Volume 52, Number 3 Autumn 2010

NEWS OF THE LEPIDOPTERISTS' SOCIETY

THE LEPIDOPTERISTS' SOCIETY EST. 1947

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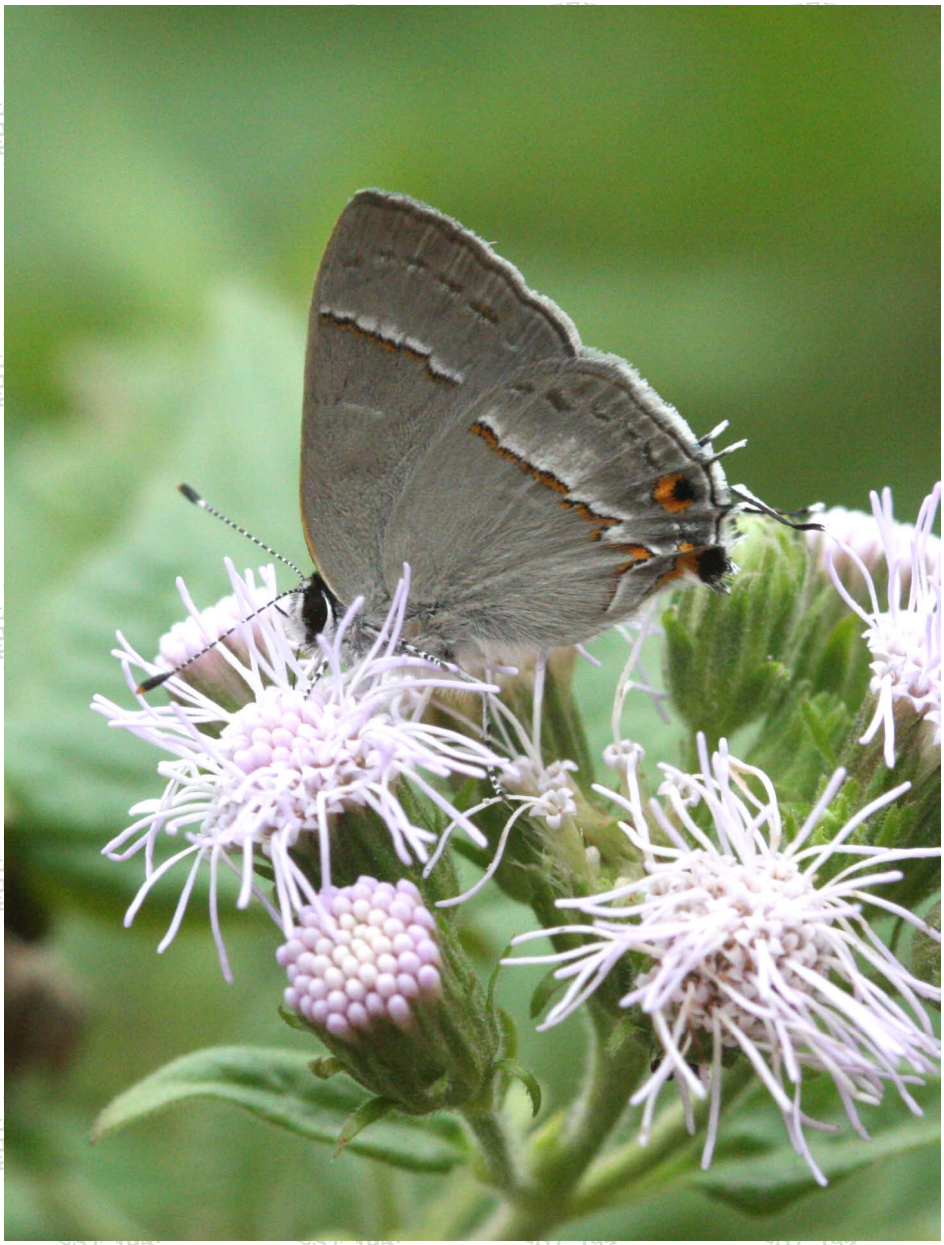

NEWS OF THE LEPIDOPTERISTS' SOCIETY

Volume 52, Number 3
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The **News of the Lepidopterists' Society** (ISSN 0091-1348) is published quarterly by The Lepidopterists' Society, c/o Los Angeles County Museum of Natural History, 900 Exposition Blvd., Los Angeles, CA 90007-4057, USA., and includes one or two supplements each year. The **Season Summary** is published every year as Supplement S1 and is mailed with issue 1 of the News. In even numbered years a complete **Membership Directory** is published as Supplement S2 and is mailed with issue 4 of that volume of the News. Please see the inside back cover for instructions regarding subscriptions, submissions to, and deadline dates for, the News.

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

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

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Issue Date: October 31, 2010 ISSN 0091-1348

Front Cover:

Strymon serapio, male, Texas: Hidalgo Co. Estero Llano Grande State Park, 19-December-2008, first US record. Photo by Michael A. Rickard.

