime in Colorado, but the appearance and size and habitat of most of these is not similar enough to the Agaristinae to suggest there is any kind of mimicry.

However, one of the commonest of these moths is *Anania funebris glomeralis* (Wlk.)(Pyralidae), which is fairly common in the gulches of the Front Range in late May-June. It is black with pale-yellowish-white spots, and looks almost exactly like *Alypia langtoni* and *octomaculata*, and even has white tegulae and white hindlegs similar to the latter! This total wing & body similarity suggests some kind of mimicry of *Alypia* and the bees. *Anania* has a fairly weak flight, and many of the adults I have seen were found sipping mud in gulch bottoms. 32 adults were collected (at Tinytown & Mother Cabrini Shrine & Apex Gulch [seen] in Jefferson Co. Colo. from May 26-July 13 [mostly June], and Hayden, Routt Co. Colo. July 15, 1985). One was found on a yellow *Barbarea orthoceras* flower, and one on a pink *Ribes inerme* flower. Its hostplant is *Solidago* (Covell, 1984).

This evident mimicry complex should be investigated, and possible poisonous compounds in the hostplants determined. But the close similarity of these moths and their apparent mimicry with bees seems to represent good circumstantial evidence that they form some kind of mimicry complex.

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Membership Update...

Julian Donahue

This update includes all changes received by 27 May 2010.

"Lost" Member

(publications returned: "temporarily away," "moved," "left no address," or "addressee unknown"):

Yanek, The Ven. John, D.D. (Santa Barbara, California)

New and Reinstated Members:

members who have joined/renewed/ been found/or rescinded their request to be omitted since publication of the 2008 Membership Directory (not included in the 2008 Membership Directory; all in U.S.A. unless noted otherwise)

Allen, Robert T. (Ph.D.): 417 East Old Shakopee Road, Apt. 107, Bloomington, MN 55420-4955.

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Davis, Nicky: 601 Stokes Avenue, Draper, UT 84020-9238.

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Watson, Adam: [address omitted on request]

Williams, Thomas S.: 1320 Boulevard of the Arts, Apt. 205, Sarasota, FL 34236-4983.

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Leski, Michael (Ph.D.): 301 North Riverwalk Drive, Apt. 606, Buffalo Grove, IL 60089-1895.

Mazry Jacob, Pedro A. (Dr.): Independencia 571, Linares, Chile.

Shuey, John A.: The Nature Conservancy, 620 East Ohio Street, Indianapolis, IN 46202-3811.

Metamorphosis...

William D. Hartgroves, of Charles Town, West Virginia, from throat cancer at the age of 77, on 21 October 2009. Mr. Hartgroves had been a member of the Society since 1973. [info from Jean K. Hartgroves]

NEW MEMBERSHIP DIRECTORY NOTICE

The Society publishes a new Membership Directory every two years. Production of the 2010 edition will begin (and end) in October 2010. If your interests, address (including e-mail address), or phone number have changed recently, don't forget to notify me soon, so that your entry in the Membership Directory will be as accurate as possible. Our present membership software allows me to send members a "screenshot" of their record for review; we hope to have new software by October, and I'm not certain that I will be able to provide a screenshot in the future. Stay tuned. Julian P. Donahue, ***Julian@Donahue.net***

The Marketplace

***IMPORTANT NOTICE TO ADVERTISERS:* If the number following your advertisement is "521" then *you must renew your advertisement* before the next issue! Remember that all revisions are required in writing.**

Books/Videos

New book on American butterflies: R.R. Askew &P.A. v.B. Stafford: Butterflies of the Cayman Islands. Hardback, 24x17cm., 172 pages incld. 6 color plates and 119 color photos. Maps and other figures. US $69.50. Also available: Larsen: Butterflies of West Africa. Hardback 28x21cm.865 pages in two volumes. 125 color plates depicting 1,400+specimens. US $276.00. Monastyrskii: Butterflies of Vietnam, softcover, 21x15cm., Vol. 1: Satyrinae. 199 pages incl. 35 color plates, US $64.00. Many others available. Visit website: www.apollobooks.com or contact Peder Skou, Apollo Books, Kirkeby Sand 19, DK-5771 Stenstrup, Denmark, or ask for a copy of our 2009-10 catalogue. 514

For Sale: High quality critically aclaimed book, The Butterflies of Venezuela, Pt. 2 (Pt. 1 also in stock). 1451 photographic figs.(84 color plates) display all 196 species (355 subspecies) of Venezuelan Acraeinae, Ithomiinae, Libytheinae, Morphinae, and Nymphalinae. 8 new species, 91 new subspecies. Laminated hardback. Details/reviews, sample plates at: www.thebutterflies ofvenezuela.com Price GBP £110 (+ p&p). Please contact the author/publisher, Andrew Neild: 8 Old Park Ridings, London N21 2EU, United Kingdom; tel: +44(0)20 8882 8324; email: andrew.neild @blueyonder.co.uk 522

