

NEWS

OF THE

LEPIDOPTERISTS' SOCIETY



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The moths of Fraser's Hill, Malaysia part 2

Speyeria adiaste clemencei in San Luis Obispo Co., California

Historical records of Maine butterflies, Part 1

Two Monarchs: two amazing journeys!

Studying Lepidoptera in different lights

Records of Phoebis agarithe and Ascia monuste in Mississippi

Marketplace, Book Review, Metamorphosis, Announcements, Membership Updates

...

... and more!



NEWS OF THE LEPIDOPTERISTS' SOCIETY

Volume 59, Number 2
Summer 2017



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The Lepidopterists' Society is a non-profit educational and scientific organization. The object of the Society, which was formed in May 1947 and formally constituted in December 1950, is "to promote internationally the science of lepidopterology in all its branches; to further the scientifically sound and progressive study of Lepidoptera, to issue periodicals and other publications on Lepidoptera; to facilitate the exchange of specimens and ideas by both the professional worker and the amateur in the field; to compile and distribute information to other organizations and individuals for purposes of education and conservation and appreciation of Lepidoptera; and to secure cooperation in all measures" directed towards these aims. (Article II, Constitution of The Lepidopterists' Society.)

The **News of The Lepidopterists' Society** (ISSN 0091-1348) is published quarterly by The Lepidopterists' Society, c/o Chris Grinter, The California Academy of Sciences, 55 Music Concourse Drive, San Francisco, CA 94118, 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 San Francisco, CA and at an additional mailing office (Lawrence, KS).

POSTMASTER: Please send address changes to **News of The Lepidopterists' Society**, c/o Chris Grinter, The California Academy of Sciences, 55 Music Concourse Drive, San Francisco, CA 94118.

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Issue Date: May 24, 2017

ISSN 0091-1348
Editor: James K. Adams

Front Cover:

Speyeria adiastrae clemencei male on Italian Thistle (*Carduus pycnocephalus* L.) (Compositae), May 28th, 2016, Cypress Mountain Drive, elevation 1200', San Luis Obispo Co., California (see associated article, page 69)

Digital Collecting:

The Moths of Fraser's Hill, Malaysia II: Bombycoidea

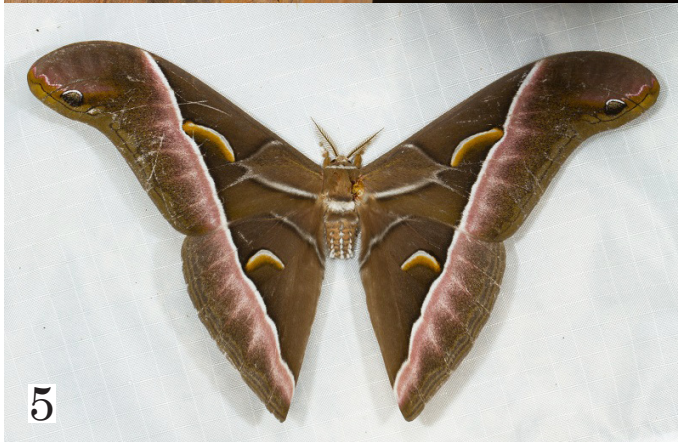
David Fischer

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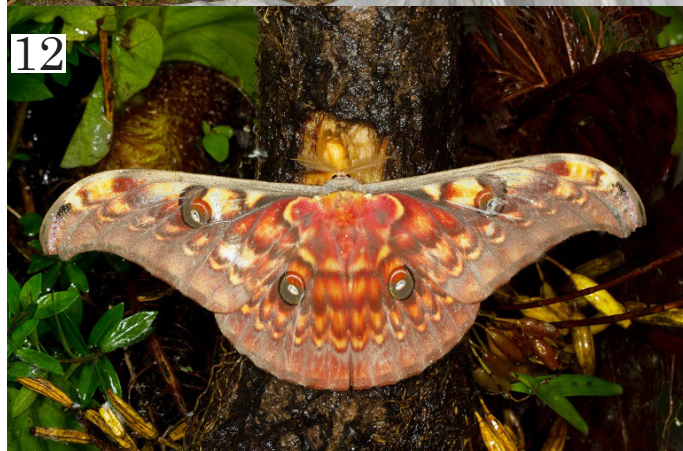
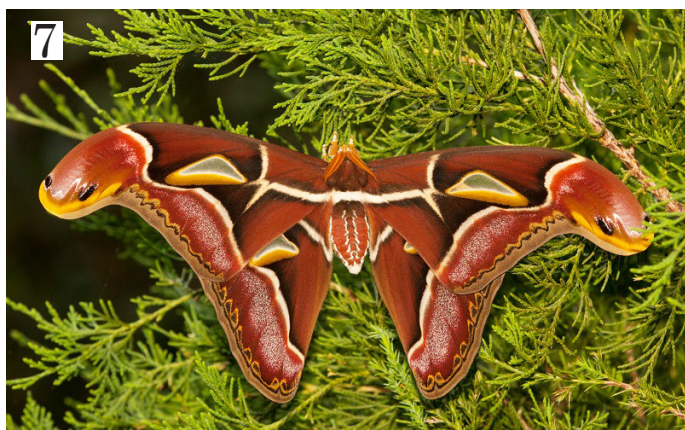
This is the second of a three part series on the Moths of Fraser's Hill, Malaysia, from the "Really Wild Place" (see the News of the Lep Soc 59:1, 3-11). Be looking for the third installment on the Noctuoidea in the Fall issue of the News.



Brahmaeidae: 1 & 2. *Brahmaea hearseyi*



Saturniidae: 3. *Actias maenas*; 4. *Loepa* sp.; 5. *Samia tetrica*; 6. *Cricula* sp.



Saturniidae: 7 & 8. *Archaeoattacus edwardsii*, male, female; 9 & 10. *Attacus atlas*; 11. *Antheraea youngi*; 12. *Antheraea larissa*; 13 & 14. *Antheraea rosieri*. Larger threads on the sheets are 5 mm apart.



Eupterotidae: 15. *Eupterote* sp.; 16. *Eupterote* sp.; 17. *Eupterote* sp.; 18. *Pseudojana perspicuifascia*; 19. *Ganisa similis*; 20. *Sphingognatha* sp. Larger threads on the sheets are 5 mm apart.



Lasiocampidae: 21. *Odonestis* sp.; 22. *Odonestis erectilinea*. Larger threads on the sheets are 5 mm apart.



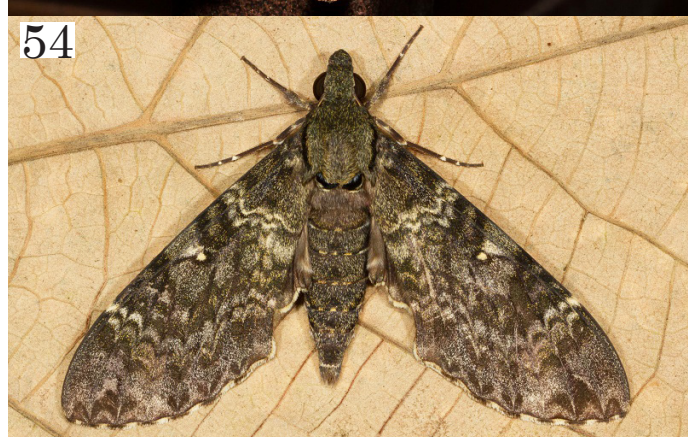
Lasiocampidae: 23. *Trabala* sp., nr. *T. ganessa*; 24. *Trabala* sp., nr. *T. irrorata*; 25. *Arguda decurtata*; 26. *Hallicarnia albipectus*; 27. *Arguda* sp.; 28. *Radhica elisabethae*; 29. *Alompra roepkei*; 30. *Paralebeda crinoides* female.
Larger threads on the sheets are 5 mm apart.



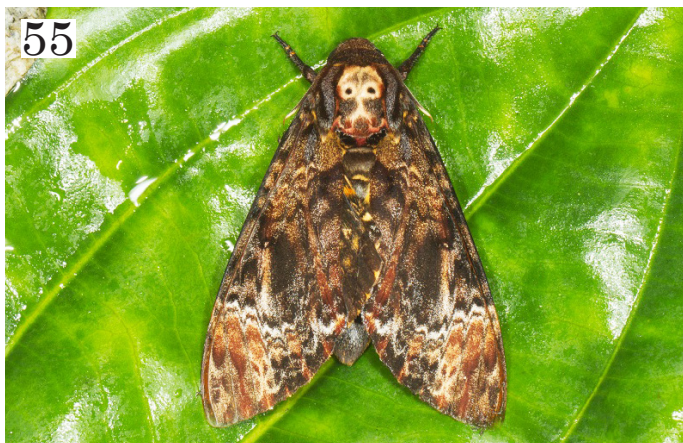
Lasiocampidae: 31. *Lebeda* sp., possibly *L. nobilis*, male; 32. *Lebeda* sp., possibly *L. nobilis*, female; 33. *Metanastris gemella*; 34. *Gastropacha* sp.; 35. *Kunugia* sp., nr. *basimacula*, male; 36. *Kunugia* sp., nr. *basimacula*, female; 37. *Kunugia* sp.; 38. *Suana sundana*. Larger threads on the sheets are 5 mm apart.



Bombycidae: 39. *Gunda javanica*; 40. *Gunda ochracea*; 41 & 42. *Prismosticta hyalinata* or *tiretta*; 43. *Mustilizans* sp.; 44. *Penicillifera apicalis*; 45 & 46. *Ernolatia* sp. Larger threads on the sheets are 5 mm apart.



Sphingidae: 47. *Daphnis hypothous*; 48. *Megacorma obliqua*; 49. *Ambulyx canescens*; 50. *Ambulyx moorei*; 51. *Ambulyx pryeri*; 52. *Daphnusa ocellaris*; 53. *Amplypterus panopus*; 54. *Meganoton nyctiphanes*. Larger threads on the sheets are 5 mm apart.



Sphingidae: 55. *Acherontia lachesis*; 56. *Eupanacra busiris*; 57. & 58. *Macroglossum passalus*; 59. *Macroglossum mitchelli*; 60. *Theretra nessus*; 61. *Cechenena helops*; 62. *Cechenena chimaera*. Larger threads on the sheets are 5 mm apart.

Membership Updates

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Includes ALL CHANGES received by 21 May 2017. Direct corrections and additions to Chris Grinter, cgrinter@gmail.com.

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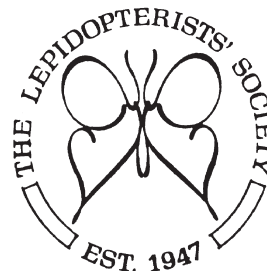
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A test of fire adaptation

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I'm not sure how many Lepidopterists took note of the huge Soberanes Fire burning in the Ventana Wilderness, Los Padres National Forest, Monterey Co California for several months in 2016. It started near Monterey in July 2016 and crept southward and eastward for over 60 days. As of late Sept 2016 more than 125,000 acres had burned. In late August, the fire stopped its eastward motion at the Carmel River and Miller Mountain, a few miles to the west of Chews Ridge and no heat was detected for 2 weeks from satellite scans passing over the area. I used to visit Chews Ridge when I lived in CA in the early 90's to see unsilvered fritillary, *Speyeria adiastrum clemencei* adults flying around the ridge in June and July and visiting various nectar sources. I didn't know how limited their range was at the time, but I understand that particular population is likely the largest left and may be only 500 individuals a year. Their relative, *Speyeria adiastrum atossa* went extinct near LA in 1959 for unclear reasons, some even say because of fire suppression, lack of natural fires. Nonetheless, I felt fortunate that this fire seemed to have spared Chews Ridge, even though it continued to spread southward nearer the coast. The problem was, it stopped moving in a rugged wilderness area, the Ventana Wilderness, where intervention is supposed to be minimal to put out a fire. So, no one could say when the fire would be officially called "contained" because humans had not contained it. And the terrain where it stopped was inaccessible by machinery and a challenge for building containment lines or assessing

fire activity. So, since Chews Ridge is accessible by a good road, a fire line was bulldozed the entire length on top of Chews Ridge to secure containment of the fire. Still, the fire command was anxious that the fire could start moving again, when winds picked up, and threaten towns east of Chews Ridge. So, a decision was made in mid-September 2016 to burn a control fire on top of Chews Ridge, the entire length, and let it run down the western flanks into the wilderness area towards the stopped fire edge. From what I could tell from satellite heat images, the final almost 20,000 acres added to the fire burn total in that area were from the deliberate and thorough burning of Chews Ridge, the entire ridge top and its western side. In hindsight, it does not seem that the fire would ever have reached Chews Ridge by natural forces.

I am not an expert in fire adaptation by butterflies, but, as the 2017 butterfly season approaches, I am concerned about the possible loss of this beautiful unique butterfly. I assume the unsilvered fritillary was already under stress due to prolonged drought conditions in the area. While we hear that fire is good for many fire adapted species, it is difficult for me to imagine it is a good thing to so thoroughly burn out grass, brush and trees over a large extent of a colony all at once. Natural fire spread is rarely as thorough as this control burn. A small portion of this ridge burned in 2008 in the Basin Complex Fire and the butterflies returned, but that was only a small part of the ridge. Other populations, if they exist nearby might also be in the burn area, as it is so massive. So, repopulation from nearby might not be possible. I can imagine host violets that were already dormant and generally found in shady areas will survive, unless the alteration of shade availability has a negative impact long term. It is generally expected that wildflowers will be more abundant next year after the blaze. But what about fritillary eggs already laid in the brush? I assume it is fortunate that the fire waited until September, after the eggs were laid, but I'm not sure of that either. Or would it be better if the adults could fly away to somewhere else to return after the burn? I wonder if other readers of the News who are more expert than me can comment on whether this is a disaster for this butterfly, or whether they should survive or even thrive after this fire. Then, as the next flight approaches, I am interested to hear from local Lepidopterists whether the Chews Ridge colony of *Speyeria adiastrum clemencei* survives. This fire event is definitely a huge test of the adaptation of nature to fires, not only for this butterfly but for many other species that are local endemics to this wilderness area. I would appreciate any expert commentary.



Speyeria adiastrum clemencei on Chews Ridge, Monterey Co CA, July 9 2007. (Photo by Jeffrey Pippen, www.jeffpippen.com).



Chews Ridge with view of approaching Soberanes fire in distance, Sept 5, 2016. Photo by Phillip Manual, National Weather Service Incident Meteorologist on the Soberanes Fire.



Aerial view of Chews Ridge burnout operation Sept 18, 2016. Photo by Phillip Manual, National Weather Service Incident Meteorologist on the Soberanes Fire.

Rediscovery of *Speyeria adiaсте clemencei* in San Luis Obispo County, California

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The Unsilvered Fritillary, *Speyeria adiaсте* W. H. Edwards, 1864, (Lepidoptera: Nymphalidae) is a beautiful and elusive butterfly endemic to the coast ranges of central California (Brock & Kaufman 2003). A distinctive species, it lacks the silver spotting on the ventral hindwing typical of most other *Speyeria*, giving it its common name.

Intermediate in coloration between the dark, nominotypical race *S. a. adiaсте* at the northern end of the species' range, and the light southern race *S. a. atossa* (W. H. Edwards) (last seen in 1960, and now presumed extinct), the central race *S. a. clemencei* (J. A. Comstock), flies locally in the coast ranges of Monterey and San Luis Obispo Counties. Most of the known *clemencei* colonies occur in the Santa Lucia Range, primarily in Monterey County where the Santa Lucias reach their fullest development. Historically, there were only two published localities for *clemencei* in SLO County: the type colony in the low mountains west of Atascadero (see Dos Passos and Grey (1947)) and another colony in the Hi Mountain area. In fact, prior to 2016, the Unsilvered Fritillary hadn't been seen in SLO County since the 1970's, and some believed that the butterfly had become locally extirpated.

The Search

My first experience with *S. a. clemencei* was on Chews Ridge (Monterey Co.) in late June 2014 after an unsuccessful foray in late July the previous year. I started seriously trying to

rediscover *clemencei* in SLO County in 2015. Beginning during the winter of 2014-15, I spent hours searching satellite imagery and topographic maps for possible sites, and gathered all the historical *clemencei* records from SLO County which I could find (remarkably few!).

One difficulty I encountered in trying to find potential sites for *clemencei*, was the conflicting information about *clemencei*'s elevational requirements. On the one hand, most books described the Unsilvered Fritillary as a butterfly of "higher mountains" (Scott 1986) or "high mountain meadows" (Glassberg 2001), some going so far as to say that *clemencei* is "absent below 3500 ft." (Howe 1975 and Zaman 2015). On the other hand, I knew that both the Atascadero and Hi Mountain colonies were/are located under 3500' (all the mountains near Atascadero are <3000'). Also, there is only one peak over 3500' in the Santa Lucias in SLO County anyway, so I decided to just search for hilltops or openings in moist woodland on the highest accessible terrain I could find (preferably >2000'). However, I discovered that the higher elevations in the areas I was searching were frequently unwooded and covered with chaparral (which is unsuitable habitat for *clemencei*), while the favorable wooded habitat tended to occur on the lower slopes and canyons. As a result, virtually all of the possible sites I found were under 1800'.

During the 2015 butterfly season, while SLO County (and really, most of CA) was in the midst of a very severe

drought, I devoted a significant amount of my limited field-time to visiting prospective sites and making unsuccessful searches for the fritillaries during late May-June, focusing on the Atascadero area. One of the sites outside of the Atascadero area which I studied on satellite imagery and maps, but was unable to visit during the 2015 flight season, was Cypress Mountain Drive in the Santa Lucias east of Cambria. This dirt road climbs from the Pacific side of the coastal divide over a ridge and descends into a heavily-wooded canyon on the interior side of the divide. Not only is the road summit at 2200' and in marginal wooded habitat, but there are also much more thickly-wooded areas on the slopes a few hundred feet lower, which are still several hundred feet above the canyon. I first explored the road in August 2015, after the butterfly flight season had already effectively ended. Despite being far from my conception of perfect habitat at the time, it seemed to be one of the more promising sites I'd found, and I decided that it was worth more investigation.

I continued my fieldwork in 2016, planning to visit Cypress Mountain Drive (among other sites) in mid-June. I also decided to make an earlier visit on May 28th to sample the other butterflies that might fly in this unexplored section of SLO County. I thought it was still too early for *S. a. clemencei*, if it even flew along the road (I had been unsuccessful too many times to *expect* to find *adiaste* anywhere), knowing, as I did, that the earliest published record for *clemencei* is May 28th (Davenport et al. 2016).

The Discovery

On May 28th, 2016, around 11:20 AM, my brother and I, in his 4X4 truck, arrived at the coastal end of the road. The day was sunny, but somewhat windy. For the first mile, the road climbed steadily, winding up mainly grass-covered hillsides, with areas of mixed chaparral and trees on some of the surrounding slopes, and more trees clustered in the steep gullies which cut their way down the hills. In about a mile, the road entered chaparral and scattered oaks, and we reached the summit shortly thereafter. I checked out a few spots along this section of the road, but saw few butterflies.

Immediately on the other side of the summit the clumps of trees thickened. We began a slow descent from the top of the ridge into the canyon, first through mixed stands of chaparral and oaks and then through dense mixed-woodland, eventually reaching a large, rocky stream in the bottom of the canyon (at 1400'). Along the descent I finally started finding butterflies including a male second-brood Large Veined White (*Pieris marginalis venosa* (Scudder)) a species which inhabits moist woodland in SLO County. Shortly after reaching the bottom of the canyon, the road crossed the streambed (figure 1). Here, at the concrete low-water crossing, I found a fairly large orange fritillary flying about and alighting on the crossing and the creekbed. Its appearance was unusual enough, from the glimpses I got of it, that I thought it might be *S. coronis coronis* (Behr) or



Figure 1: The woods near the low-water crossing.

even *S. adiaste clemencei*, instead of the regular *S. callippe comstocki* (Gunder). However, in my excitement I was too cautious and it flitted away before I could net it. I chased it and missed a number of fairly easy swings before it flew away. Disappointed, I hung around the area hoping it would return.

After waiting unsuccessfully for quite a while, I reluctantly decided to continue down the road in search of a certain patch of thistles where I had found California Dogfaces (*Zerene eurydice* (Boisduval)) on my exploratory trip in August 2015. I intended to check this area in the hope that there might be fritillaries at the thistles. While driving to the thistles, I had fleeting glimpses of several more orange butterflies, but there was no opportunity to net one.

Eventually we reached the area I remembered, a small (200' by 40'-60') opening in the thick oak woodland (elev. ~1200') (figure 2). Italian Thistles (*Carduus pycnocephalus* L.) (Compositae) were blooming on both sides of the road, and from the truck I spotted a bright orange butterfly flying around them. My brother hit the brakes and I quickly jumped out, then found and netted the butterfly. It was a fresh male Unsilvered Fritillary!! I was stunned! Not only was I elated to have finally found *clemencei* in SLO County,



Figure 2: The opening in the woods.



Figure 3: *Speyeria adiaste clemencei* male on *Carduus pycnocephalus* in the opening.



Figure 4: *Speyeria adiaste clemencei* male perched on fallen leaves at the edge of the road.

but I was astonished to have found them at the bottom of a canyon at an elevation of only 1200'! It was contrary to everything I'd heard about *clemencei*. If I was to have found Unsilvered Fritillaries on this road (which I had never taken as a given), I would have expected them at the summit or maybe on the wooded hillsides above the canyon.

I quickly started looking around. The clearing ended abruptly on one side with a 20-foot drop into the large rocky streambed and was surrounded on the other sides by woods composed primarily of tall Coast Live Oaks (*Quercus agrifolia* Née) (Fagaceae) and a smaller number of Valley Oaks (*Quercus lobata* Née) (Fagaceae) and California Laurels (*Umbellularia californica* (Hook. & Arn.) Nutt.) (Lauraceae). The Unsilvered Fritillaries were fairly common, and most appeared to be very fresh. I photographed a number of them nectaring at the Italian Thistles (*Carduus pycnocephalus* L.) (Compositae) (figure 3 & front cover), and a male flying along the side of the road and periodically landing on fallen oak leaves (figure 4). I also noticed several flying around in the bottom of the

streambed (which contained some water and damp sand). I collected three males as vouchers (figures 5 & 6) and photographed the clearing. In another part of the canyon I watched a male nectaring at California Coffeeberry (*Frangula californica* (Eschsch.) A.Gray) (Rhamnaceae).