Strymon serapio new for the U.S. (Lycaenidae: Theclinae)

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Larval feeding on the pineapple plant family (Bromeliaceae) is not very common among butterflies. However, there is one group that uses these plants exclusively (Robbins 2010). Species of the *serapio* group Robbins & Nicolay, 2002 from *Strymon* Hübner, 1818 (Lycaenidae: Theclinae) have been recorded only from Bromeliads (Robbins & Nicolay 2002). In addition, *Strymon ziba* (Hewitson, 1868), while being polyphagous, utilizes Bromeliaceae as major hosts (Harris 1927, Robbins & Aiello 1982). Both *S. serapio* and *S. ziba* group species (Robbins & Nicolay 2002) are at times serious commercial pineapple pests (Harris 1927, Carter 1934, Silva et al. 1967-1968, Beutelspacher 1972, Otero & Marigo 1990). Sixteen species are recognized by Robbins (2004) among Bromeliad-feeding *Strymon* (*serapio* and *ziba* species groups). This latest taxonomic arrangement covers 58 names, 42 of which are included as subspecies and synonyms. Bromeliad-feeding *Strymon* are mostly South-American with just three species on the Robbins list (2004) being recorded from northern Mexico, e.g. all three are known from Tamaulipas, south of Ciudad Victoria (Plate 1).

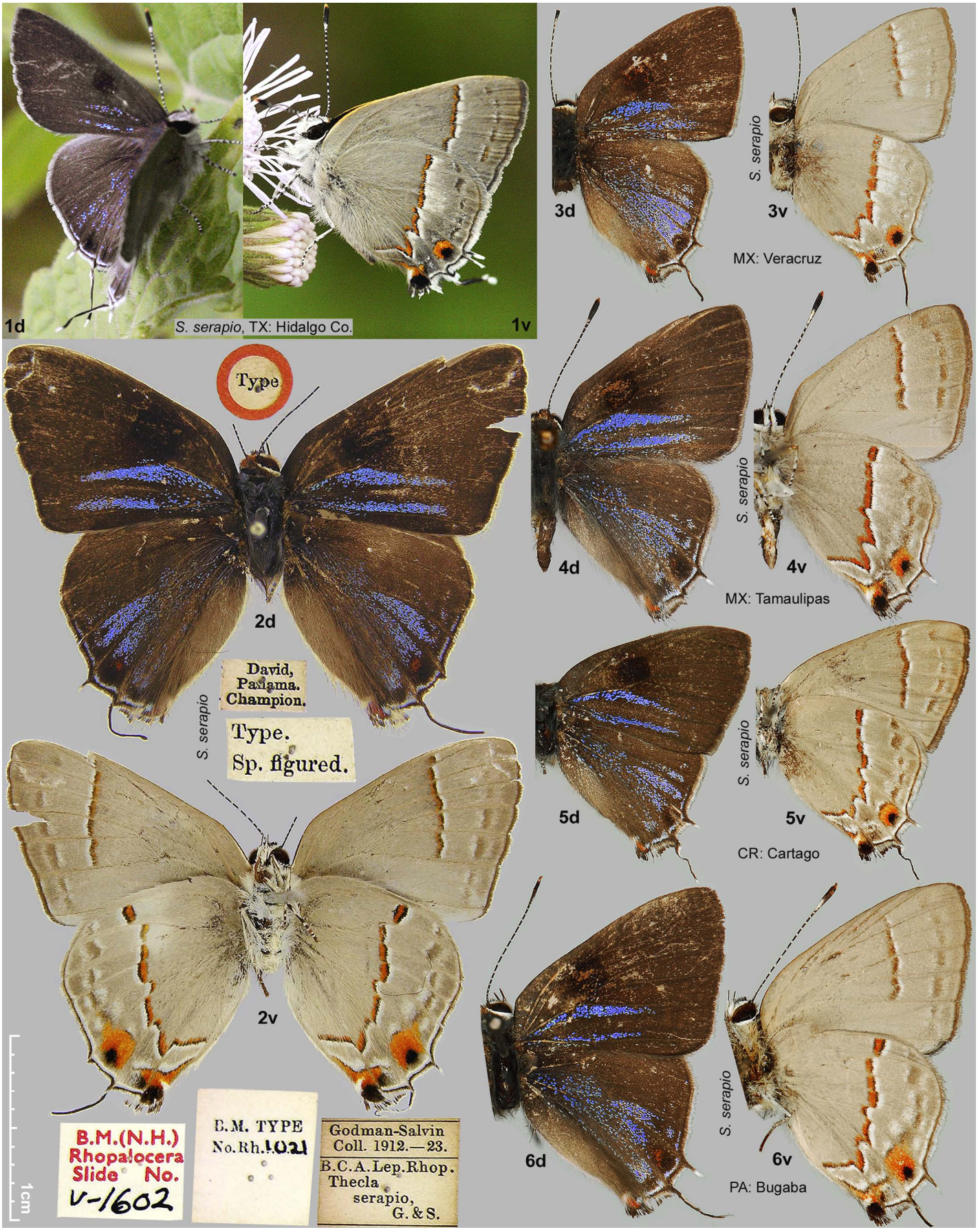
Here, we document the first occurrence of *Strymon serapio* (Godman & Salvin, 1887) from the United States. A single male individual was photographed by the senior author on December 19, 2008 in the butterfly garden at Estero Llano Grande State Park (USA: TEXAS: Hidalgo Co.). The senior author, a Texas Parks and Wildlife volunteer naturalist, was assisting with the regular Friday butterfly walk when he observed the individual nectaring on Blue Boneset (*Eupatorium azureum* DC.). It was immediately clear that this was a probable new species for the US. After the group of 10-12 people had photographed the butterfly extensively for some 20 minutes, Rickard gently prodded it with a stem and it flew to a leaf and proceeded to bask, allowing a number of additional photographs of the upperside. Eventually, approximately half an hour after first sighting, the insect flew up into trees lining the walkway. Permit restrictions prohibit collecting in the butterfly gardens (especially during a butterfly walk), and senior staff was unavailable to grant an override. Thus the butterfly could not be collected, and subsequent visits by various observers have failed to turn up additional individuals. Initial identification was made by comparison with live *S. serapio* photographs on the Internet. To date no probable hostplant has been found in the immediate area where the individual was seen, but areas that could contain 1-3 species of Spanish Mosses (*Tillandsia* L.) have yet to be fully searched, along with nearby habitat containing exotic plants.

