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NEWS OF THE LEPIDOPTERISTS' SOCIETY

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Inside:

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Contents

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Front Cover:

Spurge Hawkmoth larva (*Hyles euphorbiae*) Pasture 12, Little Missouri Nat'l Grassland, McKenzie County, North Dakota, 16 July, 2005. (photo by Bryan E. Reynolds)

Holarctic Butterflies

George O. Krizek[1] and Kyle E. Johnson[2]

[1]2111 Bancroft Place NW, Washington, D.C. 20008
[2]445 Russell Labs, University of Wisconsin-Madison, 1630 Linden Drive, Madison, WI 53706-1598
kejohnson4@wisc.edu

Here we present a photoessay sampling of Holarctic butterflies, i.e. those species found in both North America and Eurasia. These range from elusive tundra dwellers to backyard familiarities.

The photos span over three decades and countless adventures. Challenges and obstacles were many, including dreadful weather, treacherous terrain, large predatory mammals, and equipment failure. This coupled with the short flight periods and specific habitats of many of the species made photographing them quite the challenge.

We hope the reader will ponder the uncertain taxonomy of many of the Holarctic species and species groups. Are these "species" clearly one entity across continents, or are they a group of closely related species? Some (e.g. *Nymphalis antiopa*) seem to be solid species concepts and appear virtually identical between continents. Others (e.g. *Boloria frigga*) are ambiguous and definitive evidence is lacking to demonstrate whether or not Nearctic and Palearctic populations represent one or multiple species. Thus research opportunities abound for those bold enough to take the plunge!

Euchloe ausonides, Horseshoe Mtns., Colorado, July 17, 2008; considered by some to be a subspecies of palearctic *E. ausonia*.

Colias hecla, Denali National Park, Alaska, Aug. 1, 1998.

Colias palaeno. Top: male, Denali National Park, Alaska Aug. 1, 1998; Bottom: female, Col du Lautaret, French Alps, France, July 20, 1983

Colias tyche, Deadhorse, Alaska, July 4, 2014 (by Kyle Johnson; other photos this page by George Krizek)

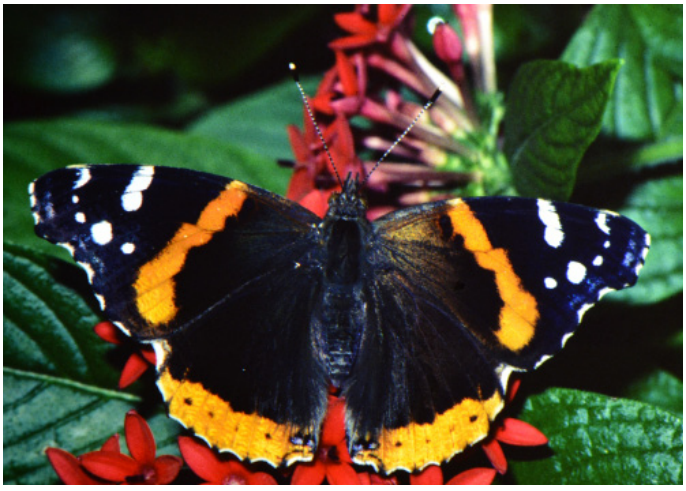
Parnassius phoebus, Val d"Isere, French Alps, France
July 25, 1983 (by George Krizek)

Nymphalis antiopa, Gaines, Tioga Co., Pennsylvania
July 1, 1991 (by George Krizek)

Vanessa cardui, Pas de la Bonaige, Pyrenees, Spain
July 29, 1991 (by George Krizek)

Papilio machaon, Rabi, Czech Republic, May 20, 1985
(by Ladislav Havel)

Nymphalis vau-album, Gaines, Tioga Co., Pennsylvania
July 1, 1991 (by George Krizek)



Vanessa atalanta, Naples, Florida, September 18, 1998
(by George Krizek)

Boloria selene, Mont Louis, Pyrenees, France
July 26, 1980 (by George Krizek)

Boloria napaea, male, Col dul Lautaret, French Alps, France
July 20, 1983 (by George Krizek)

Boloria eunomia, male, McFarland Bog, Marquette Co.,
Michigan, June 18, 2004 (by Kyle Johnson)

Boloria polaris, female, Deadhorse, Alaska, July 4, 2014
(by Kyle Johnson)

Boloria frigga. Upperside: male, Red Lake Peatland, Beltrami Co. Minnesota, May 18, 2007; underside: male, Tanglefoot Lake Bog, Marquette Co., Michigan, May 31, 2005 (by Kyle Johnson)

Boloria freija. Upperside: male, Browns Lake Peatland, Lake of the Woods Co., Minnesota, May 1, 2007; underside: female, Island Lake Trail, Sublette Co., Wyoming, July 28, 2004 (by Kyle Johnson)

Erebia disa, male, Jim River, Alaska, June 15, 2014 (by Kyle Johnson)

Erebia discoidalis, male, Channing Bog, Dicksinson Co., Michigan, May 20, 2004 (by Kyle Johnson)

Erebia fasciata, female, Rainbow Ridge, Alaska June 20, 2014 (by Kyle Johnson)

Oeneis bore, male, Galbraith Lake, Alaska July 9, 2014 (by Kyle Johnson)

Oeneis jutta, female, West McFarland Bog, Marquette Co., Michigan, June 18, 2004 (by Kyle Johnson)

Coenonympha "tullia" ochracea, Ashcroft, Aspen, Colorado, July 12, 1993 (by George Krizek)

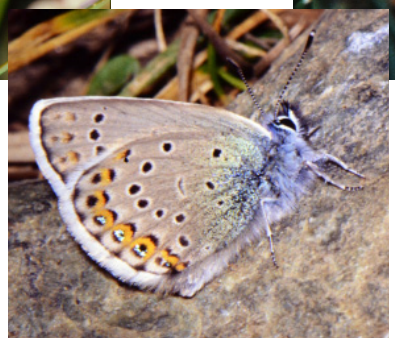
Albulina optilete, Chamonix, France, August 4, 1986 (by George Krizek)

Lycaena phlaes, female, Bad Hofgastein, Austria August 21, 1986 (by George Krizek)

Agriades glandon, Col du Lauteret, France, July 22, 1983 (by George Krizek)

Caterocephalus palaemon, East Kralova Hola, Slovakia July 2, 2002 (by George Krizek)

Hesperia comma, Bad Hofgastein, Austria. Upperside: August 22, 1986; underside: August 24, 1986 (by George Krizek)



Plebejus idas. Upperside: Riffelberg, Zermatt, Switzerland, July 31, 2001; underside: Riffelalp, Zermatt, Switzerland, August 3, 2001 (by George Krizek)

Notes on Erynnis baptisiae in Florida, documenting its widespread occurrence in northern peninsular counties, and a new larval foodplant (Lepidoptera: Hesperiidae: Pyrginae)

Andrew D. Warren[1], John V. Calhoun[2] and Bill Berthet[3]

[1]McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, SW 34th St. and Hull Rd., P. O. Box 112710, Gainesville, FL 32611-2710 **hesperioidea@yahoo.com**
[2]977 Wicks Dr., Palm Harbor, FL 34684 **bretcal1@verizon.net**
[3]12885 Julington Rd., Jacksonville, FL 32258 **bergems@comcast.net**

Erynnis baptisiae has been poorly documented from Florida. While it was reported from "Florida" in its original description (Forbes 1936), specific details on Florida records have remained sparse, and widespread confusion with other *Erynnis* species has made it difficult or impossible to interpret and verify historical records. Evans (1953) cited 14 males and 2 females of *E. baptisiae* from Florida in the Natural History Museum, London. Burns (1964) reported *E. baptisiae* from "St. Augustine [St. Johns Co.] and Tampa [Hillsborough Co.]", with no additional details. Kimball (1965) listed the species from Florida, referring to the specimens cited by Evans (1953) as the "entire local record," but also reported two localities for *E. persius* Scudder, noting that they "undoubtedly" refer to *E. baptisiae*: "Dunedin [Pinellas Co.], April" and "Osprey [Sarasota Co.], March." Seemingly far out of range, and without known specimens to back them up, none of the latter records were repeated by subsequent authors.

At our request, John Chainey of the Natural History Museum, London, examined the 16 specimens that Evans (1953) reported from Florida. Only seven males actually possess locality labels and they read simply "Floride" with no additional data. They are from the collection of the French entomologist Charles Oberthür (1845-1924), whose Hesperiidae were purchased by the museum in 1931 from his brother René Oberthür (1952-1944). The remaining nine specimens are unlabeled and it is unknown why Evans included them within the series from "Floride." We received photographs of those labeled "Floride" and they do represent *E. baptisiae*. Although these specimens were once accepted as the only evidence of the presence of *E. baptisiae* in Florida, their lack of additional data and unknown provenance bring their validity into question.

The Butterflies and Moths of North America (BAMONA) website records *E. baptisiae* from eight counties in the Florida panhandle: Okaloosa, Washington, Jackson, Gadsden, Liberty, Leon, Jefferson, and Madison, as well as Duval County in the northeastern corner of the peninsula (Lotts & Naberhaus 2015). Records from Gadsden and Madison counties were entered during the creation of the website, and specific details are unavailable; misdeterminations cannot be ruled out. The record from Liberty County is based on a photograph of a male (ID'd by JVC) taken by Jeff Ward at Torreya State Park on 8 March 2015 (see below for additional records from Liberty Co.). The report from Leon County is untraceable and cannot be verified. The record from Jefferson County was reported by Mather (1975), from "Monticello, 31-VII-1974, R. Leuschner"; we've been unable to verify this record. The record from Jackson County is based on its inclusion on a list of the fauna and flora of Florida Caverns State Park (Anonymous 2006), although the source of their data is unknown. The Washington County record is based on three adults observed and a photograph (ID'd by JVC) taken by MaryAnn Friedman on 6 June 2009, and there are multiple valid records from Okaloosa County (see below). The peninsular record, from Duval County, was included on a distribution map formerly maintained by H. David Baggett (photocopy in possession of JVC), but no specific details were included. This species was also listed by FFWCC (2004) from the Blue Springs Longleaf Tract of Twin Rivers State Forest, Hamilton County, but the source and validity of this report are also unknown.

While curating the genus *Erynnis* in the collections of the McGuire Center for Lepidoptera and Biodiversity (Florida Museum of Natural History, University of Florida), ADW found four male specimens of *E. baptisiae* labeled from Florida (identities confirmed by genitalic examination). Two of these are from Okaloosa County in the western panhandle: Shalimar, 13-IV-1963, H. O. Hilton; Eglin AFB, 3-IV-1963, H. O. Hilton. The third male is from "nr. Bristol, Liberty Co., 1-X-1983, W. L. Adair." The fourth male is labeled from "orange grove at N end of town, Umatilla, Lake Co., 18-VII-1993," collected by R. F. Hirzel. This last record, possibly mislabeled, is discussed below.

Minno et al. (2006) reported finding *E. baptisiae* in Okaloosa County (Kepner Pond, within Eglin Air Force Base, ca. 5 mi N Niceville) on 21 June 2005. Several *Erynnis* larvae were found feeding on *Baptisia calycosa* var. *villosa* Canby. Two were successfully lab-reared on that plant and produced adults of *E. baptisiae*. MaryAnn Freidman observed and photographed adults of *E. baptisiae* at several localities in proximity to *Baptisia calycosa* within Eglin Air Force Base in Okaloosa and Santa Rosa counties. The dates and

Figs. 1-12. *Erynnis baptisiae* in northern peninsular Florida. **1)** Female, 16.iv.2011, Ralph E. Simmons Memorial SF, Nassau Co. (BB). **2)** Female, 23.v.2015, Jennings SF, Clay Co. (ADW). **3)** Male, 23.v.2015, Jennings SF, Clay Co. (ADW). **4)** Male, 24.v.2015, Jennings SF, Clay Co. (BB). **5)** Ovum, 24.v.2015, Jennings SF, Clay Co. (BB). **6)** Male, 24.v.2015, Jennings SF, Clay Co. (BB). **7)** Male, 25.v.2015, Jennings SF, Clay Co., showing characteristic dangling nectaring posture on B. *lecontei* (BB). **8)** Male, 27.v.2015, Jennings SF, Clay Co. (JVC). **9)** Male, 30.v.2015, Ichetucknee Springs SP, Columbia Co. (ADW). **10)** Female, 31.v.2015, Ichetucknee Springs SP, Suwannee Co. (ADW). **11)** Female ovipositing on *B. lecontei*, 31.v.2015, Ichetucknee Springs SP, Suwannee Co. (ADW). **12)** Female, 31.v.2015, Fort White Mitigation Park, Gilchrist Co. (ADW).

number of adults seen are 23 July 2005 (1), 10 August 2008 (1-2), 13 August 2008 (1), 15 August 2008 (7), 22 August 2008 (4), and 22 July 2009 (2). On several occasions she observed oviposition and presumed early stages of *E. baptisiae* on *B. calycosa*. No adults were seen, but a larva was also found on *B. calycosa* on 30 August 2008.

In 2005, *E. baptisiae* was encountered in Liberty County (nr. Cotton Landing, Apalachicola National Forest), where larvae were found feeding on *Baptisia lanceolata* (Walter) Elliott, and a female was seen attempting to oviposit on *Baptisia simplicifolia* Croom (Minno et al. 2006). Several observers, including Dean and Sally Jue, reported adult *E.*

baptisiae at this and three nearby sites, on 28 May 2005 (1), 12 June 2005 (4), 8 September 2007 (4-5), 24 August 2008 (2), and 29 March 2009 (2-3). On 13 August 2009, the Jues recorded 4 or 5 adults and two larvae of *E. baptisiae* on *B. lanceolata* at another locality in Liberty County, also within Apalachicola National Forest. On 28 September 2013, Virginia Craig photographed *E. baptisiae* in proximity to a species of *Baptisia* within Apalachicola National Forest in western Wakulla County. These records, mapped in Figure 19, confirm the continued presence of *E. baptisiae* in the Florida panhandle, including in the vicinity of Eglin AFB, where specimens were collected in 1963. Most of the records between 2005 and 2013 are databased by the Florida Natural Areas Inventory (FNAI). We recently examined the photographic records from the Florida panhandle and confirmed their identities as *E. baptisiae*.

On 16 April 2011, BB photographed a single fresh female of *E. baptisiae* (Fig. 1) at Ralph E. Simmons Memorial State Forest, in far northern Nassau County, representing the first known record of the species from that county and the first verified record from the peninsula. This photo, however, wasn't identified as *E. baptisiae* until April 2015 (ID confirmed by JVC and ADW).

On 23 May 2015, ADW located a large population of *E. baptisiae* at Jennings State Forest in Clay County, in the northeastern corner of peninsular Florida, nearly 46 air miles south of the Nassau County locality (Fig. 19). About 20 individuals were observed and photographed (Figs. 2, 3) between 12:30 – 17:30 hrs., all of which were closely associated with *Baptisia lecontei* Torr. & A. Gray (Fig. 13), the only apparently suitable larval foodplant in the area. Hundreds of *B. lecontei* plants were present (Fig. 14), and one attempted oviposition by *E. baptisiae* on *B. lecontei* was observed. Adults of both sexes fed at flowers of *B. lecontei* (Fig. 3), as well as at flowers of *Pediomelum canescens* (Michx.) Rydb., and an unidentified low-growing white-flowered legume. On 24 and 25 May, BB returned to Jennings to observe and photograph *E. baptisiae*, where he documented ovipositions on *B. lecontei* (Figs. 4-7), thus confirming this as a larval foodplant for *E. baptisiae*. On 27 May, JVC explored Jennings State Forest and found *E. baptisiae* at a second location within the forest (Fig. 15), where *B. lecontei* is abundant. Here, about 20 adults were observed between 15:00 and 17:00 hrs. (Fig. 8), with at least one oviposition on *B. lectontei*. Two days later, on 29 May, ADW returned to Jennings for additional exploration of habitats for *E. baptisiae*, and documented the species at a third site within the forest, where ovipositions on *B. lecontei* were also observed, demonstrating that *E. baptisiae* is quite widespread within Jennings State Forest, apparently wherever *B. lecontei* is common.

The realization that *E. baptisiae* is utilizing *Baptisia lecontei* as a larval foodplant – an apparently new foodplant record for the species – suggested that searches in other areas where *B. lecontei* is common might reveal additional peninsular Florida populations of *E. baptisiae*. Kartesz (2015) indicates records of *B. lecontei* from the following peninsular counties: Alachua, Baker, Citrus, Clay, Columbia, DeSoto, Dixie, Duval, Gilchrist, Hamilton, Hernando, Highlands, Hillsborough, Lafayette, Lake, Levy, Marion, Orange, Pasco, Pinellas, Polk, Sumter, and Suwannee.

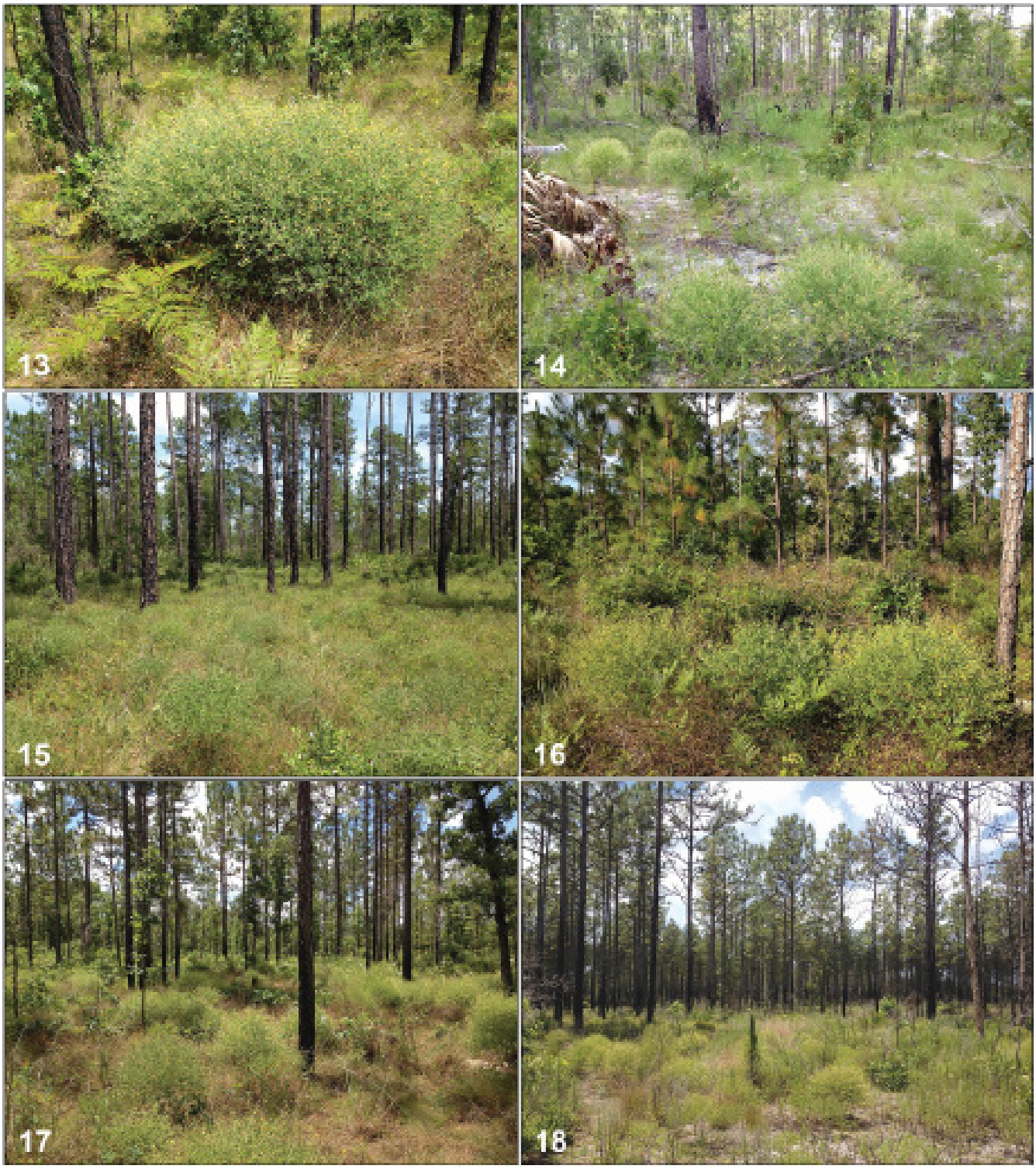
Herbarium records for *B. lecontei* from Florida were accessed online (Wunderlin & Hansen, 2008), and locality details from thirteen peninsular counties were recorded. On 30 May, ADW searched sites reported for *B. lecontei* in Dixie, Lafayette and Columbia counties. No *B. lecontei* plants were located in Dixie County. Numerous *B. lecontei* were located in Lafayette County, at and adjacent to the Grady Conservation Area, yet no *E. baptisiae* were found. Late in the day, at 18:00 hrs., the pine flatwoods at the south entrance to Ichetucknee Spring State Park, Columbia County, were searched, revealing a large population of *B. lecontei* with many hundreds of plants (Fig. 16). Two male *E. baptisiae* were found and photographed at this locality (Fig. 9).

The following day (31 May), ADW searched the sandhill habitats SW of the north entrance to Ichetucknee Springs State Park, Suwannee County, and located a massive stand of *B. lecontei* comprised of many thousands of plants (Fig. 17). Here, *E. baptisiae* was found to be relatively common. About 20 individuals were observed and photographed between 11:30 and 12:30 hrs., and several ovipositions on *B. lecontei* were recorded and photographed (Figs. 10, 11). Most adults observed were females, and they were mainly in rather worn condition.

During the afternoon of 31 May, ADW explored areas in northern Gilchrist County, where another very large stand of *B. lecontei* was located, comprised of several thousand plants, at Fort White Mitigation Park (Fig. 18). Again, about 20 adults of *E. baptisiae* were found between 13:30 and 15:00 hrs., mostly females that were in rather worn condition. One female was photographed (Fig. 12) and ovipositions on *B. lecontei* were observed.