For Sale: Butterflies of Southern Amazonia, a photographic checklist. A spiral bound book with 350 color pages, 8 photos/page, of almost 1,350 species from southeast Peru and Rondonia and Mato Grosso, Brazil. Mostly live photos but includes some specimens too. $98 plus shipping $7.50 in the US or $16 international. You can order it with a credit card or by paypal at www.neotropicalbutterflies.com, or contact Kim Garwood at kimgrwd@sbcglobal.net, or mail a US check to Kim Garwood, 721 N Bentsen Palm Dr #40, Mission TX 78572. We also have Butterflies of Northeastern Mexico, for the states of Tamaulipas, Nuevo Leon and San Luis Potosi, Mexico. This includes over 600 species, one third of the Mexican species. The cost is $30 plus shipping. 522

Specimens

For Sale: Eggs: Saturnidae: Automeris amanda tucanmana, Copaxa flavolla, Syssphinx molina plus other Saturnids from Argentina. Papered specimens of butterflies (all families), Saturnidae or Sphingidae, alsom some beetles. For a list of all Argentina species, please write or email to Nigel South, Mis Montanas, Los Robles 1818, Villa Los Altos, Rio Ceballos 5111, Cordoba, Argentina. Also collecting trips in Argentina from September to May. Contact Nigel South for further details. Email: butterfly connections@hotmail.co.uk 514

For Sale or Trade: Very rare Propomacrus davidi (China) Yoshiaki Furumi, 97-71 Komizo, Iwatsuki-Shi, Saitama-Ken, 339-0003 Japan 514

Wanted: Want to purchase butterfly collections U.S./non-U.S., common/

The aim of the Marketplace in the **News of the Lepidopterists' Society** is to be consistent with the goals of the Society: "to promote the science of lepidopterology...to facilitate the exchange of specimens and ideas by both the professional worker and the amateur in the field,..." Therefore, the Editor will print notices which are deemed to meet the above criteria, *without quoting prices,* except for those of publications or lists.

No mention may be made in any advertisement in the **News** of any species on any federal threatened or endangered species list. For species listed under CITES, advertisers must provide a copy of the export permit from the country of origin to buyers. **Buyers must beware and be aware.**

Only members in good standing may place ads. **All advertisements are accepted, in writing, for two (2) issues unless a single issue is specifically requested.**

Note: All advertisements must be renewed before the deadline of the third issue following initial placement to remain in place.

All ads contain a code in the lower right corner (eg. 481, 483) which denote the volume and number of the **News** in which the ad. first appeared. ***Renew it Now!***

Advertisements must be under 100 words in length, or **they will be returned for editing**. Ads for Lepidoptera or plants must include full latin binomials for all taxa listed in your advertisement.

Send all advertisements to the Editor of the News!

The Lepidopterists' Society and the Editor take no responsibility whatsoever for the integrity and legality of any advertiser or advertisement. Disputes arising from such notices must be resolved by the parties involved, outside of the structure of The Lepidopterists' Society. Aggrieved members may request information from the Secretary regarding steps which they may take in the event of alleged unsatisfactory business transactions. A member may be expelled from the Society, given adequate indication of dishonest activity.

Buyers, sellers, and traders are advised to contact your state department of agriculture and/or PPQAPHIS, Hyattsville, Maryland, regarding US Department of Agriculture or other permits required for transport of live insects or plants. Buyers are responsible for being aware that many countries have laws restricting the possession, collection, import, and export of some insect and plant species. Plant Traders: Check with USDA and local agencies for permits to transport plants. Shipping of agricultural weeds across borders is often restricted.

rare. Contact: Brad Black, 2777 Carrington Street NW, North Canton, OH 44720-8163. email: doc3girls @aol.com 514

For Sale or Trade: Very rare Parnassius a. przewalskii, i. imperatrix, Propomacrus davidi (China). Yoshiaki Furumi, 97-71 komizo, Iwatsuki-Shi, Saitama-Ken, 339-0003 Japan 522

Research

Material needed for research project on geographic differences in Lophocampa maculata. Eggs, larvae (all instars) or adults useful. Will pay for shipping. Please contact Ken Strothkamp, Chemistry Dept., Lewis & Clark College at kgs.lclark.edu 514