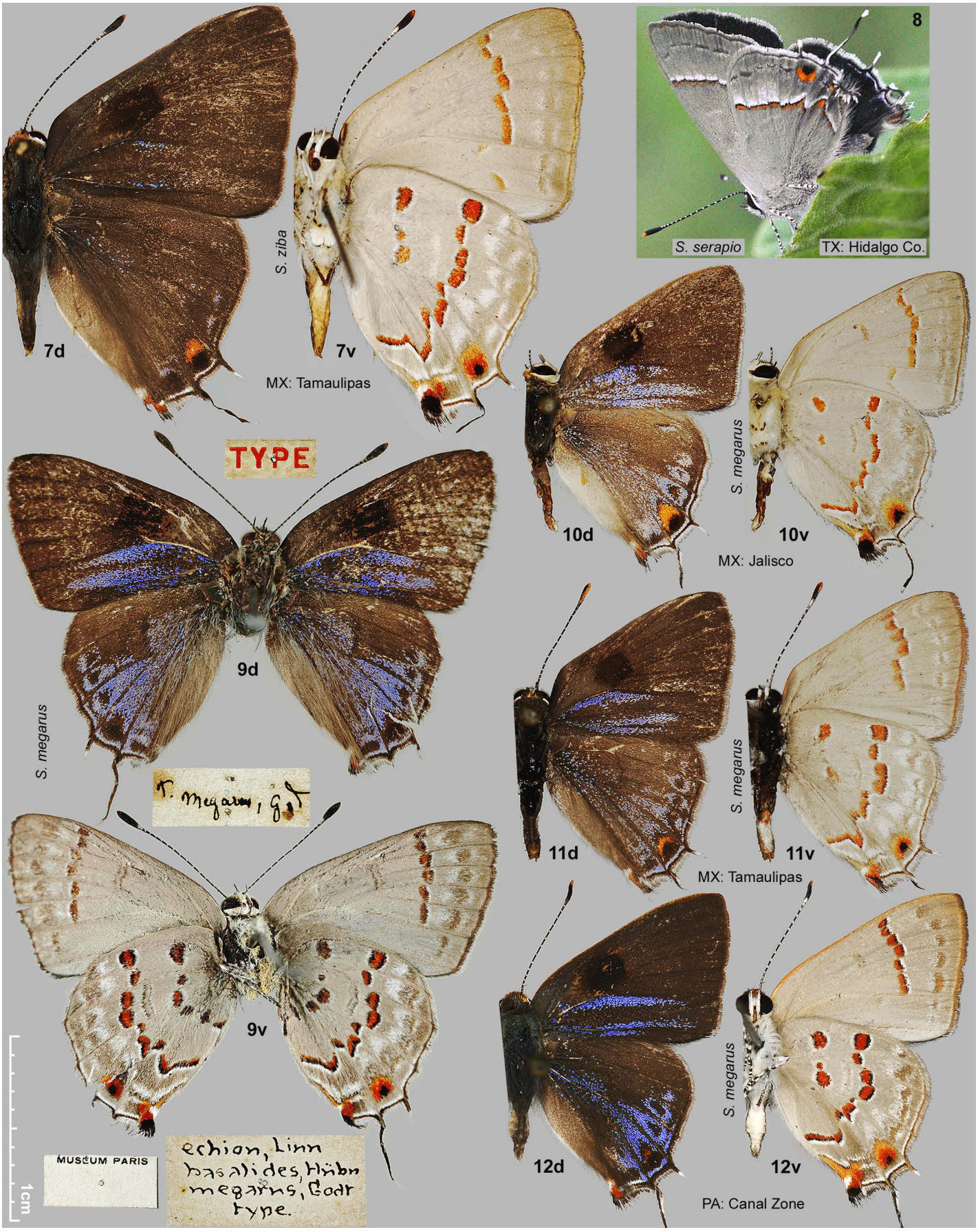
Taxonomy of the Bromeliad-feeding *Strymon* is not yet settled and is expected to be quite complex. According to Robbins (2004), 3 species recognized from Northern Mexico are: *Strymon serapio*, *S. megarus* (Godart, [1824]) and *S. ziba*. A *S. megarus* relative has been recorded from the Big Bend National Park area (USA: TEXAS: Brewster and Presidio Counties), listed under "*S. serapio*" in Pelham (2008), species #493. Here, we illustrate male specimens of these species from North American countries, and primary types of *S. serapio* and *S. megarus* (Plate 1, Figs 1-12). In addition to various levels of violet-blue overscaling on the dorsal wing surface of males and Bromeliaceae as caterpillar hosts, these hairstreaks are unified by two cornuti in the penis tip, paired in *S. serapio* group species (Plate 2, Fig. 1d) and unpaired in *S. ziba* (Plate 2, Fig. 3d) (Robbins & Nicolay, 2002).