In total, I observed an estimated 15-20 Unsilvered Fritillaries. Most of them were seen in the 1.4 miles between the low-water crossing and the transition to a drier habitat, the elevation in this section of the canyon varying from 1160'-1400'. I also observed a few scattered individuals farther away, including a single individual on the wooded slopes above the canyon (1700') about 6/10 of a mile from the next closest sighting, and a male nectaring at Narrow Leaf Milkweed (*Asclepias fascicularis* Decne.) (Asclepiadaceae) in a much drier section of the canyon about 1/3 of a mile from the woods.

“Comstock’s” Callippe Fritillaries (*Speyeria callippe comstocki* Gunder) (Nymphalidae), which are often sympatric with *S. adiaste clemencei* (Zaman 2015), were indeed



Figures 5 (dorsal) & 6 (ventral): *Speyeria adiaste clemencei* male, Cypress Mountain Drive, elevation 1200', San Luis Obispo Co., California, May 28th 2016.

flying in this area, but were much less common than *S. a. clemencei*, only three being seen. They tended to be in the drier portion of the canyon away from the thick woods.

On June 1st, 2016, Ken Davenport (pers. comm.), Stephen Randall, and Mike Mulligan surveyed the area for 2-3 hours based on directions given by the author. However, they encountered an aggressive and openly-hostile landowner and decided to make an earlier departure than they had intended. Nonetheless, they observed up to about 30 Unsilvered Fritillaries and vouchered several males and a female on the road (not on private property). Two of these vouchers (collected by Ken Davenport) are now deposited in the Colorado State Museum. Most of the Unsilvered Fritillaries were seen patrolling on or along the edges of the road near the bottom of the canyon, through the shadow and sunlight under the trees.

I returned to the area on June 3rd, 2016. It was a hot day, and butterfly activity in general seemed somewhat suppressed. I stopped briefly (no more than 25-30 minutes) in the clearing, but only observed two Unsilvered Fritillaries. Neither of them stayed in the clearing. One flew down into the streambed and stayed there for the duration of my visit. I also unsuccessfully searched the clearing for violets (*Viola* sp.) (Violaceae). They may have already dried up, but it is more likely that they occur under the oaks in the woods.

I returned again to the area on June 27th, 2016 for about an hour. Almost all of the nectar sources in the limited areas I could access were now dried up, but the fritillaries were common. I observed 10 or more of both sexes. A number of the *clemencei* were flying at the margin of the woods where it transitions to the much drier, sparser woodland. I netted and released one worn male to confirm my sight identifications. Most of the habitat in this area is on private land, fenced (and signed) and inaccessible, making a thorough study of the colony quite difficult (such as determining the size of the population or its host plant), besides concerns over a run-in with the hostile landowner. Illegal marijuana cultivation is another concern in this area.

The difficulties surrounding further investigation of this colony highlight the difficulties of attempting to survey the range of *S. a. clemencei* in SLO County. There is a vast tract of possible habitat in the mountains between CA Highway 41 (i.e. the Atascadero area) and the Monterey County line, but access is limited or nonexistent, and the region is almost entirely private land, unlike in Monterey County where much of the habitat is in the Los Padres National Forest or on state park land.

Discussion

The discovery of this new colony conclusively establishes that the Unsilvered Fritillary is not extirpated from San Luis Obispo County as some have feared. It also demonstrates that *S. a. clemencei* is not limited to "higher

mountains" as much of the literature claims (Glassberg 2001, Howe 1975, Scott 1986), but can also be found in relatively low-elevation canyons. Somehow, the belief that *clemencei* is "absent below 3500'," seemingly first propagated by Howe in 1975, has been repeated as recently as 2015 (Zaman et al.)—despite the records from Hi Mountain and Atascadero being under this elevation. This new colony proves, once again, that *clemencei* can thrive at much lower elevations than generally believed. Moreover, the elevation of this new colony is not particularly unusual: there are numbers of unpublished records from similar elevations in Monterey County, and even a couple from significantly lower elevations (John Emmel pers. comm.).

It is very likely that there are more *S. a. clemencei* colonies in similar habitat in the mountains and canyons of northwestern San Luis Obispo County (and southwestern Monterey County), a region whose butterfly fauna is largely unexplored. John Emmel stated that he "suspect[s] that this spot is the tip of the iceberg and that there is a large area of suitable habitat". I hope to explore this whole region further, but the lack of roads and the fact that it is almost entirely privately owned, presents a significant challenge to further investigation, as previously mentioned.

Acknowledgements

I'd like to thank Jim Brock, Dr. John Emmel, Andrew Gilbert, and especially Ken Davenport, for reading various drafts of this article and making many helpful suggestions. Individually, I'm grateful to Jim Brock, for sharing his observations from the Hi Mountain colony and encouraging my search for *clemencei* in SLO County; Ken Davenport, for encouraging and mentoring my interest in butterflies over the years; and Dr. John Emmel, for sharing a large number of *S. a. clemencei* records with me. Finally, I'd like to thank Ethan Gilbert for driving me in his truck so that I could explore the road.

Literature Cited:

- Brock, J. P. & K. Kaufman. 2003. Butterflies of North America. Houghton Mifflin Company, New York, New York. 383 pp.
- Davenport, K., R. Stanford, & R. Langston. 2016. Flight Periods of California Butterflies for "Resident Species", Subspecies, and most Strays to the State. The International Lepidoptera Survey, published electronically. 69 pp.
- Dos Passos, C. F., & L. P. Grey. 1947. Systematic catalogue of *Speyeria* (Lepidoptera, Nymphalidae) with designations of types and fixations of type localities. American Museum Novitates, No. 1370. The American Museum of Natural History. 30 pp.
- Glassberg, J. 2001. Butterflies through Binoculars: The West. Oxford University Press, New York, New York. 374 pp.
- Howe, W. H. coordinating editor. 1975. The Butterflies of North America. Doubleday & Company Inc., Garden City, New York. 633 pp.
- Scott, J.A. 1986. The Butterflies of North America: A natural history and field guide. Stanford University Press, Stanford, California. 583 pp.
- Zaman, K., C. Tenny, C. E. Rush, & R. I. Hill. 2015. Population Ecology of a California Endemic: *Speyeria adiastra clemencei*. Journal of Insect Conservation 19(4): 753-763

Announcements:

The 66th Annual Lep Soc Meeting

The 66th annual meeting of the Lep Soc will be held from Sun. July 30 - Tues. Aug. 1, 2017 at the Marriott University Park in Tucson, Arizona. This event is hosted by Dept. of Ent. of the College of Ag. and Life Sciences, U of A.

Online registration and abstract submission is open at <https://lepsoc2017.eventbrite.com>. Registration includes facility fees and the BBQ. Hotel accommodations can be made at the Marriott University Park for a discounted rate (<https://goo.gl/CMZrpx>). Onsite registration check in begins on Sat., July 29, at 4 PM followed by a reception with a no-host bar at Gentle Ben's restaurant next door to the Marriott. Registration check in will continue on Sunday morning with the conference beginning around 10 AM. The BBQ will be on Sunday evening (price included in registration) and the Banquet will be on Tuesday evening (additional ticket purchase). Additional information will be posted and disseminated on the Lepidopterists' Society Website, Facebook and Twitter accounts. Please email meeting@lepsoc.org with any questions or concerns.

For full announcement, see News of the Lep Soc, Winter 2016, Vol 58:4, 198-199.

Lepidoptera Short Course, Eagle Hill, Steuben, Maine, June 25 - July 1, 2017

Moths and Butterflies (Lepidoptera): Identification, Specimen Preparation and Taxonomy June 25 - July 1, 2017

Hugh McGuinness and Bryan Pfeiffer will be teaching a weeklong seminar on Lepidoptera this summer. The course, which is titled "Moths and Butterflies: Identification, Specimen Preparation and Taxonomy," will emphasize identification of macrolepidoptera; the current state of taxonomy in Lepidoptera; the techniques used for observing, studying and surveying butterflies and moths; and various aspects of Lepidopteran conservation. Each day will include a lecture topic, lab work and plenty of field time, both during the day and at night. Because we have two instructors we have a lot of flexibility in the nature of the course and we plan to adapt the course depending on the interests of the students. The course is scheduled to run from the 25th of June to the 1st of July, 2017. For more information, go to <https://www.eaglehill.us/programs/nhs/seminar-flyer-pdfs/2017%20McGuinness%20Pfeiffer.pdf>.

Eagle Hill is a wonderful biological station with great food and ample accommodations set on hillside in coastal Maine about 1 hour from Bar Harbor in Steuben, Maine.

See: <https://madmimi.com/p/89f219?fe=1&pact=172220-135616947-7501261478-5349027e9d0f7-30b8bd64a09b51f41ca602dccc> for more information on these and other insect related courses for this year.

Lepidopterists' Society Statement on Diversity, Inclusion, Harassment, and Safety¹

During the Executive Council (EC) Meeting on 6 July 2016 in Florissant, Colorado, it was proposed that the Lep Soc adopt a Statement on Diversity. This is important to help our members feel safe during Society events, and provide the necessary means to resolve situations should they occur. The following statement was approved by the EC on 13 November 2016.

"The Lepidopterists' Society values diversity among our membership, just as we value diversity within the biological communities we study. We welcome into our Society and encourage the participation of all individuals who are interested in Lepidoptera regardless of age; gender; gender identity; sexual orientation; race; ethnicity; cultural background; nationality; religion; physical or mental ability; professional status; opinions on collecting, observing, and photographing; and all other characteristics and activities that make our members unique.

"The Lepidopterists' Society is dedicated to providing a safe, hospitable, and productive environment for everyone attending our events. We therefore prohibit any and all intimidating, threatening, or harassing conduct during these events. Harassment includes, but is not limited to: offensive gestures or verbal comments; the sending or sharing of offensive images, videos, emails, texts, or voicemails; deliberate intimidation; stalking, following, harassing photography or recording; sustained disruption of talks or other events; inappropriate physical contact; and unwelcome attention. Participants asked to stop any harassing behavior are expected to comply immediately. This policy applies to all event speakers, staff, volunteers, exhibitors, and attendees.

"The Society may take any action it deems appropriate in dealing with an event participant who engages in harassing behavior, ranging from a simple warning to expulsion from any Society sponsored events to loss of membership in the Society.

"If you are being harassed, if you notice that someone else is being harassed, or if you have any other concerns, please do not hesitate to contact the Society's designated ombudsperson, who will work with the appropriate Society leadership to resolve the situation. The designated ombudsperson will always be identified by name in the event's program book, along with their contact information. If needed, the Society will also help participants get in touch with convention center/hotel/venue security or local law enforcement, and otherwise assist those experiencing harassment, to enable them to feel safe for the duration of our events."

¹Based in part on the Entomological Society of America's Statement on Diversity & Inclusion and Code of Conduct

-- John V. Calhoun, President

The Southern Lepidopterists' Society invites you to join

The Southern Lepidopterists' Society (SLS) was established in 1978 to promote the enjoyment and understanding of butterflies and moths in the southeastern United States. As always, we are seeking to broaden our membership.

Regular membership is \$30.00. Student and other membership categories are also available. With the membership you will receive four issues of the SLS NEWS. Our editor J. Barry Lombardini packs each issue with beautiful color photos and must-read articles. SLS conveniently holds its annual meeting, in Sept. or Oct., with the Association for Tropical Lepidoptera at the Florida Museum of Natural History, McGuire Center for Lepidoptera and Biodiversity in Gainesville. The SLS web page (<http://southernlepsoc.org/>) has more information about our group, how to become a member, archives of SLS NEWS issues, meetings and more.

Please write to me, Marc C. Minno, Membership Coordinator, at marc.minno@gmail.com if you have any questions. Dues may be sent to Jeffrey R. Slotten, Treasurer, 5421 NW 68th Lane, Gainesville, FL 32653.

Society of Kentucky Lepidopterists

The Society of Kentucky Lepidopterists is open to anyone with an interest in the Lepidoptera of the Great State of Kentucky. We are a very active organization. Annual dues are \$15.00 for the hard copy of the news; \$12.00 for electronic copies only.

The society typically schedules three+ field trips yearly. Contact Loran Gibson, 859-384-0083 or 1stkymothman@gmail.com, to learn more. The summer and fall trips have yet to be scheduled.

The annual meeting has yet to be scheduled but will be in November at the University of KY, Lexington.

To join the Society of Kentucky Lepidopterists, send dues to: Les Ferge, 7119 Hubbard Ave., Middleton, WI 53562.

PayPal is the easy way to send money to the Society

For those wishing to send/donate money to the Society; purchase Society publications, t-shirts, and back issues; or to pay late fees, PayPal is a convenient way to do so. The process is simple: sign on to www.PayPal.com, and navigate to "Send Money", and use this recipient e-mail address: kerichers@wuesd.org; follow the instructions to complete the transaction, and be sure to enter information in the box provided to explain why the money is being sent to the Society. Thanks!

Sixth Annual (Inter)National Moth Week - July 22-30, 2017

This Year's Spotlight – Tiger Moths (Erebidae)

The sixth annual (Inter)National Moth Week (NMW) is being held July 22-30 around the world. NMW is a global event and last year there were more than 450 participating locations in all 50 states and 42 countries. Since its inception in 2012, there have been events in 74 countries. NMW encourages "moth-ers" of all ages and abilities to learn about, observe, and document moths in their backyards, parks, and neighborhoods. The event is open to anyone, anywhere around the world. Surveys, moth-watching and educational events have been held throughout Europe, Asia, Africa, South, Central, and North America.

NMW recognizes that late July may not be ideal for moth-ing everywhere around the world and also encourages events and participation at any other time that will be productive. We are also considering adding a second Moth Week in January/February for areas where July is winter and would appreciate feedback on timing. For all events currently falling outside the July Moth Week, simply register those dates and locations on the website and we will be sure to spotlight them as well.

NMW shines a much-needed spotlight on moths and their ecological importance as well as their incredible biodiversity. Through partnerships with major online biological data depositories such as BAMONA, Project Noah, BugGuide, Encyclopedia of Life, Discover Life, Biodiversity Bhutan, DiversityIndia, Moth Photographers Group, LepiMap – Atlas of African Lepidoptera, and iNaturalist, NMW encourages participants to record moth distribution, submit data and photographs and to provide information on other aspects of their life cycles and habitats.

Participants submitted more than 10,000 moth records and held thousands of moth nights in backyards, inner cities and some of the most remote places on Earth. Many of these were attended by the public and by families and children that have never been exposed to moths or Lepidoptera survey methods. The NMW Flickr group now has over 70,000 moth images.

NMW 2017 is designated "The Year of the Tiger Moth" to encourage participants to look for and learn about these fascinating moths. Tiger moths are in the Arctiinae sub-family of the Erebidae.

NMW is always interested in partnering with organizations and can spotlight events through our website and Facebook pages. For more information about NMW and to register a location at any time of the year please visit www.nationalmothweek.org. To contact us about the event, contact Dave Moskowitz at dmoskowitz@ecolsciences.com

The Second North American Microlepidopterists' Meeting – University of Arizona, Tucson August 2, 2017

The **Second North American Microlepidopterists' Meeting** will be held at the University of Arizona on August 2nd, 2017 in Tucson, Arizona. The meeting is being held one day after the 66th Annual Meeting of The Lepidopterists' Society in Tucson.

The Microlepidopterists' Meeting will include both oral and poster presentations and workshops led by invited microlepidopteran experts. There will be both morning and afternoon sessions, with plenty of time to interact with fellow microlepidopterists and browse the collection. **The meeting is FREE of charge** and will be held at the University of Arizona Insect Collection, which will be open and accessible to all participants. Information on the venue is provided below. Thanks to Frank Krell, the programme and abstracts of the meeting will be published as a separate publication similar to last year by the Denver Museum of Nature & Science.

This is a great opportunity for both amateurs and professionals interested or specializing in microlepidoptera to meet and greet, discuss new ideas, share research, and examine or exchange specimens. There will also be the opportunity for collecting, either directly after the Microlepidopterists' Meeting or during one of the blacklighting trips being organized for the 2017 LepSoc Meeting.

There is no registration fee for the meeting, however **an RSVP is required**. If you would like to attend, give a talk, present a poster, or have any questions please contact nvazrick@yahoo.com. **Deadline for submission of abstracts is June 15th, 2017.**

We hope to see you in Tucson after the 2017 Lepidopterists' Society Meeting!

- Microlepidopterists' Meeting Organizing Committee (Vazrick Nazari, David Bettman, and Todd Gilligan)

Near the center of the University campus, the University of Arizona Insect Collection is located in the Department of Entomology, in Room 410 on the fourth floor of the Forbes Building (1140 E. South Campus Dr.). Short-term metered parking is available on University Ave. There are also several parking garages near the Forbes Building. For more information about the University of Arizona Insect Collection, please visit <http://www.uainsectcollection.com/>.

**www.lepsoc.org and
<https://www.facebook.com/lepsoc>**

The Lepidoptera Course, 8 – 16 August 2017

The Lepidoptera Course is back in 2017 at the Southwestern Research Station (SWRS) in the Chiricahua Mountains of SE Arizona (2 ½ hour drive from Tucson). With its extensive series of Sky-Island mountain ranges, SE Arizona has the highest Lepidoptera diversity in the US. With low desert scrub oak and mixed oak-pine woodland, lush riparian, juniper, Douglas fir, and mountain meadow habitats all within a 40 minute drive from the station, the SWRS is an ideal location from which to sample this diversity (of both habitats and species).

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 to adult and larval morphology with a focus on taxonomically important traits, extensive field work on both adults and larvae, collecting and curatorial techniques, genitalic dissection and preparation, larval classification, and general issues in Lepidoptera systematics, ecology, and evolution. At present, the projected staff include John Brown (Smithsonian), Richard Brown (Mississippi State), Jennifer Bundy (University of Arizona), Chris Grinter (The California Academy of Sciences), Sangmi Lee (Arizona State), Ray Nagle (University of Arizona), and Bruce Walsh (University of Arizona).

Details and an application form can be found online at <http://research.amnh.org/swrs/education/lepidoptera-course>. Deadline for applications are 1 July 2017. For further inquiries please e-mail Bruce Walsh at jbwalsh@u.arizona.edu, or Erinn Enriquez at aenriquez@amnh.org.



Marumba cristatis

Sphingidae;
from Fraser's Hill, Malaysia
(photos by David Fischer;
see article page 59)



Dahira falcata

Notes on historical butterfly records from Maine. Part 1

John V. Calhoun

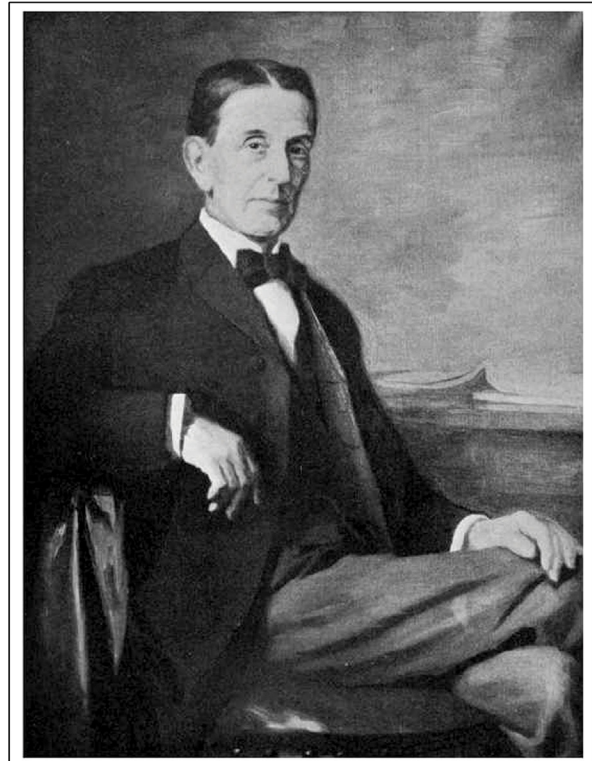
977 Wicks Drive, Palm Harbor, FL 34684

bretcall@verizon.net

I was born in Ohio and now live in Florida, but my wife is originally from Maine. In 2005 we built a lakeside camp in Kennebec County, Maine, where we spend several weeks each summer. These yearly trips permitted me to participate in the immensely successful Maine Butterfly Survey, which was conducted from 2007 to 2015. Maine is also a convenient jumping-off point to visit the Museum of Comparative Zoology (Harvard University, MCZ) in Cambridge, Massachusetts.

Over the years I developed a keen interest in historical butterfly records from Maine. In 2007, I cataloged the important butterfly collection of the amateur entomologist Mattie Wadsworth (1862-1953) from Manchester, Maine, leading to a study of her life and entomological contributions (White & Calhoun 2009). Most of all, I was intrigued by the old reports in Maine of four rare butterflies: *Erynnis p. persius* (Scudder), *Callophrys i. irus* (Godart), *Plebejus samuelis* (Nabokov), and *Phyciodes b. batesii* (Reakirt), all of which were supposedly recorded in the state between 1860 and 1880, but not since. I decided to investigate these and other noteworthy records. I reviewed the literature, searched for specimens, consulted old correspondence, and studied the activities of past entomologists. I soon realized that I could not publish all my findings in one article. In this first of two parts, I discuss the reports of *P. samuelis* and *P. batesii* in Maine. I also offer new information about a supposed record of *Agriades glandon* (de Prunner) in Maine.

Overview. The published records of *E. persius*, *C. irus*, *P. samuelis*, and *P. batesii* in Maine were attributed, directly or indirectly, to Sidney Irving Smith (1843-1926) (Fig. 1). Born in the small town of Norway in Oxford County of western Maine, Smith developed interests in botany and entomology at a young age (Coe 1929a). He was strongly influenced by Addison E. Verrill (1839-1926), who also grew up studying natural history in Maine. Verrill was born in Greenwood, Maine, and moved with his family to the town of Norway when he was 14 years old (Coe 1929b). Smith and Verrill frequently collected insects together around Norway, and they forged a lifelong friendship. Verrill would go on to become the first professor of zoology at Yale University (New Haven, Connecticut). In 1865 he married Smith's older sister, Flora L. Smith. Following in the footsteps of his brother-in-law, S. I. Smith was admitted in 1864 to Yale, where in 1875 he accepted a professorship in comparative zoology. In his later years he became totally blind as a result of glaucoma. After his death he was interred at Evergreen Cemetery, New Haven,



Sidney I. Smith.

Fig. 1. Sidney I. Smith (from Coe 1929).

Connecticut. Verrill died only seven months later and was buried just a few hundred feet away in the same cemetery.