During the spring of 2015, adults of *E. baptisiae* were observed during most of the day, from about 09:30 to 18:30 hrs. They were mainly active under sunny conditions, when most feeding and ovipositions were observed. The butterflies were most lively during early afternoon, when they were very difficult to approach or photograph; males rarely stopped as they patrolled for females around *B. lecontei* plants. Although adults were only found in direct association with the foodplant, they probably stray into surrounding habitats to reach additional nectar sources. The authors have observed this behavior in association with populations outside of Florida.

All peninsular populations of *E. baptisiae* discovered during the spring of 2015 occur in fire-maintained pine flatwood or sandhill habitats, which appear to have been burned in the past two to five years. *Baptisia lecontei* responds very well to burns and was the dominant ground cover at a few recently burned sites where *E. baptisiae* was found



Figs. 13-18. Foodplant and habitats of *E. baptisiae* in northern peninsular Florida. **13)** Large specimen of *B. lecontei*, Jennings SF, Clay Co., 27.v.2015 (JVC). **14)** Locality 1, Jennings SF, Clay Co., 23.v.2015 (ADW). **15)** Locality 2, Jennings SF, Clay Co., 27.v.2015 (JVC). **16)** Ichetucknee Springs SP, Columbia Co., 30.v.2015 (ADW). **17)** Ichetucknee Springs SP, Suwannee Co., 31.v.2015 (ADW). **18)** Fort White Mitigation Park, Gilchrist Co., 31.v.2015 (ADW).

(Ichetucknee State Park, Suwannee County; Fort White Mitigation Park, Gilchrist Co.); the plant apparently becomes scarce as the understory matures, crowding it out within a few years after a fire. We therefore believe that management of pine flatwoods and sandhill habitats through controlled burns (provided that adjacent sites support *B. lecontei* and *E. baptisiae*) may be the best way to maintain, and even expand, suitable habitats. Under ideal

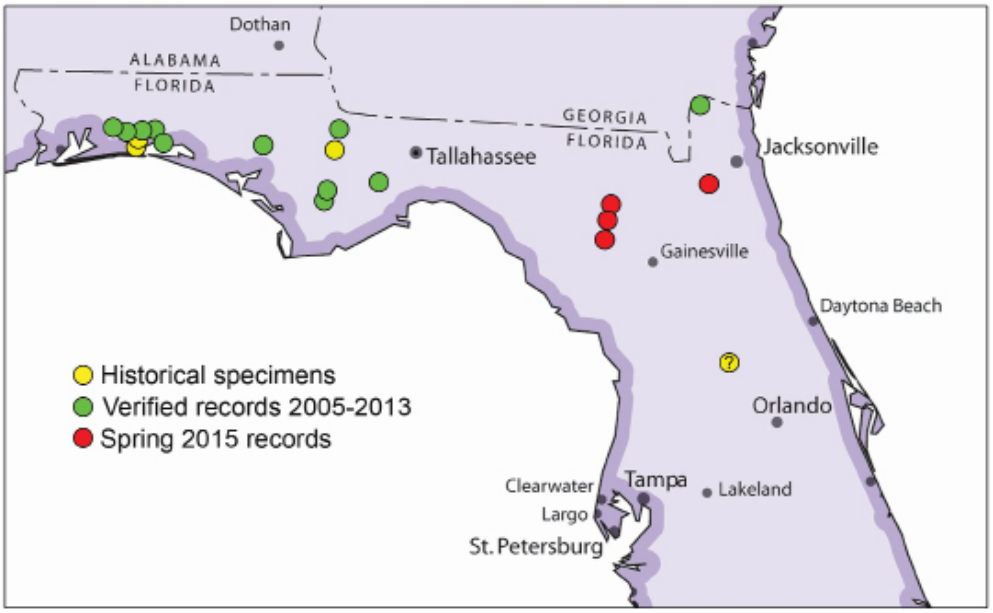


Fig. 19. Map of northern and central Florida showing verified records of *E. baptisiae*.

have been conducted a week or two too late to detect *E. baptisiae* adults. The 2015 spring season was generally advanced, with many butterfly species peaking two or three weeks earlier than normal. Previous records from the panhandle suggest that the peak flight of the second brood of *E. baptisiae* in northern Florida is typically during the first week of June. Based on available data from Florida and surrounding states, we estimate that at least three broods of *E. baptisiae* are produced in Florida, with adults flying from mid-March to early October. The first individual of the third brood in 2015, a fresh male, was photographed by BB at Jennings State Forest on 14 July.

conditions, such as following a fire, the foodplant erupts to become locally common, resulting in an associated abundance of the butterfly. It is likely that *E. baptisiae* is naturally fire-dependent, particularly in the southeastern states, where pine flatwoods habitats are rejuvenated by such disturbances. In fact, fire may be an important factor in the germination of *Baptisia* species (Young et al. 2006). This butterfly was found in similar habitats in the Florida panhandle, though it is unknown if those localities were previously burned, or if so, when (FNAI data). One site in Liberty County was described as a fairly pristine longleaf pine/wiregrass community (FNAI data).

The documentation of *B. lecontei* as a larval foodplant for *E. baptisiae* has allowed us to conduct targeted searches for the skipper in peninsular Florida, where it is likely to be the primary larval foodplant. However, other *Baptisia* species are surely used where they grow in abundance, especially in the Florida panhandle (as detailed above) and in northern peninsular counties. A search for *B. lecontei* at Ralph E Simmons Memorial State Forest by BB on May 27 was unsuccessful, although *B. lanceolata* was found in abundance, suggesting that it may serve as the primary, or only, larval foodplant for *E. baptisiae* there.

The southern distributional limits of *E. baptisiae* in peninsular Florida remain to be determined. A cursory search through the central portion of the Citrus Tract of the Withlacoochee State Forest by JVC on 30 May revealed only a single plant of *B. lecontei*, although more exploration in the various tracts of this large forest is needed. A site with many thousands of *B. lecontei* plants was located within Goethe State Forest in Levy County by ADW on 6 June, but no *E. baptisiae* were found. However, given the mostly worn condition of *E. baptisiae* adults a week earlier, about 40 air miles to the north, the search may

Given our discoveries during the spring of 2015, searches for sites with abundant *B. lecontei* should be conducted in all counties where the plant has been reported. We do not expect *E. baptisiae* to be found in all counties where *B. lecontei* is known, but believe that additional populations of the butterfly are likely to be found wherever the plant is abundant. Given the known distribution of *B. lecontei*, the presence of *E. baptisiae* in central peninsular Florida cannot be ruled out. However, even if the old, southernmost reports of *E. baptisiae* from Pinellas, Hillsborough and Lake counties are valid, habitat destruction and fragmentation in these areas has likely restricted its occurrence to very isolated, localized populations. The report of *E. baptisiae* from Sarasota County (Kimball 1965) is almost certainly based on a misidentification, as no species of *Baptisia* is known from that county (Kartesz 2015).

Historically, *E. baptisiae* was considered to be a rare species throughout its range, but it's relatively recent acceptance of exotic crownvetch (*Securigera varia* (L.) Lassen) as a foodplant has resulted in its rapid expansion and increased abundance in many areas of eastern North America. Throughout its range, *E. baptisiae* is still relatively rarely encountered within natural habitats. This species possibly occurs in low numbers throughout pine flatwoods and sandhills habitats in Florida where suitable foodplants are found.

The results presented herein demonstrate that *E. baptisiae* is far more widespread in Florida, particularly in the northern peninsular counties, than previously believed. In addition, the total number of adults observed at some localities in northeastern Florida greatly surpasses that documented in the panhandle. The Florida Natural Areas Inventory currently ranks *E. baptisiae* an S1 species (critically imperiled in Florida because of extreme rarity

– 5 or fewer occurrences or less than 1000 individuals – or because of extreme vulnerability to extinction due to some natural or man-made factor) (FNAI 2015). This status was supported by Jue and Jue (2010). Based on our recent discoveries, however, we recommend that a ranking of S3 (either very rare and local in Florida – 21-100 occurrences or less than 10,000 individuals – or found locally in a restricted range or vulnerable to extinction from other factors) is more appropriate for *E. baptisiae*.

Additional surveys are required to more fully understand the distribution of *E. baptisiae* in Florida, both in the panhandle and the peninsula. However, great care must be taken due to its superficial similarity to *E. horatius* (Scudder & Burgess) and *E. zarucco* (Lucas). *Erynnis horatius* was found at all sites where *E. baptisiae* was located in 2015, and *E. zarucco* was present at most of them. While *E. baptisiae* can usually be distinguished from *E. horatius* based on its smaller average size, and more mottled appearance of males, individuals of the spring generations of *E. zarucco* and *E. baptisiae* may be extremely similar in size and markings. Adults of *E. baptisiae* have shorter, broader forewings than *E. zarucco*, and they generally have a greater amount of gray scaling in the apical and marginal regions of the dorsal forewing, imparting a more mottled appearance. When in doubt, males of *E. baptisiae* are easily separated from males of *E. zarucco* by examination of the male genitalia; the right valve of *E. baptisiae* is long and lanceolate (similar to the left valve), while it is much shorter and blunt in *E. zarucco*. This difference is so pronounced that it is easily observed in living individuals with the naked eye or a small hand lens. Specimens or detailed photographs should be taken whenever a suspected new population of *E. baptisiae* is found. If possible, records should be confirmed genitalically. In addition, close attention should be paid to plant associations, especially if *Baptisia* species are present.

Acknowledgements

Thanks are extended to Dean & Sally Jue and Nathan Pasco of FNAI for generously providing occurrence records and photographs of *E. baptisiae* from the Florida Natural Areas Inventory (FNAI). Dean Jue, Virginia Craig, and MaryAnn Freidman shared personal photos and observations of *E. baptisiae* from the Florida panhandle. John Chainey (Natural History Museum, London) kindly examined and photographed historical specimens. We also thank James Adams for assistance in the field.

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Jeff Pippen (camera) and Nick Grishin investigating *Thorybes* eggs/larvae at Shades State Park, Indiana during Lep Soc 2015. (Photo by Ranger Steve Mueller)

Lethe creola (Nymphalidae: Satyrinae) is finally confirmed in Florida

John V. Calhoun[1], Patrick R. Leary, Bill Berthet[2], and Andrew Warren[3]

[1]Corresponding author: 977 Wicks Drive, Palm Harbor, FL 34684 **bretcal1@verizon.net**
[2]12885 Julington Rd., Jacksonville, FL 32258 **bergems@comcast.net**
[3]McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, Univeristy of Florida, P. O. box 112710, Gainesville, Florida 32611-2710 **hesperioidea@yahoo.com**

Within the last issue of the Southern Lepidopterists' News (Calhoun et al. 2015), we announced the long-anticipated discovery of the Creole Pearly-eye, *Lethe creola* (Skinner) in Florida (FL). This species was erroneously attributed to FL for over a century, but all prior records were misidentified *Lethe portlandia* (F.). On 22 April 2015, while conducting a routine monthly review of FL records that had been submitted to the Butterflies and Moths of North America (BAMONA) website (Lotts & Naberhaus 2015), the senior author (JVC) encountered a sobering image: a male *creola* from Nassau County, FL, which had been photographed two days earlier. JVC soon received an email from Pat Leary (PRL), who had submitted the photograph. PRL confirmed that he and his wife, Doris, had found the butterfly in Ralph E. Simmons Memorial State Forest. The only individual observed was encountered within the sparse understory adjoining a heavily wooded bottomland swamp forest. The butterfly was extremely wary and several efforts were required before it could be approached closely enough to photograph. Only two photos were possible, but they were enough to finally confirm the existence of this species in FL. Since we first published this discovery, Berthet (BB) located an older image of a male *L. creola* in his photographic archives, taken at Ralph E. Simmons on 26 August 2012 (Fig. 1). Initially identified as *L. portlandia*, it actually represents the first confirmed record of *L. creola* in FL, proving that the species has been present in that area for at least three years.

Ralph E. Simmons Memorial State Forest (RSMSF), 3,638 acres in size, supports twelve types of natural communities. The four primary habitats are sandhill, wet flatwoods, upland pine, and bottomland hardwood forest. Acquired by the state of FL in 1992, the forest borders Georgia along the St. Marys River in the extreme northeastern corner of FL, about 36 air miles northwest of downtown Jacksonville. The butterfly fauna of RSMSF is relatively well documented (Glassberg et al. 2000, Berthet pers. obs. 2015). Among the 96 butterfly species recorded to date are several of rare occurrence in FL, including *Callophrys irus* (Godart), *Celastrina ladon* (Cramer), and *Erynnis baptisiae* (W. Forbes). The closest known record of *creola* in Georgia is from 23 July 2010 at Paulks Pasture Wildlife Management Area, Glynn County, Georgia, about 40 air miles to the northeast (Flynn 2014, Lotts & Naberhaus 2015). This species surely occurs within suitable habitats across the intervening area.

Shortly after it was first reported in 2015, we located additional colonies of *L. creola* within bottomland forests at RSMSF (Calhoun et al. 2015) (Fig. 2). Adults were found in close proximity to stands of its foodplant, giant cane *Arundinaria gigantea* (Walter) Muhl., a native species of bamboo that is now generally considered to include what was formerly recognized as maiden cane, *Arundinaria tecta* (Walter) Muhl. The male photographed in 2012 was found at the third locality mentioned by Calhoun et al. (2015). Like populations in Texas and Alabama, *creola* is expected to produce two or three potentially overlapping broods in northern FL, with adults flying from mid-April to September or early October. After publishing our initial findings, we continued to monitor the localities at RSMSF. The first fresh adults of the second brood in 2015 were photographed by Leary on 3 July. Berthet photographed additional fresh adults on 4 and 6 July. Interestingly, the butterflies of the second brood were decidedly less wary than those of the first brood.

In comparing specimens at MGCL, Warren found that *creola* from North Carolina and Virginia west to Arkansas are smaller on average than those distributed from South Carolina (SC) to Louisiana (LA). In addition, adults from SC to LA are slightly brighter in coloration. Those found in FL are among the largest and most beautifully marked.

For more information about our observations during the spring of 2015, and a review of the history of the butterfly originally described as *Debis creola*, please consult our article in the last issue of the Southern Lepidopterists' News. An electronic copy of the article may also be downloaded at **https://lepscience.files.wordpress.com/2013/10/creola-in-fl.pdf,** or requested from JVC at **bretcal1@verizon.net**.

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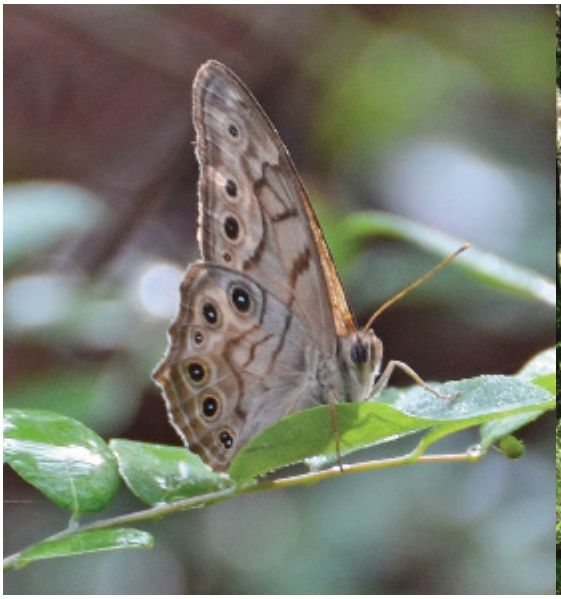

Fig. 1. First confirmed record of *L. creola* in Florida: Nassau Co., 26.VIII.2012, RSMSF (BB).

Fig. 2. Typical habitat of *L. creola* in NE Florida: open bottomland forest with giant cane in understory, 24.iv.2015, RSMSF (JVC).

Golden-headed Scallopwing at Palo Verde Ecological Reserve, Blythe, Riverside County, California

Jennifer Tobin

5963 Shaker Drive, Riverside, CA 92506 **jtobi002@ucr.edu**

At about 10:30 in the morning on May 13, 2015 I was along a dirt road in the Palo Verde Ecological Reserve (PVER) when I noticed a small, dark butterfly fluttering around beside me. When I looked at it through binoculars, I saw that it had a yellow-orange head and a few white dots towards the tip of the forewing. I recognized it as a Golden-headed Scallopwing (*Staphylus ceos*), which I had seen on previous visits to southeastern Arizona, and managed to get a few photos before it fluttered away. This represents the first record for the species in Riverside County, and also the earliest record in California.

Palo Verde Ecological Reserve is a habitat restoration site along the lower Colorado River, located just north of Blythe in Riverside County, California. It was created primarily as nesting habitat for species of birds such as the Sonoran Yellow Warbler and Western Yellow-billed Cuckoo. Habitat consists mostly of groves of Fremont Cottonwoods (*Populus fremontii*) and willows (*Salix exigua* and *Salix gooddingii*). Some plots of Honey Mesquite (*Prosopis glandulosa*) and Saltbush (*Atriplex*) are interspersed throughout the cottonwood-willow groves. There are agricultural fields adjacent to the preserve, of which alfalfa and wheat are common crops. Alfalfa is also part of the understory in the younger plantings at PVER, though not in the older groves where the scallopwing was seen.

The scallopwing was flying low along the edge of one of the cottonwood-willow plots just before 2nd Avenue hits the river and starts heading north. It perched on the ground a few times before I lost it against the vegetation. I have spent many days at PVER over the past four years and have not yet encountered another scallopwing, though I have never made an extensive search for butterflies.

Announcements:

ZONE COORDINATOR NEEDED!

Due to a retirement there is one Season Summary Zone Coordinators position open. Thanks to Thomas Jantscher for taking over the Midwest, and Crispin Guppy for taking over the Far North. The following Zone is the one that still needs a coordinator.

Zone 5: Great Plains: Saskatchewan, Manitoba, North Dakota, South Dakota, Nebraska, Kansas & Oklahoma.

If you are interested in becoming a Season Summary Zone Coordinator, please contact the Season Summary Editor, Leroy C. Koehn at **Leptraps@aol.com,** for a complete description and requirements.

Call for Season Summary Records

It is once again the time of year to start preparing your submissions for the annual Season Summary report. The annual report is sent as a hardcopy to members each year, and each year's data is also incorporated into the on-line database. Take the time to access the Season Summary database through The Lepidopterists' Society home page (http://www.flmnh.ufl.edu/lepsoc/) and do a few searches. The value of the on-line database increases as your data gets added each year. Please take the time to consider your field season and report range extensions, seasonal flight shifts, and life history observations to the appropriate Zone Coordinator. Zone Coordinators, their contact information, and the scope of their zone appears on the inside back cover of every issue of the "News".

There are a number of factors that make it necessary for the Zone Coordinators to meet a reporting deadline each year. As a result, you should have your data to the Zone Coordinator(s) no later than **December 1, 2015**. In most of our Nearctic zones, you have long since put away your cameras, nets, bait traps, and/or lighting equipment by that time anyway.

All records are important. Reporting the same species from the same location provides a history for future researchers to use. Report migratory species, especially the direction of flight and an estimated number of individuals. Again, all of these records may be useful in the future.

Season Summary Spread Sheet and Spread Sheet Instructions

The Season Summary Spread Sheet and Spread Sheet Instructions are available on the Lepidopterists Society Web Site at **http://www.lepsoc.org/season_summary.php.** The Zone Coordinators use the Season Summary Spread Sheet to compile their zone reports. Please follow the instructions carefully and provide as much detail as possible. Send your completed Season Summary Spread Sheet to the Zone Coordinator for each state, province or territory where you collected or photographed the species contained in your report.

Important reminder to contributors using MAC computers to submit records

PC operating systems save dates based upon a 1900 format, whereas MAC operating systems save dates based upon a 1904 *default* format. The Lepidopterists' Society master database is maintained in PC format. As a result, if you submit your season summary records on an Excel spreadsheet generated on a MAC to a Zone Coordinator who operates a PC system, without first disabling the default date setting, the dates will be off by 4 years and 1 day. If you submit your season summary records on an EXCEL spreadsheet generated on a MAC to a Zone Coordinator who operates a MAC system, without first disabling the default date setting, the dates will appear proper to the Zone Coordinator but the dates will be off by 4 years and 1 day when they are incorporated into the master data base. In some cases, MAC system dates sent to a Zone Coordinator operating a MAC system are off 8 years and 2 days (we haven't figured that one out). The following are instructions so that this problem will never rear its ugly head again.

Instructions

When a MAC user sits down to enter the very first record of the season, he/she must create a new Excel file. **Before typing in any data,** go to "Tools", then "Options" or "Preferences" depending upon your version of Excel, "Calculations", and ***uncheck*** the 1904 box. Once the data is entered, save this file, and close. If supplemental data is entered directly into this file by keypunching it in, there will not be any problems. However, do NOT paste in MAC data from another file into your file without first ensuring that the 1904 box was *unchecked* in their file PRIOR to entering any of data. Unfortunately, once data has been entered in a file, it does NOT do any good to retroactively *uncheck* the date box!!!

By following these few steps, it is a simple matter to accommodate MAC records. However, you, as the original contributor, must ensure that those steps are taken. Improperly dated records will be rejected and your important records will not get into the database.

Photographs for Front and Back Covers

Please submit photos for the front or back covers of the Season Summary to the editor of the News, James K. Adams (**jadams@daltonstate.edu**). Photos can be of live or spread specimens, but **MUST** be of a species that is actually reported in the Season Summary.