The *S. ziba* group is very unusual, as it is the only *Strymon* that lacks prominently developed anteriorly directed teeth on the posterior dorsal surface of male genitalic valvae (Plate 2, Figs. 1-3), a character used to define *Strymon* by Robbins & Nicolay (2002). Also, *S. ziba* females lack the sclerotized loop (Plate 2, Fig. 4) on the ductus bursae, but the posterior end of the corpus bursae is expanded and prominently sclerotized, forming a very characteristic structure termed "hood" by Johnson et al. (1990) (Plate 2, Fig. 5). Nevertheless, wing pattern of *S. ziba* is very similar to *S. megarus* (Plate 1, compare Fig 7 with 9-12) and some specimens are very difficult to separate by superficial characters (Robbins 2010). The field-marks that we find helpful (but possibly not absolute) are:

1) *S. ziba* lacks dark or orange scales on the underside at the distal end of the hindwing discal cell (Glassberg 2007). The end of the cell is marked by white scales that form a bar along the vein (Plate 1, Fig 7v). *S. megarus* has gray, dark or orange scaling in the end-of-cell bar (Plate 1, Figs 9v-12v). This is the most reliable mark, although more research is necessary to find possible exceptions.

2) Blue overscaling on the dorsal wing


1d
S. serapio, TX: Hidalgo Co.
1v
3d
S. serapio
3v
MX: Veracruz
Type
2d
David, Panama. Champion.
S. serapio
Type. Sp. figured.
4d
S. serapio
4v
MX: Tamaulipas
5d
S. serapio
5v
CR: Cartago
2v
B.M.(N.H.) Rhopalocera Slide No. V-1602
B.M. TYPE No. Rh. 1021
Godman-Salvin Coll. 1912.—23.
B.C.A. Lep. Rhop. Thecla serapio, G. & S.
1cm
6d
S. serapio
6v
PA: Bugaba


8
S. serapio
TX: Hidalgo Co.
7d
S. ziba
7v
MX: Tamaulipas
TYPE
10d
S. megarus
10v
MX: Jalisco
9d
S. megarus
T. megarus, Godt
11d
S. megarus
11v
MX: Tamaulipas
9v
MUSÉUM PARIS
echion, Linn
basalides, Hübn
megarus, Godt
type.
1cm
12d
S. megarus
12v
PA: Canal Zone

surface is very limited in *S. ziba*, and is usually confined on the forewing to the Cu2-2A cell [venation notations per Comstock (1918)], just by the Cu2 vein near its origin at the discal cell and by the 2A vein in the median section; and on the hindwing in the posterior part of the discal cell (Plate 1, Fig. 7d). Some exceptions from this trend are known, but *S. ziba* almost never has any significant number of blue scales in the forewing cell 2A. Males of *S. megarus* exhibit more prominent violet-blue overscaling in forewing Cu2-2A and 2A cells and posterior portion of the hindwing. Blue scales in 2A forewing cell are quite prominent in *S. megarus* males (Plate 1, Figs. 9-12).

3) Ventral hindwing in *S. ziba* is with 2 or 3 prominent postbasal orange macules, as in *S. megarus*, but *S. ziba* hindwing is narrower and more triangular. As a result, orange postmedian band macules in cells M1-M2 and M2-M3 are more aligned with Rs-M1 macule in *S. ziba*, and more bulged out distally in *S. megarus*. Again, this mark does not hold in all specimens.

4) Ventral hindwing orange macule in the anterior part of Cu2-2A cell is directed proximally towards Cu2 vein in *S. ziba*, and this macule is almost parallel to the wing margin or directed distally towards Cu2 vein in *S. megarus*. In some *S. megarus* the macule may be somewhat proximally directed, almost as in *S. ziba*, and some *S. ziba*, especially from South America may have this macule reduced or distally directed.