Most of the insects that Smith collected prior to 1864 were acquired by MCZ. His remaining specimens are deposited at the Peabody Museum of Natural History (Yale University PMNH) (Uhler 1865, Verrill 1926, Coe 1929). His butterflies at PMNH bear printed labels reading "Norway, ME. / S. I. Smith." Many of the accompanying entries in the old PMNH insect collection ledger were written by Smith himself, presumably when he was a professor at Yale. Most of his specimens at MCZ possess printed labels reading "Norway, / Maine. / S. J. Smith"; the incorrect middle initial resulting from a misinterpretation of Smith's handwriting (Fig. 1, bottom).

Beginning as early as 1864 and continuing for at least twenty years, Smith corresponded with the prominent entomologist Samuel H. Scudder of Massachusetts. When Scudder was studying the butterflies of New England,

Smith sent specimens and information about the species he had found in Maine and Connecticut. As a result, Smith's name figures prominently in Scudder's publications on the subject (e.g. Scudder 1868, 1888-1889). Some of Smith specimens at MCZ bear small labels reading "Smith" in Scudder's hand. These are likely from Scudder's collection, which is also deposited at MCZ. At least one of Smith's butterfly specimens is deposited at Boston University (Boston, Massachusetts; BU), which preserves the bulk of the insect collection of the now defunct Boston Society of Natural History (BSNH), whose collections were dispersed by the mid-1940s (Johnson 2004).

In the northeast, a shared larval food plant of *E. persius*, *C. irus*, and *P. samuelis* is wild lupine, *Lupinus perennis* L. (Fabaceae), which is potentially extirpated in Maine. Gawler (1984) cited historical records of *L. perennis* from three Maine "towns" (townships), but did not list the counties. Campbell et al. (1995) indicated the existence of herbarium specimens from Aroostook, Knox, Oxford, Penobscot, and Piscataquis Counties. Angelo and Boufford (2013) mapped records only from Aroostook and Oxford Counties. The Maine Natural Areas Program (MNAP 2013) recognizes records of *L. perennis* from Aroostook, Knox, and Oxford Counties. While studying the biogeography of *P. samuelis* during the 1990s, Robert Dirig examined nearly 2000 herbarium specimens of *Lupinus perennis*. All eleven specimens of *L. perennis* that he examined from Maine, including those listed by Campbell and Eastman (1980), were collected near the town of Oxford in Oxford County (R. Dirig pers. comm.). One specific site near Oxford was "the sand-plain near Whitney Pond" (Chamberlain 1907), which was located a few miles south of the town of Norway. The fact that *L. perennis* was once found in Oxford County encouraged the notion that the three lupine-feeding butterflies also occurred there and where encountered by Smith. These butterflies have come to represent vital symbols of Maine's lost natural heritage, joining at least ten other species of wildlife that have disappeared from the state. Due to a precipitous decline in the number of known populations within the United States, *P. samuelis* was listed as federally endangered in December 1992 (USFWS 1992).

Despite published accounts to the contrary, I found no proof that Sidney I. Smith actually collected *E. persius*, *C. irus*, *P. samuelis*, or *P. batesii* at Norway, Maine. Although one or more of these species may once have occurred in Maine, available evidence is insufficient to verify their presence.

Species: *Plebejus samuelis* (Karner Blue)

Status in Maine: known specimens of dubious origin

I follow Pelham (2016) in treating *P. samuelis* as a full species, rather than as a subspecies of *Plebejus melissa* (W. H. Edwards). This species was first reported from Maine by Dirig (1994), who mapped it in Oxford County, representing its easternmost documented outpost. This is based on Dirig's discovery in 1992 of a female labeled "Maine" at the Natural History Museum, London (NHMUK; formerly NHML or BMNH) (R. Dirig pers. comm.). Soon after this discovery, another researcher suggested that the specimen was likely collected by S. I. Smith in the vicinity of Norway, Maine (R. Dirig pers. comm.). Based on this anecdotal evidence, the federal Karner Blue Recovery Plan (USFWS 2003) claimed that this species was recorded prior to 1874 at the Norway Barrens Historic Site, near the town of Norway, Maine. Since then, authors have included Maine within the species' historic range. Webster and deMaynadier (2005) stated that this species "was collected in Norway (Oxford Co.) around 1865 by S. I. Smith," adding, "No other specimens are known from Maine and the species is now considered extirpated." Outside of Maine, the nearest known valid records are from southern New Hampshire, where the species was extirpated and subsequently reintroduced using stock from New York (Schweitzer 2004, Schweitzer et al. 2011, Holman 2015).

The female specimen of *P. samuelis* found by R. Dirig in 1992 is labeled "Scudderi / Maine / Fish 80" (Fig. 2) and is from the collection of the German entomologist Philipp C. Zeller (1808-1883), who specialized in moths of the family Pterophoridae. Zeller's collection of 31,000 Lepidoptera specimens (except the Pterophoridae and Tineidae) was acquired by NHMUK in 1883-84 (Waterhouse 1906). There is no obvious evidence that the specimen of *P. samuelis* was collected by S. I. Smith. In fact, I soon



Fig. 2. *Plebejus samuelis*, female, labeled "Maine," ex. P. C. Zeller collection. At bottom are labels from four other *P. samuelis* labeled "Maine" and "N.A.," ex. Zeller collection (© Trustees of The Natural History Museum).

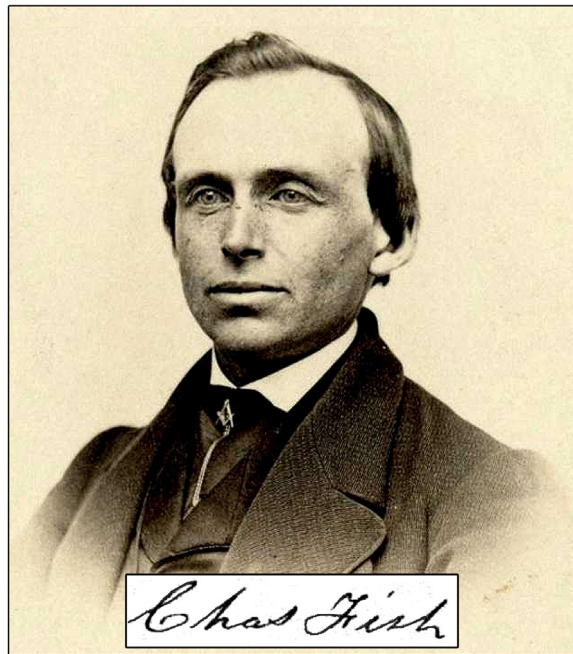


Fig. 3. Charles Fish, 1865 (Courtesy George J. Mitchell Dept. Special Collections & Archives, Bowdoin College Library). Signature from 1879 letter.

realized that the name on the label, "Fish," actually refers to Charles Fish (1832-1915) (Fig. 3), who was born in Lincoln, Maine. He briefly attended Waterville College (Colby College, Waterville, Maine) in 1855-56, then Harvard University (Cambridge, Massachusetts) in 1856-57. In 1863, Fish entered Bowdoin College in Brunswick, Maine, where he received the degrees of A.B. and A.M. in 1865 and 1868, respectively (Hall 1912, Merrill 1919, Wilder 1950). Fish worked as a teacher and school administrator in several towns in Maine (Cleaveland & Packard 1882). He taught courses in mathematics and natural sciences. From 1875 to 1881 he lived in Old Town, Maine, after which he moved to Brunswick, where he resided for the remainder of his life. Fish was described as "Modest and retiring to a fault" (Wilder 1916). He worked so modestly that few knew that for 42 years he served as the editor of the *Maine Farmers' Almanac*. After death, Fish was interred at Riverside Cemetery in Brunswick, Maine.

Fish developed an interest in Lepidoptera during the 1870s, and he began corresponding with several notable lepidopterists, including Henry Edwards, William H. Edwards, and Augustus R. Grote. In 1878, Fish turned his attention toward moths of the family Pterophoridae. He became an authority on this group and described a handful of species. Several genera and species of moths are named in his honor. Fish's interest in pterophorids led him to P. C. Zeller. They corresponded and exchanged Lepidoptera specimens from 1878 until at least 1880. I obtained scans of all the surviving letters from Fish to Zeller, which are preserved at NHMUK. In a letter dated 1 October 1880, Fish mentions sending a few "*Lycaena scudderi*," which was a name misapplied to *P. samuelis* until the 1940s,

when Vladimir Nabokov attempted to straighten out the taxonomy of these butterflies. Fish did not state where his "*L. scudderi*" had been collected, but in the following sentence remarked, "I have had the promise of some other species from correspondents, but do not hear from them yet." Based on these letters, I was able to confirm that the label on the female *P. samuelis* at NHMUK was written by Zeller. The "80" on the label apparently refers to the year when Zeller received the specimen from Fish. This is all important information, but the story does not end there.

Four additional specimens of *P. samuelis* that Fish sent to Zeller were recently located in the NHMUK collection. I received images of these specimens and their labels, all of which were prepared by Zeller (Fig. 2). One female is labeled "Maine" and dated "80." One male and one female, also dated "80," are labeled "N.A." [North America]. One male, dated "4/79," has no locality (the paper used for this label is brighter green). The four specimens dated "80" were undoubtedly those sent to Zeller in October 1880. The specimen dated "4/79" was sent to Zeller on 7 April 1879, in exchange for specimens of Pterophoridae. It is cited in the accompanying letter as "No. 3 *Lycaena Scudderi* ♂ Edwards." This suggests that Fish merely numbered his specimens for Zeller and did not provide labels. Zeller was obviously uncertain if the specimens of *P. samuelis* were from Maine (where Fish lived) or somewhere else in North America. Zeller was interested in Lycaenidae and asked Fish to send different species of this family. Fish did his best to accommodate this request, but there is no proof that he collected the five specimens of *P. samuelis* in Maine. In fact, the evidence suggests otherwise.

Fish was a good friend of Charles H. Fernald, who from 1871 to 1886 was professor of natural history at Maine State College of Agriculture and the Mechanic Arts at Orono (now the University of Maine). They sometimes visited one another and collected insects together, especially when Fish lived at Old Town, which is located just north of Orono. In 1883, Fernald purchased all of Fish's pterophorid moths (Anonymous 1883, Fernald 1895), thus he was obviously familiar with Fish's Lepidoptera collection. The following year, Fernald published *The Butterflies of Maine*, which did not list *Lycaena scudderi* or any other name that could apply to *P. samuelis*. Fernald was also a friend and correspondent of Samuel H. Scudder (whom the names *samuelis* and *scudderi* honor). None of the letters between Fernald and Scudder (Boston Museum of Science, BMS; University of Massachusetts Amherst, UMA) refer to this species. Furthermore, Scudder did not mention *L. scudderi* from Maine in his three-volume book, *The Butterflies of the Eastern United States and Canada with Special Reference to New England* (Scudder 1888-1889). The discovery in Maine of "*L. scudderi*" (= *P. samuelis*) would have been big news among New England naturalists, especially Fernald and Scudder. Other letters written by Fish, dated 1878-1881, are preserved at MCZ, The Field Museum of Natural History (Chicago, Illinois; FMNH), The Academy

of Natural Sciences (Philadelphia; ANSP), and the American Museum of Natural History (New York, New York; AMNH). None mention *P. samuelis* by any name.

Evidence precludes the possibility that Fish obtained his specimens of *P. samuelis* from S. I. Smith. First, we know that Fernald received from Smith a list of the butterflies found around Norway, Maine (Fernald 1884). This list is not preserved among Fernald's manuscripts at UMA, but it is safe to assume that "*L. scudderi*" was not included, given that this species is not mentioned in Fernald's *The Butterflies of Maine*. Second, Smith would likely have kept at least one specimen of this desirable species in his own collection, but none are deposited at MCZ, PMNH, or BU. The old PMNH collection ledger lists no such specimens. Third, Smith's surviving letters to Scudder, written from 1865 to 1886 (BMS), do not mention this species. Smith's manuscripts at PMNH also lack any reference to this species.

Important clues about the probable origin of Fish's specimens of *P. samuelis* exist within his letters. Fish exchanged butterflies with other collectors, especially F. H. Herman Strecker of Reading, Pennsylvania, whose correspondence is preserved at FMNH. In a letter dated 1 February 1879, Fish asked Strecker to provide "as many species of Pieridae, Lycaenidae and Hipparchidae not in my collection." On 22 October of that year, Fish informed Strecker, "I am fond too of Lycaenidae," adding, "I do not care so much for exotics as N. American species." More important, Fish wrote on 29 March 1880: "I wish to obtain for a specific purpose 25 or 30 examples each of as many species of N.A. Lycaenidae as I can. . . ." Not coincidentally, this request came shortly after Zeller had begged Fish for more specimens of Lycaenidae. Strecker's surviving specimen of *P. samuelis* at FMNH is labeled "E New York." It is conceivable that Fish acquired his five *P. samuelis* from Strecker. If so, they were probably collected in the vicinity of Albany, New York, more specifically the legendary Karner Pine Bush locality, which was discovered in 1869.

Three years after selling his pterophorids to Fernald in 1883, Fish donated the remainder of his "valuable collection of mounted butterflies and moths" to Bowdoin College, Brunswick, Maine (Anonymous 1886a, 1886b). Totalling 2,538 specimens, it was described as being particularly rich in New England species and "nicely arranged in a well finished cabinet." The collection was repeatedly mentioned in Bowdoin's annual *Catalogue* until about 1910, after which many of the school's natural history collections were culled and the remainder was dispersed to different parts of the campus. Some collections were improperly stored and subsequently damaged (Watson 1994). Auburn E. Brower examined Fish's collection at Bowdoin sometime prior to 1974, but he did not list *P. samuelis* in Brower (1974), implying that there were no such specimens from Maine. Unfortunately, my attempts to locate Fish's collection were unsuccessful. It was most recently stored in the Searles Science Building, but current faculty and staff

of the college were not familiar with the collection. It was possibly seen just before renovations began on this building in 1998, when a number of unwanted natural history collections were in the process of being discarded. The collection was still contained in its elaborate wooden cabinet (D. Staber pers. comm.). Unlike some other natural history collections from Bowdoin, Fish's Lepidoptera were not acquired by the Maine State Museum in Augusta (P. T. Work pers. comm.). The collection is presumed lost.

Species: *Agriades glandon* (Arctic Blue)

Status in Maine: known specimens of dubious origin

Brower (1974) listed *Plebejus aquilo* (Boisduval) in Maine based on a letter from the Pennsylvania lepidopterist Franklin (Frank) H. Chermock (1906-1967), who claimed that he and his wife collected two specimens on 1 July 1941 atop Mt. Katahdin, Piscataquis County. Brower remarked that he and others had collected butterflies on Mt. Katahdin "a great many times" without ever encountering this species. Webster and deMaynadier (2005) considered this record to be questionable and attributed it to the species *Agriades optilete* (Knoch). Both the names *aquilo* and *optilete* have been applied to the species of *Agriades* in eastern Canada, but recent authors attribute those populations to *A. glandon*.

The two specimens mentioned by Chermock were not examined by Brower. Chermock's collection was acquired by the Allyn Museum of Entomology (Sarasota, Florida) (Miller 1983), whose holdings were transferred in 2004 to the McGuire Center for Lepidoptera and Biodiversity (Florida Museum of Natural History, Gainesville, Florida; MGCL (Calhoun 2015)). Chermock's two specimens of "*P. aquilo*" were recently located in the MGCL collection. Male and female, each bears a printed and handwritten label that reads "MT. KATAHDIN ME / vii-1-1941" (Fig. 4). Another

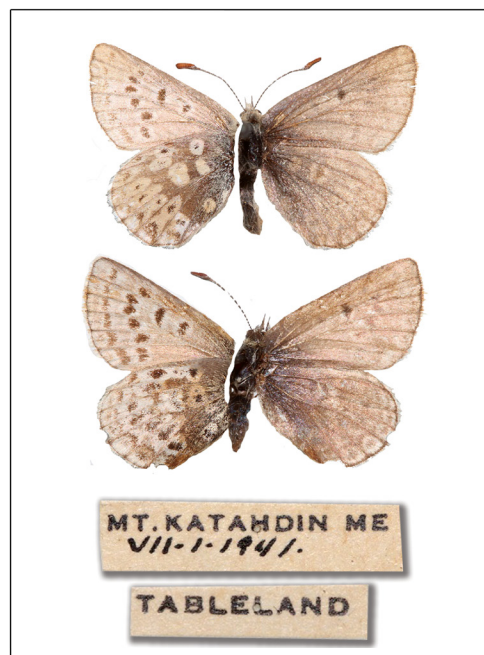


Fig. 4. *Agriades glandon* (ventral/dorsal), male (top) and female, with labels from male. Dubiously collected on Mt. Katahdin, Maine (MGCL).

printed label on each reads "TABLELAND," which refers to a relatively flat, rocky, alpine habitat above timberline on Mt. Katahdin, located on the western side of the summit at an elevation of about 1280-1463 m (4200-4800 ft.). This area of Mt. Katahdin supports the endemic butterfly *Oeneis polixenes katahdin* (Newcomb). For many years after its discovery in 1901, *O. p. katahdin* was the principal quarry of most lepidopterists who scaled Mt. Katahdin (Brower 1958). As a result, the tablelands of the mountain were thoroughly explored for butterflies for decades, and by many experience lepidopterists (Rogers 1934). Chermock's specimens of *A. glandon* seem to agree with the subspecies *A. g. labrador* Schmidt, Scott & Kondla, which is not known to occur any closer to Mt. Katahdin than central and eastern Quebec (Handfield 2011). Although Chermock thought his two specimens of *A. glandon* showed a "good racial difference from northern *aquilo*" (Brower 1974), it is not known what populations he was using for comparison.

Butterfly specimens deposited at MGCL, MCZ, and the Alabama Museum of Natural History (University of Alabama, Tuscaloosa; ALMNH) confirm that Frank Chermock and his brother, Ralph, did indeed collect butterflies on and around Mt. Katahdin on 1 July 1941. They explored the area for at least a week, from 29 June to 6 July. Among the species they found were *O. p. katahdin*, *Icaricia saepiolus amica* (W. H. Edwards), and *Ancyloxypha numitor* (F.).

Entomologists have sought butterflies on Mt. Katahdin for over a century, yet only F. H. Chermock allegedly encountered *A. glandon*. Since then, Mt. Katahdin has been meticulously explored and surveyed for butterflies without any additional records of this species. It is possible that a small, relict population of *A. glandon* survived on Mt. Katahdin until the early 1940s, far removed from other known populations. However, the Chermocks also possessed butterflies from Canada, including Quebec. More likely, the pair of *A. glandon* originated from eastern Canada and were inadvertently mislabeled.

Species: *Phyciodes b. batesii* (Tawny crescent)

Status in Maine: no known valid records

This species was first reported from Maine by Parlin (1922), who listed it from the town of Machias, which is located along the southeastern ("downeast") coast in Washington County. Parlin, however, questioned his identification. Johnson (1927) mentioned specimens "that seem referable to this species" which were taken on 25 June and 24 July at Bar Harbor and Southwest Harbor, both located on Mount Desert Island, Hancock County. These records were reiterated by Farquhar (1934). dos Passos and Grey (1934) listed no definite records of this species from Maine, but remarked that "it is likely to be found, when the state is more closely explored." Brower (1974) listed a single specimen of *P. batesii* that was collected by S. I. Smith at Norway, noting that it had also been identified as this

species by Sidney A. Hessel, and Charles L. Remington. Although Brower did not say where this specimen was deposited, he mentioned that Smith's material is at PMNH. Also, Remington served as the curator of entomology at PMNH, where Hessel was a research associate. Brower (1974) cited the previous reports by Johnson (1927) and Parlin (1922), but believed that "All except the Norway record are considered incorrect." Webster and deMaynadier (2005) stated that *P. batesii* was "collected in Norway (Oxford Co.) around 1865 by S.I. Smith," adding, "No other specimens are known from Maine and the species is now considered to be extirpated." Many published distribution maps of this species (e.g. Opler & Krizek 1984, Opler & Malikul 1992, Opler 1995, Cech & Tudor 2005) place it at Norway, Maine, or generally within the northwestern corner of the state. The map of *P. batesii* in Scott (1986) includes all of southern Maine, evidently the result of connecting the records from Oxford, Hancock, and Washington Counties as reported by Brower (1974). Schweitzer (2005) and Schweitzer et al. (2011) referred to the occurrence of this species at Norway, Maine, on the basis of the specimen at PMNH, which they described as the only credible record in New England. Outside of Maine, the nearest valid records of *P. batesii* are from southern Quebec (Layberry et al. 1998, Handfield 2011).

Assessing historical records of *P. batesii* is made difficult by this species' similarity to the highly variable and widely distributed *Phyciodes tharos* (Drury). Long after its description in 1866, *P. batesii* remained poorly understood and unfigured in the literature, resulting in many specimens of *P. tharos* being misidentified as *P. batesii*. Nearly 40 years ago, another species of *Phyciodes* was recognized in the northeast. Now generally known as *P. cocyta* (Cramer), this species is comprised of a complex assemblage of variable populations across a broad range, within which several subspecific names have been applied. *Phyciodes cocyta* is widely distributed in Maine, while *P. tharos* is mostly limited to the southwestern portion of the state (MBS 2016). Historical records suggest that "true" *P. tharos* was previously rare in Maine. It is now locally common and appears to be expanding its range.

Based on the neotype, the type locality of *P. c. cocyta* is Black Rock (prob. Boularderie Island, Victoria County), Cape Breton, Nova Scotia. After comparing specimens from eastern Canada, including Nova Scotia, I tentatively consider all populations of *P. cocyta* in Maine to represent the nominotypical subspecies. Scott (2006, 2014) identified butterflies in Vermont, New Hampshire and Maine as the subspecies *P. cocyta selenis* (W. Kirby), but I see little evidence to support this treatment, at least in Maine. Another putative species, *P. diminutor* Scott, has been identified in Vermont (Scott 2014), but its status is still uncertain and it is often treated as a subspecies of *P. cocyta*. Much more research is needed to determine the status of these so-called "*cocyta* group" taxa in Maine and elsewhere.

Prior to its recognition as a separate species from *P. tharos*, many specimens of *P. cocyta* were identified as *P. batesii* (Oliver 1979). Such “odd-looking *tharos*” (= *P. cocyta*) were often ascribed to *P. batesii* because they did not fit the standard concept of *P. tharos*. In Maine, the key character used to identify *P. cocyta* (particularly males) is the antennal club, which tends to be more elongated (elliptical) in shape, and the nudum (unscaled portion) is orange. Males of *P. t. tharos* in Maine typically have a somewhat more rounded antennal club with a black or brownish-black nudum, though in some the nudum is pale brown or even orange-brown. Females of *P. cocyta* are more difficult to discern from those of *P. tharos*. While most female *P. cocyta* have an orange nudum, some have a dark nudum like *P. tharos*, and vice versa. Some females of either species may have a pale brown nudum. Wing characters are also helpful, but variation in these species is extreme and many individuals (even males) cannot be identified with certainty. A combination of characters is helpful when attempting to identify single individuals. The antennal nudum of both male and female *P. b. batesii* in northeastern North America is black or blackish-brown.