Leroy C. Koehn, Season Summary Editor, 3000 Fairway Court, Georgetown, KY 40324-9454, **Leptraps@aol.com**

The 65th Annual Meeting of The Lepidopterists' Society, July 6-10, 2016, at Florissant, Colorado

The 2016 Annual Meeting of The Lepidopterists' Society will be held from Wednesday, July 6, to Sunday, July 10, at The Nature Place, a superb conference center sponsored by the Colorado Outdoor Education Center and located near the tiny town of Florissant at 8800 feet elevation, a few miles west of Pikes Peak in the Colorado Rockies. Beautiful facilities, an incredible mountain environment of flower-filled meadows and pine-fir forests, an amazing diversity of Lepidoptera, and cool summer weather combine to make a perfect meeting site where you can step out your front door to be immersed in Nature while enjoying a fantastic meeting in a most relaxing and fun-filled atmosphere with your fellow lepidopterists.

The setting is exceptional, the food is superb, and The Nature Place staff will help to make this an outstanding meeting, one that your family will enjoy and one in which you can collect, photograph, and watch many of Colorado's almost 300 species of butterflies around you while walking to the spacious lodge or spending each night at the moth sheets with well over 1,000 species of nocturnal Lepidoptera potentially flocking to your lights.

The organizing committee, including Tom Emmel, Jackie Miller, Charles Covell, Andrei Sourakov, Andy Warren, and Todd Gilligan (and growing daily) is already planning an outstanding program of papers and field trips. So set these dates aside now for the "Lep Soc Meeting" in your 2016 calendar and travel plans. We will be doing a direct mailing in late September to every Lepidopterists' Society member (and several other lepidopterist organizations that are interested in participating jointly), which will include full information for early registration, facilities available, activities, and an invitation to participate in the program. These items will also be placed online for ease of reference and access. It is anticipated that travel grants and student support will be available by application so that younger members especially can be encouraged to pursue attending this meeting where as many as 200 avid, knowledgeable and highly enthusiastic lepidopterists will be helpful mentors!

Come one, come all! Plan now to attend.

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!

Need curriculum ideas to teach youngsters about leps? *-- Carol Butler*

There are plenty of high quality lesson plans and materials available for getting students interested in Lepidoptera before they go to high school or college. Please share this material- it is suitable for classrooms and home schooling as well as for nature center and museum classes. Some of the material uses the general interest in monarchs as a starting point, but the content includes all the basic aspects of insect biology and behavior. We want more students to become future Lepsoc members, so let's help get them started.

A national 4-H curriculum that was developed with the Florida Museum of Natural History for grades 4-8 includes a youth guide and a leader guide as well as an interactive website. Check out **https://www.flmnh.ufl.edu/wings/Doc/WINGS_4H_overview.pdf**

Karen Oberhauser's "Monarchs and More: An Inquiry and Arthropod Based Curriculum" is a series of three thick, spiral-bound manuals that contains a wealth of information, activities, suggestions for field trip record-keeping, drawings and designs that can be copied for student handouts, and an extensive series of detailed lesson plans about ecology, systematics, experiments, life cycle, and many more areas of interest. There is a version for middle school, grades 3 to 6, and for K to 2. Produced by Monarchs in the Classroom, University of Minnesota. **http://monarchlab.org/store/monarchs-and-more-curriculum-guides-4th-edition**

Ba Rea and Karen Oberhauser produced a beautifully illustrated field guide to the invertebrate community in the milkweed patch, "Milkweeds, Monarchs and More", that is useful for all grades. **http://monarchlab.org/store/milkweed-monarchs-more**

There is also an "enlarged and updated version" that contains larger photos, a glossary, and an expanded milkweed section that includes more species. **http://monarchlab.org/store/second-edition-milkweed-monarchs-more**

"Learning from Monarchs: A Teachers' Handbook" also looks promising. **http://monarchlab.org/store/learning-from-monarchs-a-teachers-handbook**

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. We have two or three field meetings every year. Annual dues are $15.00.

The Annual Meeting will be held November 13-14 at the Insect Museum of University of Kentucky, Lexington, KY.

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

Gynandromorphism in Automeris io (Lepidoptera: Saturniidae)

Andrei Sourakov

McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, Univeristy of Florida, Gainesville, Florida 32611 **asourakov@flmnh.ufl.edu**

Gynandromorphs fascinate people for a number of reasons, one of which may be that these aberrations concern gender identity, something every human can relate to. The number of gynandromorphic Lepidoptera described in the literature continues to increase but still remains relatively low. For instance, when Scriber and Evans (1988) reviewed the relevant literature, bilateral gynandromorphs formed a list under a page-long, with only three species of Saturniidae included. There are certainly many additional gynandromorphic specimens out there, published or unpublished, and the silk moths are no exception (e.g., Pariser 1927, Majerus 1986, Eitschberger 1994). Nevertheless, finding one continues to be an occasion for excitement.

Scriber and Evans (1988) hypothesized that hybridization may be causing an increase in the frequency in gynandromorphism in the Tiger Swallowtail complex. This finds support in known interspecific lab crosses of other species. For instance, Standfuss, in his experiments on *Saturnia,* found that in primary hybrids, gynandromorphs were rare (2 in 4000), but in secondary hybrids, they were numerous. A backcross of *Saturnia pavonia/pyri* hybrid male with *S. pavonia* female produced 12 gynandromorphs out of 54 offspring (Cockayne 1915). In butterflies that have different wing patterns but hybridize readily, such as *Heliconius* or certain *Papilio*, a bilateral gynandromorph in a hybrid can be especially striking (e. g., Emmel & Boender 1990; Blanchard & Descimon 1988).

One of the possible causes of sexual mosaics in hybrids is considered to be divergence of sex-determining systems rather than loss of chromosomes or double fertilization of binucleate oocytes (the latter is suggested by Blanchard & Descimon (1988) as the primary cause of bilateral gynandromorphism). Most gynandromorphic individuals, however, are likely to be intersexes (males or females in all of their tissues, with features of the opposite sex expressed in some of them) (see Narita et al. 2010 for a review of various causes of gynandromorphism). It is this kind of phenomenon observed by Richard Goldschmidt in his experiments crossing gypsy moth races from Europe and Asia (e. g., Goldschmidt 1934), which helped him postulate theories that later led to the development of modern physiological genetics (e. g., Golubovsky 2010).

In addition to hybridization, gynandromorphism can result from a variety of mutagenic factors. The Chernobyl nuclear disaster, for example, may very possibly have instigated, a year later in southern Russia, the appearance of a population of lycaenids *Meleageria daphnis*, with a high frequency of sexual mosaics and bilateral gynandromorphs (Dantchenko et al. 1995). The fallout from the Fukushima reactor prompted a detailed study of mutations in local populations of the pale grass blue butterfly *Zizeeria maha*. The authors "*obtained a small number of gynandromorphs in which one of the forelegs was morphologically male and the other female in the Fukushima F1 generation, the EMS-mutagenesis experiment, and the internal exposure experiment…*" (Hiyama et al. 2013, p. 17). Jahner et al. (2015, p.7) who found six gynandromorphs among over 7,000 *Plebejus anna* and *P. melissa* butterflies collected within 10 years across the United States, note that all *"were captured or reared in the 16 mo following the Fukushima nuclear accident and none have been captured since.*" Hessel (1964), who in 1962 collected a bilateral gynandromorph of *Automeris io*, mentions discoveries of two other saturniid gynandromorphs the same year in the northeastern US. He suggests (p. 31) that "*some fundamental environmental change*" may be the cause of this localized triple occurrence of gynandromorphs. In October 1961, as the parents of these gynandromorphs were developing, the largest ever nuclear weapon was being tested above ground, not to mention the 200 or so other atmospheric nuclear tests that had been conducted by both the US and the USSR in the preceding years. While correlation does not always imply causation, this relationship, together with the internal exposure experiments by Hiyama et al. (2013), suggests that larval feeding on plants with low-level of radioactivity can be one of the possible causes of gynandromorphism.

To date, there have been few reports of *A. io* gynandromorphs in the literature. The recent photo of a specimen in the News (Menaker 2014) taken by an anonymous student over 30 years ago has symmetrical male antennae in an otherwise perfect bilateral gynandromorph. Such gynandromorphs normally have one male and one female antenna (e.g., Figs. 1A, 9A). Among sexual mosaics, even almost entirely male individuals of *A. io* have asymmetrical antennae that are of intermediate pectination length (between that of a male and female) (Fig. 9). According to Traut et al. (2007, p. 341) "*why in one case purely female and purely male patches arise and in others even single cells show intermediate characters, is not known. An investigation on the molecular level with a focus on the expression of sex-determining cascade genes in intersexes has not yet been performed.*" In any case, the asymmetry of the antennae is found not only in sexual mosaics and gynandromorphs of silk moths, where the sexual dimorphism of the antennae

Fig. 1. Gynandromorphic specimens of *Automeris io* from the collection of laboratory broods created by Thomas R. Manley (donated to the Peabody Museum, Yale University). (A-B) Upper side and underside of bilateral gynandromorph, brood 9-73. (C-F) Sexual mosaics, broods 18-69 (C-D), 19-70 (E-F).

is obvious, but in other Lepidoptera as well. For instance, even the partial gynandromorph of a butterfly *Dismorphia spio* had asymmetrical antennae (Sourakov 2011). Hence Menaker's report, which is not supported by a voucher or even a collector's name, requires confirmation.

For several decades, Thomas Manley reared and crossed *Automeris io* from around the US. He created some remarkable broods of aberrant specimens and studied the genetics and biology of *A. io* in great detail (Manley 1990, 1993). By the time he reported having reared two gynandromorphic specimens (Manley 1971), he had raised over 10,000 *A. io* specimens. Manley illustrated these sexual mosaics, referring to them as specimens 18-69 and 19-69 (here, I refer to their origins as broods 18-69 and 19-70, according to their labels (Fig. 1C-F)). Manley obtained additional gynandromorphic specimens in three other broods during 1970-1973. Two of these broods, 10-70 and 13-70,

Fig. 2. Sexual mosaics of *Automeris io* from the collection of laboratory broods created by Thomas R. Manley (donated to the Peabody Museum, Yale University), broods 10-70 (A-D) and 13-70 (E-F).

produced a total of three mosaics (Fig. 2), while brood 9-73 yielded numerous sexual mosaics (Figs. 3-7) and a bilateral gynandromorph (Fig. 1A-B). I am indebted to Larry Gall of the Peabody Museum at Yale University for allowing me to access Manley's collection.

This proliferation of gynandromorphic specimens, as well as a number of other heritable wing pattern aberrations among Manley's broods, coincided with the explosion of mutations in disjunct wild populations of *Drosophila melanogaster* (Ivanov & Golubovsky 1977). For instance, in 1973 a 100-fold rise of mutability was detected at one of the fruit flies' loci (Golubovsky 1980; Berg 1982). According to Berg, who supports her conclusions by numerous references (e. g., Hook 1978), the mutability rise occurred that year among humans as well. Golubovsky (1980) suggests that male recombination factors (MR) induced by viruses may be responsible for the simultaneous rise in mutations within wild *Drosophila* populations. He remarks that MR also produce chromosome breakage during meiosis: *"In some cases one or more chromosomes can be completely pulverised*" (p. 147).

Fig. 3. Sexual mosaics of *Automeris io* from the collection of laboratory broods created by Thomas R. Manley (donated to the Peabody Museum, Yale University), brood 9-73.

Fig. 4. Sexual mosaics of *Automeris io* from the collection of laboratory broods created by Thomas R. Manley (donated to the Peabody Museum, Yale University), brood 9-73.

Fig. 5. Sexual mosaics of *Automeris io* from the collection of laboratory broods created by Thomas R. Manley (donated to the Peabody Museum, Yale University), brood 9-73.

Fig. 6. Sexual mosaics of *Automeris io* from the collection of laboratory broods created by Thomas R. Manley (donated to the Peabody Museum, Yale University), brood 9-73.

Fig. 7. Sexual mosaics of *Automeris io* from the collection of laboratory broods created by Thomas R. Manley (donated to the Peabody Museum, Yale University), brood 9-73.

The most recent, to my knowledge, gynandromorphic specimen of *A. io io* illustrated in Fig. 8, was reared by me and deposited in the collection of the McGuire Center for Lepidoptera and Biodiversity. It was part of a brood of ca. 60 sibling individuals. The line originated from 19 wild-collected eggs in September 2013 in Gainesville, Florida, where two subspecies, *A. io io* and *A. io. lilith* co-occur and are able to interbreed (Sourakov 2014; pers. obs.). Considering that the eggs were collected in an isolated patch of woods and on a plant on which *A. io* larvae are unable to feed (*Crotalaria pallida*), they may have represented an already mutated stock. Two consecutive sib-sib crossings produced two cousin lines with numerous offspring, some of which exhibited aberrations that will be reported at a later date. The gynandromorphic specimen was large – forewing (FW) length = 46.3mm (the average female FW in this line = 40.8±3.2mm (N=30), with a maximum of 47.2mm; males are much smaller, ca. 30mm). The egg, from which this specimen was reared, was laid on 1 May 2014; larvae were fed *Prunus serotina*; pupation occurred on 14 August; emergence followed on 28 September 2014, hence representing a non-diapausing individual, but with somewhat delayed emergence (a non-diapausing pupa normally develops in 25-30 days).

On the wing surfaces, the male characteristics in this otherwise female specimen are expressed on the left FW dorsum and right FW ventrum. On the former, a male-colored patch occupies interspace between veins R_4 and M_1 and also extends basally along the cell (Fig. 8A). On the ventral surface of the opposite wing, the male patch is almost symmetrical to the dorsal one, but is wider, extending along the costal margin between veins Sc and M_1 (Fig 8B). The sexually dimorphic discal I (DI) wing element is present on the left FW in both the male and female state (Fig. 8C). Antennae are asymmetrical (Fig. 9J), with the left antenna more pectinate than normal. Head, legs, palpi and abdomen (Fig. 8D-F) are covered with a mix of female and male-colored hairs with female ones being predominant and the male hairs distributed asymmetrically. Genitalia appear to be normal for a female, and the abdomen, when dissected, revealed a normal (in appearance) egg mass.

The male/female patches of coloration in all sexual mosaics illustrated here are distributed so that the contrasting characters are manifested on opposing sides of the body, as is the case in most sexual mosaics, reflecting the bilateral nature of differentiation in larvae and pupae (Scriber & Hagen 1990). These specimens could have resulted from damage to one of the genes that control sex-determination. Something as radical as the loss of the W chromosome in one of the embryonic cells could have led to male tissue development, but it is more likely that the development of male tissues is due to an error during sex-specific splicing of a sex-determining cascade gene (e. g., of an *A. io*-equivalent of *Bmdsx* gene - the system described for *Bombyx mori*) (see Traut et al. 2007 for details). Perhaps the mutation that made the sex-determining system unstable in these specimens occurred already in the wild populations and was expressed phenotypically via repeated inbreeding. Alternatively, intersexes could also have resulted from infection in larvae, as in studies conducted by Narita et al. (2007). This would make it easier to explain why sexual mosaics, such as in Manley's brood 9-73, are not only asymmetrical but also so variable, as infection would spread randomly in different tissues and could affect individuals to different degrees and at various stages of sex-determination. If this is the case, inbreeding could be just another factor that reduced immune resistance to the infecting agent.

In total, we are now up to seven reliable reports of *A. io* broods producing gynandromorphic specimens, six of which represent inbred lines, and only two of which had more than a single gynandromorphic offspring. The absolute majority of these aberrant specimens originated from Manley's broods. The gynandromorphic aberrations, like the ones reported here, may help elucidate genetic controls of embryonic development of wing and body coloration in various Lepidoptera species. Additional reports of gynandromorphic specimens of *A. io* and other Lepidoptera, as well as details concerning their origin, would be of great interest.

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Fig. 8. A sexual mosaic of *Automeris io* from a brood, representing F2 generation within an inbred laboratory line. Reared at the McGuire Center, Florida, 2014. (A) Dorsum; (B) Ventrum; (C) Close up of the left forewing; (D-F) Head, thorax, and abdomen. Yellow scales and hairs represent male phenotype.

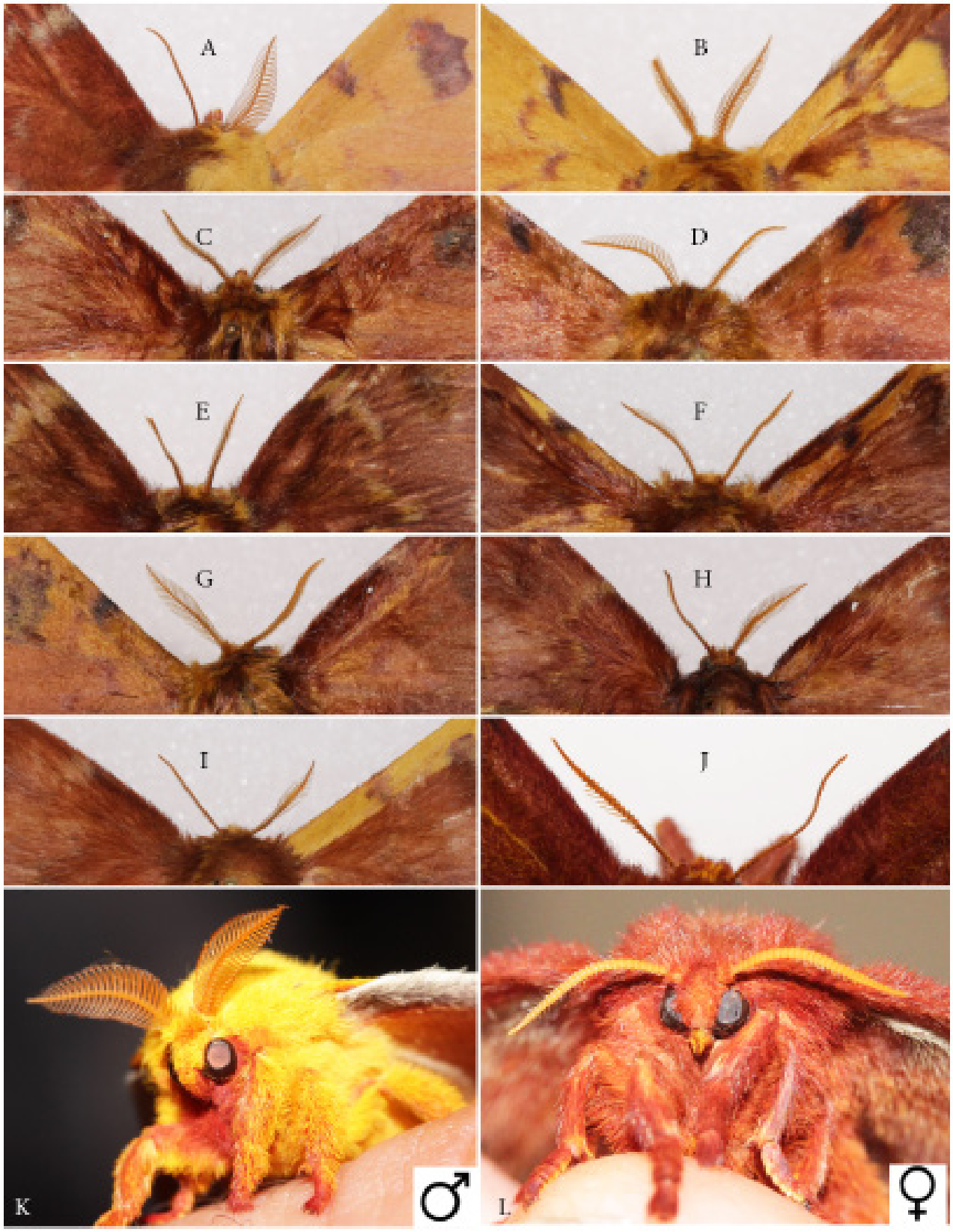

Fig. 9. Antennae of *Automeris io*: (A) bilateral gynandromorph; (B-J) mosaic gynandromorphs; (K) normal male; (L) normal female. Corresponding complete specimens are figured as follows (A)-Fig.1A; (B)-Fig.1E; (C)-Fig.6E; (D)-Fig.3G; (E)-Fig.7A; (F)-Fig.7E; (G)-Fig.4E; (H)-Fig.4G; (I)-Fig.5G; (J)-Fig.8A.

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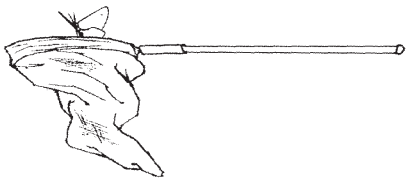


The Mailbag . . .

James Scott has reopened the discussion of the "subspecies problem" that has been going on since the Devil was a little boy ("Do subspecies exist?", NEWS, Summer 2015). I have no intention of contributing at length to the chronic logorrhea associated with this issue, but since I devote two class periods to it in the "Principles of Systematics" course I teach at U.C. Davis, I think I've thought it through enough that I can make a few points very succinctly. So here goes:

1. Scott illustrates perfectly why the subspecies category is problematic when he distinguishes between "good" and "bad" subspecies. *His* subspecies are "good"; *other people's* are "bad." There is no objective "scientific" criterion for telling one from the other. It's all a matter of subjective judgment or personal taste.

2. During the heyday of the Neo-Darwinian Synthesis, it made perfectly good sense to treat subspecies as species-in-the-making. With the molecular-genetic tools now available to us, we have learned -- painfully -- that there is no predictable relationship between phenotypic differentiation and genomic differentiation. Dramatic phenotypic differences can reflect the action of a handful of genes under strong selection, against a background of genomic uniformity. Things that look alike can be quite different at the genomic level. Each case has to be studied on its own merits. Nearly all naming decisions are based on phenotype anyway. (My research group has a paper coming out momentarily in the *Journal of Biogeography* in which we address these issues for the Sandhill Skipper, *Polites sabuleti,* one of the most subspecies-burdened taxa in the North American butterfly fauna. Want a copy? E-mail me and ask for a pdf.)