Although the sole *Strymon serapio* US individual was not captured to examine genitalia, from the ventral wing pattern it is certain that it is not *S. ziba* or *S. megarus*, as the latter two species possess prominent postbasal orange-red macules (Plate 1, Figs 7v 9v-12v). The presumed *S. megarus* type (Brazil), currently in the Muséum national d'Histoire naturelle, Paris, France (Plate 1, Fig. 9), exhibits a band of 6 postbasal macules. Specimens from Mexico to Panama (Plate 1, Figs. 10-12) vary in the expression level of orange macules on the hindiwng, from rather small and narrow (Plate 1, Fig. 10) to almost as large as in the type (Plate 1, Fig. 12), with the majority of specimens showing intermediate tendencies (Plate 1, Fig. 11). The US individual (Plate 1, Figs. 1, 8) clearly lacks the postbasal macules and in this feature agrees with *S. serapio* (Plate 1, Figs. 2-6).

Additionally, the postmedian orange band on ventral hindwing in *S. megarus* and *S. ziba* is clearly separated into macules that are narrower near the veins. In particular, orange areas in Rs-M1, M1-M2 and M2-M3 cells form clearly separated macules. In *S. serapio*, the postmedian orange band is more continuous, and macules in Rs-M1, M1-M2 and M2-M3 are aligned with each other and are not obviously separated by veins, forming almost continuous band (Plate 1, Figs 2v-6v). The same continuous band is apparent in the US individual (Plate 1, Figs 1v, 8).

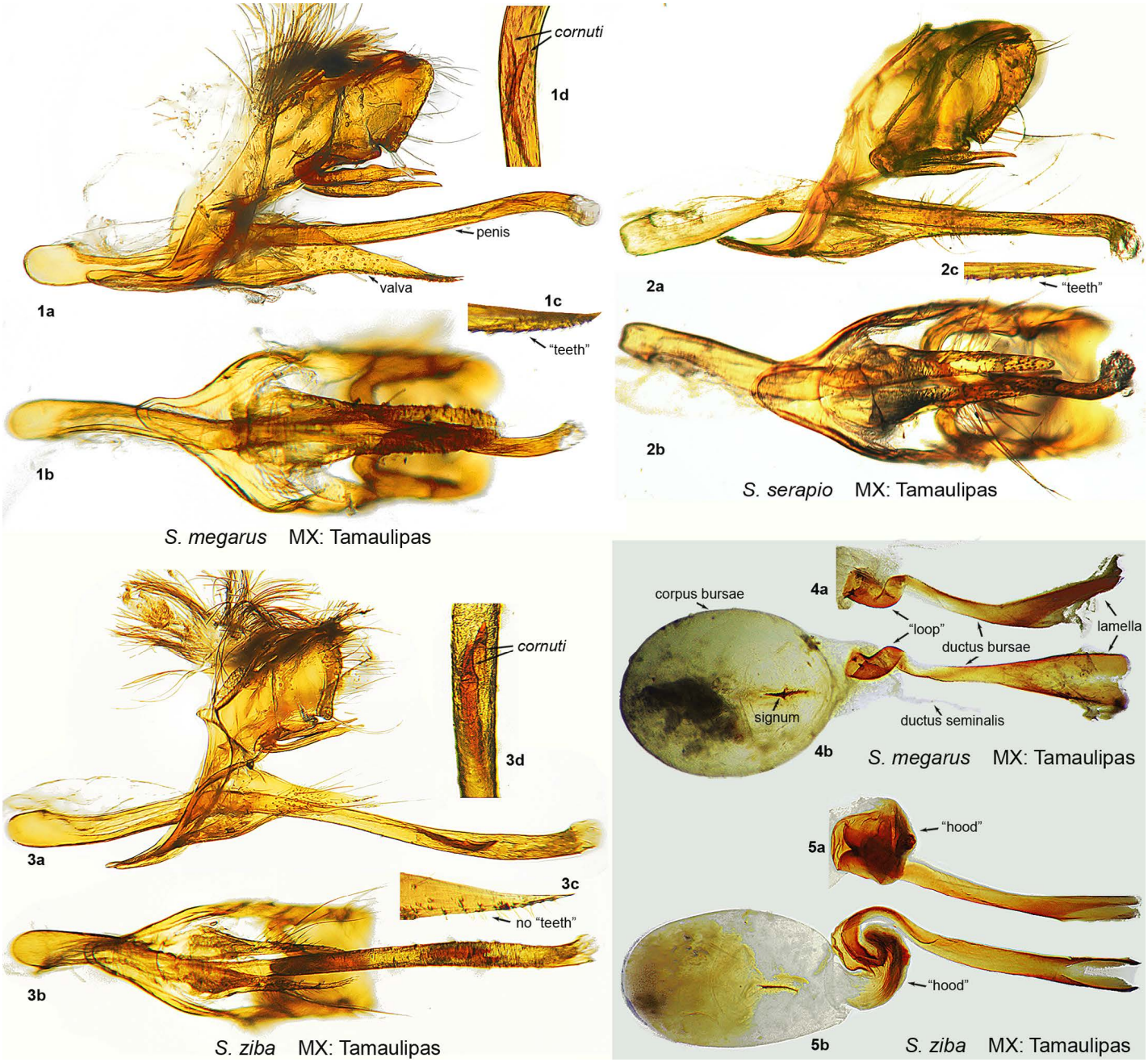
Thus out of the three species known from northern Mexico among those listed by Robbins (2004), the US specimen may match only *S. serapio*. Analysis of remaining 13 species from the *S. serapio* group (data not shown) revealed that none agrees with the US phenotype.