Deposited at PMNH are twelve specimens of *Phyciodes* (five males, seven females) labeled “Norway, Me / S. I. Smith.” Ten bear small printed labels identifying them as “*Tharos*.” The remaining two (male and female), with slightly different printed locality labels, are not identified. Based on my analysis of high-resolution images of these twelve specimens, four of the males possess all the principal characters of *P. cocyta*. The remaining male is less distinctive and lacks antennal clubs, but it probably also represents *P. cocyta*. Smith’s male specimens suggest that all seven of his females are also *P. cocyta*. Sidney Smith informed Scudder in September 1869 that “*tharos*” (= *cocyta*) was rare around Norway, Maine: “I have never seen a dozen specimens, and this year I have not yet seen one” (BMS). This observation was reiterated by Scudder (1874, 1888-1889).

Smith’s twelve *P. cocyta* from Maine are listed in the PMNH collection ledger. The handwritten entries identify all the specimens as *P. tharos*. Ten of the specimens are listed as having been collected in 1865, though there is no evidence of this on the specimens themselves. This may actually refer to the year when the specimens were received by the museum, as suggested by a note at the rear of the ledger that records the purchase of 392 specimens of Lepidoptera from Smith in February 1865. The ledger entries were written by Katherine J. Bush (1855-1937) (L. F. Gall pers. comm.), who was hired by A. E. Verrill in 1879 to work on cataloguing and labeling invertebrate specimens at PMNH (Conniff 2016). Based on the ledger, Smith’s remaining two *P. cocyta* (without identification labels) were received by the museum in 1870. The entry for these two specimens was probably written by Bush’s sister, Charlotte E. Bush (1859-1940), who cataloged specimens at PMNH and worked as a librarian at Yale. By the time

these entries were made, most likely during the 1880s, the use of the genus *Phyciodes* for this species (rather than *Melitaea*) had become more widely accepted.

Based on the ledger entries, one of Smith’s *Phyciodes* specimens is unaccounted for in the PMNH collection. Entry 2973 records that three specimens of “*P. tharos*” were received from Smith in 1870, but only two *P. cocyta* with that number were located despite a thorough search of the collection (L. F. Gall pers. comm.). This entry may be in error or the specimen was lost. According to notations in the ledger, a number of Smith’s insect specimens were destroyed during the nineteenth century; this specimen was possibly among them.

One of Smith’s male *P. cocyta* at PMNH, lacking an abdomen and bearing a small label with the collection ledger number “1989” (received in 1865) (Fig. 5, top), is most likely the specimen that Brower (1974) and others previously identified as *P. batesii*. It fundamentally agrees with the concept of *P. batesii* as often mischaracterized in earlier literature (e.g. Forbes 1944, Klots 1951), before the recognition of *P. cocyta*. As with most other male *P. cocyta* from Maine, its antennal club is elongated (elliptical) and the nudum is distinctly orange. No actual specimens of *P. batesii* from Maine are deposited at PMNH or MCZ. In fact, no Maine specimens of *P. batesii* are known to exist.

A male *P. cocyta* in the BU collection, collected on 24 July at Bar Harbor, Maine (Fig. 5, bottom), is undoubtedly one of the specimens that Johnson (1927) tentatively identified as *P. batesii*. There are many butterflies in the BU collection from Bar Harbor and Southwest Harbor, Maine, which

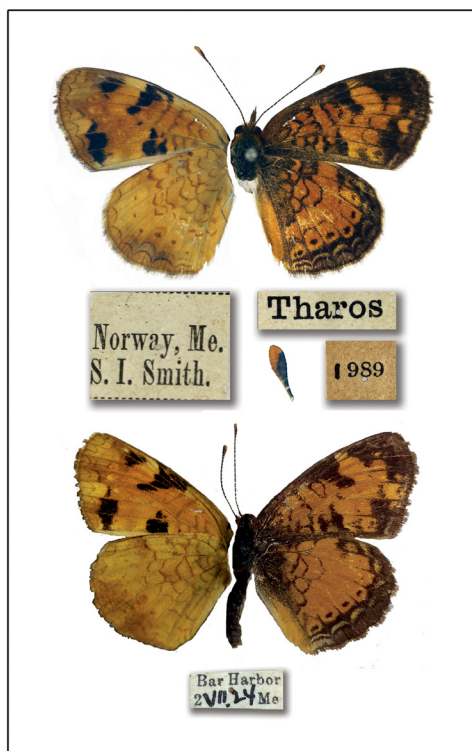


Fig. 5. *Phyciodes cocyta* males (ventral/dorsal) probably attributed to *P. batesii*. Top: Norway, Oxford Co., Maine, with labels; leg. S. I. Smith (PMNH; ENT.417887) (at center is enlarged dorsal antennal club). Bottom: Bar Harbor, Hancock Co., Maine, with label; prob. leg. C. W. Johnson (BU).

were collected during BSNH surveys of Mount Desert Island from 1918 to 1926 (Johnson 1927). From 1903 until his death in 1931, Charles W. Johnson served as the curator of insects and mollusks for BSNH (Johnson 2004). In fact, the old, handwritten cabinet labels from the BSNH Lepidoptera collection at BU are written in Johnson's distinctive script. Auburn E. Brower assisted with the Lepidoptera section for the subsequent Mount Desert Island survey report by Proctor (1938), which was reprinted with some revision by Proctor (1946). Although these two reports included most of the published data of Johnson (1927), they do not list *P. batesii*. Brower (1974) examined specimens from the old BSNH collection, and he evidently considered all the Maine *Phyciodes* to represent *tharos*.

Finally, The Lepidoptera collection of John C. Parlin (1863-1949), a Maine school teacher and amateur botanist, was destroyed in a flood (Brower 1974). Parlin was unsure of his identification of supposed *P. batesii* from Machias. Like those collected by Smith and Johnson, Parlin's specimen(s) probably also represented *P. cocyta*.

To be continued . . .

Acknowledgments

I offer my sincere thanks to the following individuals who searched for specimens and manuscripts, provided images and literature, granted permission to reproduce images, and shared valuable observations: Armand Esai (FMNH Library Archives); Phillip G. deMaynadier; Pamela Bryer, Patsy Dickinson, Robert Stevens, and Nathaniel T. Wheelwright (Bowdoin College); Robert Dirig (Cornell University, Ithaca, New York); Eva Grizzard and Barbara L. Harvey (BMS); Robert E. Gobeil; Blanca Huertas (NHMUK); Chrystal A. Maier and Rebekah S. Baquiran (FMNH); Sophia G. Mendoza and Kat Steffko (Bowdoin College Library); Anne L. Moore and Kirstin Kay (W.E.B. Du Bois Library, UMA); Dale A. Pasino (BU); Evan Peugh (ANSP Library and Archives); Lorraine Portch (Library and Archives, NHMUK); Mary Beth Prondzinski (ALMNH); Mai Reitmeyer (AMNH Library); Dale F. Schweitzer; Debra Staber (L. C. Bates Museum, Hinckley, Maine); Sharon Stichter; Andrew D. Warren (MCGL); Reginald P. Webster; Paula T. Work (Maine State Museum, Augusta); and Robert S. Young (Ernst Mayr Library, MCZ). Rachel L. Hawkins and Philip Perkins (MCZ) graciously rolled out the red carpet during my visits to the museum. I especially wish to thank Lawrence F. Gall (PMNH) for his untiring assistance in locating specimens, examining manuscripts, sending images, and patiently answering my many questions.

Literature Cited

- Angelo, R. & D. E. Boufford. Atlas of the flora of New England: Fabaceae. *Phytoneuron* 2013-2:1-15, 21 maps.
 Anonymous. 1877. Maine personal notes [C. Fish sends insect specimens to A. R. Grote]. *Lewiston Evening Journal* (news-paper) 16:2.
 _____. 1883. C. Fish collection of Pterophoridae to C. H. Fernald. *Psyche* 4:19.
 _____. 1886a. [Charles Fish collection]. Catalogue of the officers and students of Bowdoin College and the Medical School of Maine. For the year 1886-1887:38.

- _____. 1886b. [Charles Fish collection]. General conference of the congregational churches in Maine, sixtieth anniversary, including the historical sketch, 1876-1886, with index:124.
 Brower, A. E. 1958. Collecting on Mount Katahdin, Maine. *Lepid. News* 12:47-51.
 _____. 1974. A list of the Lepidoptera of Maine – Part 1: the macrolepidoptera. *Life Sci. Agr. Exp. Sta., Univ. of Maine, Orono*. 136 pp.
 Calhoun, J. V. 2015. Long-lost holotypes and other forgotten treasures in the Ralph L. Chermock collection, with biographical notes. *News Lepid. Soc.* 57:80-85.
 Campbell, C. S., H. P. Adams, P. Adams, A. C. Dibble, L. M. Eastman, S. C. Gawler, L. L. Gragory, B. A. Grunden, A. D. Haines, K. Jonson, S. C. Rooney, T. F. Vining, J. E. Weber, & W. A. Wright. 1995. Checklist of the vascular plants of Maine. Third revision. *Josselyn Botanical Soc. Maine Bull.* 13:i-xvii, 1-100.
 Campbell, C. S. & L. M. Eastman. 1980. Flora of Oxford County, Maine. *Life Sci. Agr. Exp. Sta., Univ. Maine, Orono. Technical Bull.* 99. 244 pp.
 Cech, R. & G. Tudor. 2005. Butterflies of the east coast: an observer's guide. Princeton Univ. Pr., Princeton, New Jersey. xii+345 pp.
 Cleaveland, N. & A. S. Packard. 1882. History of Bowdoin College. With biographical sketches of its graduates from 1806 to 1879, inclusive. James Ripley Osgood & Co., Boston. iv+905 pp.
 Coe, W. R. 1929. Biographical memoir of Sidney Irving Smith 1843-1926. *Nat. Acad. Sci. Biog. Mem.* 14:1-16.
 _____. 1929. Biographical memoir of Addison Emery Verrill 1839-1926. *Nat. Acad. Sci. Biog. Mem.* 14:19-66.
 Conniff, R. 2016. House of lost worlds: dinosaurs, dynasties, and the story of life on earth. Yale Univ. Pr., New Haven, Connecticut. xvi+352 pp.
 Dirig, R. 1994. Historical notes on wild lupine and the Karner blue butterfly at the Albany Pine Bush, New York. Pp. 23-36. In Andow, D. A., R. J. Baker, & C. P. Lane (eds.), Karner blue butterfly: a symbol of a vanishing landscape. Misc. Publ. 84-1994, Minnesota Agri. Exp. Station, Univ. Minnesota, St. Paul.
 dos Passos, C. F. & L. P. Gray. 1934a. A list of the butterflies of Maine with notes concerning some of them. *Can. Entomol.* 66:188-192.
 Farquhar, D. W. 1934. The Lepidoptera of New England. Ph.D. thesis. Harvard Univ., Cambridge, Massachusetts. 328 pp.
 Fernald, C. H. 1884. The butterflies of Maine. Designed for the use of the students in the Main State College, and the farmers of the state. Sprague & Son, Augusta, Maine. 104 pp.
 _____. 1895. New North American microlepidoptera. *Can. Entomol.* 25:94-96.
 Forbes, W. T. M. 1944. The genus *Phyciodes* (Lepidoptera, Nymphalinae). *Entomol. Amer.* 24:139-212.
 Gawler, S. C. 1984. An annotated list of Maine's rare vascular plants. Revised. Exec. Dept. State Planning Off., Augusta, Maine. vi+75 pp.
 Hall, H. 1912. General catalogue of Bowdoin College and the Medical School of Maine 1794-1912. Bowdoin Coll., Brunswick, Maine. iv+494 pp.
 Handfield, L. 2011. Le guide des papillons du Québec. Vol. 1. Partie 1. Édition review et corrigée. Broquet, Saint-Constant, Québec. 1198 pp.
 Holman, H. 2015. Karner blue butterfly: *Lycaeides melissa samuelis*. Pp. A48-A51. In New Hampshire Fish and Game Dept., New Hampshire wildlife action plan. 2015 revised edition. Concord, New Hampshire. www.wildlife.state.nh.us/wildlife/wap.html.

- Johnson, C. W. 1927. Order – Lepidoptera. Moth and butterflies. Pp. 50-90. In Proctor, W. (ed.), Biological survey of the Mount Desert region. Part I. Mount Desert Island Biol. Lab., Mount Desert, Maine.
- Johnson, R. I. 2004. The rise and fall of the Boston Society of Natural History. *Northeastern Nat.* 11:81-108.
- Klots, A. B. 1951. A field guide to the butterflies of North America, east of the Great Plains. Houghton Mifflin Co., Boston, Massachusetts. 349 pp., 40 pls.
- Layberry, R. A. P. W. Hall, & J. D. Lafontaine. 1998. The butterflies of Canada. Univ. of Toronto Pr., Toronto, Ontario, Canada. 280 pp., 32 pls.
- MBS [Maine butterfly survey]. 2016. Distribution by township. Webpage: <http://mbs.umf.maine.edu/distribution-by-township/>.
- Merrill, J. D. 1919. Alumni notes. *Harvard Alum. Bull.* 22:176-180.
- Miller, L. D. 1983. Chermock, Hovanitz and Weber collections donated to Allyn Museum. *J. Lepid. Soc.* 37:317-318
- MNAP [Maine Natural Areas Program]. 2013. Maine rare plant list and rare plant fact sheets. Webpage: http://www.maine.gov/dacf/mnap/features/rare_plants/plantlist.htm.
- Oliver, C. G. 1979. Experimental hybridization between *Phyciodes tharos* and *P. batesii* (Nymphalidae). *J. Lepid. Soc.* 33:6-20.
- Opler, P. A. 1995. Lepidoptera of North America 2. Distribution of the butterflies (Papilionoidea and Hesperioidea) of the eastern United States. *Contrib. C. P. Gillette Mus. Insect Biodiversity, Dept. of Entomol., Colorado St. Univ., Ft. Collins, Colorado.* 6+[166].
- Opler, P. A. & G. O. Krizek. 1984. Butterflies east of the Great Plains: an illustrated natural history. Johns Hopkins Univ. Pr., Baltimore, Maryland. xvii+294 pp., 54 pls.
- Opler, P. A. & V. Malikul. 1992. A field guide to eastern butterflies. Houghton Mifflin Co., New York, New York. xvii+396 pp., 48 pls.
- Parlin, J. C. 1922. Butterflies collected by J. C. Parlin. *Maine Nat.* 2:73-74.
- Pelham, J. P. 2016. A catalogue of the butterflies of the United States and Canada, with a complete bibliography of the descriptive and systematic literature. Revised 11 March 2016. In Warren, A. D., K. J. Davis, E. M. Stangeland, J. P. Pelham & N. V. Grishin, *Butterflies of America*. Webpage: www.butterfliesofamerica.com.
- Proctor, W. (ed.) 1938. Biological survey of the Mount Desert region. Part VI. The insect fauna with references to methods of capture, food plants, the flora and other biological features. Wistar Inst. Anatomy & Biol., Philadelphia, Pennsylvania. 496 pp.
- _____. 1946. Biological survey of the Mount Desert region in incorporated. Part VII: being a revision of Parts I and VI with the addition of 1100 species. The insect fauna. Wistar Inst. Anatomy & Biol., Philadelphia, Pennsylvania. 566 pp.
- Rogers, W. P. 1934. Collecting notes on *Oeneis katahdin* Newcomb (Lepid.: Satyridae). *Entomol. News* 45:191-193.
- Schweitzer, D. F. 2004. *Plebejus melissa samuelis* – (Nabokov, 1944). NatureServe Explorer: an online encyclopedia of life. Version 7.1. Webpage: www.natureserve.org.
- _____. 2005. *Phyciodes batesii batesii* – (Reakirt [1866]). Nature Serve Explorer: an online encyclopedia of life. Version 7.1. Webpage: www.natureserve.org.
- Schweitzer, D. F., M. C. Minno & D. L. Wagner. 2011. Rare, declining, and poorly known butterflies and moths (Lepidoptera) of forests and woodlands in the eastern United States. U.S. Forest Service, Forest Health Technology Enterprise Team, FHTET -2011-01, USDA Forest Service, Morgantown, West Virginia. vi+517 pp.
- Scott, J. A. 1986. The butterflies of North America. Stanford Univ. Pr., Stanford, California. 583 pp., 64 pls.
- _____. 2006. *Phyciodes (Phyciodes)*: more progress. *Papilio (n.s.)* 13:1-34.
- _____. 2014. Identification of *Phyciodes diminutor*, *P. cocyta*, and *P. tharos* in northeastern U.S. (Nymphalidae). *Papilio (n.s.)* 23:1-26.
- Scudder, S. H. 1868. Supplement to a list of the butterflies of New England. *Proc. Boston Soc. Nat. Hist.* 11:375-384.
- _____. 1874. The distribution of insects in New Hampshire. Pp. 331-380. In Hitchcock, C. H. & J. H. Huntington (eds.), *The geology of New Hampshire. A report comprising the results of explorations ordered by the legislature. Pt. 1. Physical geography.* Edward A. Jenks, Concord, New Hampshire.
- _____. 1888-1889. The butterflies of the eastern United States and Canada with special reference to New England. 3 vols. Author, Cambridge, Massachusetts. xxiv+1956 pp., 89 pls.
- Uhler, P. R. 1865. Report on the collection of insects. Pp. 29-37. In Gray, W. (ed.), *Annual report of the trustees of the Museum of Comparative Zoology, at Harvard College, in Cambridge, together with the report of the director, 1864.* Wright & Potter, Boston, Massachusetts.
- USFWS [United States Fish and Wildlife Service]. 1992. Endangered and threatened wildlife and plants: determination of endangered status for the Karner blue butterfly. *Fed. Reg.* 57:59236-59244.
- _____. 2003. Final recovery plan for the Karner blue butterfly (*Lycaeides melissa samuelis*). U.S. Fish and Wildlife Serv., Fort Snelling, Minnesota. 273 pp.
- Verrill, A. E. 1926. Sidney Irving Smith. *Science (n.s.)* 66:57-58.
- Warren, A. D., K. J. Davis, E. M. Stangeland, J. P. Pelham, K. R. Willmott & N. V. Grishin. 2016. *Butterflies of America*. Webpage: www.butterfliesofamerica.com.
- Waterhouse, C. O. 1906. Alphabetical list of the previous owners of collections of insects which contained types when acquired by the museum: with which are incorporated the names of the chief authors of types preserved in the museum. Pp. 579-601. In Lankester, E. R. (ed.), *The history of the collections contained in the natural history departments of the British Museum. Vol. II. Trustees Br. Mus, London.*
- Watson, K. J. (ed.). 1994. The legacy of James Bowdoin III. *Bowdoin Coll. Mus. Art, Brunswick, Maine.* xix+247 pp.
- Webster, R. P. & P. G. deMaynadier. 2005. A baseline atlas and conservation assessment of the butterflies of Maine. A Technical Report submitted to the Maine Department of Inland Fisheries and Wildlife, Bangor. 127 pp. (www1.maine.gov/ifw/pdfs/butterfly_atlas_report.pdf).
- White, H. B., III & J. V. Calhoun. 2009. Miss Mattie Wadsworth (1862-1943): early woman author in Entomological News. *Trans. Amer. Entomol. Soc.* 135:413-429.
- Wilder, P. S. (ed.). 1916. Obituary record of the graduates of Bowdoin College including the Bowdoin Medical School for the year ending 1 June 1916. *Bowdoin Coll. Bull. No. 66:* 356-414.
- _____. 1950. General catalogue of Bowdoin College and Medical School of Maine: a biographical record of alumni and officers 1794-1950. Anthoensen Pr., Portland, Maine. xv+670 pp.

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Two Monarchs: two amazing journeys!

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In a year not too far into the future, it is not too fanciful to believe that scientists will follow individual Monarch butterflies on their migration by inserting an electronic chip in the thorax and monitoring their journey by satellite. When this happens we will know in real time exactly the route a Monarch takes, how time is partitioned into flight, resting and nectaring and how many actually survive the migration and arrive at overwintering sites. Think of the amazing and illuminating data we would get from electronic-tagging just a few Monarchs!

However, in 2017 we still do what we have done since Fred Urquhart pioneered Monarch tagging in the 1950's: use sticky adhesive labels. Some of the early tags involved glue but fortunately with the advent of small, circular, lightweight, weatherproof adhesive tags introduced by Monarch Watch in 1992, tagging is still a remarkably simple and effective way of monitoring the Monarch migration. In more than 20 years of Monarch tagging in the eastern United States, about 14,000 tags, approximately 1% of all the Monarchs tagged, have been recovered at the overwintering sites in Mexico. Each tag recovery provides information on the date and location of release and recovery. Most of the tag recoveries in Mexico are of dead butterflies found on the forest floor often months or years after the butterflies have departed. Tagging provides no information on migration routes or residency duration at the overwintering site.

Tagging Monarchs in the western United States has been very limited until recently so we know very little about Monarch migration in the west compared to what we know about the eastern population. However, significant citizen scientist-based tagging programs in Arizona and the Pacific Northwest over the past few years have begun to provide much-needed data on the fall migration of Monarchs in the west. However, the limitations are the same as with eastern migrants; we usually only get information on release and recovery.

In 2016 two Monarchs tagged by citizen scientists as part of the Washington State University Pacific Northwest tagging program, provided a whole lot more data on their journeys and overwintering than just the date/location of tagging and recovery! Their stories are also now etched in the minds and imaginations of the children that helped give these two Monarchs their lives and journeys. The case histories of these two remarkable Monarchs and the impact they have had on the children that helped raise them are described here.