3. Given that there are no objective criteria for delimiting subspecies, if we *must* have them -- and they do have their uses! -- the "75% rule" proposed by the ornithologist Dean Amadon in 1949, while never objectively justified, is probably as good a rule of thumb as one can get. Of course, different people focus on different things; that's why we have "splitters" and "lumpers" (and Scott, who is both). So *your* 75% may not match *mine!*

4. I've developed a package of readings for use in my course. Many readers of the NEWS are too young to remember the discussions of several decades ago, and most readers do not have unlimited journal access and so cannot easily track down and read the classic papers on the subject. If you want to delve into this literature, e-mail me and I'll send you a batch of pdfs.

5. Of course, if you're a religious cladist, all of this is nonsense. All terminal taxa are species. Period.

Peace and joy,

Arthur M. Shapiro, Center for Population Biology, U.C. Davis, Davis, CA 95616, **amshapiro@ucdavis.edu**

The Marketplace

IMPORTANT NOTICE to ADVERTISERS: If the number following your ad is "572" then you must renew your ad before the next issue if you wish to keep it in the Marketplace!

New Advertising Statement: The News of The Lepidopterists' Society accepts advertising related to Lepidoptera and consistent with the purposes of the Society free of charge. Other types of advertising will not be accepted, regardless of the source. Acceptability of advertisements for publication is at the discretion of the News editor.

Research Requests

WANTED: Observations, photos, specimens of larvae and adults of the Spotted Tussock Moth, *Lophocampa maculata*, from all areas of North America, recent or old data. Records from far 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 photographs are useful, especially if they show unusual patterns of coloration. Specimens are desired for future genetic analysis. Contact Ken Strothkamp, Lewis & Clark College and Portland State University (**kgs@lclark.edu** or **kstrot2@pdx.edu**) for more information on the project. 573

Wanted; Buckeye butterflies (genus *Junonia*) of all 3 *Junonia* species from the Florida counties of Collier, Broward, Monroe, and Miami-Dade for a Masters project trying to reconstruct the invasion history of tropical buckeyes into Florida. Historical material of any vintage very valuable to our study. 1990's currently under-sampled by the project, but all dates needed. We genotype using DNA from single legs, so if desired precious specimens can be returned largely intact. Jeffrey Marcus, Dept. Biological Sciences, Univ. Manitoba, Winnipeg, Manitoba R3T 2N2, Canada; 1-204-474-9741; **marcus@cc.umanitoba.ca** 572

Livestock

Hyalophora cecropia cocoons for sale. $6.00 each plus shipping. Contact Ben McAllister at **ben.d.mcallister@gmail com.** 573

Equipment

FOR SALE: Light Traps: 12 VDC or 120 VAC with 18 inch vanes (15 & 32 Watt) and 24 inch (40 Watt). Rigid vanes of Stainless Steel, Aluminum, or Plexiglass. Rain Drains and beetle screens to protect specimens from damage.

Collecting Light: Fluorescent UV 15, 32 & 40 Watt. Units are designed with the ballast enclosed in a weather tight plastic enclosure. Mercury Vapor: 160 & 250 Watt self ballast mercury vapor with medium base mounts. 250 & 500 Watt self ballast mercury vapor with mogul base mounts. Light weight and ideal for trips out of the country.

Bait Traps: 15 inch diameter and 36 inches in height with a rain cloth top, green Lumite plastic woven screen, and supported with 3/16 inch steel rings. A plywood platform is suspended with eye bolts and S hooks. Flat bottom has a 3/16 inch thick plastic bottom that will not warp or crack. Bait container is held in place by a retainer.

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

We now accept ads from any credible source, in line with the New Advertising Statement at the top of this page. **All advertisements are accepted, in writing, for two (2) issues unless a single issue is specifically requested.** All ads contain a code in the lower right corner (eg. 564, 571) which denotes the volume and number of the **News** in which the ad first appeared. **Renew it Now!**

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

Advertisements should be under 100 words in length, or **they may be returned for editing.** Some leeway may be allowed at the editor's discretion. Ads for Lepidoptera or plants must include full latin binomials for all taxa listed in your advertisement.

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

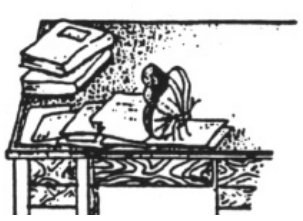
Buyers, sellers, and traders are advised to contact state department of agriculture and/or ppqaphis, Hyattsville, Maryland, regarding US Department of Agriculture or other permits required for transport of live insects or plants. Buyers are responsible for being aware that many countries have laws restricting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

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

Cornell Drawers: Leptraps now offers Cornell and California Academy Storage Drawers. Drawers are made of Douglas Fir, Hardboard Bottom and Glass Top. Finished in Clear Satin Gloss Varnish. A single Card Holder with Pull or two Card Holder with a Knob Pull. Foam pinning bottom is available.

For more information on any of the above, visit our web site at: **www.leptraps.com**, or contact Leroy C. Koehn, Leptraps LLC, 3000 Fairway Court, Georgetown, KY 40324-9454: Tel: 502-542-7091. 572

FOR SALE: 1 California Academy cabinet, holding 24 California Academy drawers. A variety of unit trays, included. Price: $1000.00. Shipping not included. Mike Toliver, 706 Lake Road, Eureka, IL 61530 (miketol@mtco.com); or Dept. Of Biology, Eureka College, 300 E. College, Eureka, IL 61530; **miketol@eureka.edu**. 572



From the Editor's Desk

James K. Adams

First and foremost, I need to apologize for the pixilation of the photos in some (most) of the articles in the previous issue. I was not with my "normal office" computer for May through July, and used a computer with a different version of In Design on it, and my unfamiliarity with that version led me to incorrectly choose a low resolution draft quality pdf as the final print version. My bad, and I am sorry to the authors whom I may have offended. I also need to apologize to Brian Reynolds, whose cover photo finally appears on this issue. I had intended on using his larval photo for the summer issue but had to replace it at the last moment with a different image. At least I can promise this problem will not happen again.

I have a problem that is good to have. I have been swamped with articles, and as such need to let authors know that new articles may take two to three issues to appear in the News. That does NOT mean stop sending them. It just gives you a little more time to perfect them.

The Lep Soc meeting at Purdue was very enjoyable, and there are photos and short essays in this issue that share with you some of the fun that you missed if you couldn't attend. Hope to see you next year at the Nature Place in Florissant, CO (see the preliminary ad in this issue)!

Membership Updates

Chris Grinter

Includes ALL CHANGES received by 22 August 2015

New and Reinstated Members: members who have joined/renewed/been found/or rescinded their request to be omitted since publication of the 2014 Membership Directory; all in U.S.A. unless noted otherwise

Timothy Anderson: 2465 Easton Lane, West Lafayette IN 47906
Barbara K. Bartell: 2538 Highway 46, Blackhawk CO 80422
Robert Behring: [address omitted on request]
Mason Buckman: 15680 Cedar Cove Drive, Granger IN 46530
Jim Crumpler: 12 Regalia Drive, Novato CA 94947
Timothy Geddes: P.O. Box 866, Silver City NM 88062
Chris Leslie: 731 Algonquin Street, Ventura CA 93001
Patrick Mrazek: 455 Oaklawn Cr., Ottawa ON K4A 3J2 CANADA
Kristie Nelson: P.O. Box 402, Lee Vining, CA 93541
Hector Vargas Ortiz: Los Mapuches 081, Arica 1000000 CHILE
Regina Rochefort: 3821 Carpenter Street, Mount Vernon WA 98274
Christopher Smith: 1043 Kinau Street, Apt. 301, Honolulu HI 96814
Felix Stumpe: [address omitted on request]

Address Changes (all U.S.A. unless noted otherwise)

Alexandra Bachtold: Rua Alfredo Tormin 60, Apto. 301, Jardim Finotti, Uberlandia Minas Gerias 3840-8096 BRAZIL
Matthew J.C. Barnes: Avalon, Upottery, Honiton Devon EX14 9PQ UNITED KINGDOM
Julian P. Donahue: 2985 E. Manzanita Ridge Place, Tucson AZ 85718
Michael S. Fisher: 2624 Virginia Lane, Montrose CO 81401
Royer, Ronald ALAN: P.O. Box 54, Backus MN 56435
Note: Ronald AARON Royer from PA was listed in 57:2 as being the person who moved to MN. We correct that error here. Ronald Aaron Royer still lives in PA.
Jae-Cheon Sohn: Dept. of Environmental Education, Mokpo National University, 61 Dorim-ri, Chungkye-myon, Muan-gun, Jeonnam 534-729 SOUTH KOREA

Conservation Matters: Contributions from the Conservation Committee

The beauty of butterfly nets

Robert Michael Pyle

Swede Park, 369 Loop Road, Gray's River, WA 98621-9701 **tlpyle@willapabay.org**

(**Author's Note**: this piece is adapted from an essay of the same name originally published in *Wings*, the magazine of the Xerces Society, in 2006, and subsequently in *G'num*, the newsletter of the Washington Butterfly Association, in 2015.)

Epigraph: "Sometimes I feel guilty about capturing butterflies and other insects, but it is giving me so much insight into the web of life at Panakanic [Ranch]. What used to be just a sandy road into the place is now known to be a marvelous habitat for sweat bees, parasitic wasps, tiger beetles and dung beetles. And the shores of a dried up vernal pool a source of food and minerals for skippers, butterflies, moths and many beetles. Everything is so alive and I would have never known this without my butterfly net!" -- Joy Markgraf, White Salmon, Washington

It is in many ways apt that this piece should be penned on a Friday the thirteenth, the day between Charles Darwin's two hundredth birthday and St. Valentine's Day. The thirteenth, because an unlucky day to me is one when I don't get outdoors in direct contact with nature. Valentine's, because this essay is really a love letter to one of my favorite tools and field companions. And Darwin Day, on account of the simple and certain fact that our all-time greatest naturalist might have merely toiled in quiet obscurity as a country vicar, had it not been for his butterfly net.

When Darwin cut theology classes at Cambridge, he did so to collect beetles and chase swallowtails at Wicken Fen. That's what led him astray, ultimately to his voyage on the *Beagle*, to the Galapagos, and to his residence at Down House where *On the Origin of Species* was written. Things are not too different in our time: E. O. Wilson didn't need a net to study ants, but he made clear in his memoir, *Naturalist*, that his carefree days afield with his insect net were the hours that made him who he is. The godfather of the Karner blue butterfly (*Lycaeides samuelis*) and a great literary recorder of the "individuating detail," Vladimir Nabokov, put it this way: "The ordinary stroller might feel on sauntering out a twinge of pleasure . . . but the cold of the metal netstick in my right hand magnifies the pleasure to almost intolerable bliss."

Some readers perhaps find it odd to read an encomium to the classic collecting implement in a journal devoted to insect conservation. But this is no contradiction, as was recognized in the earliest days of the Xerces Society, when its collecting policy was carefully crafted. When collecting presents an actual conservation risk with overzealous pursuit of rare or highly restricted species, we of course oppose it. But this is an uncommon event. For the most part, aerial insect populations in particular are reproductively adept, elusive, and highly resistant to overcollecting. Besides, as anyone who has actually tried to catch butterflies knows, a human being wielding a net is one of the most inefficient predators you could design. On the other hand, in order to conserve something, you have to know exactly where it occurs. The great contribution of the net-wielders is in building and updating the database of invertebrate distribution. This is why, as counterintuitive as it may seem to some, butterfly nets have been among our most important instruments for insect conservation.

In fact, in recent years, species entirely new to science have been detected among existing specimens in museums, thanks to the sharp eyes of systematists and improved techniques and tools for measuring genetic distance. These *taxa novae* are cryptic species, heretofore hidden in the thick shrubbery of similarity, and only discerned when enough material was assembled and examined to demonstrate their very real evolutionary differences. They include a new wood nymph in northern California; a second and third *Hermeuptychia* on the southern coastal plain and in south Texas; and a hairstreak in the Big Bend country of Texas. In addition to these, careful workers are teasing out new hostplant-adapted species of dotted blues in the West. Some of these may be rare in nature, highly deserving of habitat protection measures. But none of them would even be known to exist, were it not for generations of net-wielders who have deposited specimens in our great public institutions. And as the motto of The International Lepidoptera Survey (TILS) says, "*We can not protect that which we do not know*." So it is not only in the tropic wilds where novelty awaits discovery; even in the good ol' USA, there are new butterflies to be found that photos alone are not enough to document.

But that is just one reason we should appreciate these simple and centuries-old implements. True, our field guides, state butterfly atlases, and rare-species surveys have commonly depended upon specimens in hand. More and more these days these functions are being conducted with binoculars and digital cameras instead, and that's all to the good when it serves the purpose just as well. But it doesn't always. The fact is, many butterflies—especially certain blues, skippers, and rare varieties only subtly differentiated from more-common types—require close examination for positive identification. For these it doesn't help to have an approximate ID; positive recognition is essential.

For example, during my 2008 Butterfly Big Year, I was looking (among other things) at the responses of butterfly ranges to changing climate, and I certainly saw some dramatic examples. But, at one spot in arid north Texas, I thought I had found a species abundant more than a hundred miles north of any previous records. Surrounded by my field guides, I still couldn't determine the species for sure from my notes, or from photographs. Even the national authority on the group had to dissect a specimen to be certain which of two species it represented—and in the end, he was able to determine that it was the one that belonged there after all.

So the reliability of occurrence data is essential—and often it is still the net that sifts good data from bad. Nets are seldom weapons of mass destruction and need not even be lethal. I do a great deal of my field survey and teaching with harmless catch-and-release. I find that people make a deeper connection when they can examine a creature up close, from every angle, and then carefully release it to a flower, or a child's nose. This practice, employing net, tweezers, and a light and practiced touch, gives a far more satisfactory encounter for a group than a fleeting glimpse from yards away.

And that brings us to my favorite reason for loving butterfly nets: they are the cheapest, simplest, and most effective environmental education tools ever invented. Give a child a pair of binoculars or a camera, and he will be occupied for a moment or two, before setting it aside. But give her a net, and watch her go! Besides, the argument that all interaction with butterflies should be conducted solely through optics is an elitist one; most kids can't afford close-focusing binoculars or a good camera, but they can often pull together twelve or fourteen bucks for a basic net from BioQuip—or make one themselves, as my friends and I always did. To this day I chiefly use a net fashioned from a Colorado cottonwood branch—an artifact from my youth—that I named Marsha. I made Marsha more than forty years ago, and she has had a hard life (described in detail in my book *Walking the High Ridge: Life as Field Trip,* Milkweed Editions, 2000). Yet she is still with me, a beloved friend who has helped me introduce butterflies to thousands of children and their parents.

Kids love nets because chasing insects is *fun*. It also brings the chaser face-to-face with exciting, novel, always-surprising *life*. Talk to any number of biologists, doctors, wildlife managers, and other life-science professionals, and the preponderance of them will tell you that catching bugs was a vital early stimulus for their engagement with nature. And consider the current crisis of children's disconnection from the living world, articulated in Richard Louv's book *Last Child in the Woods: Saving Our Children from Nature Deficit Disorder*. Most kids used to wander freely and catch fireflies in a jar—or crawdads, or polliwogs—and, through those encounters, learned to connect with the land on which we all depend. These days, their attachment to electronica almost from birth, their parents' fears for their safety, and the loss of accessible habitats close to home, means that this fundamental experience of roaming freely is now rare. Where will our future conservationists and biologists come from, when children no longer chase grasshoppers in real life? Well, there is no more effective defense against nature deficit disorder than the butterfly net! That's why the Lepidopterists' Society has initiated the Outernet Project, to get free nets into the hands of curious kids, and to get them outdoors with knowledgeable mentors.

Now, some people oppose the use of nets outright. With the exciting rise of butterfly watching and photography in the outdoor-recreation repertoire, an either/or mentality has too often crept into people's attitudes. Since my *Watching Washington Butterflies* (1974) and *Handbook for Butterfly Watchers* (1984) were among the first books to push these activities, I accept some responsibility for this trend. However, I have always promoted watching and photography *alongside*—not *instead of*—responsible netting. I continue to preach mutual tolerance in this regard and an ecumenical approach among watchers and catchers, as parallel and compatible parts of the community of butterfly lovers.

Rhiannon James, Young Lepidopterist, in Idaho. (photo by Jenny Taylor)

For my own part, I have carried both my binoculars and my netstick (when appropriate) for several decades, and I feel naked without either one. They can be wonderfully complementary means for exploring the living world. During the Butterfly Big Year, I used Marsha a great deal—as net, yes, but also as companion, and walking staff. But I also employed Akito, a beautifully engineered, extendible and collapsible Japanese net, given me by a fine lepidopterist of the same name; a basic BioQuip wooden-handled net, easy to jump out of the car with; and a little foldable job known as Mini-Marsha that fits into a pocket for times when I need both hands. I used them all—or none. When investigating endangered species, such as the Uncompahgre fritillary above thirteen thousand feet in Colorado's San Juan Mountains with Xerces director Scott Black; in parks and preserves, where nets were not welcome; or when in company with watchers uncomfortable with nets, I relied solely on my binoculars. The point is, all of our appliances for apprehending nature, taken together, are like a good tool box: more than the sum of their parts. When a butterfly in the bush just won't do, a net in the hand, deftly and gently wielded, may be just the right tool for the job.

Watching and photographing butterflies as a recreational pastime now draws increasing numbers of enthusiasts. But to me, doing away with butterfly nets, as some advocates of butterfly watching would like to do, would be a great mistake and a tragic loss. Many butterfly watchers, like most biologists, began with a butterfly net, and learned much of what they know on the end of it. If they then go on to enjoy butterflies through ground glass instead of gossamer mesh, more power to them. My wish for all children is that they may know the delight of a sunny day afield in company with the bright wings of summer. And if that should involve a net, well then more power to them, too.

Young naturalist in the making in the Loess Hills, Iowa. (photo by Melissa Sevigny)

John Shuey talking about Indiana habitats and conservation at the 64th Annual Meeting of the Lep Soc at Purdue University July 31, 2015. Note that there are no people in the "spit zone" in the front row. (photo by Christi Jaeger)

Butterflies collected by George R. Crotch in N America in 1873, with notes on the identity of Pamphila manitoba and a type locality clarification for Argynnis rhodope

John V. Calhoun

977 Wicks Dr., Palm Harbor, FL 34684 **bretcal1@verizon.net**

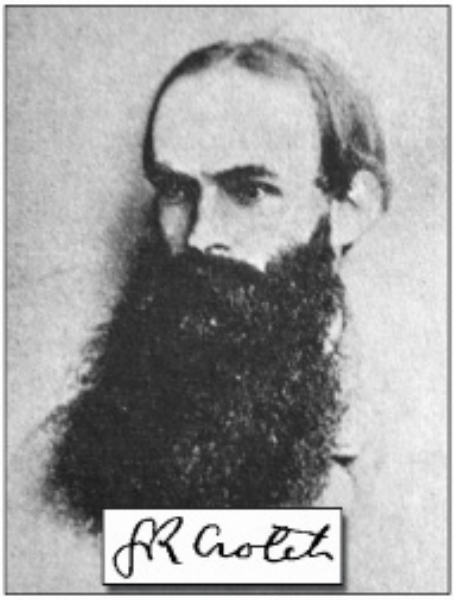


Fig. 1. George R. Crotch, c. 1872 (Essig 1931). The signature is from an 1873 letter.

In 1872, the English coleopterist George Robert Crotch (1842-1874) (Fig. 1) embarked on an ambitious journey to explore parts of the world that were poorly known entomologically. His first stop was North America, where he collected numerous insects during the summer of 1873, many of which were described as new. Sadly, Crotch had no way of knowing that his plans would take a tragic turn. His collecting tour of California, Oregon, and British Columbia would turn out to be his last. Brief remarks have been published about his visit to North America (e.g.Hatch 1949, Guppy & Shepard 2001), but few details are known and some references are inaccurate (e.g. Blackmore 1921). In an effort to learn more, I examined Crotch's surviving letters (Crotch 1872-1874), which reveal a great deal about his travels and the butterflies that he collected.

Crotch's visit to North America

Crotch worked in the library at Cambridge University from 1866 to 1871, and he also served as a sub-editor of the Zoological Record (Anonymous 1874, Prothero 1888). After leaving his post at Cambridge, he began corresponding with the American entomologist Henry Edwards, who was living in San Francisco, California. "I am going to collect in California & travel about the state for 2 or 3 months," Crotch wrote on 23 October 1872. "From there I mean to go to Australia & round the world." Insisting that he would "get nothing really good & complete" from correspondents, Crotch preferred to collect his own specimens. He arrived at Philadelphia, Pennsylvania, during the autumn of 1872, where he visited local insect collections. He departed for California a few months later. Presumably traveling by train, he reached San Francisco in late February 1873. Soon after his arrival, Crotch gathered up his gear and set out in search of insects. Along the way, he kept Edwards informed of his whereabouts and success in the field. The itinerary detailed below was mostly extrapolated from Crotch's letters to H. Edwards.

In early March 1873, Crotch collected insects around the towns of Colma and San Miguel, California. He explored the vicinity of San Diego in mid-March, capturing as many as 100 checkerspot butterflies at one location, complaining that they filled all his paper envelopes. Later that month, he collected butterflies in the vicinity of El Cajon before heading north via steamship to explore around Los Angeles, San Bernardino, and the Holcomb Valley. After three weeks, he returned to San Diego via steamer and collected once again at El Cajon before boarding another steamer for Santa Barbara, where he arrived in late April, after a brief stop at Wilmington near Los Angeles. He was not satisfied with what he found in southern California: "The species are not numerous & are very widely spread." Nonetheless, he confessed that he "made large collections especially of Coleoptera & have done fairly well . . . ." During May and early June, Crotch explored portions of the Sierra Nevada and the Mojave Desert in California. He visited Calaveras County and Truckee during the first week of June, then Stockton on 9 June, arriving at Lake Tahoe on 10 June. Heading back toward the coast later that month, he collected around Cloverdale ("a ghastly failure") and Healdsburg. Crotch's publications indicate that he also collected around San Buenaventura (Ventura) and Hot Springs (in the Santa Ynez Mountains), probably in early May. He visited Fort Tejon at the end of May, and Donner Lake and Lakeport during June.