Seeking egg masses of the Catalpa Sphinx, Ceratoma catalpa (Sphingidae) for research on the chemical ecology of this species. Please contact Deane Bowers at: deane.bowers@colorado.edu or (303) 492-5530. I am happy to reimburse for express shipping. Send to: Deane Bowers, Dept. of Ecology and Evolution, Ramaley N122, UCB 334, University of Colorado, Boulder, CO 80309. 514

The Ecoinformatics lab of Dr. Jeremy Kerr at the University of Ottawa is conducting an analysis of mobility for butterflies in Canada. In the absence of experimental mobility data for the vast majority of species, I will rely on the cumulative knowledge of Canada's lepidopterists to construct a mobility index. I am distributing a survey to people with field experience with butterflies and skippers of Canada. Surveys of lepidopterists in the UK and Finland have produced mobility estimates remarkably similar to those obtained from field experiments. If you have field experience with Canadian butterflies then I hope you will take the time to complete my survey. Visit: www.science.uottawa.ca/~jfitz049/survey.html for more information on this project and to download the survey. Email me: rburk091@uottawa.ca with any questions or comments you may have. 514

Equipment

A new Light Trap with Plastic or Aluminum Vanes: 12 VDC or 120 VAC with 15 Black Light or the new 36 Watt CF Twin Tube plasma UV. Rain Drain and Beetle Screens, Photoelectric Switch are optional. New Self Ballast Mercury Vapor Lights 250 Watt, 500 Watt and 750 Watt. New Tropics Bait Traps: 12 inch diameter 42 inches in height with a six inch cone top. Mosquito netting in Forest Green, Camouflage or White. A Plastic platform is suspended with plastic eye bolts and S hooks. Available in Tropical style for butterflies and flat bottom style for moths. Traps weigh less than 6 ounces. Excellent for travel to the tropics. For more information, visit our web site at: www.leptraps.com, or contact Leroy C. Koehn, Leptraps LLC, 3000 fairway Court, Georgetown, KY 40324-9454: Tel: 502-542-7091 522

Livestock

For Sale: Captive bred Philippine butterfly pupae, year round. Imogene Rillo, P. O. Box 2226 Manila 1099 Philippines email: clasinse@mindgate.net 522

Announcement

The 6th International Conference on the Biology of Butterflies will be held at the University of Alberta, Edmonton, Canada from June 29 through July 2, 2010. This meeting has been held at irregular intervals since 1981 and recognizes the role that the study of butterflies has played in our understanding of both evolutionary biology and ecology. The meeting will include Symposia, Contributed Papers, Posters, Banquet and Field Trips.

For those wishing attend this meeting, and anyone wishing to present a Contributed Paper or a Poster, please view the Conference webpage at:

http://www.biology.ualberta.ca/biobutterfly2010

Announcement

The Lep Course: A comprehensive Introduction to Lepidoptera Identification and Classification August 7 - 14, 2010.

Held at the SouthWest Research Station in the Chirichahua Mountains in SE Arizona (a 2 1/2 hour drive from Tucson), the focus of the lep course is to train graduate students, post-docs, faculty, and serious citizen-scientists in the classification and identification of adult lepidoptera and their larvae.

Topics to be covered include an extensive introduction into adult and larval morphology with a focus on taxonomically-important traints, extensive field work on both adults and larvae, collecting and curatoral techniques, dissection and preparation, larval classification, use (and abuse) of DNA bar coding, and general issues in lepidopteral systematics, ecology, and evolution. Course is limited to 16 students. Tuition is $900 for students and $1,000 for non-students. For further details go to: www.lepcourse.org

Announcement

Lepidoptera of the Northeast: Taxonomy, Ecology, and Biomonitoring of Butterflies and Moths with Brian Scholtens

Descriptions of seminars may be found at http://www.eaglehill.us/programs/nhs/nhs-calendar.shtml

Information on lodging options, meals, and costs may be found at http://www.eaglehill.us/programs/general/application-info.shtml

There is an online application form at

http://www.eaglehill.us/programs/general/application-web.shtml

Syllabi are available for these and many other fine natural history training seminars on diverse topics. For more information, please contact the Humboldt Institute, PO Box 9, Steuben, ME 04680-0009.

Online general information may be found at http://www.eaglehill.us

Less Common Butterflies of the Rocky Mountains

1) *Colias meadii*, male, Wolfcreek Pass, Colorado; July 21, 2008. **2)** *C. meadii*, same data as fig. 1. **3)** *Colias hecla*, male, Denali National Park, Alaska; August 1, 1998. **4)** *Polygonia gracilis*, Kebbler Pass, Crested Butte, Colorado; July 23, 2007. **5)** *Coenonympha haydenii*, Jackson Hole, Curtis Canyon, Wyoming; July 21, 1996. **6)** *Erebia theano*, Clay Butte, near Beartooth, Wyoming; July 22, 1996. **(Images 7 - 10 on p. 73)** **7)** *Limenitis weidemeyerii*, without white dot on forewing, Pagosa Springs, Colorado, July 20, 2008. **8)** *L. weidemeyerii*, with white dot on forewing, same data as fig. 7. **9)** *Erebia callias*, dorsal view, Clay Butte, Beartooth area, Wyoming, July 22, 1996. **10)** *E. callias*, ventral view. Same data as fig. 9. All photos: George Krizek.