Amelia's Monarch, Ms A4853:

reared, tagged and released by Molly Monroe and Amelia Jebousek in Corvallis, Oregon:

Molly Monroe and her five year old daughter Amelia reared their female Monarch during August 2016 from an egg laid on their backyard milkweed by a visiting female. They also reared 23 others and ended up tagging 22 of them. Amelia's Monarch was tagged with the serial number A4853 and released at her 'Growing Oaks' pre-school in Corvallis on August 30 (Figs. 1-2). We can only speculate on the route that Amelia's Monarch took after her release but given that the south was her destination, it seems likely that she followed the Willamette Valley through Eugene and Roseburg and perhaps followed the I-5 corridor through

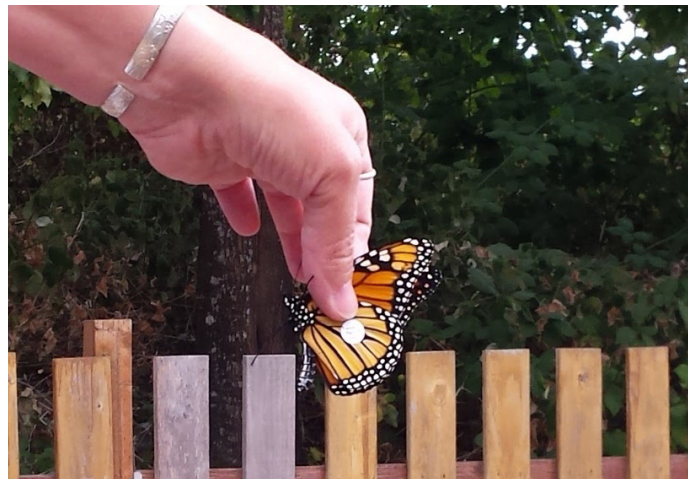


Figure 1. Amelia's Monarch, Ms A4853 on the day of her release at 'Growing Oaks' pre-school in Corvallis, Oregon (Photo: Melissa May).



Figure 2. Molly Monroe showing Amelia's Monarch to the pre-school class before release on August 30, 2016. Amelia watches from the far right (Photo: Melissa May).



Figure 3. Amelia's Monarch visiting Lisa De Angelis' rooftop garden for nectar in North Beach, San Francisco, CA during 5-7pm on September 18 2016 (Photo: Lisa De Angelis).

Grant's Pass into northern California. She may then have passed through Redding and down through the open agricultural flood plain of the Sacramento River heading towards the San Francisco area.

One thing we do know is that Amelia's Monarch appeared in Lisa De Angelis' roof deck garden of her 4th story apartment in North Beach, San Francisco on September 18! Lisa had her I-phone at the ready and took an iconic picture of Ms A4853 nectaring on Verbena, showing the unmistakable San Francisco skyline (Fig. 3). Amelia's Monarch hung around Lisa's blooms for two hours between 5-7 pm spending most of her time feeding from Lantana, before flying off. Ms A4853 had taken just 19 days to fly the 470 air miles south to San Francisco or an average of 24.7 miles a day. Undoubtedly her route was more meandering thus she probably flew many more miles. Traveling had not taken a discernible toll on her condition; her wings were still vibrantly colored and in excellent condition. Clearly, North Beach, San Francisco was a refueling stop and she had not reached her overwintering destination.



Figure 4. Amelia's Monarch roosting on a cypress tree at the Lighthouse Field overwintering site, Santa Cruz, CA on October 11 (Photo: John Dayton).

We thought the odds of seeing Amelia's Monarch again were slim but amazingly 23 days later, long time Monarch biologist John Dayton spotted Ms A4853 amongst 10,000 or so Monarchs on a Cypress at the Santa Cruz Lighthouse Field overwintering site! (Fig. 4). She had flown another 64 miles south-south-east to Santa Cruz and if she was flying at the same rate as prior to her San Francisco stop she probably arrived in Santa Cruz around September 21. John Dayton's photo shows Amelia's Monarch to still be in excellent condition (Fig. 4). The Lighthouse Field overwintering site consists of a small grove of Eucalyptus and Cypress trees just a few hundred yards from the ocean and is as nice a place as any to hang out for the winter as a Monarch could wish for. However, perhaps she didn't get on with her fellow Monarchs or perhaps the marauding crows that would sometimes dive into the Monarch colony feasting on the unlucky few, freaked her out. Whatever the reason Ms A4853 decided to set off again for a short 1.6 mile hop westwards to the much more famous Santa Cruz overwintering site at Natural Bridges State Park. Far fewer Monarchs (~3000) resided at Natural Bridges in October-November and Amelia's Monarch was spotted there in a high cluster on Eucalypts on November 25 by Aleece Townsend, an active Monarch tagger in our program in southern Oregon. Perhaps this was Ms A4853's final winter home? No it wasn't.

She turned up again on December 30 at yet another Santa Cruz overwintering site, this time at Moran Lake which is about 4.6 miles east of Natural Bridges. Amelia's Monarch likely flew right over Lighthouse Field and part of Santa Cruz Bay to get to Moran Lake. The Moran Lake site is a Eucalypt grove that surrounds a waste treatment works and the Monarch population there varied from 2-6,000 during October-December. John Dayton spotted Amelia's Monarch at Moran Lake and I was fortunate enough to be with him on December 30 to see the by now famous and widely traveled Ms A4853 for myself! John took the final photograph we have of Amelia's Monarch and she was still in remarkably good condition for a well-traveled four month old Monarch (Fig. 5).

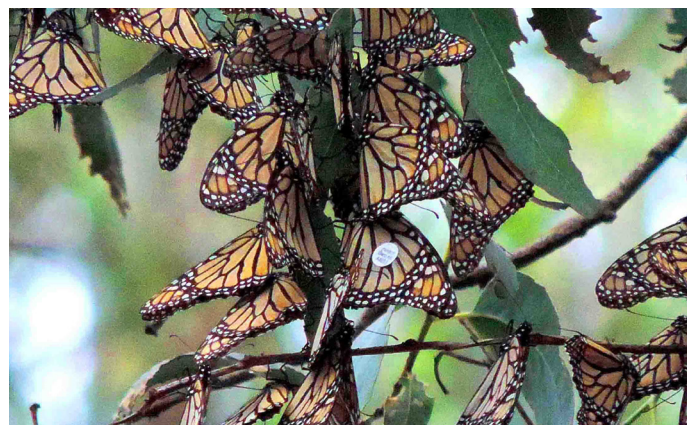


Figure 5. Amelia's Monarch at Moran Lake, Santa Cruz, CA seen for the last time at an overwintering site on December 30, 2016 (Photo: John Dayton).

January and February 2017 were stormy, wet and windy in Santa Cruz and all of the Monarch colonies substantially dispersed by mid-late February. Amelia's Monarch was not sighted again but this tenacious Monarch very likely flew inland eastwards or northwards looking for newly sprouting milkweed. Hopefully she laid enough eggs in northern California to produce another generation of Monarchs whose progeny would reach Corvallis and perhaps lay eggs on Molly and Amelia's milkweed!

Journey, Monarch A6504:

reared, tagged and released by Susie Werts and her middle school students at Sisters, Oregon.

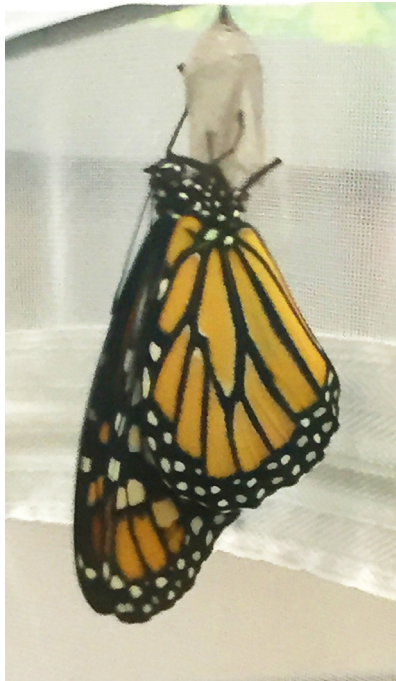


Figure 6. Journey, shortly after emergence in a Sisters middle school classroom on September 16 2016 (Photo: Susie Werts).

In spring 2016 Susie Werts and her middle school students at Sisters, Oregon created a Monarch waystation at their school by planting milkweed and butterfly nectar plants. Susie also taught her class about Monarchs and the problems they face. They also reared five Monarch caterpillars obtained from a southern Oregon backyard and watched transfixed as two of them emerged as adult butterflies, a male and female, on Friday September 16 (Fig. 6). Susie's 9 year old son, Kellen, named the male 'Journey' and the female 'Hope'. Both were tagged and released the following

day at the school's waystation. Ironically, Journey and Hope paid no attention to the available nectar and soared away over the baseball field to the south shortly after midday.

Fifty five days later and 700 miles to the south in coastal Carpinteria near Ventura in southern California, Journey was seen again! Susie, Kellen and all the Sisters middle school students were ecstatic! Their butterfly that they had watched grow from a tiny caterpillar to an adult had made this amazing journey to southern California. In conversations they imagined the perils and adversaries Journey had overcome to find his way to Carpinteria. The trucks, the birds, the weather, finding nectar, so many obstacles to overcome but he had made it! So inspired by Journey's journey were these children, that they put their imaginings into words, chapters of which will feature in

a forthcoming book called 'The Amazing Migration of a western Monarch' put together by Jean Russell Nave of Bend.

Carpinteria Creek is bordered by a dense undergrowth of bushes, small trees and towering eucalypts, mostly blue gum, *Eucalyptus globules*. The creek runs through suburbia and a small area just one third of a mile from the ocean is where the butterflies roost. The creek has been known as an overwintering site for Monarchs since at least 1997, however, few people know about it. On November 11 Joe Billings of MonarchQuestAZ was visiting for the first time in search of Monarchs he had tagged during the fall in Arizona. His tags are fluorescent orange but as he used his spotting scope to scan a long pendulous string of Monarchs packed together tightly on a thin downward-arching branch, he sighted a white tag! However, it was at an impossible angle to read. Noting a dead branch as a reference point, Joe relocated his tripod and scope to a more favorable position but he couldn't find the butterfly with the tag! Once again he relocated setting up at an almost opposite position to the original sighting. Focusing on the lower portion of the cluster Joe was elated when the tagged butterfly appeared in his scope again. Even now the butterfly was at an angle but when he zoomed in close, he could clearly read the tag: monarch@wsu.edu A6504.... Journey!!!

Joe reported the weather as clear and still, temperature 78 °F and he could hear the waves crashing on the nearby beach. Joe is a naturalist dedicated to understanding our natural world and Journey was the first of eight PNW-tagged Monarchs he found for us at various California overwintering sites during 2016/17. Although Journey was sighted at Carpinteria 55 days after release, it is likely he arrived in the area, three to four weeks after release, probably in mid October. Fall migrating Monarchs average 25-30 miles a day, as Amelia's Monarch did. Journey is the first Monarch tagged in the Bend area to be recovered in California. He also holds the record for longest distance traveled by an Oregon Monarch and Carpinteria is to date the furthest south that a PNW-tagged Monarch has been found since we began tagging in 2012.

On November 26 my wife, three daughters and I visited Carpinteria Creek on the first day of our annual Thanksgiving PNW tagged Monarch search and estimated at least 7000 Monarchs were roosting there, most on a large Eucalyptus tree. My thirteen year old daughter Jasmine was the first to spot a tagged Monarch... a fluorescent orange tag, one of Joe's! Nice karma! Scanning 7000 Monarchs takes a little time but within a few minutes I'd found Journey perched high in a cluster and very readable. So he was still here but even in this mini-cathedral of Monarchs dangers lurked. A male monarch struggled in an orb spider web as the spider moved closer to its prey. I intervened and the monarch flew free. This was the second time in two years I had rescued a Monarch from a spider web at Carpinteria Creek!

Joe Billings revisited Carpinteria Creek in early January 2017 and found that the entire population of Monarchs had disappeared! Journey was gone. Joe then checked another Monarch overwintering site in Carpinteria (Dump road) located within an oil and gas processing operation, 0.4 miles east of the creek site on January 11 and found about 4,000 Monarchs roosting high in tall eucalypts. It didn't take long for Joe to find Journey in a dense cluster (Fig. 7). Joe returned on January 23 and 26 and sighted Journey both times, taking photographs on the 26th (Fig. 8). This is the last photograph of Journey who likely participated in the pre-dispersal mating activities then left Carpinteria some time in February following females inland to seek out newly sprouting milkweed to lay their eggs.

Amelia's Monarch and Journey told us more about their remarkable journeys than we could have ever expected thanks to the observant eyes of Lisa De Angelis, John Dayton, Aleece Townsend and Joe Billings! Clearly, some Monarchs like Amelia's and Journey like to move between overwintering sites during winter. We also know from other tag sightings that some stay put in the same overwintering site from October to January. The increased awareness of Monarchs among the general public and renewed interest in visiting overwintering colonies in California, should

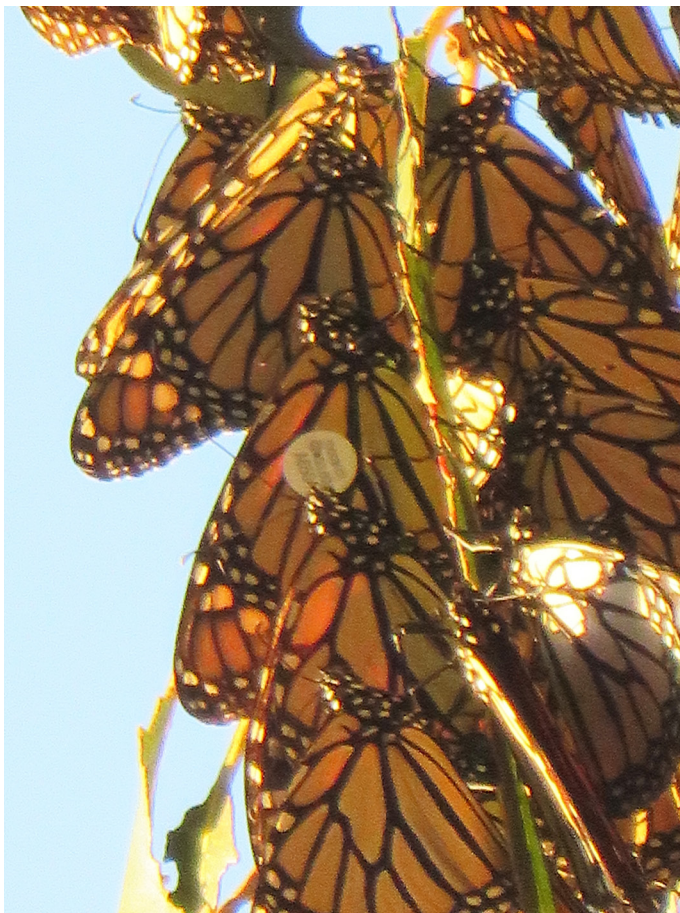


Figure 7. Journey at the Dump Road overwintering site in Carpinteria, CA on January 11 2017 (Photo: Joe Billings: MonarchQuestAZ)



Figure 8. The final photograph of Journey roosting with many friends at the Dump Road, Carpinteria, CA overwintering site on January 26 2017 (Photo: Joe Billings: MonarchQuestAZ).

combine to provide more sightings of tagged Monarchs and further insights into winter movements of Monarchs. The ubiquity of I-phones makes us all ready to photograph and report a tagged Monarch at a moment's notice.

However, the real value of opening a window on the life and travels of a Monarch butterfly raised from an egg by a child, is the magic and understanding it brings to that child. For a child to learn that the seemingly insignificant piece of life that he or she nurtured can become a winged wonder that travels and triumphs over adversity, has the potential to be a defining experience for that child. To learn about and see the travels of your little piece of nature in real time is a priceless educational experience. No text book narrative can hit home that hard! Amelia and her friends will never forget her Monarch of 2016 and the Sisters Middle School students will never forget Journey. Both Monarchs will live long in the memories of these children and hopefully will create awareness in these future guardians of our planet of the need to protect even the 'insignificant' bits of life.

Acknowledgments

I extend my heartfelt gratitude to Molly Monroe, Amelia Jebousek, Susie Werts, Kellen Werts and all the children at the Growing Oaks pre-school (Corvallis) and the Sisters Middle School who helped rear Amelia's Monarch and Journey and watched as they began their journeys. I also thank Lisa De Angelis, John Dayton, Aleece Townsend and Joe Billings of MonarchQuestAZ for playing their equally critical roles in finding and reporting Amelia's Monarch and Journey in the various locations they traveled to. Without you all none of this would have been possible!

First records of *Phoebis agarithe* (Lepidoptera: Pieridae: Coliadinae) in Mississippi and of *Ascia monuste* (Lepidoptera: Pieridae: Pierinae) in northern Mississippi

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Many species of Pieridae are known to disperse or emigrate far to the north of areas where they have permanent populations, including *Phoebis agarithe* (Boisduval), a species whose range extends from Brazil and Peru, northward through Central America and the West Indies, to southern Texas and southern Florida (Opler & Krizek 1984, Scott 1986). Rare individuals of *P. agarithe* have strayed as far north as Colorado, South Dakota, Wisconsin, and Maine, but until now the species has never been recorded from Mississippi (Brower 1974, Brown et al. 1956, Marrone 2002, Mather & Mather 1958, 1959, Opler & Krizek 1984).

During the fall of 2016, Glenn Crisler (GBC) made regular visits to observe and photograph butterflies at the Mississippi State Trial Gardens (33°28'20"N 88°47'09"W) and the Veterans Memorial Rose Garden (33°28'12"N 88°46'46"W), both located in the R. Rodney Foil Plant Science Research Center (North Farm) on the Mississippi State University campus, Oktibbeha County, Mississippi. These gardens were particularly attractive to butterflies during the fall of 2016, perhaps because Oktibbeha County and much of northern Mississippi had been experiencing a moderate to severe drought through most of the summer and fall, and the regularly watered gardens provided excellent sources of nectar compared to the surrounding area.

On the afternoon of 23 September 2016, GBC photographed a female *Phoebis agarithe* nectaring on *Cuphea* 'Vermillionaire' [Lythraceae] at the Mississippi State Trial Gardens (Figs. 1, 2). This record is the first reported occurrence of *P. agarithe* in Mississippi. The following afternoon, 24 September, GBC visited the nearby Veterans Memorial Rose Garden and again photographed a female *P. agarithe*, this time nectaring on *Bidens pilosa* Linnaeus [Asteraceae] (Figs. 3-5). Although the Trial Gardens and Rose Garden are only 0.6 km apart, the butterflies that were photographed proved to be different individuals. The photographs of individual #1 taken on 23 September show that the left hindwing is missing part of the apical region and a large section of the cubital region of the wing (Fig. 2). These portions of the wing are present on individual #2 photographed on 24 September (Fig. 4). The overall coloration of the two butterflies also differs, with individual #1 being very pale yellow and individual #2 being white. In addition, the discocellular spots on both the forewing and hindwing are shaped differently in the two individuals.

On the afternoon of 2 October, unaware of GBC's earlier records, Terence Schiefer (TLS) photographed two white morph female *P. agarithe* along the main levee of Bluff Lake on the Sam D. Hamilton Noxubee National Wildlife Refuge, Noxubee County, Mississippi (33°16'47"N 88°46'41"W), which is located about 21 km south of where GBC photographed the species the previous week. Both butterflies were nectaring on the same patch of *Ipomoea lacunosa* Linnaeus [Convolvulaceae], but were seen together only briefly. The following day, 3 October, one of these individuals was seen again at the same patch of flowers. The two butterflies at Bluff Lake, individuals #3 (Figs. 6, 7) and #4 (Fig. 8), can be distinguished from each other by the condition of the outer margins of the left wings, which in individual #3 are largely intact, except for a small portion of cell M_3 on the hindwing (Fig. 7), but in individual #4 are rather tattered throughout, including a small notch near the forewing apex (Fig. 8). In addition, individuals #3 and #4 can be distinguished from those photographed earlier by GBC, by the lack of the large tear on the left hindwing present in individual #1 and by having differently shaped discocellular spots on the forewing compared to individual #2.

Another pierid with a propensity for wandering is *Ascia monuste* (Linnaeus). The species is widespread in South America, ranging northward through Central America and the West Indies to southern Texas and southern Florida (Opler & Krizek 1984, Scott 1986). Periodically, populations of *A. monuste* undergo mass emigrations, especially in coastal areas (Nielsen & Nielsen 1950), with rare individuals straying as far north as Maryland, southern Ontario, South Dakota, and Colorado (Layberry et al. 1998, Marrone 2002, Opler & Krizek 1984, Scott 1986). In Mississippi, *A. monuste* is primarily known from the three coastal counties, where they are usually scarce, but occasionally common. Mather (1953) observed several hundred individuals migrating eastward along the Mississippi coast from 13-15 June 1952. The species was also noted as being fairly common in coastal Hancock County from 18 May through the end of December 1971 (Mather 1972) and as being common in the same county from 1-2 June 2002 (R. L. Patterson, *in litt.*). The only inland records documented from Mississippi prior to 2016 are from the southern half of the state: three collected 20 October 1922 in Pike County and one collected 14 May 1950 in Hinds



Figs. 1-12. *Phoebis agarithe* and *Ascia monuste* in Mississippi. 1) *P. agarithe* #1, right ventral, 23.ix.2016, Mississippi State Trial Gardens, Oktibbeha Co. (GBC). 2) Same, left ventral (GBC). 3) *P. agarithe* #2, right ventral, 24.ix.2016, Veterans Memorial Rose Garden, Oktibbeha Co. (GBC). 4) Same, left ventral (GBC). 5) Same, dorsal (GBC). 6) *P. agarithe* #3, right ventral, 2.x.2016, Sam D. Hamilton Noxubee NWR, Noxubee Co. (TLS). 7) Same, left ventral (TLS). 8) *P. agarithe* #4, left ventral, 2.x.2016, Sam D. Hamilton Noxubee NWR, Noxubee Co. (TLS). 9) *A. monuste* #1, dorsal, 29.ix.2016, Mississippi State Trial Gardens, Oktibbeha Co. (GBC). 10) Same, left ventral (GBC). 11) *A. monuste* #2, right ventral, 7.x.2016, Mississippi State Trial Gardens, Oktibbeha Co. (GBC). 12) Same, left ventral (GBC).

County (Mather & Mather 1958). In addition, there are sight records of one seen 7 July 1957 in Hinds County (Mather & Mather 1958) and one seen on the Delta National Forest, Mississippi butterfly count in Sharkey and Yazoo counties on 21 July 2012 (Lafferty 2013).

On 29 September 2016, GBC photographed an individual of *A. monuste* nectaring on *Stachytarpheta jamaicensis* (Linnaeus) Vahl [Verbenaceae] at the Mississippi State Trial Gardens in Oktibbeha County, Mississippi (Figs. 9, 10). This is the first documented record for the species in the northern half of the state. A second individual of *A. monuste*, also nectaring on *S. jamaicensis*, was photographed by GBC at the same location on both 7 and 16 October (Figs. 11, 12). The two individuals can be distinguished from each other by the condition of the left hindwing, which has a portion of the outer margin missing on the first individual but has the margin intact on the second individual. The second individual also has a large tear on the left forewing, providing a means by which the photographs from 7 and 16 October can be recognized as being of the same individual.