Strymon serapio was described by Godman & Salvin in 1887 under the name "*Thecla serapio*" in the book "Biologia Centrali-Americana. Insecta. Lepidoptera-Rhopalocera". The description was based on specimens from three localities in two countries: Mexico (Veracruz): Jalapa and Panama: David and Chiriqui. A Panamian male from David was figured on Plate 58, Figs. 8, 9 (Godman & Salvin, 1887), and is curated in The Natural History Museum, London, UK as "Type". This specimen is illustrated here on Plate 1, Fig. 2. The Latin original description of *Thecla serapio*, species number 200, appearing on page 93 of volume 2 (Godman & Salvin, 1887) can be translated as follows:

"Similar to *T*[*hecla*]. *bebrycia*, however dorsal fore[wing] has two blue lines parallel to the internal margin; discal area on hind[wings] with blue overscaling: below, discal line black, somewhat separated [into spots], submarginal line of dark spots bordered with white on both sides."

It is apparent (Plate 1, Figs. 2-6) that while Mexican (n=16) and Panamian (n=7) specimens share a number of characters, such as 1) the absence of postbasal orange macules and 2) narrow postmedian orange band poorly separated into spots on the ventral hindwing, 3) violet-blue streaks in dorsal forewing Cu2-2A cell along Cu2 and 2A veins and 4) violet-blue overscaling in the posterior half of dorsal hindwing, they also show some differences. The most prominent difference is in stronger developed areas of white scales distally from the postmedian orange band on the ventral hindwing of Mexican specimens (Plate 1, Figs 3v, 4v). These white areas are reduced in examined specimens from Costa Rica (n=2, Plate 1, Fig. 5) and Panama (Plate 1, Fig. 6) and are present as a narrow framing of the postmedian macules. Most Panamian specimens have postmedian macules more separated, narrower at the veins, and the first macule (in Sc+R1-Rs cell) in

Plate 1, pp 80, 81. Males of described Bromeliad-feeding *Strymon* species recorded from Northern Mexico and Texas. Dorsal (d) and ventral (v) wing surfaces are shown for each specimen. Primary types are displayed in full expanse, with all the labels shown. Only a half for other specimens is illustrated. Species names and general location are indicated on the plate and detailed here. All pinned specimens are to scale; a scale is placed at the bottom left. Live individuals are scaled approximately to match corresponding species. **1.** and **8**. *S. serapio,* male, Texas: Hidalgo Co. Estero Llano Grande State Park, 19-December-2008, first US record, photographed in natural conditions, photographs by Michael A. Rickard. **2.** *S. serapio*, syntype. Panama: Chiriquí, David, leg. Champion, Godman & Salvin collection 1912-1923. In BMNH collection, copyright Natural History Museum. **3.** *S. serapio*, Mexico: Veracruz, Orizaba. Possibly Wm. Schaus collection. In USNM collection. **4.** *S. serapio*, Mexico: Tamaulipas, Villa Gomez Farias, elevation 500m, 28-December-1972, leg. W.W. McGuire. In USNM collection. **5.** *S. serapio*,



Costa Rica: Cartago, Juan Vinas, November, Possibly Wm. Schaus collection. In USNM collection. **6.** *S. serapio*, Panama: Chiriquí, Bugaba, July, Wm. Schaus collection. In USNM collection. **7.** *S. ziba*, Mexico: Tamaulipas, Villa Gomez Farias, 14-July-1973, leg. W.W. McGuire. In USNM collection. **9.** *S. megarus*, possible holotype. Possibly Brazil. Label "*P. megarus*, God" matches Godart's handwriting. In MNHN collection, photograph by Rene Lahousse. **10.** *S. megarus*, Mexico: Jalisco, Chamela, 29-March-1939. Fred. H. Rindge collection. In USNM collection. **11**. *S. megarus*, Mexico: Tamaulipas, Road to Ocampo (Hwy A70) ca 16km W of Hwy 85, 5-January-1974, leg. Roy O. Kendall & C.A. Kendall. In TAMU collection. **12.** *S. megarus*, Panama: Canal Zone, Paraíso, 5-August-1977, leg. G.B. Small. In USNM collection. **Abbreviations:** BMNH – The Natural History Museum (London, England, UK); MNHN – Muséum national d'Histoire naturelle (Paris, France); TAMU – Texas A&M University Collection (College Station, Texas, USA); USNM – The National Museum of Natural History, Smithsonian Institution (Washington, DC, USA).