As early as 29 April, Crotch began thinking about new areas to explore, eagerly asking Henry Edwards, "How about Vancouver?" Around 9 July 1873, Crotch boarded a northbound steamer toward British Columbia, Canada. He traveled with his friend, Edmund L. Phelps (1847-1918), a graduate student and athlete from Cambridge University, who was described as an "enthusiastic fisherman and yachtsman" (Anonymous 1873a, 1873b, Horn 1874, Venn 1953). Crotch had delayed his trip northward for several weeks until Phelps arrived from England. Despite H. Edwards' (1874) claim that Crotch left California during

June on "a prolonged tour through Oregon and British Columbia," Crotch did not leave until July and he spent little, if any, time in Oregon on his way to British Columbia. At best, he had a brief layover in Portland, where he spent about a week during his return (see below).

Reaching Vancouver Island, Crotch was collecting insects there by 15 July (Edwards 1875). Writing on the 26th from Victoria (a "horrid place"), Crotch remarked that he would "go over on Fraser River soon." Complaining about the lack of insects on Vancouver Island, he left for the Cariboo District on 1 August: "God knows what I shall get there." Complaining about wasting a year collecting where insects were sparse, he dreamed of all the species that surely awaited him in the tropics of Belize or Panama. He had little enthusiasm for heading deeper into British Columbia, but reckoned that it was too late to turn back.

From Victoria, Crotch and Phelps traveled by steamboat to New Westminster on the mainland. They probably boarded another steamboat heading eastward up the Fraser River to the settlement of Yale, where the Cariboo Wagon Road began. The improved southern portion of this road (completed in 1863) snaked along the Fraser River to the settlement of Lytton, and then strayed away from the river to Clinton. Turning northeastward, the road continued to a number of roadhouses, including the 100-Mile House, located about 21 air km (13 mi) southeast of Lac La Hache ("The Lake of the Axe"), a large plateau lake in the watershed of the San Jose River (Fig. 2). When the original southern portion of the Cariboo Wagon Road was built in 1861-1862, road miles were counted beginning at the settlement of Lillooet (Stangoe 1994). As implied by its name, 100-Mile House was established 100 road miles north of Lillooet and a community still exists there today (Fig. 2). Part of the route traveled by Crotch corresponds to present-day Highways 1 and 97 (the Trans-Canada Highway and the Cariboo Highway, respectively).

Much of the countryside was forested when Crotch visited. On a map of the Cariboo District, Begbie (1861) documented the surrounding landscape. In the vicinity of 100-Mile House, he wrote, "Level Forest," while Lac La Hache was bounded by "Woody topped hills" with "grass abundant." He remarked, "From Beaver Lake to beyond Keithley's is one continuous dense grassless mountainous forest," adding that this distance was about "5 or 6 days for loaded animals." Although Brown (1965) placed Beaver Lake "fifteen to twenty miles west of Quesnel Lake," it actually lies 22 km (13.7 mi) west of the western shore of Quesnel Lake, along present-day Likely Road (Fig. 2). During the 1870s, Beaver Lake Ranch operated there, where several trails from the mountains converged (Patenaude 1998). Period maps (e.g. Epner 1862) clearly show Beaver Lake along a trail that branched off the Cariboo Wagon Road, just east of the Fraser River near Williams Lake. "Keithley's" refers to Keithley Creek (Keithley Ranch), a former settlement located at the southwest end of Cariboo Lake near the base of the mountains (Fig. 2).

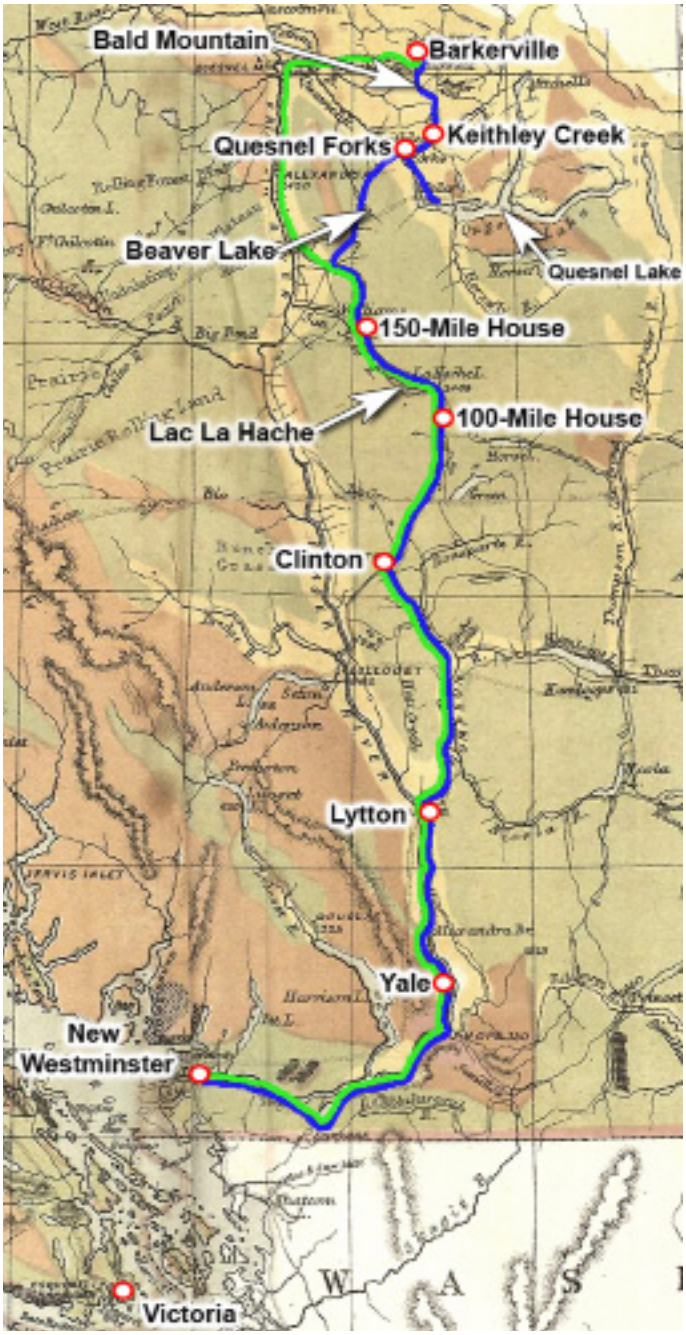


Fig. 2. Detail of map by Good ([1873]), with various settlements and features indicated. Crotch's likely route through the Cariboo District of British Columbia in 1873 is shown in blue (northward) and green (southward).

"I am well in it now – 350 miles up country," Crotch wrote on 17 August. Usually camping and carrying 50-pound packs, Phelps hunted and fished while Crotch collected. Crotch remarked that it was "hard work packing." For weeks at a time, they subsisted on boiled duck and beans with a little oatmeal and sometimes a grouse. Calling Cariboo a "mean place," Crotch collected around Lac La Hache during the second week of August. Following the Cariboo Wagon Road and adjoining trails, he reached the settlement of "Quesnelle" (Quesnel) Forks by 17 August. Ten days later he was collec-

ting around Quesnel Lake, which he called a "better place." Rain was a problem and Crotch was sometimes forced to sleep on his collection boxes to keep them dry. Disheartened by the overall lack of insects and foul weather, he informed Henry Edwards that he desired to head back to California as soon as possible. Starting out at Keithley Creek on 31 August, Crotch climbed Bald Mountain, which he described as "the highest place about here – awful place." He took "a splendid trip over it up to William's Creek." He probably explored that vicinity of the mountains for several days before arriving at Barkerville on 5 September. He departed for Victoria two days later (Anonymous 1873a).

Leaving Barkerville, Crotch and Phelps returned southward by stagecoach, reaching Vancouver Island by the second week of September. Crotch was very disappointed to have missed Henry Edwards, who had visited the area just days before. In a letter to Edwards, postmarked 15 September, Crotch hinted at his declining health, remarking that his stage ride to Victoria was "aggravated by epizootic." The term epizootic (outbreak of disease) was often used in connection with tuberculosis. Before leaving British Columbia, Crotch searched for insects around New Westminster. In late September, he boarded a southbound steamship toward Portland, Oregon, where he lodged at the St. Charles Hotel. For about a week he collected insects around Portland. He departed on 4 October for San Francisco, where he arrived by the 7th.

Crotch claimed that he collected "certainly 150,000 specimens" of insects during his trip, and it was estimated that they included between 300 and 500 new species (Anonymous 1873a, 1873b, 1874). Although he frequently complained about the lack of insects during his travels, Crotch was actually appalled by the amount of material he had amassed. Based on specimens that he collected in Victoria and New Westminster, Crotch named a beetle *Scymnus phelpsii* (=*S. nebulosus* LeConte) in honor of his friend and traveling companion, E. L. Phelps.

Instead of proceeding to Australia as originally planned, Crotch was invited to take a position as an assistant curator at the Museum of Comparative Zoology (Harvard University, Cambridge, Massachusetts; MCZ), working with Hermann A. Hagen under the supervision of the celebrated Swiss zoologist Louis Agassiz. "It appears to be settled that I shall come to Boston for the winter & help you straighten out the Coleoptera," he notified Hagen from Victoria on 19 July 1873. "I hope to be back in October & shall get my collection sorted & arranged at once & then go to work on the general lot." Crotch arrived in Philadelphia by 26 October and left for Cambridge, Massachusetts, on the 27th. He soon after informed Henry Edwards, "I am getting things set as fast as possible – but have an awful lot to do – nothing is in order here yet but hope to get it so pretty soon." He mentioned that he expected "to get on pretty well with Hagen." Just one week later, however, Crotch stated that Hagen was "not very easy to get on with," adding that he had "combatted him successfully in a few things & hoped to do so in [the] future." Hagen probably regarded the much younger Crotch as radical and overly zealous. Crotch soon tackled the museum's Coleoptera collection, but Hagen harshly criticized his work. Crotch removed the original labels from important historical specimens, prompting Hagen to condemn the loss as "irreparable." Hagen believed that Crotch failed to receive proper instruction due to the death of Agassiz in December 1873. "The Professor [Agassiz] gave me . . . pretty much absolute control over the Coleoptera," Crotch explained to Samuel H. Scudder in March 1874. In a written evaluation of Crotch's activities at MCZ during the period November 1873 to February 1874, Hagen (1874) remarked that he had "no idea of the possibility of such a kind of mischief" that Crotch could inflict, claiming that everything that Crotch arranged was "brought into confusion in the most unaccountable manner." Crotch disputed this assessment and complained to H. Edwards that Hagen had "started a magnificent set of charges" against him. In the end, Crotch decided to "give up the ghost" and planned to take another trip out west in April 1874.

By February 1874, Crotch was so stricken with tuberculosis that he decided to relocate to Philadelphia. He mentioned that he had "only a very little cough left," while conceding that he was "pretty bad at Boston." He rented a room in a building next door to the American Entomological Society (Philadelphia Academy of Natural Sciences building), where he worked when his health permitted. His condition gradually worsened, and he was invited in early May to move in with the geologist J. Peter Lesley and his wife. By mid-May, Crotch realized the severity of his condition and sent for his brother in England: "If I can only get a few good nights I might get on perhaps – but they are hard." Crotch died four weeks later on 16 June 1874 (Edwards 1874, Smart & Wager 1977). He was interred at Woodlands Cemetery in Philadelphia. Leslie's home at 1008 Clinton Street (where Crotch died) was designated in 1994 as a National Historical Landmark.

Prothero (1888) described Crotch as a "remarkable gymnast" and "eccentric in his habits, utterly careless of conventionalities, affectionate, and lavishly generous," adding that he was "in many respects a very original and striking character, with a great turn for philosophy and abstract speculation, but at the same time a strong grasp of facts and details however minute." Crotch's eyesight, powers of observation, and memory were so acute that he could reportedly "name and describe without hesitation a great number of insects placed at random in a box, and at a distance at which ordinary eyes could hardly distinguish any characteristics at all" (Prothero 1888). Concerning Crotch's seemingly cavalier behavior, Newman (1874) recounted, "These attributes were so remarkable as to take the form of an eccentricity, - meat, drink, and rest, seemed to him matters of indifference; if night found him on what he considered good collecting ground, rather than leave it, with the intention of returning on the morrow, he has been known to lie down under the shelter of a hay-

stack or sedge-stack in the fens, and there remain, until the return of daylight enabled him to resume his labours." While collecting in California, Crotch sometimes slept in the open air, "with no other covering than the clothes he wore" (Edwards 1874). It seems that Crotch's passion for entomology was more important to him than his health, and his reckless habits were blamed for his ultimate death. Perhaps not surprisingly, Crotch never married. "The grass which covers the grave of George Robert Crotch will grow above the remains of a most able naturalist, wrote Edwards (1874), "a true and generous friend, and an accomplished and genial man."

Crotch's butterflies

Information about the butterflies that Crotch collected can be found in his letters (Crotch 1872-1874) and those of the American lepidopterist William H. Edwards (1873-1877). Writing to Crotch in October 1873, W. H. Edwards expressed an interest in acquiring all the butterflies that Crotch had collected during his trip out west. In the event that Crotch would not sell them outright, Edwards offered to take the specimens on loan in exchange for a copy of the second volume of his book *The Butterflies of North America*. Crotch responded that he had 670 butterfly specimens, all in papers, and offered the entire lot to Edwards for $150 ($3,000 in today's economy). Crotch stated that his specimens "have traveled I think pretty well" and that the "localities are all carefully marked." He summarized the localities as "S[an] Diego, S[an] Bernardino, Los Angeles, S[anta] Barbara, Calaveras & Tahoe in the Sierras, Gilroy in Coast Range, Victoria, & British Columbia up through Cariboo." If Edwards was interested in the specimens, Crotch asked that he sell back one of every species for the MCZ collection, where Crotch's other insects would be deposited. Edwards agreed to purchase the butterflies, paying three installments of $50. He received the specimens on 25 November 1873, remarking, "There are very few new species, but fine examples of old ones, and some of them rare." Edwards complained that many had broken antennae, which he attributed to the large field envelopes that Crotch had folded, allowing the specimens to shift during transit.

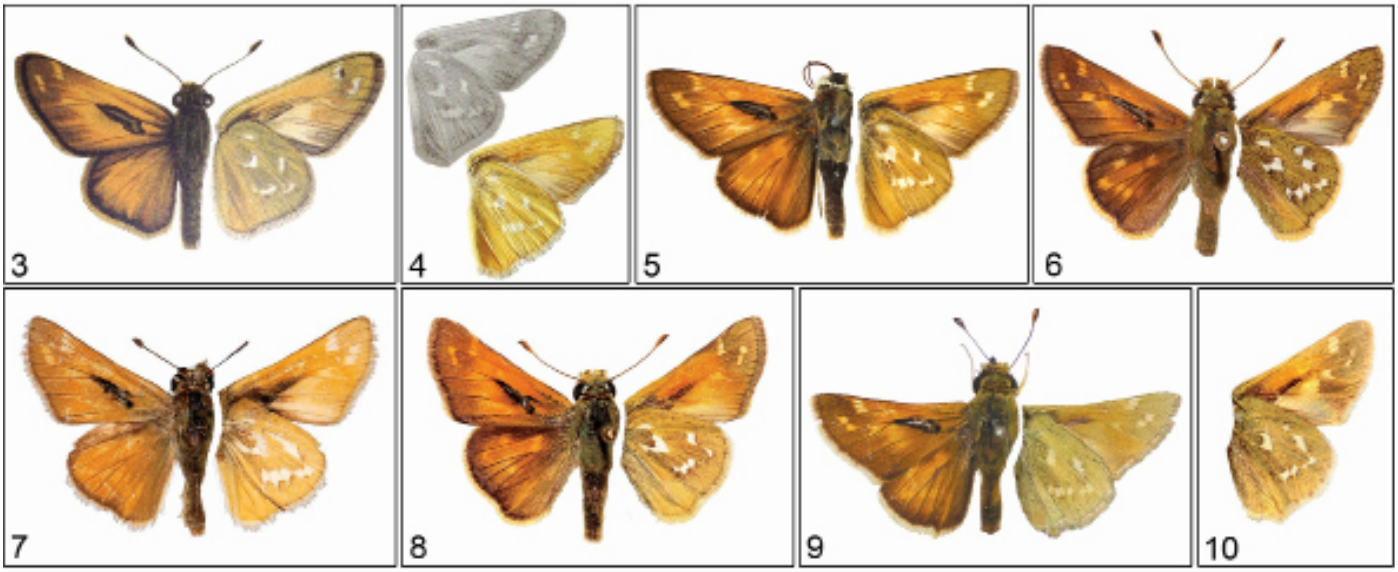
Edwards kept the specimens he desired and offered others to his friends, including Henry Edwards, Theodore L. Mead, and S. H. Scudder. "I have received the Crotch collection of butterflies and can promise you some good things," he informed Mead. In turn, Henry Edwards provided some of Crotch's specimens to other lepidopterists, including F. H. Herman Strecker. Before describing new taxa from Crotch's specimens, W. H. Edwards usually sent examples to H. Edwards for his opinion. I found no evidence that W. H. Edwards sold back any specimens for MCZ as Crotch requested.

Based on Crotch's specimens, W. H. Edwards described *Colias eriphyle* (=*Colias philodice eriphyle*), *Argynnis opis* (=*Speyeria mormonia opis*), *Argynnis rhodope* (=*Speyeria hydaspe rhodope*), and *Satyrus phocus* (=*Cercyonis oetus phocus*). Henry Edwards described *Argynnis columbia* (=*Speyeria aphrodite columbia*). Samuel H. Scudder described *Pamphila manitoba* (=*Hesperia comma manitoba*) based in part on three specimens that were collected by Crotch. The primary types of these nominal taxa are deposited in the Carnegie Museum of Natural History (Pittsburgh, Pennsylvania; CMNH), American Museum of Natural History (New York, New York; AMNH), and MCZ. Notes on each of these taxa are provided below, with historical comments gleaned from letters written by W. H. Edwards to H. Edwards (AMNH).

Pamphila manitoba Scudder

In December 1873, S. H. Scudder visited the home of W. H. Edwards and left with all of Crotch's papered Hesperiidae. Among those specimens were three males that Scudder included within the type series of *Pamphila manitoba* Scudder. These specimens are now deposited at MCZ. Scudder (1874, Pl. 10, fig. 8) figured one from "British Columbia" and another (Pl. 10, fig. 11) (Fig. 3) from "Labache" (=Lac La Hache). He again figured the "Labache" specimen fifteen years later (Scudder 1888-1889, Pl. 17, fig. 4), confirming, "The same specimen served for the illustration in the Memoirs Bost. Soc. nat. hist., ii, pl. 10, fig. 11." Though an uncolored lithograph, the wing maculation of the later image is more accurate than that of the 1874 chromolithograph, and it depicts the wings in their actual mounted positions (Fig. 4, top). Scudder (1874, Pl. 11, figs. 7, 8) figured the genitalia of Crotch's third specimen, also reportedly from "Labache." Scudder (1874) stated that all three specimens were "Collected by G. R. Crotch," but he did not provide collection dates, most likely because this data was not present on Crotch's field envelopes. Crotch most likely collected his specimens of *manitoba* during the second week of August 1873.

Barnes and McDunnough (1916) designated the specimen figured by Scudder (1874, Pl. 10, fig. 11) (Fig. 5) as the lectotype of *P. manitoba*. This specimen bears a small, unevenly-cut clipping of paper with the penciled notation "Lahache" (=Lac La Hache) in Crotch's handwriting (Fig. 11; a), which both Scudder and W. H. Edwards initially misconstrued to read "Labache" (see discussion of *C. eriphyle* below). The specimen that Scudder dissected bears a similar clipping, but the "e" is cropped (Fig. 11; b). Both of these clippings are of the same type of blue-lined paper on which Crotch frequently wrote letters during his trip. Scudder presumably cut the notations from Crotch's field envelopes when he mounted the specimens (he did the same with T. L. Mead's envelope data). Crotch's upper case "L" is very distinctive in lacking a loop or hook at the top, and his lower case "a" tends to be open (Fig. 11; c, d). These features are contrary to the writing of both W. H. Edwards (Fig. 11; e, f) and Scudder (Fig. 11; g, h). A clipping on Crotch's remaining specimen of *manitoba* reads "B Col" (i.e. British Columbia) in the hand of W. H. Edwards. Scudder later purchased more of Crotch's



Figs. 3-10. Comparison of *Hesperia* taxa (dorsal/ventral unless otherwise stated). **3)** Figure of male lectotype of *P. manitoba* from Scudder (1874), "Labache" [Lac La Hache, Cariboo District, British Columbia, Canada] (image reversed). **4)** Top: ventral figure of lectotype in Scudder (1888-1889) (image reversed). Bottom: ventral image of lectotype from MCZbase (2015). **5)** Male lectotype of *P. manitoba*, [August 1873], "Lahache" [Lac La Hache, Cariboo District, British Columbia, Canada] (MCZ*). **6)** Modern concept of *H. comma manitoba*; male, 17.vi.1975, 10 mi N of the Pas, Manitoba, Canada (MGCL). **7)** Male lectotype of *Pamphila colorado* var. *idaho*, "East Cal[a]" [California] (CMNH). **8)** Male ascribed to *Hesperia colorado idaho*, 3.ix.1964, Eagle Lake, 5100', Lassen Co., CA (MGCL). **9)** Male lectotype of *Pamphila manitoba* var. *assiniboia*, 5.viii.1890, Regina, Saskatchewan, Canada (LEMQ). **10)** Male (ventral) ascribed to *Hesperia [colorado] assiniboia*, 5.viii.1942, Lloydminster, Saskatchewan, Canada (MGCL). (*© President and Fellows of Harvard College).

butterflies from Edwards (now at MCZ), but they all possess small labels that give the name and locality in W. H. Edwards' hand, suggesting they were already mounted when Scudder received them.