There is some indication that 2016 was an exceptional year for *A. monuste* in Mississippi. Tim Lockley, a newspaper columnist and retired U.S. Department of Agriculture research entomologist, reported seeing exceptionally large numbers of this species in coastal Harrison County, with peak numbers in mid-June. He also received numerous phone calls and e-mails from the general public asking about the white butterflies they were seeing (T. C. Lockley, *in litt.*). In southwestern Mississippi, *A. monuste* was photographed on 25 October 2016 in Natchez, Adams County (Matthews 2016). Finally, in Oktibbeha County, about 20 km south of where GBC photographed *A. monuste*, TLS observed what was almost certainly this species on 1 October, along the north levee of Bluff Lake on the Sam D. Hamilton Noxubee National Wildlife Refuge (33°17'34"N 88°47'56"W). The butterfly landed briefly on a flower of *Verbena brasiliensis* Vellozo, providing views of both the dorsal and ventral sides of the wings. However, the color of the antennal clubs was not noted, so the butterfly was not critically distinguished from the similar *Appias drusilla* (Cramer), a species never recorded from Mississippi, but which is known to rarely stray northward from its normal range, which extends from South America to southern Texas and southern Florida (Opler & Krizek 1984).

Acknowledgements

We would like to thank Ricky Patterson (Vicksburg, MS) for providing information on the status of *Phoebis agarithe* and *Ascia monuste* in Mississippi and Tim Lockley (Gulfport, MS) for sharing his observations of *A. monuste* on the Mississippi coast. We would also like to thank Joe MacGown for preparing the figures and plate. This Research was supported in part by the Mississippi Agricultural and Forestry Experiment Station and the USDA National Institute of Food and Agriculture, Hatch Project No. MIS-311260.

Literature Cited

- Brower, A. E. 1974. A List of the Lepidoptera of Maine - Part 1: The Macrolepidoptera. University of Maine, Life Sciences and Agriculture Experiment Station Technical Bulletin 66. 136 pp.
- Brown, F. M., D. Eff, and B. Rotger. 1956. Colorado Butterflies. Part IV: Pieridae, the Whites and Sulphurs; Papilionidae, the Swallowtails and Parnassians. Proceedings of the Denver Museum of Natural History 6. pp. 178-236.
- Lafferty, D. 2013. Delta National Forest, MS [p. 30]. In: S. Wander, ed. 2012 Report: NABA Butterfly Counts. North American Butterfly Association, Morristown, NJ. xxxvi + 106 pp.
- Layberry, R. A., P. W. Hall, and J. D. Lafontaine. 1998. The Butterflies of Canada. University of Toronto Press, Toronto, Canada. 354 pp.
- Marrone, G. M. 2002. Field Guild to Butterflies of South Dakota. South Dakota Department of Game, Fish, and Parks. Pierre, South Dakota. 478 pp.
- Mather, B. 1953. A migration of *Ascia monuste* in Mississippi. The Lepidopterists' News 7: 13-14.
- Mather, B. 1972. Zone 6: South: Arkansas, Louisiana, Tennessee, Mississippi, Alabama, Georgia, South Carolina, North Carolina and Virginia. News of the Lepidopterists' Society 14: 9-11.
- Mather, B. and K. Mather. 1958. The butterflies of Mississippi. Tulane Studies in Zoology 6: 63-109.
- Mather, B. and K. Mather. 1959. The butterflies of Mississippi - Supplement No. 1. Journal of the Lepidopterists' Society 13: 71-72.
- Matthews, J. 2016. Bugguide: *Ascia monuste*. (Online) <http://bugguide.net/node/view/1308228> (Accessed 14 December 2016).
- Nielsen, E. T. and A. T. Nielsen. 1950. Contributions towards the knowledge of the migration of butterflies. American Museum Novitates 1471. 29 pp.
- Opler, P. A. and G. O. Krizek. 1984. Butterflies East of the Great Plains. Johns Hopkins University Press, Baltimore, Maryland. xvii + 294 pp., 54 pls.
- Scott, J. A. 1986. The Butterflies of North America: A Natural History and Field Guide. Stanford University Press, Stanford, California. xiii + 583 pp., 64 pls.



Figs. 1-2. *Amorbia concavana* larva on *Croton linearis*, 23 February 2013, Long Pine Key, Everglades National Park (Miami-Dade County, Florida) (Photos by H.L. Salvato).

***Croton linearis*, a new larval hostplant record for *Amorbia concavana* (Tortricidae)**

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Croton linearis Jacq. (Euphorbiaceae) grows predominantly within the pine rocklands of southern Florida and the West Indies. In Florida *C. linearis* serves as the sole larval hostplant for two endangered butterflies *Anaea troglodyta floridalis* F. Johnson and Comstock (Nymphalidae) and *Strymon acis bartrami* (Comstock and Huntington) (Lycaenidae) (Smith *et al.* 1994; Worth *et al.* 1996). It is also utilized by *Calycopis cecrops* (Fabricius) (Lycaenidae) (Heppner 2007), and *Anaea andria* Scudder will feed on it in the laboratory (Salvato and Hennessey 2003).

On 23 February 2013, while surveying for *A. t. floridalis* in the Long Pine Key region of Everglades National Park (Miami-Dade County, Florida), we encountered an unknown lepidopteran larva within a silk-enclosed shelter on *C. linearis* (Figs. 1–2). The larva was collected and taken to the laboratory, where it was provided with fresh cuttings of *C. linearis*. It pupated on 13 March and eclosed 27 March 2013.

The resulting adult moth (Fig. 3) was sent to John W. Brown (National Museum of Natural History, Smithsonian Institution, Washington, DC) for identification. Following dissection of the male genitalia and barcoding, the specimen was determined to be *Amorbia concavana* (Zeller). *Amorbia concavana* is distributed from northern Mexico to Panama and Cuba (Phillips-Rodríguez and Powell 2007) and is only recently recorded from the United States, based on observations in southern Florida (Hayden 2012). Most records of *A. concavana* in Florida come from Miami-Dade County, including the Anhinga Trail within the Everglades (Hayden 2012), an area approximately 7 km southeast of where our individual was collected.

Amorbia concavana is polyphagous, as are most species of *Amorbia*, and uses a wide variety of hosts throughout its range (Brown *et al.* 2008; Janzen and Hallwachs 2009; Hayden 2012). In Florida, documented hosts for *A. concavana* include *Rosa* L. sp. (Rosaceae) and *Mikania micrantha* Kunth (Asteraceae) (Hayden 2012). Janzen and Hallwachs (2009) list *Croton trinitatis* Millsp. (Euphorbiaceae) as a host for *A. concavana* in Costa Rica. However, to our knowledge, this is the first observation (and subsequent rearing) of *A. concavana* on *C. linearis*.

Acknowledgements

We thank John W. Brown for identifying the specimen, providing information on Tortricidae, and reviewing the manuscript. We thank Paul Herbert and the staff of Biodiversity Institute of Ontario, University of Guelph, Ontario, Canada for sequencing

the specimen and providing access to the BOLD database, and Allison Brown of the same institution for providing a neighboring tree of *Amorbia concavana* barcodes. We also thank the staff of Everglades National Park for permitting and technical assistance.

Literature Cited

- Brown, J. W., G. Robinson & J. A. Powell. 2008. Food plant database of the leafrollers of the world (Lepidoptera: Tortricidae) (Version 1.0). <http://www.tortricid.net/foodplants.asp>.
- Heppner J. B. 2007. Lepidoptera of Florida. Part 1. Introduction and Catalog. Arthropods of Florida and Neighboring Land Areas. Vol. 17. Florida Department of Agriculture and Consumer Services. Division of Plant Industry. Gainesville, FL. 670 pp.
- Hayden, J. E. 2012. First U.S. records of *Amorbia concavana* (Zeller) (Lepidoptera: Tortricidae). *Insecta Mundi*. Paper 785. <http://digitalcommons.unl.edu/insectamundi/785>
- Janzen, D. H. and Hallwachs, W. 2009. Dynamic database for an inventory of the macrocaterpillar fauna, and its food plants and parasitoids, of Area de Conservacion Guanacaste (ACG), northwestern Costa Rica. <http://janzen.sas.upenn.edu> [accessed February 9, 2017].
- Phillips-Rodríguez, E. and J. A. Powell. 2007. Phylogenetic relationships, systematics, and biology of the species of *Amorbia* Clemens (Lepidoptera: Tortricidae: Sparganothini). *Zootaxa* 1670: 1–109.
- Salvato, M.H., and M.K. Hennessey. 2003. Notes on the historic range and natural history of *Anaea troglodyta floridalis*. *Journal of the Lepidopterists' Society* 57(3):243-249.
- Smith, D.S., L.D. Miller, and J.Y. Miller. 1994. *The Butterflies of the West Indies and South Florida*. Oxford University Press, New York. 264 pp.
- Worth, R.A., K.A. Schwarz, and T.C. Emmel. 1996. Notes on the biology of *Strymon acis bartrami* and *Anaea troglodyta floridalis* in south Florida. *Holarctic Lepidoptera* 3(2): 62–65.



Fig. 3. Reared adult *A. concavana*, photographed shortly after eclosion on 27 March 2013 (Photo by H.L. Salvato).

The Marketplace

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Books

The Wedge Entomological Research Foundation (WERF) proudly announces publication of its newest fascicle in the Moths of North America series: "*Pelochrista* Lederer of the Contiguous United States and Canada (Lepidoptera: Tortricidae: Eucosmini)" by Donald J. Wright and Todd M.



Gilligan. The book will be published by May, 2017. The retail price is \$90.00, however the WERF is offering an early-bird-special discounted price of \$80.00 (plus shipping and handling) for all orders received by August 1, 2017. Please go the WERF's website www.wedgefoundation.org for details on ordering books from the WERF. Several of your favorite retailers of entomology books will also have

copies available. The book, ISBN 978-0-933003-20-0, is 376 pages, 48 colored plates, 70 monochrome plates, hardbound

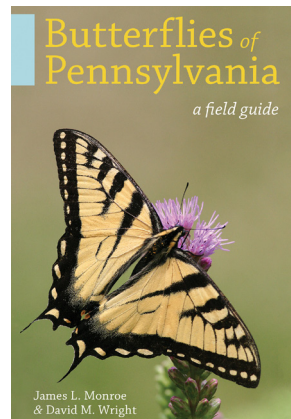
Buyers, sellers, and traders are advised to contact state department of agriculture and/or ppqaphis, Hyattsville, Maryland, regarding US Department of Agriculture or other permits required for transport of live insects or plants. Buyers are responsible for being aware that many countries have laws restricting 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.

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with dust jacket, and 8.75" x 11.25" approximate dimensions. The contents include 168 species accounts, descriptions of 15 new species, and 18 new synonymies are proposed. Diagnostic morphological features useful in species identification are emphasized and illustrated with 720 color adult images and 945 detailed genitalia drawings. This is the companion volume to the *Eucosma* book published in 2015. Orders and payment can be sent directly to Kelly Richers, 9417 Carvalho Court, Bakersfield, CA 93311. Do not forget August 1, 2017 for the discounted price! 592

Butterflies of Pennsylvania: A Field Guide

by James L. Monroe and David M. Wright



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- Habitat and host plants
- Tips for field identification
- Seasonal flight graphs show when they are present

James L. Monroe is a research associate at the McGuire Center for Lepidoptera and Biodiversity in Gainesville, Florida, and is professor emeritus at Pennsylvania State University, Beaver. His butterfly photographs have appeared in *Nature's Best Photography*, *American Butterflies*, *Butterfly Gardener*, and numerous other journals. He is the author of the recently published *The Large Sulphurs of the Americas*.

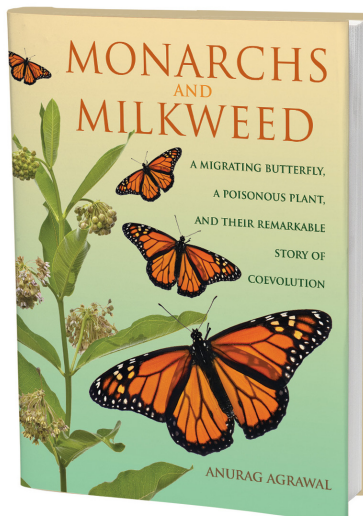
David M. Wright is chairman of patient safety and quality council at Abington Health-Lansdale Hospital in Pennsylvania. He is an anatomical and clinical pathologist who has published extensively on butterflies of Pennsylvania and neighboring states. His papers have appeared in *American Butterflies*, *Journal of Lepidopterists' Society*, *the Journal of Research on the Lepidoptera*, and several other journals.

Editor's Note: This book is reviewed this issue on page 105.

Monarchs and Milkweed: A Migrating Butterfly, a Poisonous Plant, and Their Remarkable Story of Coevolution

by Anurag Agrawal

\$29.95 - 296 pp. - hardcover, ISBN: 9780691166353, 37 color illustrations, 35 line illustrations.



Monarch butterflies are one of nature's most recognizable creatures, known for their bright colors and epic annual migration from the United States and Canada to Mexico. Yet there is much more to the monarch than its distinctive presence and mythic journeying. In *Monarchs and Milkweed*, Anurag Agrawal presents a vivid investigation into how the monarch butterfly has evolved

closely alongside the milkweed—a toxic plant named for the sticky white substance emitted when its leaves are damaged—and how this inextricable and intimate relationship has been like an arms race over the millennia, a battle of exploitation and defense between two fascinating species.

The following fascicles of the MONA series are for sale at \$10 each: Fascicles 15.2, 18.1, 20.1, 20.2A, 20.2b, 21, and 22.2. Or \$50 plus shipping for all seven. Ernest Williams, ewilliam@hamilton.edu. 593

Field Guide to Eastern Moths, 2005 edition, \$30; and *Butterflies and Moths (Lepidoptera) of Kentucky*, 1999, \$20. Both postpaid in the US; postage extra outside. Send checks to Charles V. Covell Jr., 207 NE 9th Ave., Gainesville, FL 32601-4378 U.S.A. 592

Research

Wanted: Observations, photos, specimens of larvae and adults of *Lophocampa roseata* and the Spotted Tussock Moth, *Lophocampa maculata* from all areas of North America, recent or old data. Records from Alaska and northern Canada, the desert SW, southern Appalachians and Pacific Coast are especially needed to define range. Records of early or late season observations are particularly valuable. All larval and adult photographs are useful, especially if they show unusual patterns of coloration. Specimens are desired for future genetic analysis. Contact Ken Strothkamp, Portland State University (**kstrot2@pdx.edu**) for more information on the project. 593

Conservation Matters: Contributions from the Conservation Committee**Persistent decline in the abundance and diversity of Lepidoptera**Nick Haddad¹ and Dave Wagner²¹Dept. of Biological Sciences Bow 7617, North Carolina State University, Raleigh, NC 27695 haddad@ncsu.edu²Ecology and Evolutionary Biology, University of Connecticut, Storrs, CT 06269 david.wagner@uconn.edu

We have studied the ecology and conservation of some of the rarest North American butterflies, including *Neonympha mitchellii francisci* (Fig. 1), *Cyclargus thomasi bethunbakeri* (Fig. 2), *Strymon acis bartrami*, and eastern segregate of the *Speyeria idalia*. Populations of these butterflies are estimated to be in the low thousands. For three of these, their current global ranges encompass the low tens of hectares. The abundance of each species and the number of extant populations has declined precipitously from their known historical ranges and estimated abundances in the USA. Are these species exceptional outliers? Or are they indicative of many other butterflies, moths, and terrestrial insects in general?

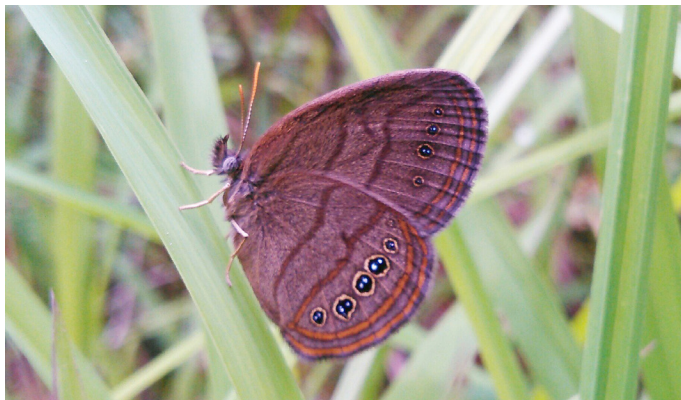


Figure 1. *Neonympha mitchellii francisci* populations have declined to small numbers and are contained within one army installation. A key aspect of habitat loss has been loss of natural disturbance by fire and by beaver creation of wetlands. (photo credit Jenny McCarty)

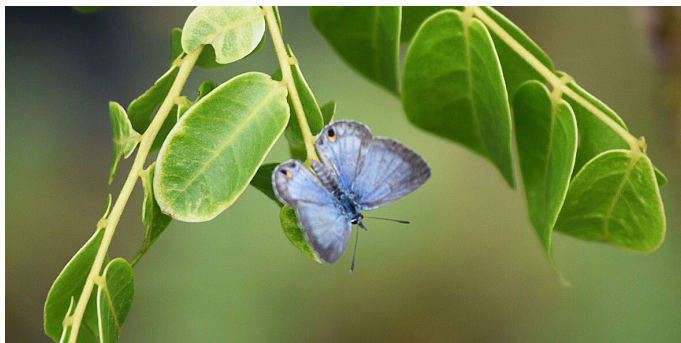


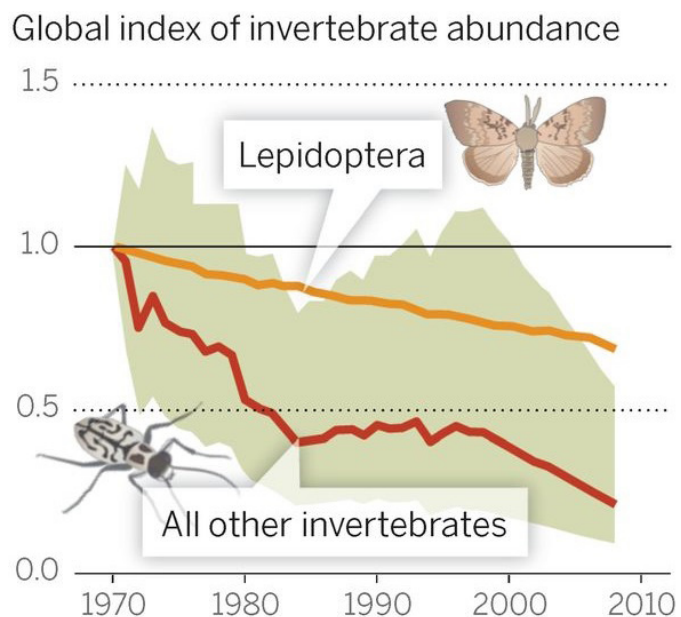
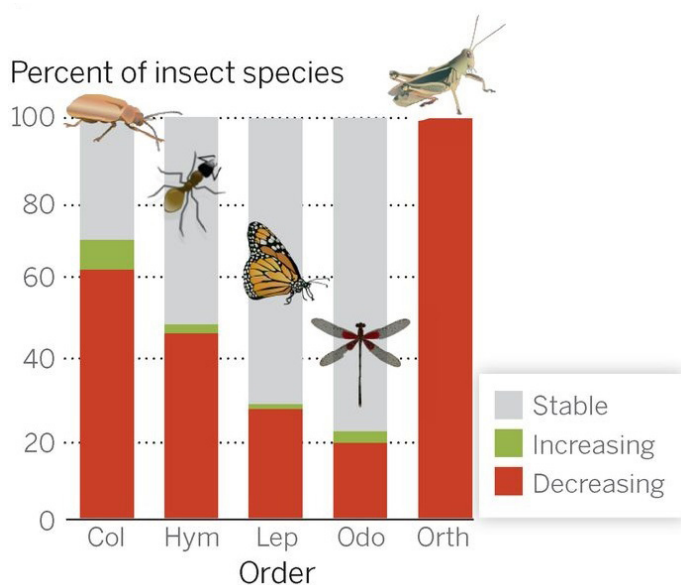
Figure 2. *Cyclargus thomasi bethunbakeri* was once common throughout South Florida. It has been eliminated from the mainland and from the Florida Keys with road access by urbanization. It is now found in small populations on remote islands. (photo credit Helen Haddad)

We draw member's attention to the findings of a large meta-analysis of animal abundances that was carried out by Dirzo and five other researchers from around the world (2014, *Science* 345:401-406) (<http://science.sciencemag.org/content/345/6195/401>). Their review, titled *Defaunation in the Anthropocene*, examines faunal changes of vertebrates and invertebrates globally, but emphasizes vertebrates and the upward and downward ecological cascades that follow when a keystone taxon is lost from a community or ecosystem.

We relate only their unsettling findings for invertebrates, which were based on comprehensive, decade-plus datasets on insect populations. The mean study duration was nearly 40 years. They analyzed 452 species, the largest number of which were Lepidoptera, principally from Europe and North America, but also Australia, Japan, Panama, and elsewhere.

What first drew our eye to this paper was their claim that 67% of the monitored insect population had a mean population decline of 45% over the four decades that were analyzed. Since 1970, lepidopteran populations had declined by an average of 30% (Figs. 3, 4). The overall trend was nearly linear--it is disturbing that the decline did not level off either for Lepidoptera alone or when all insects was taken together. It does not bode well for insects confronted with accelerating global change. Even more alarming, among non-Lepidoptera invertebrates, Dirzo et al. reported that the rate of loss was significantly higher: about 25% per decade, although there were many fewer species analyzed and the variance in their estimates were greater. This result is supported by new findings reported in the May issue of *Science* (356: 576-579) for one of Europe's most intensively sampled insect faunas: the Orbroich Bruch Nature Reserve in northwestern Germany. Over the past quarter century of monitoring, the Krefeld Entomological Society has documented a 78% decline in insect biomass in the preserves's flight interception (malaise) traps—run season-long in the same sites, and with the same trap design. Declines almost as large are being reported for long-term insect monitoring sites in Great England and Scotland, over the same decades, but interestingly the downturns come in different years in different regions.