Plate 2, p 83. Genitalia of described Bromeliad-feeding *Strymon* species recorded from Northern Mexico. 1-3 males, 4-5 females; a and b denote left lateral and ventral views, c is a magnified lateral view of left valva tip, d is a magnified ventral view of the penis tip; in females, corpus bursae is not shown in a; all specimens are from Mexico: Tamaulipas, leg. Roy O. Kendall & C.A. Kendall (unless indiated otherwise) and are in Roy O. Kendall & C.A. Kendall collection (TAMU). **1.** *S. megarus,* Road to Ocampo (Hwy A70) ca 16km W of Hwy 85, 5-January-1974, NVG #518. The specimen is shown on Plate 1, Fig. 11. **2.** *S. serapio*, Tamaulipas?, ex larva 1977, Sue Gardner, larval food plant *Tillandsia utriculata*, NVG #517. **3.** *S. ziba*, Taylor Ranch ca. 32 km NNW of Ciudad Mante, 5-January-1974, NVG #521**.** **4.** *S. megarus*, Paso del Abra near El Abra, 18-December-1973, NVG #522. **5.** *S. ziba,* Rancho Pico de Oro vic. of Los Kikos, 9-January-1974, NVG #521.

distally offset. Mexican specimens exhibit more continuous postmedian band with most macules not significantly narrower at the veins, and Sc+R1-Rs macule is mostly aligned with the Rs-M1 macule. Genitalia of these allopatric phenotypes are similar, and in males are characterized by the short almost symmetric saccus with rounded tip, robust tegumen and wider, shorter penis compared to S. megarus. It is unclear whether the abovementioned differences in wing pattern signify taxonomic differences, but they likely represent geographic, rather than seasonal or individual variation.

The sole US specimen agrees very well with the features of *S. serapio* from Mexico in the hindwing pattern. However, interesting differences were observed in the extent of violet-blue overscaling on the dorsal wing surface. The US specimen shows significantly reduced blue overscaling compared to the majority of examined *S. serapio* specimens from many locations. We think that the expression of blue overscaling may represent seasonal and individual variation, as 2 other specimens (from both Mexico and Panama) in the US National Museum of Natural History, (Smithsonian Institution, Washington, DC) reveal similarly reduced number of blue scales.

As a summary, among all 58 described taxa of Bromeliad-feeding *Strymon*, the wing pattern of the US specimen is consistent only with *Strymon serapio*, and matches very well *S. serapio* specimens from Mexico: Tamaulipas to Veracruz.

Per the Kendall & Kendall collection archive (Texas A&M University, College Station, Texas, USA), *S. serapio* from Mexico was reared on *Tillandsia utriculata* L. by Sue Gardner in 1977, and there is a *S. serapio* specimen of a typical phenotype and genitalia in TAMU collection to signify this observation. Spanish mosses (*Tillandsia* sp.) are known from the lower Rio Grande Valley and grow on trees in wetter lowland areas similar to those around the Estero Llano Grande State Park in Hidalgo and Cameron Counties (Poole et al. 2007, Richardson 1995). It is likely that Spanish moss is the host plant, and additional records for the *S. serapio* should be expected from these two counties.

Acknowledgments

We are grateful to Edward G. Riley (Associate Curator, Texas A & M University insect collection), Donald J. Harvey (Museum Specialist, US National Museum of Natural History, Smithsonian Institution) and Robert K. Robbins (Curator of Lepidoptera, US National Museum of Natural History, Smithsonian Institution) for the loan of specimens, permission to photograph specimens under their care and fruitful discussions, Blanca Huertas (Curator of Lepidoptera, The Natural History Museum, London, UK) and Rene Lahousse for photographs of Strymon serapio *and* S. megarus *types. Robert K. Robbins made a number of very helpful comments on the manuscript and we thank him for excellent suggestions.*

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The Discovery of Theodore L. Mead's Journal of 1871

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Theodore L. Mead (1852-1936) (Fig. 1) is best known to lepidopterists for his 1871 exploration of Colorado as part of the Wheeler Survey. Mead was only 19 years old when he embarked on an incredible adventure with his older brother, Samuel. The journey began on 17 May 1871. Reaching Denver by rail on 31 May, Mead explored Colorado until 27 September. He then continued on to California by rail, southward by steamer to Panama, then back to New York by steamer, stopping at Kingston, Jamaica along the way. He returned to New York in December of 1871.

During the course of Mead's survey of Colorado, all the butterflies that he collected were sent to William H. Edwards of Coalburg, West Virginia. Edwards partially funded Mead's participation in the Wheeler Survey and his daughter, Edith, would marry Mead in 1882. Based on Mead's specimens, Edwards described many new butterfly taxa. Upon Mead's return, he and Edwards divided the Colorado specimens equally between them (Edwards 1890). Mead spent most of the following year processing his specimens and writing his report for the Wheeler Survey, which was published in 1875. Most of Mead's specimens are deposited in the Carnegie Museum of Natural History, Pittsburg, Pennsylvania. William J. Holland, who in 1898 became the first Director of the Carnegie Museum, purchased Mead's collection in 1877 and Edwards' collection in 1886 (which was received in numerous shipments over several years). Brief biographies of Mead were published by Brown (1955) and Brown (1996). Mead wrote a more lengthy autobiography the year before his death (Mead 1935).