Less Common Butterflies of the Rocky Mountains

George O. Krizek

2111 Bancroft Pl., N.W. Washington, D.C. 20008

One of the "good prizes" for the exhausted photographer of live butterflies, (who is exhausted due to the hypoxia and High Mountain sickness) is without any doubt *Colias meadii* Edwards (Pieridae). It's flight is "deceivingly fast, with quick wingbeats, making adults difficult to follow over the steep terrain" (J. P. Brock and Kenn Kaufman). This glacial relict-needing two years for its development due to cold temperature — erratic in its movements, only seldom lands on some flowers or the ground. I succeeded, after almost giving up any hope of making a picture, to photograph two individuals on July 21, 2008 at the "Lobo overlook" (elv. 11,760') above the Wolfcreek Pass in southern Colorado.

Our first picture catches a male taking nectar from *Tetraneuris grandiflora* (Asteraceae), where the crypic underside helps it to blend with the blossom, while the other male sits (lateral basking?) on the ground. This species lives above the timberline, and seldom descends lower.

Another jewel, this time of the circumpolar arctic tundra, is *Colias hecla* Lefebre. I took the shown picture on 1 August, 1998 at the DeNali National Park, Alaska, on the slopes of Mt. McKinley, on the shore of a wild river. In those areas it is lucky to meet both the butterfly and the acceptable weather and not be surprised by a snow storm. *Colias hecla* most probably is hybridizing with *Colias nastes* Boisduval. Both are sympatric in much of the Arctic Circle (*C. hecla* is the only *Colias* living in Greenland). *Colias boothii* Curtis may be the offspring of such hybridization.

I would like to present two "specimens" of *Limenitis weidemeyerii* Edwards (Nymphalidae); both are involved in dorsal basking on the ground, in the area south of Pagosa Springs, Colorado. One has a tiny white spot in the lateral part of the forewing cell, while the other one lacks this spot. The pictures were taken on 20 July, 2008.

Another interesting Nymphalid is *Polygonia gracilis* (Grote & Robinson). It is considered to be the "rarest and smallest" of the *Polygonias*. Our picture is from Kebbler Pass above Crested Butte, Colorado, taken on July 23, 2007.

Finally, I would like to show some of the Satyrs from the high mountains. One is *Coenonympha haydenii* (Edwards), a small ringlet with a restricted area. Typical are "bold marginal eyespots" on hindwings (J. P. Brock). This species is very close to palearctic *Coenonympha oedippus* (Fabricius).

From the genus *Erebia* we can demonstrate *Erebia theano* (Tauscher). It is considered to be very local. The photo shows the underside of both wings is characteristic with submarginal rows of ochraceous spots and was taken at Clay Butte in the Beartooth area, Wyoming on 22 July, 1996.

From the same locality is the *Erebia callias* Edwards, shown here with both the dorsal and lateral views. Palearctic Erebia tyndarus (Esper) is practically indistinguishable, but differ markedly in chromosome numbers (T. C. Emmel).

The Mailbag...

Letters to the Editor:

Corrections, please!

Dale, I heartily thank you for the inclusion of my entire, lengthy manuscript and for your splashy layout of my photos in my recent article I titled "Caterpillars, Ants and Popoluca Indians: An Adventure in Remote Mexico" (NEWS, Spring 2010, Vol. 52, No. 1). I hope readers enjoyed my nostalgia and that fledgling lepidopterists were inspired to consider fieldwork in relatively obscure areas (yes, there are still some such places). Unfortunately, there was an editorial glitch: The word "**Popoluca**" was misspelled as "**Populuca**" in the five prominent title areas that required an editor- composed heading: "Cover," "Contents," title of article, and the two head captions for the photos on pages 41 and 44. (The word, however, IS spelled correctly throughout the article.) It is easy to imagine how such a transposition of similar vowels could occur when an unfamiliar word is being retyped during the formatting of a publication. Simple mistakes such as this occur all the time—not only in scientific media but also in highly proofed commercial/popular magazines. But because the word Popoluca denotes both a unique **culture** and **language**, what may seem like a trivial misspelling to most readers is now a personal embarrassment as I share extra issues of this NEWS with the John and Royce Lind family (affiliates of the Summer Institute of Linguistics/Wycliffe Bible Translators, dedicated mentors to the Popoluca, my hosts during my research, and my lifelong friends) and literate Popoluca acquaintances. making matters worse, the word Populuca DOES exist. It is actually an Aztec/Nahuatl word that probably means