An obvious source of decline in abundance and diversity is landscape transformation. To assess these effects, Dirzo et



Figures 3 & 4. Dirzo et al's (2014) meta-analysis of insect declines over four decades beginning in 1970s. Fig. 3, Insect abundance of Lepidoptera and other insects. Fig. 4, Percent decrease by taxon for 452 species of insects. (Reproduced with permission, courtesy *Science*, AAAS from Dirzo, R., Young, H. S., Galetti, M., Ceballos, G., Isaac, N. J. B., Collen, B. (2014). Defaunation in the Anthropocene. *Science* 345: 401-406.)

al. conducted a separate literature review where responses of Lepidoptera were measured in human-disturbed landscapes, i.e., areas affected by logging and silviculture, agriculture, and urbanization. They found that insect species diversity in disturbed areas trended downward in nearly all studies, reducing (species) diversity by 40% on average. There was greater variation in whether human disturbance increased or decreased Lepidopteran abundances, but on average there were even greater effects with lower insect abundances in 90% of the long-term studies that Dirzo et al. examined.

In an analysis of species for which International Union for the Conservation of Nature (IUCN) had assessed population trends, Lepidoptera were among the orders with the fewest species (about 25%) declining in abundance, faring better than Hymenoptera, Coleoptera, and especially Orthoptera (which had 50% of species declining). In analysis of UK insects alone, arguably the world's best-studied insect fauna, 25 species have seen declines of 30% or more, a rate that is similar to that of the elevated rates found in other insect orders.

The majority of the article is not about insects. Dirzo's team describes one Kenyan study of system-wide effects that followed reductions in numbers of large mammals. A small fraction of the reported consequences involved arthropods, for example increased (e.g. Coleoptera) or decreased (e.g. ticks) abundances. Changes in abundances also affected species interactions (e.g. defense of acacia by ants) as well as ecosystem functions. In sum, defaunation, especially of vertebrates, often triggers species losses and the degradation of ecosystem functions that cut across taxonomic boundaries.

Although broader effects of defaunation and species loss were not examined for Lepidoptera, similar pathways can be imagined for them. Lepidoptera, and especially the larvae of geometrids and many lineages of tree-feeding noctuoids are essential elements in the diets of warblers and other songbirds. Even in birds that we regard as granivores--regulars at our bird feeders for the winter months--switch to insectivory when nesting. To build baby birds you need caterpillars, upwards of 3000 just for a clutch of chickadees. The pollination services of Lepidoptera are modest in temperate zones, but they become increasingly important in lower latitudes and can be important in tropical forests. Collectively, the planet's 250,000 species of Lepidoptera are enormously important in nutrient cycling, regulating host plant abundances, and are an essential fabric in many of the world's terrestrial food webs.

Dirzo's et al.'s global meta-analysis puts other declines of individual species into context. Monarchs are declining at an even faster rate than the Dirzo global average, by more than 80% in the past two decades (note: this estimate is dependent on what starting year is chosen). Measures to stem this collapse can't come too soon. And perhaps even more importantly, Dirzo et al.'s findings underscore that the monarch, while being an exceptional case, has an alarming amount of company, and that insect decline is happening across the globe, across a sweeping array of taxa.

Butterfly and moth conservation often focuses on those species and subspecies that are nearing extinction or on widely known known species, e.g., monarchs. But this emphasis could be blinding us from seeing an even greater problem, i.e., widespread downturns in insect abundance. These are undoubtedly of greater importance to community

Continued on p. 101

Studying Lepidoptera in different lights

Andrei Sourakov

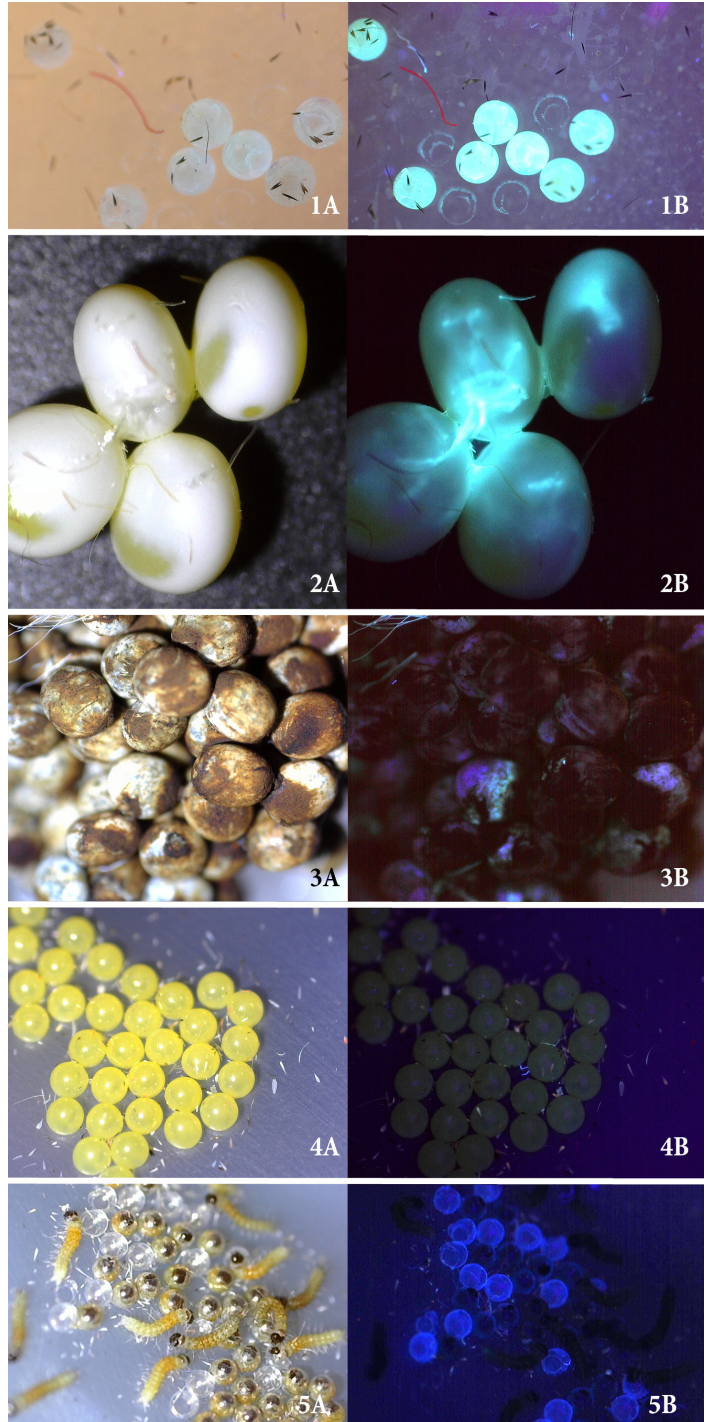
McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, Gainesville, Florida, USA.
 asourakov@flmnh.ufl.edu

It is well known that humans cannot see the UV spectrum of light. However, we can detect the UV which is reflected from a wing of a butterfly or a caterpillar with the help of UV photography, which requires special lenses, or with the help of photometers. We can then try to imagine what the UV - seeing animal (like a bird or a butterfly) would experience. However, getting into the head of another animal may not be the best use of our time, and, unless we all become 'eyeborgs,' like Neil Harbisson (a color-blind artist who can 'hear' colors including UV after having an antenna implanted into his skull), seeing UV is not the first thing on the agenda of most people. That said, as pointed out by the article in the last issue of the News (Moskowitz 2017), we can use UV for detecting caterpillars and other life forms at night because of the glow that is produced by their pigments when these molecules get excited by UV light. Here, I would like to discuss using UV light as well as other types of lighting in application to lepidopterology.

We normally describe Lepidoptera to each other (either verbally or in the literature) based on our visual observations that are most frequently conducted under indoor incandescent lights. If Lepidoptera were to consistently change their appearance under UV light as they seem to have done in Moskowitz's photos, green to blue, red to brown, white to brighter white, etc., then shining UV light on Lepidoptera would mostly be interesting from the utilitarian point of view outlined by Moskowitz; we would be able to find these insects at night much easier as they would stand out on the background of vegetation.

However, what if these changes in appearance are species-specific and unpredictable? What if a caterpillar that looks uniformly green to us in the daylight suddenly shows hidden markings in parts of its body, akin to secret writing that appears on a letter only when the paper it is written on is subjected to the heat from a candle? If this is the case, then would not it be prudent to study Lepidoptera under different light conditions, UV being one of them, to determine if they have additional properties not detectable under 'normal' conditions?

Recently I acquired a AM4115T-CFVW dino-lite hand-held digital microscope that has 400nm LED excitation lights and a high-pass type emission filter that cuts off at 430nm. The UV light emitted by the scope allows visualizing fluorescence. There is also a white LED light for 'normal' lighting. I shone both lights on a variety of eggs, larvae and adult moths and took their photos (Figs 1-27). In figures 1-5, one can observe that fluorescence in eggs varies greatly with the species. While eggs of *Apantesis vittata* tiger moth stand out shining under UV like a full



Figs. 1-5. Eggs of various moth species under LED (A) and UV (B) lights. (1) *Apantesis vittata*; (2) *Automeris io*; (3) *Actias luna*; (4) *Utetheisa ornatrix*; (5) Neonate larvae of *Utetheisa ornatrix* next to empty chorions.

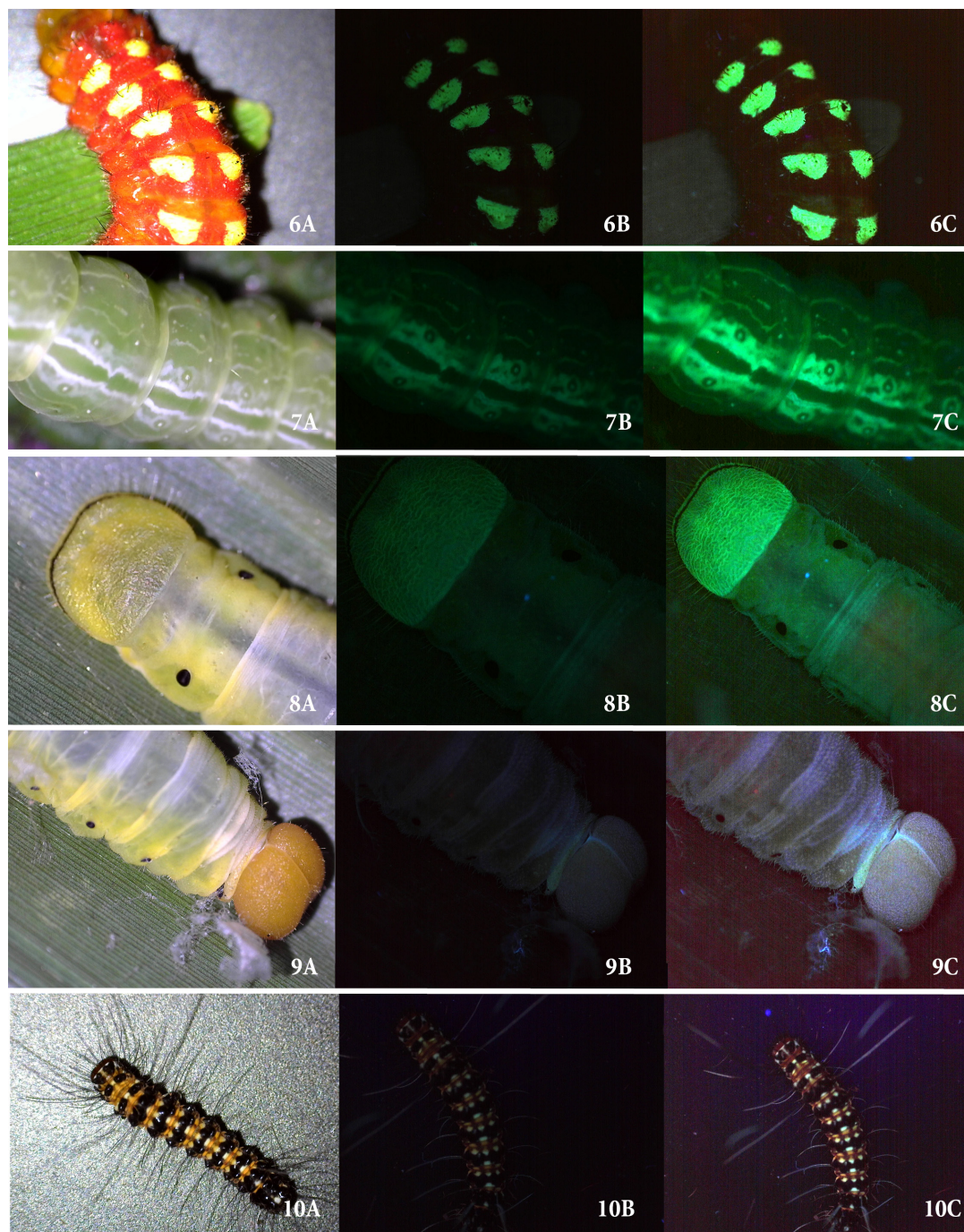
moon on a clear night (Fig. 1), the similarly white eggs of *Automeris io* are much less 'excitable' (Fig. 2). Even less 'interesting' are eggs of *Actias luna* (Fig 3) and of *Utetheisa ornatrrix* (Figs 4-5). Photos of neonate larvae of the latter next to their eggs shells show clearly that any fluorescence comes from the chorion and not from the embryos, as the newly hatched larvae appear completely black in UV light.

This lack of excitation by UV rays of the surface pigments of the *U. ornatrrix* neonates that are cream-white in color

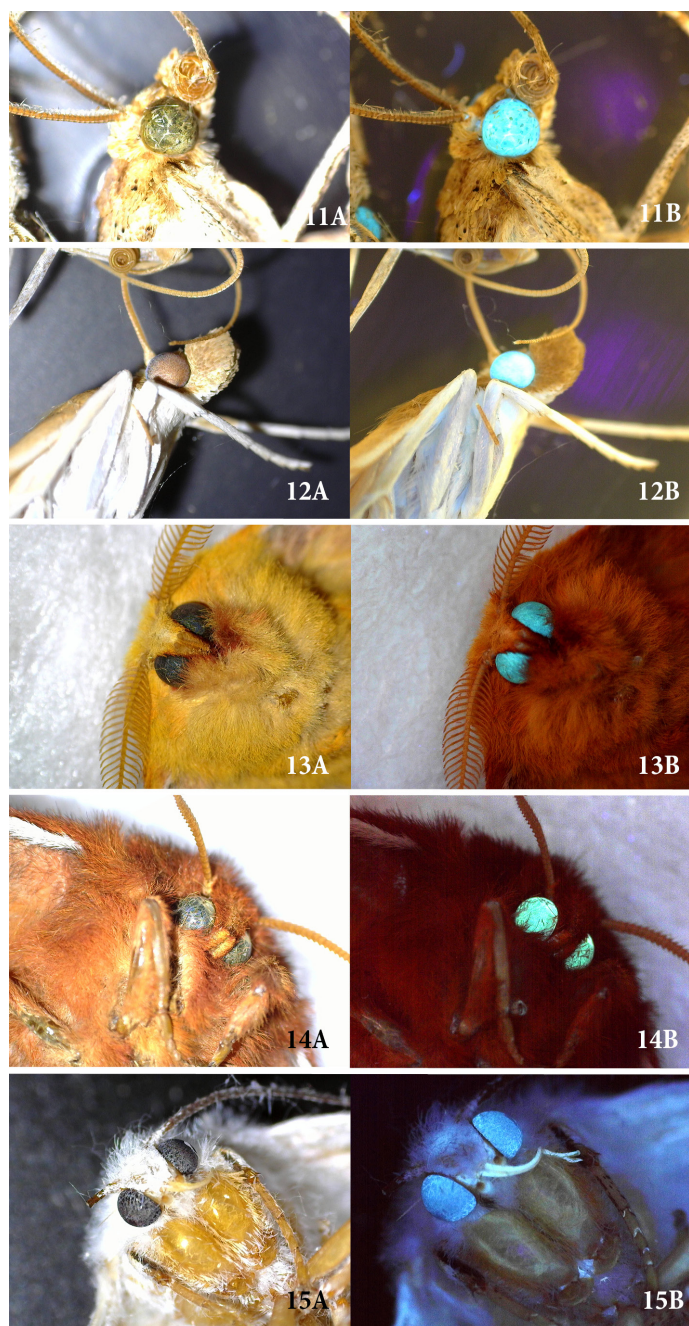
may be adaptive; perhaps this makes them less visible to predators that see UV. The larvae, especially after they start feeding on their toxic *Crotalaria* hostplants, become chemically defended. Correspondingly, the cream-white dots marking the dorsal surface of the older instars of *U. ornatrrix* are well visible in UV (Fig. 10) and so are their long hairs that in normal light are not too obvious to a human eye and appear mostly black. Typically indistinct pale markings on the back of the cabbage looper become much more pronounced in UV light (Fig. 7), but the

most dramatic are the aposematic markings of the *Eumaeus atala* caterpillars that proved to be fluorescent (Fig. 6). While for *E. atala* and *U. ornatrrix* one may suppose a correlation between their fluorescence and aposematism, fluorescence is not found in all aposematically colored caterpillars. For instance, the white lateral stripe on the late instar of *Automeris io* was not fluorescent in my experience.

Some other larvae of the few that I examined showed unexpected results as far as how their visible pigments react to UV light. One example is the mature larva of the Monk skipper (*Asbolis capucinus*). In visible light, it is cryptic (green-yellow with an orange-brown head), but under UV the pigments on its last abdominal segment glowed florescent-green (Fig. 8). Interestingly, these larvae live in shelters that they build out of their hostplant (palm) leaves, and only come out at night to feed (per. obs.). Perhaps the observed UV-induced colors are somehow important in creating a 'false-head' and in deflecting an attack from a potential UV-seeing predator to the less-vulnerable rear end.



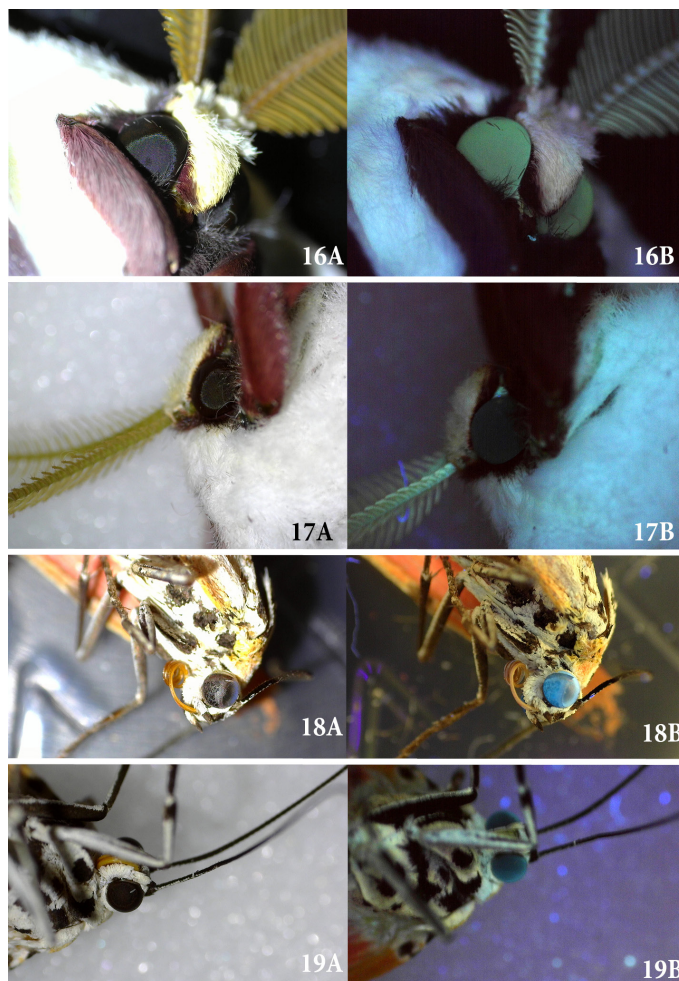
Figs. 6-10. Larvae of various moth species under different lights: (A) - LED; (B) - UV; (C) - same as (B) adjusted for brightness. (6) *Eumaeus atala*; (7) *Trichoplusia ni*; (8,9) *Asbolis capucinus*; (10) *Utetheisa ornatrrix*.



Figs. 11-15. Head region of various moth species under (A) LED and (B) UV lights. (11) *Terastia meticulosalis*; (12) *Agathodes monstralis*; (13) *Automeris io*, male; (14) *Automeris io*, female; (15) *Hyphantria cunea*.

I did not spend much time studying Lepidoptera wing patterns under UV in fear that the subject is vast and all-consuming. However, after putting dead moths under the UV scope I noticed that black eyes would turn fluorescent-blue in several, though not all, species (Figs. 11-16 and 18). However, when I examined two of these species, *A. luna* and *U. ornatix* alive, the effect was either not there (Fig. 17), or much less apparent (Fig. 19).

Another interesting observation concerns differences in appearance between older worn specimens and the



Figs. 16-19. Head region under (A) LED and (B) UV lights. (16) *Actias luna*, dead specimen; (17) *Actias luna*, live specimen; (18) *Utetheisa ornatix*, dead specimen; (19) *Utetheisa ornatix*, live specimen.

newly hatched ones of Luna moths. It has been recorded that owls change their appearance in UV light with age, allowing researchers to classify their age and perhaps allowing their potential mates to make a distinction between an older and a younger male (Weidensaul et al. 2011). It seems that the same applies to the Luna moths. In Figs. 20-21, one can observe that in LED light the old worn specimen (Fig. 20A) looks not that different from the freshly emerged one (Fig. 21A). However the veins of the older individual that with age lost their scale cover fluoresce brightly in UV light (Figs 20B,C) while they are hardly noticeable in a freshly emerged individual (Figs. 21B,C). As a result, the wing pattern of the two males of different age that may look similar to us may potentially look different to Luna moth females, informing them about the age of the potential male.

While on the subject of perception of the Luna moth wing pattern in different light, I would like to also note the difference between perceiving its pattern under different natural lighting conditions. For instance, if a predator discovers this moth sitting under direct sunlight (simulated



Figs. 20-21. Wing region of *Actias luna* under different lights: (A) - LED; (B) - UV; (C) - same as (B) adjusted for brightness. Fig. 20 - old worn specimen; Fig. 21 - freshly emerged specimen. Fig. 22. Live specimen of *Actias luna* photographed under different lighting conditions: (A) - flash; (B) - center-weighted metering and (C) evaluative modes of the camera.

in Fig. 22A by a flash) it will perceive a different pattern from that found on a cloudy day (Fig. 22B), or when viewed from the understory by a bird against a sky (Fig. 22C). It is the latter that attracted my attention recently, as it made me for the first time realize why many saturniids may have windows in their eyespots: too large to hide from predators, they may rely on the scare tactic when dealing with bird predation, and when viewed against the light, their eyespots are still functional, because they let enough light through to appear as such.