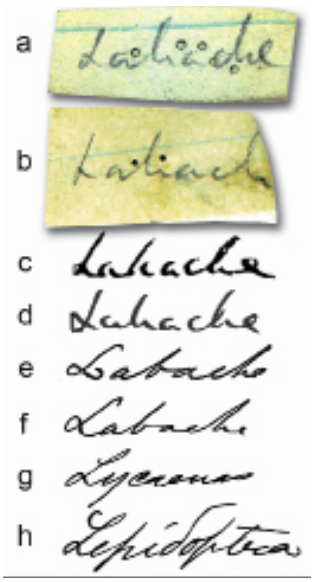


Fig. 11. Handwriting comparison: **a, b,** "Lahache" clippings from Crotch's specimens of *H. c. manitoba*; **c-d,** "Lahache" in Crotch's hand; **e, f,** "Labache" in W. H. Edwards' hand; **g, h,** "Lycaena" and "Lepidoptera" in S. H. Scudder's hand.

The figures of Crotch's specimens of *P. manitoba* in Scudder (1874) portray the ventral hindwings with an overall greenish hue (Fig. 3). However, Scudder (1874) stated that the hindwing of *manitoba* is "slightly flecked with not very dark green." Scudder (1988-1889) later characterized the typical ventral hindwing coloration of *manitoba* as "almost uniformly greenish yellow." The Canadian lepidopterist Henry H. Lyman examined the types in Scudder's collection in 1891 and mentioned the green tint of their hindwings (Lyman 1892). More recently, images of these specimens were posted on MCZbase (2015). These images suggest that the two male specimens figured by Scudder (1874), including the lectotype, are weakly marked above and mostly pale yellow below (Fig. 4, bottom). Some lepidopterists are currently basing assumptions about the identity of *P. manitoba* on these low-resolution images, which were not intended for taxonomic analysis. Lighting and other factors were not closely controlled during the imaging process (R. Hawkins pers. comm.). I recently visited MCZ and personally examined the type series of *P. manitoba*. Under natural lighting, Crotch's two specimens are considerably different from the online images. The dark margin above is more defined, and the ventral hindwing and ventral forewing apex are golden-ochre with a subtle olive-green overtone. New high-resolution images more accurately depict this specimen (Fig. 5). Delicate hues were difficult to replicate using the chromolithographic process, thus the hindwings of Crotch's specimens in Scudder (1874) were too green. However, the greenish hindwings of the female paralectotypes from "Pike's Peak" and "East Coast Lake Winnipeg" were more faithfully reproduced in Scudder (1874, Pl. 10, figs. 9, 10). Scudder's figures reveal that the types of *P. manitoba* have not significantly faded over time. Based on specimens that were compared with the types, Lindsey (1921) remarked that "the typical form" of *manitoba* is "golden brown beneath with whitish maculation," which is a precise description of the lectotype as it exists today.

Many taxa within the genus *Hesperia* are extremely similar. Species and subspecies boundaries are unclear and intensely debated. The concept of *P. manitoba* is no exception. Since its description, interpretations have varied and involved multiple taxa. Obviously based on the type

series of both males and females in his possession, Scudder (1888-1889) noted that the ventral hindwing of *manitoba* ranges in color from "bright olivaceous to a dark greenish gray." Lindsey (1942) remarked that his specimens of *manitoba* varied from "extremely dark to comparatively pale. . . ." Holland (1898, 1931) characterized the ventral hindwings of *manitoba* as "pale ferruginous" (reddish-brown). However, more recent authors (e. g. MacNeill 1975, Stanford 1981, Scott 1986, Klassen et al. 1989, Bird et al. 1995, Guppy & Shepard 2001) considered *manitoba* to represent a dusky northern and montane entity, with darker greenish, greenish-brown, or grey-green ventral hindwings (Fig. 6). This interpretation was popularized despite the existence—for over a century—of the more brightly colored lectotype in a major American museum. This situation is analogous to that of *Pamphila colorado* Scudder, whose lectotype was essentially ignored for many decades, leading to misconceptions about its identity (Calhoun 2015, Warren & Calhoun 2015).

Crotch's two specimens of *manitoba* that were figured by Scudder (1874) are consistent with populations that occur within the dry interior plateau of British Columbia. Such populations were previously ascribed to the subspecies *Hesperia comma harpalus* (W. H. Edwards). The lectotype of *P. manitoba* is comparable (in general coloration and in the size and shape of the white spots on the ventral hindwings) to males from British Columbia that were figured as *H. c. harpalus* by Layberry et al. (1998) and Guppy and Shepard (2001). Crotch's third specimen (which Scudder did not figure) is darker and more closely resembles the modern concept of *P. manitoba*. It may suggest variation in the local population, or represent another taxon.

Based on a review of the lectotype of *Pamphila harpalus* W. H. Edwards, Scott (1998) concluded that populations in British Columbia that were previously ascribed to *H. c. harpalus* should be recognized as the subspecies *H. colorado idaho* (W. H. Edwards) (Figs. 7, 8). This treatment is still generally accepted (Threatful 2003, Warren 2005, Warren et al. 2014), though some authors regard *idaho* to be a subspecies of *H. comma*. The lectotype of *P. manitoba* suggests that this nominal taxon is synonymous with populations that are currently recognized as *H. c. idaho* in southern British Columbia. As a result, usage of the specific name *Pamphila colorado* var. *idaho*, W. H. Edwards is threatened by the name *Pamphila manitoba* Scudder, which was described nine years earlier. A prairie entity, *Hesperia assiniboia* (Lyman) (Fig. 10), is superficially similar to the lectotype of *P. manitoba*, but it is paler and does not appear to occur around Lac La Hache (Guppy & Shepard 2001). For comparison, I have figured the lectotypes of *Pamphila colorado* var. *idaho* (CMNH) (Fig. 7) and *Pamphila manitoba* var. *assiniboia* (Lyman Entomological Museum, McGill University, Ste. Anne de Bellevue, Quebec, Canada; LEMQ) (Fig. 9). Pohl et al. (2010) recently treated *manitoba* as a full species (i.e. *Hesperia manitoba*), underscoring the importance of resolving the identity of its lectotype.

***Colias eriphyle* W. H. Edwards**

Writing from Quesnelle (Quesnel) Forks on 17 August 1873, Crotch mentioned that he had found "a pale lemon yellow *Colias*" during his travels. Among Crotch's material were about 30 such specimens. "I think I shall go for a distinct species in the case," wrote W. H. Edwards in late 1874. By March 1875, he had decided to call it *eriphyle*. The lectotype of *C. eriphyle* is deposited at CMNH (Brown 1973). Crotch most likely collected these specimens during the second week of August 1873.

Doubtless based on the notations on Crotch's field envelopes, Edwards (1876) misread the handwriting and described these specimens from "Lake Labache, in British Columbia." When first encountering references to this locality, Edwards asked Henry Edwards "What is that & where is it?" He desired a map "with Labache, Bald Mtn, etc. laid down," noting that he had a map of "Olympic trails" on which he could see "Cariboo & certain localities mentioned by Crotch." Edwards often repeated the misspelling "Labache" before changing it to "Lahache" during the late 1870s. "Is there a Lake Labache or is it only Lahache?" he asked H. Edwards. "I have bothered much on that name, thinking it at first was Labache." By 1890, he was correctly referring to the locality as "La Hache." Scudder (1874) made the same mistake, but he corrected the name to "Lake La Hache" in Scudder (1888-1889), though he called it "Lake Labache" while citing Edwards. Other authors, such as Hagen (1882) and Lyman (1888), also referred to "Labache," but clearly on the authority of Edwards.

***Argynnis opis* W. H. Edwards**

On 31 August 1873, Crotch wrote to Henry Edwards that he had just ascended "Bald Mountain" where he found "a nice new *Argynnis* like *selene* with broader wings & generally no silver beneath, but a yellowish colour – some however have a little silver beneath." In a subsequent letter to W. H. Edwards, Crotch mentioned that he collected "a pair only," but Edwards (1874c) described *A. opis* from "several specimens taken at Bald Mountain, Cariboo District, British Columbia." Brown (1965) found two syntypes of *A. opis* (male and female) at CMNH from the W. H. Edwards collection, but Grey (1989) reported a third syntype at the National Museum of Natural History (Smithsonian Institution, Washington, D.C.). In fact, Edwards listed three specimens of *opis* on his invoice to Holland (Brown 1965). Crotch collected these butterflies between 31 August and 5 September 1873 (see below).

In a November 1874 letter to H. Edwards, W. H. Edwards discussed naming this butterfly. "Suppose we give it a diminutive [name], considering its littleness," he wrote. William H. Edwards did not like the sound of the name "*crotchii*" and refused to use it under any circumstances: "I think a man unfortunate that has to carry such a name." On the other hand, Henry Edwards had no such compunction and named two new moth species *crotchii*. Upon further

consideration, W. H. Edwards suggested the name *opis* and he was willing to surrender all rights to naming and describing it to H. Edwards, who declined the offer.

Brown (1965) asserted that the labels that W. H. Edwards affixed to the lectotype and a paralectotype of *A. opis* (at CMNH) read "Bald Mtns" (plural) in reference to a group of peaks called the Bald Mountains. However, a close examination of these labels reveals that they read "Bald Mtn" (singular), which agrees with the letter that Crotch wrote while in British Columbia, when he described his ascent of "Bald Mountain" and stated that he hiked over the peak and "up to Williams Creek." Having started at Keithley Creek, his excursion to Bald Mountain was "a heavy day's work about 20 miles." His account is consistent with a peak still called Bald Mountain, located 7 km (4.4 mi) south of the town of Barkerville at the headwaters of Williams Creek (Fig. 2), the most prolific gold producing stream in Cariboo. Articles written during the 1860s and 1870s in the Cariboo Sentinel (the local newspaper of Barkerville, British Columbia) often refer to "Bald Mountain" at the head of Williams Creek. Crotch climbed Bald Mountain on 31 August and he discussed this butterfly in connection with that specific peak, though he probably collected in that area until he arrived at Barkerville on 5 September. In a letter written two months after his trip to British Columbia, Crotch mentioned that he took this butterfly "on the Bald Mountains," a name often used for the chain of mountains in that region (Bancroft 1887). Crotch possibly wrote "Bald Mountain" or "Bald Mtn." on his field envelopes, leading to Edwards' reference to this specific locality on his labels and within his original description of *A. opis*.

***Argynnis rhodope* W. H. Edwards**

Shortly after receiving Crotch's butterflies, W. H. Edwards informed T. L. Mead, "I certainly see a new *Argynnis* from Cariboo . . . the under side the color of poke juice, a purple red." Only four such specimens (three males and one female) were present among the papered material, and Edwards decided to name them *Argynnis rhodope* in early December 1873. Writing to Edwards on 31 December 1873, Crotch stated that these butterflies were "only found in the forest on the way from Bates's to Beaver Lake," adding that "Bates's" was "commonly called the 100-mile House." Edwards (1874a) described the taxon from "British Columbia," but later quoted Crotch's letter and stated that the specimens were collected "in the Fraser's River country, British Columbia . . . in the forest on the way from Bates' (commonly called 100-mile House) to Beaver Lake" (Edwards 1874b). This prompted McDunnough (1927) to state that the type specimens were "taken by Crotch near 100 Mile House on the old Cariboo Trail, about 75 miles north east of Lillooet and at about 2500 ft. elevation."

Dos Passos and Grey (1947) designated one of Crotch's specimens as the lectotype of *A. rhodope* (at CMNH) and proposed a more ambiguous type locality of "Cariboo District, British Columbia." Attempting to further restrict the type locality, Brown (1965) cited Crotch's letter to Edwards and suggested that the types were collected in "the forested, broad river-bottoms of the Fraser River system" of British Columbia. This was abbreviated by Miller and Brown (1981) to "Fraser River lowlands." Grey (1989) rejected this type locality on the grounds that suitable habitat does not occur in that area. In his review of *A. rhodope*, Kondla (2001) reached a similar conclusion and considered the information provided by Edwards (1874b) to represent the correct type locality. Based on Crotch's letter, the type locality of *A. rhodope* would represent the road and trail between 100-Mile House and Beaver Lake, about 110 road km (68.4 mi) in extent (Fig. 2). Unfortunately, Crotch made a critical mistake in his letter.

In 1871, Aschel S. Bates (1829-1879), an American from Boston, purchased a roadhouse called 150-Mile House, which then became known as "Bates's" (Patenaude 1995, 1998). 150-Mile House was established along the Cariboo Wagon Road, just south of the point where the present-day Cariboo Highway (BC-97) turns westward, east of Williams Lake. A community called 150-Mile House still exists there today. In his same letter to Edwards, Crotch mentioned that another species of *Argynnis* was "common along the shores of Lake Lahache & on up the high road as far as Bates's." Lac La Hache ("Lake Lahache") is located between 100-Mile House and 150-Mile House (Fig. 2). It is obvious that while discussing his specimens of *rhodope*, Crotch incorrectly associated "Bates's" with 100-Mile House, rather than 150-Mile House. As a result, the type locality of *A. rhodope* is hereby restricted to between 150-Mile House and Beaver Lake, Cariboo District, British Columbia. This is about 50 road km (31 mi) in extent and reduces the distance embraced by the type locality by 60 road km (37.3 mi) (Fig. 2). Although McDunnough (1927) indicated that the elevation of the type locality was 2500 ft., the area between 150-Mile House and Beaver Lake traverses elevations from 732 to 1067 m (2400-3500 ft.). As noted by Kondla (2001), this type locality contradicts the coastal range of *rhodope* as given by Guppy and Shepard (2001). Crotch most likely collected his specimens of *S. h. rhodope* during the second week of August 1873.

Brown (1965, fig. 27) believed that the original label on the lectotype of *A. rhodope* was inscribed in the "early handwriting" of William J. Holland, who acquired the collection of W. H. Edwards. This label, however, was prepared by T. L. Mead, and the specimen undoubtedly originated from his collection, not that of Edwards. After Edwards described *rhodope* in 1874, he evidently gave this specimen to Mead, who identified it on his label as "one of the 3 original types," referring to the three males that Edwards had received from Crotch. This is supported by the fact that Holland received only three specimens of *rhodope* from Edwards; two males and one female (Brown 1965). The third male had obviously been given to Mead, whose collection was later also purchased by Holland.

Mead often visited Edwards at his home in West Virginia and they exchanged countless specimens. The hindwings of the lectotype have become detached since this specimen was figured by Brown (1965).

***Argynnis columbia* H. Edwards**

In August 1877, W. H. Edwards reminded H. Edwards that he was expected to "describe *Arg[ynnis] Columbia* . . . ." Two months later, W. H. Edwards chided H. Edwards because he had not yet described it. Becoming impatient, W. H. Edwards remarked that he "may as well" describe it himself. In November, W. H. Edwards penned a description of *columbia* and credited H. Edwards for the name. He sent the manuscript to the printer later that month, advising H. Edwards, "It will do no harm to let it go on to type, lest some devil get ahead of you else." This description, however, was not published until January 1878 (Edwards [1878]). In the meantime, H. Edwards self-published a description of *columbia* in December 1877, thus he is credited with authorship of the name.

In his original description, H. Edwards attributed Crotch's specimens to "Lahache, near the Alaskan border of British Columbia." He received two males of this butterfly from W. H. Edwards and the lectotype bears a small label in the hand of the latter, attributing the specimen to "Labache" (see the discussion of *C. eriphyle*, above, regarding W. H. Edwards' initial spelling of this locality). Based on 14 additional papered specimens from Crotch, W. H. Edwards ([1878]) further defined the source of the specimens as "Lakes Lahache and Quesnelle, British Columbia." Crotch most likely collected at Lac La Hache during the second week of August, and in the vicinity of Quesnel Lake during the last week of August 1873.

***Satyrus phocus* W. H. Edwards**

Writing from Quesnelle (Quesnel) Forks on 17 August 1873, Crotch mentioned that he had encountered "a black *Satyrus* – gray beneath." Although Edwards (1874a) reported that he described the butterfly from "several males," and that the female was unknown, he informed T. L. Mead that he had "perhaps 15 or 20 specimens, some damaged, some good." This is supported by the fact that Scudder purchased two female syntypes from Edwards – one quite battered – which are now preserved at MCZ. Presumably based on Crotch's envelope notation, Edwards (1874a) attributed *S. phocus* to "Lake Labache, British Columbia." He coined the name *phocus* as early as December 1873. Like other notable butterfly captures, Crotch most likely collected his specimens of this butterfly during the second week of August 1873.

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Lepidopterists' Society business of note

Executive Council Meeting, 28 July 2015 Purdue University - *Mike Toliver*

The meeting began at 09:00, called to order by President Gilligan. The following voting members were in attendance: President Todd Gilligan (also acting as proxy for Vice President Mirna Casagrane), Vice President Delano Lewis, Secretary Mike Toliver (also acting as proxy for Member at large Michael Collins), Member at large Carol Butler, Member at large Jennifer Zaspel, Member at large Megan McCarty (also acting as proxy for Past President Andrew Warren), Journal Editor Keith Summerville, News Editor James Adams (also acting as proxy for John Calhoun). Additional attendees were Assistant Secretary/Treasurer Chris Grinter (acting as proxy for Treasurer Kelly Richers), Incoming President Jonathan Pelham, Incoming Member at large Christi Jaeger, Season Summary editor Leroy Koehn (at 10:55), Archivist and stalwart Charles Covell (at 11:30). With attending members and proxies, 13 of 19 voters were present.

The Minutes of the 2014 meeting were approved as submitted.

President Gilligan began with a summary of his report (copies available on request). He noted that he wished to spend as little time as possible rehashing what we've already done so we'd have enough time to seriously consider new business. He acknowledged the important role Chris Grinter has taken on, replacing Julian Donahue as new assistant secretary/treasurer. The membership database has now been migrated to modern software (Excel), with the help of Chris, Larry Gall and a graduate student. A new meetings committee has been formed, with meeting locations essentially set until 2020. An "official" statement on the Monarch debate appeared in the News. Through the efforts of Keith Summerville, we signed a 5-year contract with BioOne to host the Journal. We also reduced the cost to print the Journal by $2,000 annually. The Karl Jordan medal was presented to Ted Edwards **[Editor's Note: see story, this issue]**. A 5-year plan was developed for the Society, to be discussed under New Business.

President Gilligan presented Treasurer Richers report in Kelly's absence. The main issue is that our investment income exceeds allowable limits for a non-profit organization. We need to find ways to increase regular income (memberships, for example) or reduce investment income. A number of suggestions were proposed (fancier T-shirts, a sellable curriculum for teachers, royalty income from BioOne, selling memoirs). Keith noted that other non-profits must suffer from the same difficulties. Todd noted that we must have sufficient funds to cover life memberships; we have about double that amount. We need specific figures from the Treasurer: how much investment income should we have to meet non-profit requirements, etc. The Treasurer's report noted that we only collect between 30 – 70% of the page charges we are supposed to collect for articles published in the Journal – we need some sort of collection mechanism. Discussion revolved around some sort of ban on publishing for repeat offenders. Collecting funds from international authors is particularly difficult. The current process involves Keith submitting charges to Kelly, who then invoices the authors, but there is no mechanism to enforce payment. Carol Butler volunteered to contact Kelly and formulate some plan.

Secretary Toliver summarized his report (also available on request). Secretary Toliver inquired about the nominating committee, specifically to avoid the problem of nominating non-members for offices. Todd noted that he believes that problem has been taken care of with the new committee structure. The Mather award has not generated applicants, until Delano Lewis applied and was awarded these funds. Efforts will and have been made to publicize this award, and it appears that we will have future applicants. The student-oriented issue of the Journal is ready for print – thanks to Keith and Peg. The necessity for our current email voting policy was explained; we have to have one week of electronic discussion after a motion is made and seconded, and then we have to have a week to vote. The Society needs to develop and publicize a privacy policy. All members of the Executive Council must sign a statement regarding their understanding of Constitutional restrictions on conflicts of interest. Those present signed the statement, and the secretary has received electronic versions from many of the members who were unable to attend.

Assistant Secretary/Treasurer Grinter presented his report. The official mailing address for the Society has been changed to the Illinois Natural History Survey. Due to the conversion of the old membership data base, dues notices were sent out late last year. Back issues also now reside at the Illinois Natural History Survey. Chris is a co-administrator of the Society's Facebook page. We have a total of 2554 "likes" as of July (aside – I wonder if we can recruit some of these likes as members?). Our membership is down; it is now at the lowest point since records were kept electronically (1984). We have only a total of 31 student members!

Education committee – there was no report as this committee is moribund. We need to recruit a chair. Delano volunteered to be on this committee.

Membership committee – Carol Butler: no report – but the new brochure was published and distributed last year and some new members have joined as a result. Carol was disappointed that membership is down – as are we

all. The committee is open to suggestions on recruiting new members. Developing curricula for teachers has potential. Karen Oberhauser has a curriculum already done for her organization which they offer for sale **[see *Announcements* this issue]**. Maybe we could work out something with her as another way to make some money. Keith asked if local societies are suffering a decline in membership. Jon noted that these societies are suffering a loss of members. Some mechanism for partnering with local societies needs to be found. **[Editor's note: a summary of new member initiatives is also listed in this issue of the News.]**

Budget and publications committee – In 2015, President Gilligan assembled a "Strategic Planning Committee" to develop a 5 year plan for the Society. Because the 5 year plan also deals with the topics listed above, and the above committee is mandated by the Constitution, he suggested that future planning falls under "Budget and Publications Committee" purview, and updated the membership of that committee – list available on request.

News – James Adams. Last issue was by a different version of Adobe InDesign so the figures were somewhat pixilated; he has since resolved this issue. Nobody used the printed version of the registration form and abstract form for the past few annual meetings – that space should be used for other purposes. Therefore, registration and submissions for abstracts for the annual meetings will be exclusively on-line in the future. Discussion ensued on registration fees for non-members attending the annual meetings. Perhaps they should pay an additional fee. Meeting organizers will need to coordinate meeting registration with the member file with Chris' help.