Continued on p. 72

John Burroughs Association

Gary Noel Ross

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John Burroughs (1837-1921) occupies a permanent place in American literature. Though he was a leading literary critic in his day, he was also a pioneer in the new school of nature writing and the most popular writer of his period in the field he made his own. Burroughs's influence on our appreciation of nature is so pronounced that he is often regarded as the "Father of Recreational Nature Study." Unlike many who are not appreciated during their lifetime, John Burroughs was honored during his latter decades. Included among the famous naturalist/writer's friends were President Theodore Roosevelt, John Muir, Henry David Thoreau, Walt Whitman, Andrew Carnegie, Thomas Edison, Henry Ford, and Harvey Firestone. On the day of his death in 1921, the New York Senate adjourned in Burroughs's honor. After his death, The John Burroughs Association (JBA) quickly formed. Headquartered in the American Museum of Natural History (AMNH), New York City, the association aims to foster a love of nature as exemplified by Burroughs's life and work, and to preserve the places associated with his life. To this end, the association owns and maintains SLABSIDES (John Burroughs' log cabin in the Catskill Mountains of New York) as a National Historic Landmark and the adjoining John Burroughs Sanctuary near West Park. Additionally, since 1926 JBA has been publicly recognizing exceptional natural history publications by bestowing literary awards at a special luncheon held in the AMNH after the association's annual meeting on the first Monday of April. A permanent exhibit about John Burroughs is in the AMNH. The association keeps members informed through Wake-Robin, a distinguished newsletter published three times each year and named after Burroughs's first volume of nature essays (1871).

Over the years many outstanding nature writers have been honored with either a GOLD MEDAL (for a book) or a CERTIFICATE FOR OUTSTANDING PUBLISHED NATURE ESSAY; in addition, the association acknowledges a LIST OF NATURE BOOKS FOR YOUNG READERS. Winning writers have included William Beebe, Paul Brooks, Archie Carr, Rachel Carson, John Daniel, Loren Eiseley, Joseph Wood Krutch, Aldo Leopold, Jeffrey Lockwood, Peter Matthiessen, Roger Tory Peterson, Michael Pollan, Robert M. Pyle, Scott Russell Sanders, Ernest Thompson Seton, John Terres, Geerat Vermeij, and Ann Zwinger. Two lepidopterists—Robert M. Pyle and yours truly—have been recipients. Furthermore, I am a periodic contributor to Wake-Robin.

On April 5, 2010, the 2009 GOLD MEDAL AWARD went to Michael Welland for "Sand: The Never-Ending Story"(University of California Press), and the OUTSTANDING PUBLISHED NATURE ESSAY AWARD went to Scott Russell Sanders for his "Mind in the Forest" (Orion, Nov./Dec. 2009.) This is the second time Sanders has won the essay award.

As stewards of the environment, most of us revel in the intellectual, personal, and unhurried style of storytelling that John Burroughs fathered. And in today's dot com society, it is refreshing to know that there is an organization that still supports this nearly extinct genre. But JBA needs to increase its financial base to continue its programs; hence, the organization is actively soliciting new members. Contact information is below. (It is worth noting that all personnel of the organization are non-salaried; ergo 100 percent of your contribution goes to the association's programs.)

Yearly Membership, from April to April:

Student/Senior:	$15.00
Annual:	$25.00
Family:	$35.00
Patron:	$50.00
Benefactor:	$100.00
Life:	$500.00

Tax-deductible check or money order can be made payable to JBA.

Send to:

Secretary, The John Burroughs Association, Inc.
15 West 77th Street
New York, New York 10024-5192

e-mail: breslof@amnh.org

internet: http://research.amnh.org/burroughs

Parasitic Mite Larvae (Acari) on an Adult *Strymon acis bartrami* (Lycaenidae)

Mark H. Salvato and Holly L. Salvato

1765 17th Ave SW, Vero Beach, Florida, 32962, USA, ***anaea_99@yahoo.com***

The Bartram's hairstreak, *Strymon acis bartrami* (Huntington & Comstock) (Lycaenidae), occurs locally within the pine rocklands of southern Florida and the lower Florida Keys (Minno and Emmel 1993, Smith et. al 1994). Hennessey and Habeck (1991) and Worth et al. (1996) described many aspects of *S. a. bartrami* natural history. Salvato and Hennessey (2004) and Salvato and Salvato (2008) also discussed *S. a. bartrami* ecology and provided a review of known predators and parasites for the species.