Whether someone shines a flash on a specimen or takes its photo under a 'normal' light can determine whether iridescent coloration will make it into a species description or not (e.g., Figs. 23-25). However, flash sometimes can obscure rather than reveal differences. I return here to an example that I recently examined when my co-authors and I resurrected an old name, *Agathodes monstrialis*, separating the North American *Erythrina* Leaf Roller

from its Central-South American relative, *Agathodes designalis* (Sourakov et al. 2015). The decision was based on the results of DNA barcoding and genitalia and it was an easy one to make as the two taxa were already originally described by Guenée based on wing pattern differences. While these differences were not apparent to the subsequent authors who lumped the two species into one, in our 2015 paper we demonstrated that, depending on the light in which the specimens of the two species are examined, tiny differences in hindwing coloration can either be apparent or not. Here, I provide a series of photos of the two species taken in different light conditions (Figs. 26-27) including under UV (Figs. 26E, 27E) to illustrate that UV mode may be useful in situations when examining nearly cryptic species.

To conclude, it appears from this limited sample of observations that there are several possible uses of UV microscopy in Lepidoptera research. As we produce species



Figs. 23-25. Three species of nymphalids: *Caerois gerdrudtus*, *Narope* sp., and *Taygetina ypthima*, photographed under (A) incandescent lights and (B) with a flash.

descriptions from egg to adult, we should remember that we are merely providing subjective perceptions of a complex reality. Modern tools, from DNA barcoding to UV microscopy, allow us to broaden our descriptions by introducing other variables, among which examining specimens under different lights is both affordable and fun.

References

Moskowitz, D. 2017. Caterpillar hunting with a UV flashlight. *News of the Lepid.Soc.*, 59(1): 42-44.
 Weidensaul, C.S., Colvin, B.A., Brinker, D.F. and Huy, J.S., 2011. Use of ultraviolet light as an aid in age classification of owls. *Wilson J. Ornith.*, 123(2), pp.373-377.
 Williams, A. 2014. www.dailymail.co.uk/sciencetech/article-2582019/Colour-blind-artist-worlds-eyeborg-having-antenna-implanted-inside-skull-hear-colours.html (accessed 5-8-2017)

For a review of fluorescence found in nature and its functional significance, interested readers are referred to an excellent review by Justin Marshall and Sonke Johnsen (2017) "Fluorescence as a means of colour signal enhancement," which appeared after submission of the present article in *Philosophical Transactions of the Royal Society B*, 372:20160335. <http://dx.doi.org/10.1098/rstb.2016.0335>.

Editor's Note: Andrei sent two more figures to include if there was enough space. See the next page.



Figs. 26-27. Sister species *Agathodes monstralis* and *Agathodes designalis* (right) photographed under different lights (A) - flash; (B) - LED; (C) - incandescent light; (D) - back-lit with LED light; (E) - UV.

Decline in abundance/diversity of Leps -- Haddad and Wagner

Continued from p. 95

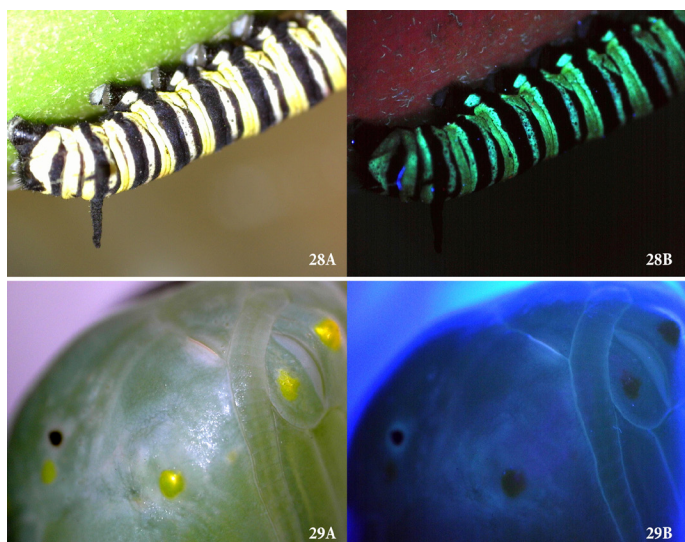
and ecosystem health and function. Abundant taxa provide ecosystems services and anchor the local population dynamics of other species.

One wonders if we have put too little emphasis on common species and their interaction diversity, a measure of the number of direct ecological linkages that a species shares with other taxa. Abundant species have far higher measures of interaction diversity, and serve as important ecological (energy flow) hubs in communities. Quantifying these and monitoring their changes might serve as an early warning sign that a community or region is in decline.

Are the declines of some bats, songbirds, and other insectivores linked to downturns in available insect biomass? Are butterflies and moths really much less common than they were a half century ago as lamented (and warned) by so many? And if so, how much so and what must be done to reverse these trends?

A core message from Dirzo et al's research is that more long-term datasets are needed, and especially those that record abundances. Members of the Lepidopterists' Society have pioneered such efforts around the country and around the world. Accumulating long-term datasets of butterfly and moth numbers will enable more refined analysis of their ecology, their response to global change, the causal factors in declines, and provide the information needed to direct successful conservation. The UK Butterfly Monitoring Scheme has long served as the gold-standard for large-scale, long-term butterfly datasets, with 4000 sites sampled across 40 years. Indeed, this dataset comprises a good part of Dirzo et al.'s meta-analysis. A greater geographic expanse of long-term datasets are needed, especially in tropical areas where human population growth is high and deforestation is proceeding at alarming rates.

The threats to invertebrate diversity are many and gaining momentum. Presently, development and human-driven habitat degradation (including logging and agricultural practices, changed fire ecology, hydrological perturbations, damming and channelization, etc.) comprise the great global threat to biodiversity. Invasive species, especially on islands and in density populated areas, are becoming increasingly problematic. The planet's biota will face increasing challenges from climate change. We are poised to plunge into E. O. Wilson's BioDiversity Crisis. Species, entire lineages, will be lost. The charge will be to do one's best to stem the losses by preserving habitat, working to change policies, embracing green technologies, and gathering the data needed to guide conservation efforts. We must act for those creatures without a voice.



Figs. 28-29. Monarch larva and pupa up close and personal: (A) LED light; (B) UV light.



From the Editor's Desk

James K. Adams

To the left is the aforementioned *Catocala myristica* (News 58:3, pg. 136) collected near Rome, GA near the end of August of 2016. Again in this coming August I will be checking on the status of the isolated population of the moth at the location where the host Nutmeg Hickories occur.

The specimen at the lower left is a nice morph of *Catocala micronympha* from Sapelo Island, GA, from May of this year. I collected two specimens like this.



Death in the field

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Butterflies and moths, like all living things, are subject to enemies and environmental hazards. Anyone who follows adults and caterpillars in the field occasionally finds evidence of death, with the causes sometimes being clear and sometimes obscure. The attached photo array illustrates the kinds of hazards that lepidoptera may encounter in the field. Several of these photos came during a study I did of *Euphydryas gillettii* in northwestern Wyoming; two were taken in New York; and two photos were taken by others (my thanks to Lincoln Brower and Matt Perry for contributing their use). The same sources of mortality, however, can affect butterflies and moths anywhere.



Fig. 3. Orb-weaving spider with *Euphydryas gillettii* (3 Aug 1981, Park Co., WY)



Fig. 1. Erythraeid mite attacking hatching eggs of *Euphydryas gillettii* (4 Aug 1979, Park Co., WY).



Fig. 4. Crab spider with geometrid moth (*Macaria* sp.) (6 Aug 1980, Park Co., WY).



Fig. 2. Ichneumon parasitoid (*Benjaminia?*) attacking *Euphydryas phaeton* larvae (20 Aug 1992, Onondaga Co., NY).



Fig. 5. Chickadee with *Euphydryas phaeton* pupa (10 Aug 2015, Oneida Co., NY: photo by and courtesy of Matt Perry).



Fig. 6. Black-backed oriole feeding in a monarch, *Danaus plexippus*, cluster (19 Jan 1980, Sierra Chincua, MX; photo by and courtesy of Lincoln Brower).



Fig. 7. Female *Euphydryas gillettii* crushed in a hailstorm while ovipositing on the upper leaves of its hostplant *Lonicera involucrata* (24 Jul 1980, Park Co., WY).

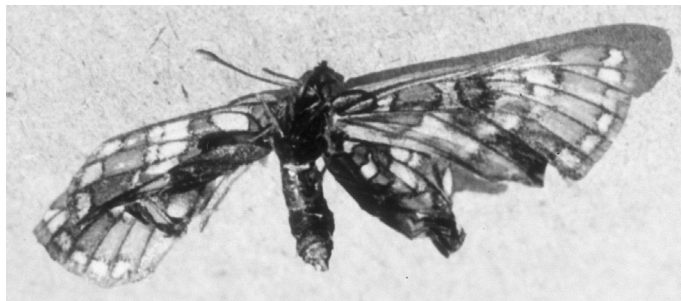


Fig. 8. The same as in Fig. 7 but removed from the shrub (the female had been marked as part of a mark-recapture study); ants then took the body.

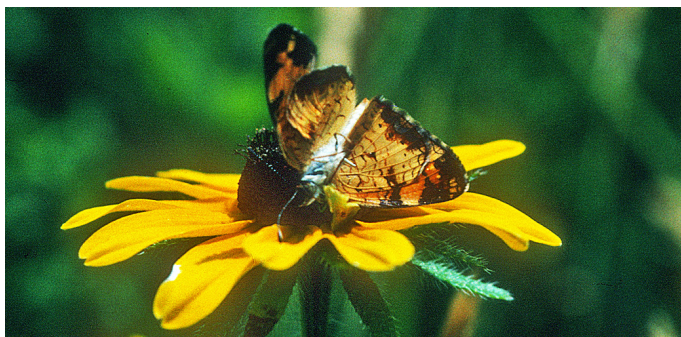


Fig. 9. *Phyciodes tharos* caught by a predatory (phymatine) bug (Jul 1995, Onondaga Co., NY).

Metamorphosis

Chris Grinter



Raymond Walter Neck Jr., PhD was born Nov. 12, 1946 to Raymond Walter Neck and Joyce Stansbury Neck in Brownsville, Texas. He died on March 23, 2017 in Houston, Texas. Preceded in death by his parents and son, Patrick Kent Neck. He is survived by his wife, Mary Eleanor Rentfro Neck; daughter, Anna Kristine

Nickless (John Michael) of Corpus Christi; brother, Stephen Neck (Nora); and many cousins and inlaws.

Raymond graduated from Brownsville High School in 1964 and Texas Southmost College in 1966. He continued his education at the University of Texas in Austin culminating with a PhD in Biology specifically Ecological Genetics in 1974. Raymond worked as a Conservation Biologist in Master Planning for Texas Parks and Wildlife until 1991. Dr. Neck was a member and past president of the Texas Organization for Endangered Species. He was a member of the American Malacological Union serving as the editor of the Newsletter (1990 – 1993) and the Lepidopterist Society (1968 – 2013). In 1991, he and Pinké moved to Houston to be the Curator of Invertebrates for the Houston Museum of Natural Science. He was the Director in Planning for the Cockrell Butterfly Center. Always a curious and avid scientist, he was published almost 200 times and was the author of the statewide field guide, “The Butterflies of Texas”, 1996, a Texas Monthly Field Guide. He was a co-author of “Freshwater Mussels of Texas”, 1996. Unfortunately, Raymond suffered a cardiac arrest in 1993, which forced him to retire from his much loved professional life. The next 23 years he lived quietly with his wife as his sole caregiver until his death only 5 months prior to their 50th wedding anniversary.

Always courteous and kind, he endured his disability and fragile health with courage and dignity. Raymond will be interred in Assumption Cemetery next to his son, Patrick, in Austin, Texas. No services as he wished. Be kind; be compassionate; and make a call to someone you care about while they are still here.

[contributed by: *Mary Pinké Neck*]

William Ray Black Jr., age 71, of Paducah, KY, died Saturday, March 18, 2017 at his home.



Mr. Bill Black was born September 30, 1945 in New York City to William Ray Black and Virginia Giblin Black. Bill graduated from Paducah Tilghman High School in 1963 and attended Princeton University on a NROTC Scholarship. He graduated in 1967 with a degree in History and was commissioned a 2nd Lieutenant in the U.S. Marine Corps. He served two tours in Vietnam,

where he earned a Bronze Star for meritorious service and two Purple Hearts. He completed his service to the Marines in 1971, having attained the rank of Captain. Following his service in Vietnam, Bill returned to his hometown of Paducah, and joined his father and grandfather in the family construction business at Ray Black & Son. Bill recognized that a community's architectural and historic heritage was a source of beauty and diversity and knew these treasures were non-renewable resources. He specialized in historic preservation throughout his career. Among his preservation projects were: Whitehaven, The River Discovery Center, and many other historic buildings in Paducah. In the late 1970's he was an original visionary for the creation of the 26 square block Lower Town Neighborhood National Register District. Bill became the Scoutmaster of Boy Scout Troop 1 in 1985 and kept the historic troop from losing its charter as one of 7 original troops in the U.S. The troop grew to more than 70 scouts, from all backgrounds, under his leadership. Bill served on the Paducah Independent School Board for 24 years. He was a passionate lepidopterist, archaeologist, and collector of all things he found interesting.

He is survived by his wife of 44 years, Nancy Fowler Black; three sons, William Ray (Will) Black III and his wife, Sarah Maggos Black, David Dawson Black and his wife, Lindsay McMaster Black and Merle Fowler Black and his wife, Emily Yocum Black; five grandchildren, Liam Black, Dawson Black, Sasha Black, Ford Black and Nolan Black. He is also survived by his sister, Virginia (Ginny) Black Coltharp and her husband James Richard (Rick) Coltharp and his brother, Christopher James Black and his wife, Nancy Williams Black. He was preceded in death by his parents and his brother, David Bruce Black.

Anyone interested may make a memorial gift to The Society of Kentucky Lepidopterists: The Society of Kentucky Lepidopterists, Les Ferge: Treasurer, 7119 Hubbard Avenue, Middleton, WI 53562.

Karel Spitzer CSc. (1939-2016) -- Karel Spitzer passed away on 27th November 2016 in České Budějovice, Czech Republic after fighting congestive heart failure for over two years. He was a well-known specialist in Lepidoptera and Diptera, as well as in the ecology of peat bogs and in nature conservation. As he did not have a family of his own, studying insects was his chief all-absorbing interest, though he was well-read in history, philosophy, literature, and current affairs, which he also loved to discuss.

Karel was born October 13, 1939 in Jindřichův Hradec, where his parents owned first a button manufacturing facility, and then a foundry business. His father was Jewish, which adversely affected Karel's childhood during the 2nd World War and his formative years after the war. Thus Karel's first 20 years were full of uncertainty but already in High School in Jindřichův Hradec Karel started to collect butterflies and moths. After high school he studied at the Agricultural University in Brno, and continued his collecting, specializing in Noctuidae. During his University studies he became an intern at the Department of phytopathology, where Prof. Povolný directed him also to Diptera – families Rhagionidae and Therevidae. His first job after university was as a phytopathologist at an agricultural cooperative in Jindřichův Hradec but after three years he became a lecturer at the (new) University of Agriculture in České Budějovice, where he taught entomology, ecology and nature conservation. He loved lecturing and was recognized as one of the best teachers and active research entomologists.

In 1968, during the short period of Prague Spring, he was able to arrange a one-year research study in New Zealand (1969-1970), and after returning to Czechoslovakia he finished his Ph. D. and continued to lecture. In 1977 he transferred to a position of a Research Scientist at the Institute of Entomology, Czechoslovak Academy of Sciences, which today belongs to the Biology Centre of Czech Academy of Sciences in České Budějovice. He worked there till his death.

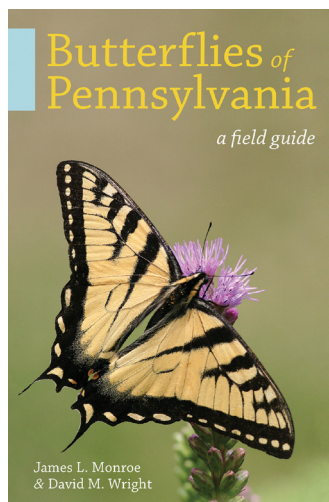
Karel travelled to many countries to collect butterflies and flies, including the Soviet Union, Bulgaria and in the 1980's also to Vietnam. He travelled to Vietnam seven times in the period 1980 – 1995 to collect moths and butterflies, and with his colleagues wrote up a number of highly cited publications on tropical Lepidoptera of Vietnam. Later, he also travelled to other countries including Panama, USA and Canary Islands (Spain), giving lectures and collecting Lepidoptera. Karel authored about 150 articles in various entomological journals, and also co-authored four books; he had a number of Ph.D. students, and became well recognized in the area of the entomofauna of peat bogs, and insect taxonomy in relation to nature conservation. His Lepidoptera collections were taken over by the Moravian Museum in Brno.

[contributed by: *Josef Jaroš and Hana Zikmundová*, Institute of Entomology, Biology Centre CAS, České Budějovice, Czech Republic]



Karel Spitzer at Mrtvý Luh bog, Šumava Mts., Czech Republic, 2001

Book Review



Butterflies of Pennsylvania a field guide, James L. Monroe & David M. Wright, University of Pittsburgh Press (see ad in Marketplace, pg. 93)

This work has all of the features that make field guides to a region's butterfly fauna useful to anyone with a serious interest in that fauna: (1) beautiful and clear images of each species, (2) flight period data, (3) foodplant information, (4) habitat associations, (5)

notes on behavior, and (6) the conservation status of each taxon in Pennsylvania. But there are also innovations that set this book apart from its congeners. For example, rather than simply having county records shown on a map, the records are color coded so that one can see at a glance whether the records are older than 20 years or more recent. When viewed in this light, it is sometimes possible to visualize a species retreating south to north with climate change or moving from west to east as the

species expands its range. Moreover, the phenograms for the flight data of each species note the number of records that each phenogram is based upon, also very useful in assessing the data. There is also a broad range of 22 special topics interspersed throughout the text discussing issues relating to the *Papilio glaucus* group, the *Celastrina ladon* complex, identification of *Erynnis* species and other areas that benefit from being highlighted as opposed to buried in the species accounts. In addition to these special topics, there are sections on a range of more general topics such as butterfly anatomy and life history and also on topics specific to Pennsylvania, such as a section on the physiographic provinces of the state and a fascinating five pages on the history of butterfly study in Pennsylvania from the Delaware people's name for butterflies (*memekas*) to the present.

As the authors note, this book helps fill a gap, as there are relatively recent books on the butterflies of Pennsylvania's neighboring states, New Jersey, Ohio and West Virginia. The northeastern butterfly fauna is perhaps the best-studied of the United States, and yet there are always new discoveries and insights that make it imperative to keep up. I know I am going to rely very heavily on the treatment of *Celastrina* set out here and I was surprised that *Celastrina idella* (Wright & Pavulaan, 1999), which flies in the New Jersey pine barrens, does not occur in Pennsylvania. But this book does treat six other members of the genus as full species that occur (or have occurred in the case of *C. nigra*) in Pennsylvania. There are also informative treatments of the *Papilio glaucus* complex as noted above, as well as the *Phyciodes tharos* complex.

At something a bit under six by nine inches, with a strong plastic cover, the book will easily fit into a field bag and serve as an actual guide in the field. Unlike the popular *Butterflies through Binoculars* series by Jeffrey Glassberg, most of the images in the species accounts are of pinned specimens (all expertly prepared and many of them reared by the late Frank Fee or Richard Boscoe). There are, however, many gorgeous images of live butterflies by Monroe throughout the introductory sections of the book, as well as others in some of the species accounts and special topic sections. I quickly counted 94 images of living butterflies in the book, and for some of the difficult to identify skippers, the images of living butterflies supplement the images of pinned specimens in the species account. All in all, I like this treatment, recognizing that there are some in the butterfly-watching community who will object. The authors also do a nice job discussing both collecting and watching, careful to be objective and inoffensive to either group. And, while that may be an impossible goal to achieve, it is at least worth striving for. At under \$25 (ok, \$24.95) the book is a bargain and a must for anyone with an interest not just in Pennsylvania's fauna, but the northeast fauna as a whole.

Harry Zirlin, hzirlin@debevoise.com

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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 and/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:

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The Lepidopterists' Society
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Students must send proof of enrollment. Please add \$5.00 to your dues if you live in Canada/Mexico, \$10.00 for any other country outside the U.S. to cover additional mailing costs. Remittances must be in U.S. dollars, payable to "The Lepidopterists' Society". All members receive the **Journal** and the **News** (each published quarterly). Supplements included in the News are the Membership Directory, published in even-numbered years, and the Season Summary, published annually. Additional information on membership and other aspects of the Society can be obtained from the Secretary (see address inside back cover).

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Submissions are always welcome! Preference is given to articles written for a non-technical but knowledgeable audience, illustrated and succinct (under 1,000 words, but will take larger). 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 thumb drive in any of the popular formats/platforms. Indicate what format(s) your disk/article/graphics are in, and call or email if in doubt. The InDesign software can handle most common wordprocessing software and numerous photo/graphics software. Media will be returned on request.
3. Color and B+W graphics should be good quality photos suitable for scanning or, as indicated above, preferably electronic files in TIFF or JPEG format at least 1200 x 1500 pixels for interior use, 1800 x 2100 for covers.
4. Typed copy, double-spaced suitable for scanning and 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 Vol. 59 and 60 must reach the Editor by the following dates:

Issue	Date Due
59 3 Fall	August 15, 2017
4 Winter	Nov. 15, 2017
60 1 Spring	Feb. 15, 2018
2 Summer	May 10, 2018

Be aware that issues may ALREADY BE FULL by the deadlines, and so articles received by a deadline may have to go in a future issue.

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 (facing page) for Zone Coordinator information.

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Great Lakes Region Buck Moths (*Hemileuca maia* complex). These photos are from a fen along the eastern end of Lake Ontario, near Pulaski, New York. When I (Steven Daniel) was helping with a survey this September (2016) we observed many patrolling males. I watched one drop down and attach to the calling female. When we returned a few hours later they had already disengaged and she was in the process of oviposition on the stem of a nearby woody shrub, *Myrica gale*, sweet gale. (photos by Steven Daniel, natdisc@gmail.com)



Ampelophaga rubiginosa (Sphingidae), from Fraser's Hill, Malaysia, photo by David Fischer (see article page 59)

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