Journal – Keith Summerville. Twenty-seven articles are in the loop now; six have been rejected, nineteen are reviewed and in the next stages towards publication and four are out for review. Turnaround time is now 3 weeks and can't be any faster. Some reviewers (niche) review a lot of papers. Our impact factor is now up to 0.9. The next issue will be 96 pages. More student papers will be in future issues. Currently, we have enough material to go to 70(2). BioOne gated content will include 2010 – 2014; BioOne has been easy to work with. The royalty income from BioOne should help with non-profit issues. Due to time lags in processing memberships, the first issue for next year will be March 15, 2016. Allen Press is continually attempting to sell/provide new services, many of which we don't actually need; however, we were able to save approximately $500/issue by printing the Journal on a different press. We received a composition services quote from Allen Press, which would be cheaper, but both Keith and Todd said that Peg provides assistance well beyond basic composition services. If Peg wants to retire sometime, then they'll consider this option. Mike mentioned that there will be hidden composition charges from Allen Press. Keith noted that many authors seem clueless on how to submit material; some do not know how to submit tables and some don't compose their own plates – Peg generally helps him sort out these issues. Keith blackballed an author who submitted a plagiarized article and informed that person's institution. Todd asked if we could obtain spare journals to pass out at the ICE meeting.

Memoirs – Kelly volunteered to be the editor at the 2014 meeting, anticipating writing a new commemorative volume. Another memoir on the Sesiidae of Mexico is anticipated. Todd obtained sample quotes from Allen Press for publishing our memoirs – the cost is similar to the previous publisher and the quality will be much better: 75 pages in full-color using the same paper as the Journal is approximately $1,000.00 for 100 copies. Todd and Keith will edit the Sesiidae memoir and likely print via Allen Press. Keith is willing to edit Memoirs (research-based) and will put a notice in the Journal. Submissions to Keith will start July 1, 2016. Memoirs directions for authors should be on the web site.

Season Summary – Leroy Koehn. After many years of hard work in this position, Leroy will be stepping down as the season summary editor after the 2015 issue. Possible replacements were discussed. Leroy noted that 133 contributors to the last season summary weren't members of the Society. Carol wants the list of these people to attempt to recruit them.

Publications manager – Ken Bliss sent his report with current publication inventories – available on request.

Meetings committee – Todd Gilligan. Locations for the next 5 years are mostly set. Next year will be at Whitehorse, Yukon around June 28 (we hope, Cris Guppy was supposed to attend and present on this meeting). The 2017 meeting is traditionally in the East, but we have been unable to obtain a site. Tom Emmel has proposed the Colorado Nature Center at Florissant, Colorado. The Executive Council voted unanimously to accept this offer, pending receipt of a letter from Tom. The 2018 meeting will be in Davis, CA. The 2019 meeting will be in Ottawa at the CNC. The 2020 will be in Eugene, Oregon. Perhaps the 2021 meeting could be at the McGuire center. **[Editor's note: After the EC meeting, it was decided that the 2016 meeting will be in Florissant, Colorado, (see Announcements) NOT Whitehorse. The location for the 2017 meeting is currently undecided.]**

Awards Committee – Charlie Covell. Charlie has taken over from Becky Simmons for a number of years, but it is time for new leadership (in Charlie's opinion) so he is resigning as chair. We need a volunteer to take his place. For this meeting, there were judges in place for 9 student presentations and 3 student posters.

Conservation Committee – no report. The Conservation committee has reinstated their column in the news. Todd briefly detailed the monarch article printed in the News.

Web and Technology – Todd. John Snyder retired. A complete revamp of the website is required to integrate with BioOne and the membership database. Keith provided a deadline of March 15, 2016 for this integration.

Archives – Charlie; no report. Charlie continues to downsize his photo collection.

New Business:

Resolutions committee: A resolutions committee should be selected each year at the annual meeting. Members should also be able to present resolutions at the business meeting. It is essential to have at least an appreciation resolution to thank the meeting organizers.

Honorary life member – Julian Donahue was discussed as a nominee. The procedure requires a letter nominating Julian (with biography) being submitted to Jon (when he assumes office at the end of this meeting), then email the Executive Council for a vote and (if unanimous) then the nomination will be placed on the ballot. Approval requires an 80% "yea" vote by the members voting.

Assistant Secretary/Treasurer – it was proposed that this position should be a voting member of the Executive Council and receive funds to attend the annual meeting. This proposal received unanimous support. As a point of order, it was pointed out that Executive Council members not in attendance, but providing proxies to attending members, should receive new business items before they assign proxies so their wishes can be made known to their proxies.

Committees – Todd has assembled a current list of committee members. Some revisions to the Constitution may be necessary to formalize some of these committees – committee list available upon request and will be posted to the website.

The International Congress of Entomology (ICE) will be in Orlando, Florida in 2016. The Society needs a presence at this congress and the cost of having a booth is especially attractive as it involves not only the booth but full registrations for 2 people. Thus, the Society should allocate sufficient funds to acquire a booth and provide travel and lodging to 2 volunteers to staff the booth. Chris Jaeger and Mike Toliver are tentative volunteers. Some other members who will be in attendance can serve as people to relieve the booth sitters on occasion. We will need presentation materials for the booth, such as banners, copies of the Journal and the News, pens, jump drives, etc. We should revamp and print new membership brochures for this meeting.

Keith requested a 96 page Journal for the last issue for this year. The proposal passed the Executive Council unanimously.

5 year plan – the remainder of the meeting involved discussion of the 5 year plan drafted by Todd Gilligan, edited by Keith Summerville and John Shuey, and presented initially to the Budget and publications committee, and later to the entire Executive Council. **[Editor's note: the 5-year plan was presented to the membership during the Saturday night banquet at Purdue. The outline of the 5-year plan is printed in this issue of the News, below.]**

CONCLUSION: The Executive Council endorsed the 5-year plan as proposed by President Gilligan (unanimous vote).

The meeting adjourned at 03:55 PM.

The Lepidopterists' Society: 5-Year Strategic Plan

Todd Gilligan, John Shuey & Keith Summerville

[Approved by the Executive Council at the 64th Annual Meeting of the Lepidopterists' Society, 28 July 2015, Purdue University]

Mission: The Lepidopterists' Society is a non-profit educational and scientific organization. It shall be the purpose of the Society to promote internationally the science of lepidopterology in all its branches; to further the scientifically sound and progressive study of Lepidoptera; to publish 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 tending to that end.

Vision: The vision of The Lepidopterists' Society is to maintain and expand its role as the premier worldwide organization focused on the scientific study of Lepidoptera for both professionals and amateurs.

Goals and strategies are listed below. Goals are in **RED**. Action items are in **BLUE**.

Goal 1. Strengthen the leadership and foundations of the Society

STRATEGIES

1. Transform leadership of the Society from a passive maintenance model towards an active, engaged leadership:

- **Hold bi-monthly conference calls (one call every two months) to discuss current business and issues facing the Society.**

2. Increase membership and retention of members:

- **Retain base membership at current levels (1,000 members). Add 20 new members per year for the next five years (100 new members by 2020).**

- **Investigate other membership options, especially for students or younger members.**

3. Maintain good financial standing; increase private donations:

- **Maintain a base level of assets.**

4. Clarify expectations of Executive Committee members, produce orientation materials for incoming EC members, prepare for EC turnover, and develop strategies for recruiting new EC members:

- **Produce orientation materials for incoming EC members detailing the Society and EC functions.**

5. Review and ensure committees are active and fulfilling needed functions, and increase membership involvement in committees:

- **Conduct annual reviews of committee membership.**
- **Involve committee Chairs in bi-monthly conference calls.**

Goal 2. Improve benefits for members

STRATEGIES

1. Improve meeting organization, support, and overall quality:

- **Produce an updated meeting handbook with guidelines for meeting organizers.**
- **Actively involve EC members in meeting planning.**
- **Investigate implementing a funded meeting organizing committee to help local organizers and to help offset costs.**
- **Investigate funding meetings through the Society.**

2. Keep Society resources current with new/upcoming online technologies:

- **Update the Society's current website to a new interface and with new functions (e.g., membership login for BioOne) by 2016.**
- **Revisit website design and functions every three years at a minimum.**
- **Participate in social media and new/evolving technologies.**

3. Encourage greater student involvement and recognition:

- **Promote student involvement in the EC by having at least two student members serve on the EC each year.**
- **Investigate providing mini research grants and/or travel grants to students.**
- **Add a student member sponsorship option to membership forms.**

4. Partner with other Lepidoptera organizations:

- **Investigate partnering with other international organizations by co-sponsoring meetings or providing a strong Society presence at other meetings.**
- **Investigate partnering with other Lepidoptera-focused organizations in North America.**

Goal 3. Maintain and improve the quality and accessibility of our publications

STRATEGIES

1. Reduce/offset costs of publications where possible:

- **Review the Society contract annually with Allen Press.**
- **Review the Society contract for layout work annually.**
- **Review the status of BioOne download and royalties semi-annually starting in 2016.**

2. Utilize modern publication technologies if appropriate:

- **Investigate the use of online pre-publications and/or print-on-demand options for the Journal.**
- **Monitor the use of BioOne and member downloads of publications from the website; explore BHL hosting and paid open access options.**

3. Explore reducing or eliminating page charges for members in the future:

- **Explore ways to reduce or eliminate page charges for Society members to publish in the Journal by replacing page charges with other sources of income.**

New Member Initiatives -- *Todd Gilligan and Carol Butler*

The following is a summary of initiatives to attract new members to the Society that were discussed at the Membership Meeting during the 64th Annual Meeting of the Lepidopterists' Society, 29 July 2015, Purdue University. These items are included in the 5-year plan (also published in this issue of the News); however, they are summarized here for easier reference.

1. The International Congress of Entomology (ICE) will be held in Orlando, Florida, 25-30 September 2016. This is being advertised as the largest meeting of entomologists ever held, with over 6,000 attendees. We are going to staff a non-profit booth at the meeting advertising the Society with the intent of gaining exposure and potential new members. For this initiative, we will need:
    a. Volunteers to staff booth (2 dedicated people and several people with an assigned schedule). Mike Toliver, Christi Jaeger, and possibly Keith Summerville have volunteered. We will also obtain a list of other Society members that plan to attend the meeting.
    b. Keith will request 100 extra runs of Journal 70(2) for distribution at the booth.
    c. The McGuire Center, specifically Charlie Covell and Jackie Miller, will coordinate providing display materials of pinned butterflies and moths, etc.

   d. We need old issues of the News to distribute at this meeting. Contact Todd or Carol if you can contribute.
   e. We need posters/banners/graphic materials and marketing materials (pins, logo materials, etc.). Christi Jaeger has some experience/ contacts for these materials.
   f. We need another run of the membership brochure – Todd will work with Carol to produce a new version and do a special printing for the meeting.
2. Keith regularly distributes samples of the Journals to potential authors. He will increase this activity by mailing samples of the Journal to research laboratories that are active in Lepidoptera research but are not members of the Society.
3. We need to connect with Presidents of other Societies interested in Lepidoptera (regional Societies, NABA, etc.) to make them aware of LepSoc. We might provide some free memberships and/or partner with these organizations with a discount to their members that also join LepSoc.
4. We will add a section to membership renewal forms for sponsoring a student member. The EC has pledged to promote this activity by sponsoring at least one new student member each for 2016. We hope other members will follow suit and help increase our current student membership numbers.
5. Teacher engagement is critical to reaching students. We have published a guide to curricula involving Lepidoptera in The News that will be useful to teachers, and we can provide information on regional speakers and other resources for engaging students. Our new President is recruiting a new Education Committee Chairperson to lead this initiative.
6. To attract new students, we might allocate funds for student research grants and/or travel funds. We currently do not have a travel award that is solely for student applicants (although students can apply for the Bryant Mather Award). In order for this initiative to be successful it would need to be promoted by major professors and teachers and widely publicized by the Society.

Brochures -- *Chris Grinter*

If anyone is in need of some of the new Membership Brochures to hand out at various functions, please contact Chris Grinter (**cgrinter@gmail.com**) and he will be glad to help you out.

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https://www.facebook.com/lepsoc

2015 Lep Soc Awards -- *James K. Adams*

As always, there were several awards presented at this year's meeting of the Lep Soc. The student awards presented included the following: the Harry K. Clench awards for student papers (1st Place $500.00, 2nd Place $250.00) and the Alexander B. Klots awards for student posters (only one was awarded this year for $250.00). There were nine student presentations and three student posters. First Place for the Clench Award went to Brigette Zacharczenko for her presentation "Who can you trust? The trouble with larval host records in *Acronicta* (and all Lepidoptera)". Elena Ortiz-Acevedo was awarded second place for her presentation "Insights into the origin and evolution of preponine butterflies". The one Klots award was given to Julia Snyder for her poster "Survey of secondary plant metabolites in Tiger Moths (Lepidoptera: Erebidae: Arctiinae)". Congratulations to the winners!!

At the banquet on Saturday night, Ted Edwards was awarded the Karl Jordan medal for his continuing work on the moth and butterfly fauna of Australia. See the Karl Jordan article about Ted Edwards by Jackie Miller in this Issue of the News.

Delano Lewis was presented the first Mather Travel Award of $1000.00 to help with expenses to get to the meeting from Jamaica. These awards (there can be more than one awarded for each meetingas subsets of $1000.00) are available to anyone, students or otherwise, who can show need of funding to help attend a meeting. The requirements and procedure for applying for the Mather Awards will be presented in the winter and spring issues of the News, and have appeared in past issues (see the Lep Soc News, 57:1, page 23).

And last but not least, the incoming president Jonathan Pelham was awarded a whole set of regal paraphernalia from outgoing president Todd Gilligan!

Jon Pelham, incoming president, with the regal antennae and the lovely pink nepticulid eye caps. (photo by James K. Adams)

2015 Award Winners at the 64th Annual Lepidopterists' Society Meeting

(Photos this page by James K. Adams)

Brigette Zacharczenko, winner of the Harry K. Clench award for best student paper, with president Todd Gilligan and Awards Committee chair Charlie V. Covell, Jr.

Delano Lewis, winner of the Bryant Mather travel award, with Todd Gilligan and Charlie V. Covell, Jr.

Elena Ortiz-Acevedo, second place winner of the Harry K. Clench award, with Todd Gilligan and Charlie V. Covell, Jr.

Jackie Miller, chair of the Jordan Award committee, with Ted Edwards, winner of this year's Karl Jordan Medal, and president Todd Gilligan.

Julia Snyder, winner of the Alexander B. Klots award for best student poster, with Todd Gilligan and Charlie V. Covell, Jr.

Jon Pelham, incoming president, with the the royal blue wings, that complete the presidential regalia.

Karl Jordan Medal Award 2015 Presented to Ted Edwards

Jacqueline Y. Miller

McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, Univeristy of Florida, P. O. Box 112710, Gainesville, Florida 32611 **jmiller@flmnh.ufl.edu**

Ted Edwards received the Karl Jordan Medal Award at the banquet during the Annual Meetings at Purdue University. He was born in Sydney, Australia on 12 October 1945. Ted married Muriel Story in 1977 and they have a son, Dr. Robert Edwards (New York), and daughter, Nony (Canberra).

Ted Edwards (photo by James K. Adams)

He received a Bachelor of Science (Agriculture) from the University of Sydney in 1967 with a major interest in Entomology during his final year. He worked for several years as an agronomist with the New South Wales Department of Agriculture. Ted joined the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in 1970 to work as an assistant with Dr Ian Common on Australian moths and to build the moth unit of the Australian National Insect Collection based in Canberra. Ted took early retirement in 2000 and has continued to work on the Australian National Insect Collection as an Honorary Fellow until the present. During his association with the collection, the Lepidoptera collection grew to about 1.3 million specimens of Australian moths and butterflies. An active member of four scientific societies, Ted is also a volunteer guide at the Australian National Botanical Gardens and a bit of a bibliophile.

Ted Edwards' accomplishments as an author and co-author include a series of four books, 54 book chapters, 48 peer reviewed publications in addition to four major websites and 63 popular articles. There is a series of interrelated works on Australian Lepidoptera including 39 chapters in the *Checklist of the Lepidoptera of Australia* monograph (1996), a zoological catalogue of Australian *Lepidoptera: Hesperioidea, Paplionoidea* (2001), the Australian Moths Online website (2005) and *A Guide to Australian Moths* (2007). He discovered a unique tripartite association between a species of *Trisyntopa* (Oecophoridae) associated with threatened Australian parrots that obligatorily nest in termite mounds and suggests co-speciation between the birds and the moths (Edwards et al. 2007.) His extraordinary breadth of knowledge on the morphology, taxonomy, biogeography, and biology of the Australian fauna has often laid the foundation for subsequent studies by Ted and other collaborators. The review article on the cossoid/sesioid assemblage (1998) and his authoritative work on the Australian Castniidae provided supportive documentation for the conservation management of threatened ecological communities in Australia. Edwards (2003) recorded three species of the genus *Eriogenes* (Stenomatinae = Elachistidae) from Cape York Peninsula in north-eastern Australia, and expanded the distribution of this genus from mainland New Guinea and adjacent islands. This included newly described species and the first known females. One paper on the behavior of the Australian endemic scribbly moth larvae of *Ogmograptis* (Cooke and Edwards 2007) set the stage for a revisionary study (Horak et al. 2012) which ultimately led to a reassessment of the family Bucculatricidae. Ted has received Whitley awards for three of the books in which he has been involved. In 2012 he became a Member of the Order of Australia for his contributions to science. It is for his extraordinary original research and major publications on the systematics, morphology, behavior, biology, and natural history of the Australian Lepidoptera that the 2015 Committee recognized Ted Edwards with the Karl Jordan Medal.

During his presentation at the banquet, Ted highlighted the unusual endemic taxa of Lepidoptera present in Australia, some of which are mentioned above. He also entertained those present talking about various field expeditions, including a more recent one to Kangaroo Island off southern Australia to collect a moth, *Aenigmatinea glatzella*. This moth species is so unusual and distinct that they had to describe a entirely new

family, Aenigmatineidae, for it (Kristensen, et al. 2015). It is associated with the Southern Cypress-pine tree (*Callitris gracilis*), a rather ancient plant that is found within dry rocky, sandy soils. The moth was only known from a photo, and Ted initiated an expedition to collect the type series. A previous expedition member declined the invitation until Ted chided him by pointing out how rare the opportunity is to collect the type series of a brand new species let alone a new family! It was the first time since the 1970's that a new family of primitive moths had been identified anywhere in the world. Ted's presentation at the banquet was outstanding and showed once again that the evolution of butterflies and moths continues to be more complex that previously thought.

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Vazrick Nazari, Megan McCarty, Gareth Powell (pointing) and Alberto Zilli enjoying a snake at Muscatatuck Nat'l Wildlife Refuge on July 27, 2015 (photo by Jeff Pippen)

Field Trip Participants at Kankakee Sands, July 28, 2015 (photo by Ranger Steve Mueller)

Regal Fritillary (*Speyeria idalia*) at Kankakee Sands, July 28, 2015 (photo by Jeff Pippen)

Purdue University, 64th Lep Soc meeting field trips

Compiled by Ranger Steve (Mueller)

Ody Brook Enterprise, 13010 Northland Drive, Cedar Springs, MI 49319 **odybrook@chartermi.net**

Three butterfly field trips provided opportunities from Muscatatuck National Wildlife Refuge in southern Indiana to Kankakee Sands Prairie in northwest Indiana. The Shades State Park trip represented central Indiana. The coordination and leadership for the three outings was appreciated by participants.

We thank the trip leaders, as follows: A) July 27 to Muscatatuck National Wildlife Refuge: Gareth Powell and Jen Zaspel; B) July 28 to Kankakee Sand Prairie: Tim Anderson and John Shuey; C) August 1st to Shades State Park: Gareth Powell and Jen Zaspel.

Thank you to Jeff Pippen for providing species lists that added to my incomplete list.

See **Table 1** species list. In addition to field collecting and observation opportunities, leaders provided history, management strategies, and natural history guidance.

The opportunity to spend time in the field with fellow lepidopterists is educational, fun, and a highlight of Lep Soc Meetings for many of us. We hope to enjoy time afield with many of you at the Florissant, Colorado meeting at The Nature Place in July 2016.