On 1 May 2010 we observed and photographed larval mites (n = 2) attached to the outer forewing of an adult *S. a. bartrami* (Fig 1, p. 73) in the Long Pine Key region of Everglades National Park (Miami-Dade County, Florida). We were unable to capture the butterfly to obtain the mite specimens. However, after examining the photos, these individuals appear to be parasitic mite larvae, most likely in the Family Erythraeidae, a group known to frequently attach to the wings of butterflies. Treat (1975) reported parasitic mite larvae from several lycaenid species as well as other Lepidoptera. However, to our knowledge this is the first observation of mite association with *S. a. bartrami*. Further studies are required to verify which mite species are involved in the natural history of *S. a. bartrami*.

Acknowledgements

We thank Dr. Cal Welbourn (Florida Department of Agriculture and Consumer Services, Gainesville, Florida) for examining photos and proving information on parasitic mites. We also thank Dennis Olle for assistance in the field.

Literature Cited:

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Smith, D. S., L. D. Miller & J. Y. Miller. 1994. The Butterflies of the West Indies and South Florida. Oxford University Press, New York. 264 pp. 32 pl.

Treat, A. E. 1975. Mites of Moths and Butterflies. Cornell University Press. London. 362 pp.

Worth, R. A., K. A. Schwartz & T. C. Emmel. 1996. Notes on the biology of *Strymon acis bartrami* and *Anaea troglodyta floridalis* in south Florida. Holarctic Lepid. 3:52-65.

Digital Collecting

Continued from p. 52

up all the females of a particular subspecies from Secret Canyon and if they have two broods I can easily compare those too. The best part is I can keep building this dataset, fine-tune it as my needs and interests change and adapt quickly to taxonomic realignments. If someone publishes a paper and a butterfly gets moved to a new species or genus I can re-label all 100 images in about 5 seconds. Try that with a dozen specimen drawers!

While I tease my collector friends, I have to admit that as photographers we have certain limits and photos will never compete with a pinned specimen. Indeed some images can never be reliably identified. The point is that photographs, or rather digital images, are proving to have increased value and potential in the study of Lepidoptera as well as the dissemination of knowledge. The simple reason is that we now have prolific tools for integrating high quality images into databases of all kinds from pure research to public education. The images and data can come from anywhere and anyone, but with qualified editors it's exciting to think of the possibilities.

I'll admit I have a vivid imagination but I've lived through two digital revolutions, one in my career as an audio engineer and later as a photographer. I can tell you no one had any idea what was coming and when I look back at what the technology has spawned and how limitless it still feels, it stimulates that imagination. Consider the technology that currently exists, some that's just around the corner and more that's simply possible by extrapolation: Start with the software used for fingerprint analysis or facial recognition. Add an image database of pinned specimens. Now throw in wing-pattern analysis software developed by a grad student at your local university. Plug that into quantum computers on loan from the government and teraflop number-crunching for six straight days. Just imagine for a moment. As silly as it might seem now, I bet there's something useful in your life you take for granted that's the product of wilder fantasies than this. In the meantime I want to unchain myself from this computer and find a nice meadow, a pond and some really amazing critters to bring home with me.

Computerization of the Field Museum of Natural History Giant Butterfly Moth Collection (Castniidae)

James H. Boone[1], Jorge M. González[2], Gracen M. Brilmyer[1] and Daniel Le[3]

1. Division of Insects, Zoology, Field Museum, 1400 South Lake Shore Drive, Chicago, Illinois 60605-2496, USA. jboone@fieldmuseum.org, gbrilmyer@fieldmuseum.org

2. Texas A&M University, Department of Entomology, College Station, Texas 77843-2475, USA. (Research associate, McGuire Center for Lepidoptera and Biodiversity) gonzalez.jorge.m@gmail.com

School of the Art Institute of Chicago, 7 West Madison, Chicago, Illinois 60602, USA. dle@saic.edu

The Field Museum of Natural History (FMNH) giant butterfly moth (Lepidoptera: Castnioidea: Castniidae) collection is comprised of over 45 species and 118 specimens contained in eight insect drawers. This pantropical family is represented by species from the Neotropical and Australian Regions. Most giant butterfly moths at the FMNH originally belonged to the Hermann Strecker collection, though several were added after its acquisition in 1908 including specimens from individual collections such as those of Adolf Mares and Borys Malkin.

As part of the ongoing FMNH Arthropod Collection databasing initiative, the giant butterfly moths were recently entered into the database according to genus, species and subspecies (if applicable). Specimen records include current taxonomic classification and all data associated with the specimens as well as zoogeographical region (Nearctic, Neotropical, and Australian). Highlights of the database are the high resolution images of each specimen (dorsal and ventral habitus) and their accompanying labels.

The FMNH database is available through the Field Museum's website at: http://emuweb.fieldmuseum.org/arthropod/Query.php. The Lepidoptera "Quick Browse" link to the right leads to the Lepidoptera search page, which provides background information on the Lepidoptera collection and associated data.

To view the giant butterfly moth records, enter "Castniidae" in the family field of the search form and, if desired, choose a region from the drop-down list. Once the list of records appears click on any name to display that individual record with thumbnail links to images of the specimen and its labels (Fig. 1). Clicking on the thumbnail image displays a larger image of the specimen (Figs. 2 and 3) and its labels (Fig. 4). Click on the image one more time and it will resize to fit your computer screen. Use your internet browser "back button" to return to the list of records.

Giant butterfly moths from the FMNH insect collection, like other Lepidoptera, are available for loan by contacting the first author.

The Mailbag

Continued from p. 69

"mumbler" or "foreigner" and therefore a derogatory name. And to further complicate matters, yet another close spelling, Popoloca, refers to an entirely different language group in the state of Puebla, Mexico.) Perhaps in the future, editorial policy could include an author's "proof" of text that has to be altered or created? I realize that this would require extra lead time, but an author's proofing could prevent another such sensitive incident. Your thoughts?

Gary Noel Ross

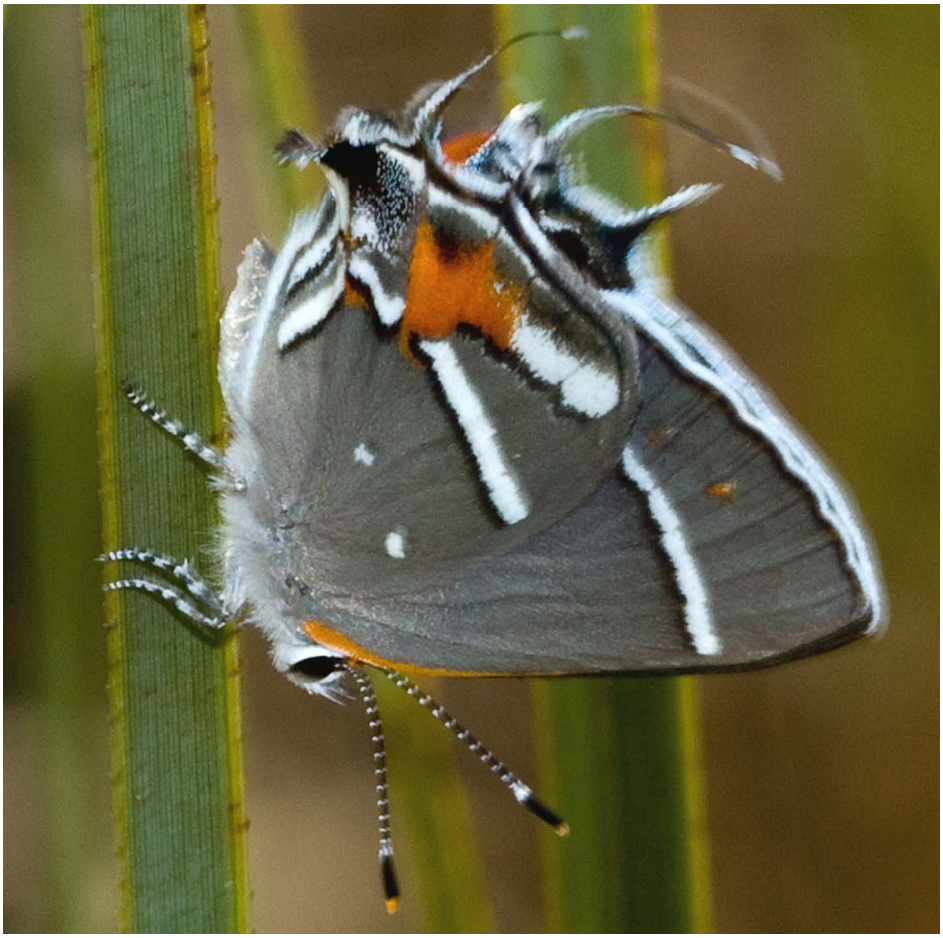
GNR-butterfly-evangelist@juno.com

Gary, I do apologize for this unfortunate and embarrassing error. My anxiety level climbs whenever I ship off each issue to the publisher, fearing that I've done something just like this. While this is hardly my first mistake in the nearly five years I've been editor, it definitely ranks as the biggest blunder in my eyes. I like your suggestion of giving contributors a "final look" at their submissions before it goes to press, something that can easily be done with an emailed PDF file.