Common Name	**Species**	Muscatatuck	Kankakee	Shades
Date 27 July - 1 August 2015		27 July	28 July	1 August
Papilionidae -- 4 species				
Pipevine Swallowtail	*Battus philenor philenor*	X		
Zebra Swallowtail	*Eurytides marcellus*	X		
Eastern Tiger Swallowtail	*Papilio glaucus glaucus*	X	X	X
Spicebush Swallowtail	*Papilio troilus troilus*		X	X
Pieridae -- 6 Species				
Cabbage White	*Pieris rapae rapae*		X	X
Clouded Sulphur	*Colias philodice philodice*		X	X
Orange Sulphur	*Colias eurytheme*	X	X	X
Cloudless Sulphur	*Phoebis sennae sennae*		X	
Little Yellow	*Pyrisitia lisa lisa*		X	
Sleepy Orange	*Abaeis nicippe*		X	
Lycaenidae -- 4 species				
American Copper	*Lycaena phlaeas hypophlaeas*		X	
Bronze Copper	*Lycaena hyllus*		X	
Eastern Tailed Blue	*Cupido comyntas comyntas*	X	X	X
Summer Azure	*Celastrina neglecta*	X		
Nymphalidae -- 14 species				
American Snout	*Libytheana carinenta bachmanii*	X		
Great Spangled Fritillary	*Speyeria cybele cybele*	X	X	
Regal Fritillary	*Speyeria idalia occidentalis*		X	
Pearl Crescent	*Phyciodes tharos tharos*	X	X	X
Question Mark	*Polygonia interrogationis*	X		X
Eastern Comma	*Polygonia comma*	X		X
Red Admiral	*Vanessa atalanta rubria*	X		X
American Lady	*Vanessa virginiensis*		X	
Painted Lady	*Vanessa cardui*		X	

Common Name	**Species**	Muscatatuck	Kankakee	Shades
Red-spotted Purple	*Limenitis arthemis astyanax*	X		X
Viceroy	*Limenitis archippus archippus*	X	X	
Hackberry Emperor	*Asterocampa celtis celtis*	X		
Common Wood Nymph	*Cercyonis pegala pegala*		X	
Monarch	*Danaus plexippus plexippus*	X	X	X
Hesperiidae -- 12 species				
Silver-spotted Skipper	*Epargyreus clarus clarus*	X	X	X
Horaces's Duskywing	*Erynnis horatius*	X	X	
Swarthy Skipper	*Nastra lherminier*		X	
Least Skipper	*Ancyloxypha numitor*		X	
Peck's Skipper	*Polites peckius peckius*		X	
Northern Broken Dash	*Wallengrenia egeremet*	X	X	
Tawny-edged Skipper	*Polites themistocles themistocles*			X
Crossline Skipper	*Polites origenes origenes*	X		
Little Glassywing	*Pompeius verna*	X		
Zabulon Skipper	*Poanes zabulon*	X		
Eastern Dun Skipper	*Euphyes vestris metacomet*	X		
Common Roadside Skipper	*Amblyscirtes vialis*		X	
Early Life Stages				
Monarch Larva	*Danaus plexippus plexippus*			X
Cloudywing larva	*Thorybes* sp.			X

Nomenclature follows Jeffrey E. Belth - Butterflies of Indiana

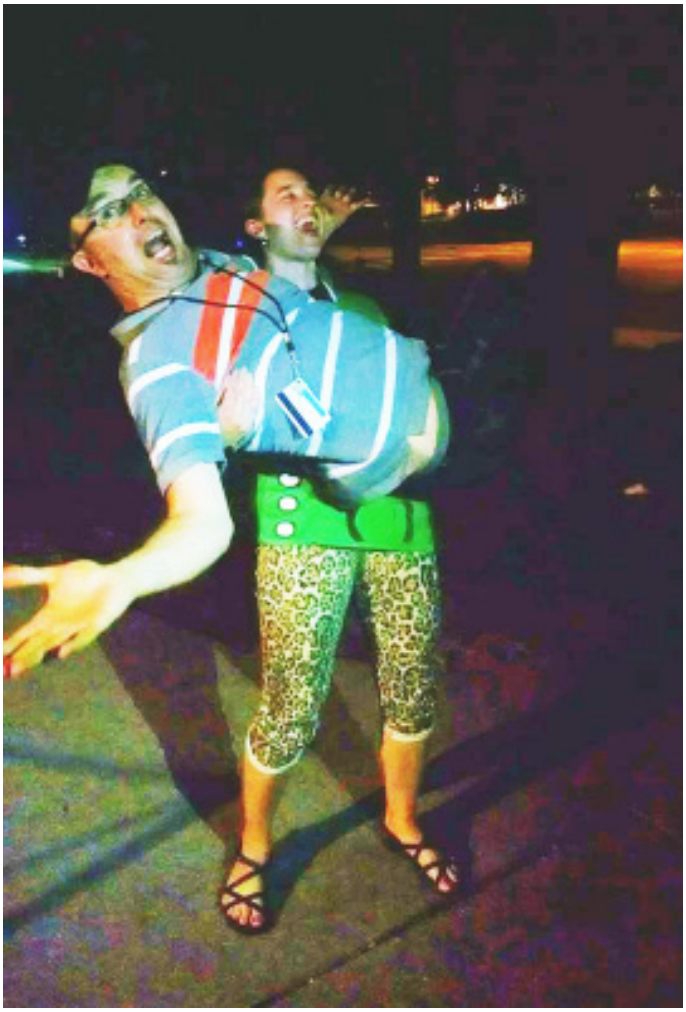
American Copper (*Lycaena phlaes hypophlaes*) at Kankakee Sands, July 28, 2015 (photo by Jeff Pippen)

Bronze Copper (*Hyllolycaena hyllus*) at Kankakee Sands, July 28, 2015 (photo by Jeff Pippen)

Elena Ortiz-Acevedo, left, Jen Zaspel (Lep Soc 2015 Program Organizer), right (photos by Delano Lewis). There is a remarkable set of coincidences that go with these two photos that must be shared. During the door prize presentations at the Lep Soc 2015 banquet on Saturday night by Charlie Covell, Delano's photos had been showing in sequence on a screen in the background. After many door prizes had come and gone, a couple of copies of a very nice book on Australian Natural History were being offered. Elena's number was called and right as she got up to get her copy, the photo of her smiling (above) popped up. Jen had already indicated that she never won any door prizes, and did so vociferously again right after Elena got her copy. And remarkably, the next picture on the screen was Jen's poutish picture above. Laughter ensued for those that noticed. Jen then said, "Charlie, call my number." And, miraculously, that's exactly what Charlie did. Congratulations Elena and Jen! -- *James K. Adams*

Ranger Steve Mueller and Brian Scholtens. You would think that they discussed those shirts prior to the meetings!
(photo by James K. Adams)

The Landrys -- Jean-Francois, Marie-Therese, and Marie.
(photo by James K. Adams)



Brigette Zacharczenko showing off her world-class weightlifting skills (no, really, she does that), picking up Vazrick Nazari.
(photo by Christi Jaeger)

Geoff Martin and Charlie Covell. (photo by James K. Adams)


James Adams and Jeff Pippen. (photo by Ranger Steve Mueller)


Mari Kekkonen and Maria Heikkilä, the Finnish contingent. (photo by James K. Adams)


Kathy Wildman, t-shirt vendor. (photo by Delano Lewis)


Leroy Koehn and David McCarty. (photo by James K. Adams)

Matt Lehnert presenting on proboscis coiling patterns. (photo by Delano Lewis)


Megan McCarty and Jen Zaspel. (photo by James K. Adams)


Valerie Kramer, a Lehnert student. (photo by Delano Lewis)

Metamorphosis

Chris Grinter

David Dauphin: It is with sadness I report the death of David Dauphin on July 8, 2015. David was our neighbor, friend, and above all, a fellow nature enthusiast. The cause of death was COPD with heart complications, and David had been on oxygen for some time. However, he and wife Jan remained active within their yard and in the past year added a number of new species to the yard list, including a US record, *Astraptes talus*. He is survived by Jan, daughter Stephanie, and two grandchildren.

David Dauphin's extensive birding activities have been detailed elsewhere. I will only mention that he served in various official capacities in the major birding organizations and was instrumental in getting critical habitat protection, especially along the upper Texas coast. When he and Jan retired to Mission, Texas, circa 2003, they increased their interest in butterflies. The home they purchased was in an over-55 community of mobile-home-sized lots. Many of the home-owners were winter residents only, and there were mostly rock yards with a few exotic plants and even fewer blooms. The Dauphins proceeded to remove much of the rock from their yard, then fill every available space with native host plants and nectar sources, plus select non-natives. The result, over a decade later, is a yard list standing at 159 species, all photographed within their property lines. Flybys and bugs in the neighbors' yards are not counted!

In addition to the superb butterfly yard, David developed and maintained an excellent website featuring extensive data about Rio Grande Valley nature, economy, and other areas of interest to visitors. The showpiece of the website is Jan's excellent photos of butterfly adults and life histories. When we moved to the RGV in 2008 we made good use of this website. David was for several years director of the Texas Butterfly Festival, now in its 20th year, and as long-time NABA members, the Dauphins participated in annual butterfly counts, and various other butterfly-related activities.

Seeking a community that was open to butterfly-friendly yards, we looked in the Dauphins' neighborhood and ultimately bought the house behind theirs. Over the years, I'm sure we had many nice butterflies stray from Jan and David's yard to ours, but I think we sent a few back their way. Good butterflying, David. *[by Mike Rickard]*

Robert S. Bryant of Baltimore, Maryland passed away earlier this year; a specialist on the leps of Maryland, he had been a member of the Society from 1963 through 2009.

Mr. Michael "Mike" Bruce Sowers, 53, of Frederick, MD, died suddenly on Thursday, April 23, 2015 at Frederick Memorial Hospital. He was the loving husband of Mary Fink. They'd been inseparable for 35 years.

Born April 2, 1962 in York, PA, he was the son of Oliver F. Sowers, Jr. of York, and the late Faye J. (Kauffman) Sowers.

An entomologist by trade, Mike recently was a volunteer with the Smithsonian Institute's Natural Museum Natural History (NMNH) Butterfly Pavilion. He held memberships in different organizations across the country and was known by many. Among those memberships were Maryland Invasive Species Council, the Golden Key National Honor Society, and the Maine Master Gardeners.

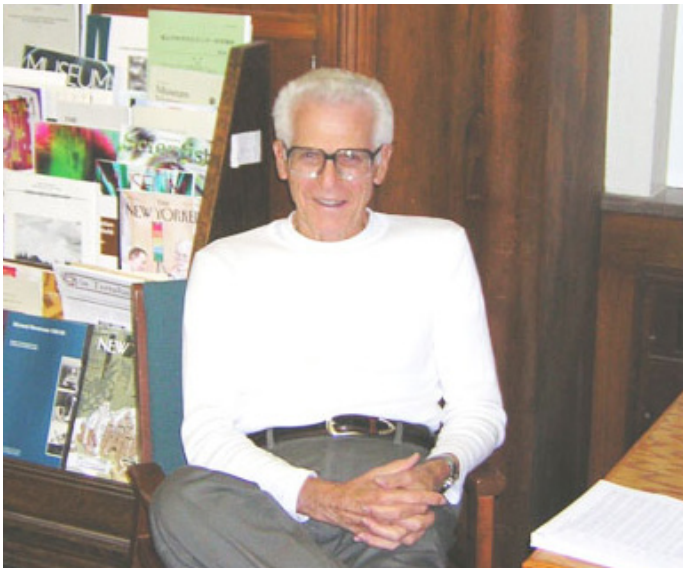
Mike received his BA in Russian Studies and a minor in Geography from Millersville University of Pennsylvania. He continued his education by receiving the following Masters Degrees: an MA in Geography and Regional Planning from California University of Pennsylvania; an MS in Forest Resources from the University of Minnesota; and an MS in Entomology from the University of Nebraska. Mike will be greatly missed.

In addition to his wife and father, Mike is survived by his sister, Susan Spencer; his brother, Dennis Sowers; and his extended family in Pennsylvania, Ohio and Virginia.

In lieu of flowers, memorial contributions may be made to the NMNH Butterfly Pavilion, Office of Advancement, MRC 135 P.O. Box 37012, Washington, DC 20013-7012; or to Maine Master Gardeners, 21 Bradeen Street, Suite 302, Springvale, Maine 04083.

Expressions of sympathy may be shared with the family at **www.staufferfuneralhome.com.** *[Information received from an abridged obituary originally run by the family]*

Bruce Boyd died Saturday July 11 at his home in Henderson, Nevada following a battle with cancer. Born in Iowa Falls, Iowa in 1951 he moved with his family to California in 1958 and settled in Henderson in 1978. A self-taught naturalist his studies focused on the butterflies of Nevada, with a special interest in the fauna of Spring and Sheep Mountains, Clark County. During the final years of his life he worked extensively to protect the butterflies of the Spring Mountains from development and habitat loss. He is survived by his son, Bret Boyd and wife Sally, and brothers Vern and Sandee Boyd of Henderson, Nevada and Steven and Sandi Boyd of New Braunfels, Texas. More information about his work can be found on his website, **www.butterfliesofthespringmountains.com**. *[by Bret Boyd]*



Clyde Gillete: Long time Utah Lepidopterist, COL Clyde F. Gillette, passed away on 9 Jun 2015 after a short illness. He is remembered as a scientist, searching for and studying butterflies, adventurer and explorer, and climbing mountains during his 88 years.

Clyde's love of butterflies began as a child and, at age 9, he co-authored an article on butterfly migrations with Dr. Angus Woodbury of the U of U. He co-founded the Utah Lepidopterists' Society and was known informally as Mr. Butterfly of Utah because of his extensive research of butterflies. A stroke in 2011 curtailed this somewhat. As one of the co-founders of the Sierra Club's Utah chapter (1959), Clyde was an avid conservationist, putting summit registers on the top of the highest peaks in all 29 counties of Utah. He climbed the highest mountains in all 11 western states.

Clyde's devotion to Utah butterflies and developmental histories was herculean in carefully documenting county records, early records, late records, larval food plant records, adult nectar records, low elevation, and high elevation extremes. Clyde not only proved many butterfly core records, but also acknowledged other previous Utah lepidopterists who made noteworthy discoveries. Clyde invented his own proprietary abbreviation system allowing the most data to be shared in the least amount of space and was adamant about accuracy.

Although Clyde's lifelong project, the book, "Butterflies of Utah," was never completed, Clyde loved writing about butterflies and provided dozens of articles in his publication, "Utahensis," as well as uncounted numbers of butterfly write-ups in the form of handouts and quizzes during decades of Utah Lepidopterists' Society meetings.

Clyde's passion for mountaineering and western North American butterflies especially included hiking high elevation Arctic Alpine habitat in search of his favorite coppers Lycaena cupreus and Lycaena phlaeas as well as satyrines such as Erebia magdalena.

In July, 2006, Clyde took the lead in organizing the Pacific Slope Section Meeting of The Lepidopterists' Society held at the Great Basin Environmental Education Center in Ephraim, UT, and was the Saturday evening keynote speaker. He shared his passion for UT butterflies and how much remorse he felt for human expansion and the destruction of native butterfly habitat in support of housing and commercial development. Unfortunately with Clyde's ailing condition, he was not able to attend last year's Lepidopterists' Society meeting in Park City, Utah.

At the conclusion of his graveside service, following the dignified military folding of the U.S. Flag provided to his wife, Janet, five individual local swallowtails -- *Papilio bairdi* form "*bairdi*", *Papilio bairdi* form "*brucei*', *Papilio multicaudatus pusillus, Papilio rutulus*, and *Papilio eurymedon* were released in honor of Clyde. Especially touching was seeing the male multicaudatus circle around his family and stop to nectar on the floral arrangements while Clyde's great granddaughters pursued and watched in awe.

Clyde's family obituary can be found at **http://bit.ly/1MwyGjh.** *[by Janet Walker Gillette and Todd Stout]*

Membership

The Lepidopterists' Society is open to membership from anyone interested in any aspect of lepidopterology. The only criterion for membership is that you appreciate butterflies 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:

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

Dues Rate

Active (regular)	$ 45.00
Affiliate (same address)	10.00
Student	20.00
Sustaining	60.00

(outside U.S., for above add 5$ for Mexico/Canada, and 10$ elsewhere)

Life	1800.00
Institutional Subscription	60.00
Air Mail Postage, **News** ($30.00 outside North America)	15.00

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).

Change of Address?

Please send permanent changes of address, telephone numbers, areas of interest, or e-mail addresses to:

Chris Grinter, Assistant Secretary
Illinois Natural History Survey
1816 S. Oak Street, Champaign,
IL 61820-0904; cell: 847-767-9688
cgrinter@gmail.com

Our Mailing List?

Contact Chris Grinter for information on mailing list rental.

Missed or Defective Issue?

Requests for missed or defective issues should be directed to Chris Grinter. Please be certain that you've really missed an issue by waiting for a subsequent issue to arrive.

Memoirs

Requests for Memoirs of the Society should be sent to Publications Manager, Ken Bliss (address opposite).

Submissions of potential new Memoirs should be sent to:

Kelly M. Richers
9417 Carvalho Court
Bakersfield, CA 93311
(661) 665-1993 (home)
kerichers@wuesd.org

Journal of The Lepidopterists' Society

Send inquiries to:

Keith Summerville
(see address opposite)
ksummerville@drake.edu

Book Reviews

Send book reviews or new book release announcments to either of the following (do NOT send new books):

James K. Adams
(see address opposite)
jadams@daltonstate.edu

Carol A. Butler
60 West 13th Street
New York, NY 10011
cabutler1@verizon.net

WebMaster

Todd Gilligan, Colorado State University, Bioagricultural Sciences and Pest Management, 1177 Campus Delivery, Fort Collins, CO 80523-1177, (970)490-4478
tgilliga@gmail.com

Submission Guidelines for the News

Submissions are always welcome! Preference is given to articles written for a non-technical but knowledgable audience, illustrated and succinct (under 1,000 words, 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 Volumes 57 or 58 must reach the Editor by the following dates:

Issue		Date Due
57	4 Winter	Nov. 15, 2015
58	1 Spring	Feb. 15, 2016
	2 Summer	May 20, 2016
	3 Fall	Aug. 15, 2016

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.

Executive Council

President

Jonathan P. Pelham
3733 138th Street SW
Lynnwood, WA 98087-5237
(206)910-4764
zapjammer@comcast.net

Past President

Todd Gilligan
Colorado State University
Bioagricultural Sciences
and Pest Management, 1177
Campus Delivery, Fort
Collins, CO 80523-1177
(970)490-4478
tgilliga@gmail.com

Vice Presidents

John Calhoun (1st VP)
977 Wicks Drive, Palm
Harbor, FL 34684-4656
(727)785-0715
bretcal1@verizon.net

Crispin Guppy
5 Boss Road, Whitehorse,
Yukon Territory, Y1A 5S9
CANADA (867)633-2762
csguppy@gmail.com

Niklas Wahlberg
Ahventie 10 As 2, 20760
Piispanristi, Varsinais-
Suomi, FINLAND
(358)407647922
niklas.wahlberg@utu.fi

Secretary

Michael Toliver
Division of Math and
Science, Eureka College
300 E. College Ave.
Eureka, IL 61530-1500
miketol@eureka.edu

Assistant Secretary

Chris Grinter
Illinois Natural History
Survey, 1816 S. Oak Street,
Champaign, IL 61820-0904;
847-767-9688
cgrinter@gmail.com

Treasurer

Kelly M. Richers
9417 Carvalho Court
Bakersfield, CA 93311
(661) 665-1993 (home)
kerichers@wuesd.org

Assistant Treasurer

Chris Grinter, Illinois Natural History Survey, 1816 S. Oak Street, Champaign, IL 61820-0904; 847-767-9688
cgrinter@gmail.com

Publications Manager

Kenneth R. Bliss
2438 Falcon Drive
Round Rock, TX 78681-2755
(512)850-1700
krbliss@gmail.com

Editor, News of The Lepidopterists' Society

James K. Adams
School of Sciences and Math
Dalton State College
650 College Drive
Dalton, Georgia 30720
(706)272-4427
jadams@daltonstate.edu

Editor, Journal of The Lepidopterists' Society

Keith Summerville
Dept. of Environmental
Science and Policy, 131 Olin
Hall, Drake University
Des Moines, IA 50311-4505
(515)271-2265
ksummerville@drake.edu

Editor, Memoirs of The Lepidopterists' Society

Kelly Richers
(see Treasurer, above)

WebMaster

Todd Gilligan
(see WebMaster opposite)

Members-At-Large

Christi Jaeger, Caitlin LaBar, Erik Runquist, Megan McCarty, Kathleen Prudic, Mark Walker, Carol Butler, Michael Collins, Jennifer Zaspel

Season Summary Zone Coordinators

Refer to Season Summary for Zone coverage details.

Chief Season Summary Coordinator and Editor

Leroy C. Koehn
3000 Fairway Court
Georgetown, KY 40324
(502) 370-4259
leptraps@aol.com

Zone 1, The Far North:

Crispin Guppy
5 Boss Road, Whitehorse,
Yukon Y1A 5S9, Canada
778-256-1251
csguppy@gmail.com.

Zone 2, The Pacific Northwest:

Jon H. Shepard
4925 SW Dakota Ave.
Corvallis, OR 97333
(541) 207-3450
shep.lep@netidea.com

Zone 3, The Southwest:

Ken Davenport
8417 Rosewood Avenue
Bakersfield, CA 93306
(661) 366-3074 (home)
kdavenport93306@yahoo.com
with help on moths from Kelly Richers (see Treasurer, this page)

Zone 4, The Rocky Mountains:

Chuck Harp
8834 W. Quarto Ave.
Littleton, CO 80128-4269
(720) 981-5946
cehmoth@aol.com

Zone 5, The Plains:

OPEN: If you have ANY interest in being the Zone Coordinator for this region, please contact Leroy Koehn as soon as possible!! See contact information above.

Zone 6, Texas:

Charles Bordelon
Texas Lepidoptera Survey
8517 Burkhart Road
Houston, TX 77055
texaslepsurvey@sbcglobal.net

Zone 7, Ontario and Quebec:

Maxim Larrivee
Collections entomologiques et recheche, Insectarium de Montréal/Espace pour la vie
4581, rue Sherbrooke E.
Montréal, Québec
Canada H1X 2B2
(514) 872-0474, ***maxim.larrivee@ville.montreal.qc.ca***

Zone 8, The Midwest:

Thomas Jantscher
2501 Simpson Street
Roseville, MN 55113-3142
(612) 875-1710
tjantscher@gmail.com

Zone 9, The Southeast:

Brian G. Scholtens
Biology Department
College of Charleston
66 College Street
Charleston SC 29424-0001
(803) 856-0186
scholtensb@cofc.edu

Zone 10, The Northeast:

Mark J. Mello
c/o Lloyd Center,
430 Potomska Rd
Dartsmouth, MA 02748
markmello@lloydcenter.org

Zone 11, Mexico & the Caribbean:

Isabel Vargas Fernandez
Museo de Zoologia,
Facultad de Ciencias,
Univ. Nacional Autonoma
Mexico, Apartado Postal 70-399, D.F., Mexico 04510
ivf@ciencias.unam.mx

Attendees at the 64th annual meeting of The Lepidopterists' Society, July 29- August 2, 2015, Purdue University, West Lafayette, IN
(Photo by John Obermeyer, Purdue Entomology)