Not the circumstances that I wanted to bring back The Mailbag, but hopefully this will get other members to send in their comments and suggestions on what they are seeing in the NEWS or on any other topic as it relates to Lepidoptera.

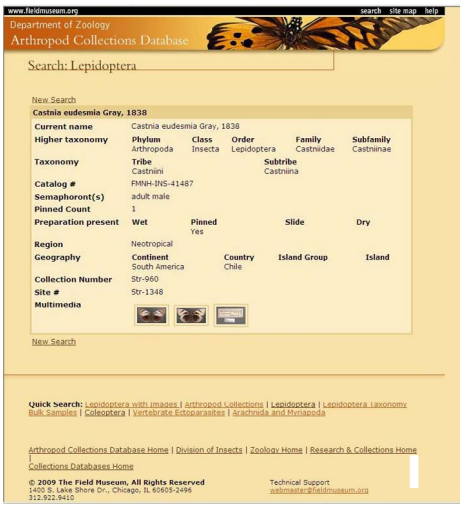
Dale Clark, Editor

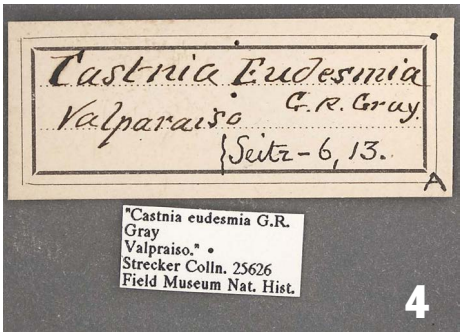
daleclark@dallasbutterflies.com



Two parasitic mite larvae (likely erythraeid mites) on the outer forewing of an adult *Strymon acis bartrami* in Long Pine Key, Everglades National Park on 1 May 2010 (Photo Credit: H. L. Salvato). See article on p. 71.

Less Common Butterflies of the Rocky Mountains
See article and photo data on p. 69.





Images from the Field Museum's giant butterfly moth database

Fig. 1. Screen shot of catalog record FMNH-INS 41487, *Castnia eudesmia* Gray, 1838. Fig. 2. Dorsal habitus of *C. eudesmia*. Fig. 3. Ventral habitus of *C. eudesmia*. Fig. 4. Labels associated with this *C. eudesmia* specimen.

Membership

The Lepidopterists' Society is open to membership from anyone interested in any aspect of lepidopterology. The only criterion for membership is that you appreciate butterflies or moths! To become a member, please send full dues for the current year, together with your current mailing address and a note about your particular areas of interest in Lepidoptera, to:

Kelly Richers,
Assistant Treasurer,
The Lepidopterists' Society
9417 Carvalho Court
Bakersfield, CA 93311

Dues Rate

Active (regular)	$ 45.00
Affiliate (same address)	10.00
Student	20.00
Sustaining	60.00
Contributor	100.00
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Journal of the Lepidopterists' Society

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Submission Guidelines for the News

Submissions are always welcome! Preference is given to articles written for a non-technical but knowledgable audience, illustrated and succinct (under 1,000 words). Please submit in one of the following formats (in order of preference):

1. Electronically transmitted file and graphics—in some acceptable format —*via* e-mail.

2. Article (and graphics) on diskette, CD or Zip disk in any of the popular formats/platforms. Indicate what format(s) your disk/article/graphics are in, and call or email if in doubt. Include printed hardcopies of both articles and graphics, a copy of the article file in ASCII or RTF (just in case), and alternate graphics formats. Media will be returned on request.

3. Color and B+W graphics should be good quality photos or slides suitable for scanning or—preferably—electronic files in TIFF or JPEG format at least 1200 x 1500 pixels for interior use, 1800 x 2100 for covers. Photos or slides will be returned.

4. Typed copy, double-spaced suitable for scanning aand optical character recognition. Original artwork/maps should be line drawings in pen and ink or good, clean photocopies. Color originals are preferred.

Submission Deadlines

Material for Volume **52** must reach the Editor by the following dates:

Issue	Date Due
3 Autumn	Aug. 15, 2010
4 Winter	Nov. 15 2010

Reports for Supplement S1, the Season Summary, must reach the respective Zone Coordinator (see most recent Season Summary for your Zone) by Dec. 15. See inside back cover for Zone Coordinator information.

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Top: Sara Orangetip (*Anthocharis sara*), Solstice Canyon, Malibu, CA, April 18, 2010. **Bottom:** Yucca Giant Skipper (*Megathymus yuccae martini*)Kelso Valley, CA, April 16, 2010. Photos: David Horner. See article on p. 52.