The route that Mead traveled in Colorado was largely unknown until F. Martin Brown extrapolated it from remarks by Mead (1875) and references to Mead's specimens in various publications by W. H. Edwards (Brown 1934). Twenty years later, Brown (1955) charted Mead's presumed route and itinerary. Brown (1964 and later) used this information to propose type localities for many of the taxa that

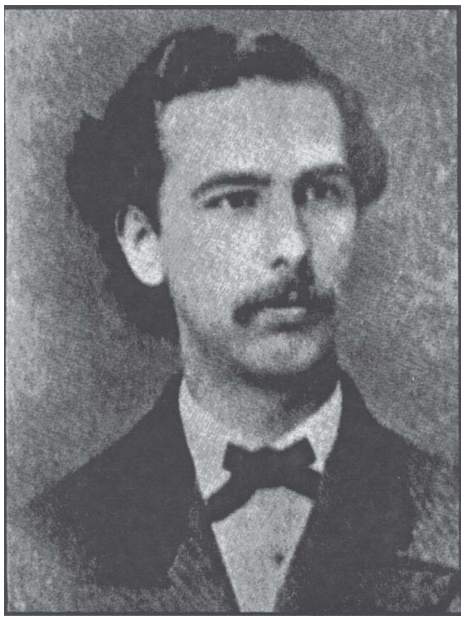

Fig. 1*. Theodore L. Mead at 22 years of age, three years after returning from Colorado (from Brown 1996).*

Edwards described from Mead's specimens. In 1979, Brown examined photocopies of numerous fair copy letters that Mead had sent to correspondents during his time in Colorado. These letters, preserved at Rollins College in Winter Park, Florida, were transcribed and later published after Brown's death by his wife, Grace (Brown 1996). Despite this documentation, some portions of Mead's itinerary remained obscure. A recent discovery promises to eliminate much of this uncertainty.

Several months after reading a two-year old Internet posting about a purported 1871 journal of T. L. Mead, an incredibly fortunate chain of events led me to acquire this important manuscript from James W. Tillery and Mary E. Vance of Lehigh Acres, Florida. They had found it amongst the remaining inventory of a defunct local bookseller, who had stored it in a box within a climate-controlled storage unit for at least four years. Nothing more is known of its provenance.

In 1882, Mead ("Teddy" to his wife) settled in central Florida, where he spent the remainder of his life researching and hybridizing various types of plants. He probably brought his 1871 journal to Florida, but it is a mystery why it became separated from his other manuscripts. He may have presented it to an acquaintance, such as his good friend John H. Connery. Before his death, Mead is known to have presented Connery his entire collection of rare plants and some glass photographic negatives. The plants were used by Connery to help establish a botanical park in the city of Winter Park, Florida, called Mead Garden, which was dedicated in 1940. The glass negatives are preserved in the Winter Park (Florida) Public Library.

The 1871 journal is signed, "Theodore L. Mead / 596 Madison Ae / next cor. [next to corner] 61st St. / New-York" (Fig. 2). This is known to have been Mead's address at that time. Mead purchased a preprinted market diary measuring 3 x 6 in (7.6 x 15.2 cm) with a leather binding that is now worn and

crumbling. The letterpress title page reads, "Patent Self Closing Diary for 1871 for the Trade." Mead chronicled his daily activities throughout the year using ink and graphite (Fig. 3). During his extensive journey, Mead recorded modes of transportation, arrival and departure times, and mileage between destinations. He provided a tabulation of all the letters sent/received during 1870 (207/262) and 1871 (163/252). Mead made note of the people he encountered and the goods he purchased. He also mentioned some butterflies by their Latin names and pressed a few plants between the journal's pages.

The condition of the journal is remarkable, especially considering that it was written by a 19 year old student over the course of an entire year, and was transported over 12,000 miles on every imaginable manner of conveyance. It was later brought to Florida from New York, where it passed through the hands of at least three other owners during the ensuing 128 years.

A handwritten "1871" along the bottom edge of the journal suggests that Mead also kept records for other years. However, there are no known published references to such journals and none are listed among the contents of the Mead manuscript collection at Rollins College. Various collections of Wheeler Survey documents also lack listings for Mead's materials (see Dewing 1964). Mead apparently kept a separate account of his collecting activities (Mead 1935). An entry about another "journal" in Mead's 1871 personal journal may refer to this second manuscript, which was possibly lost or discarded many years ago with other Wheeler Survey documents.

It is my intention to transcribe all entomologically relevant passages from his 1871 journal and publish this information as an addendum to the work by F. Martin Brown. I also plan to digitally photograph the entire manuscript and provide printed hardcopies to Rollins College and the Carnegie Museum of Natural History.

A debt of gratitude is expressed to Jimmy Tillery and Mary Vance for realizing the importance of Mead's journal and ensuring its survival.

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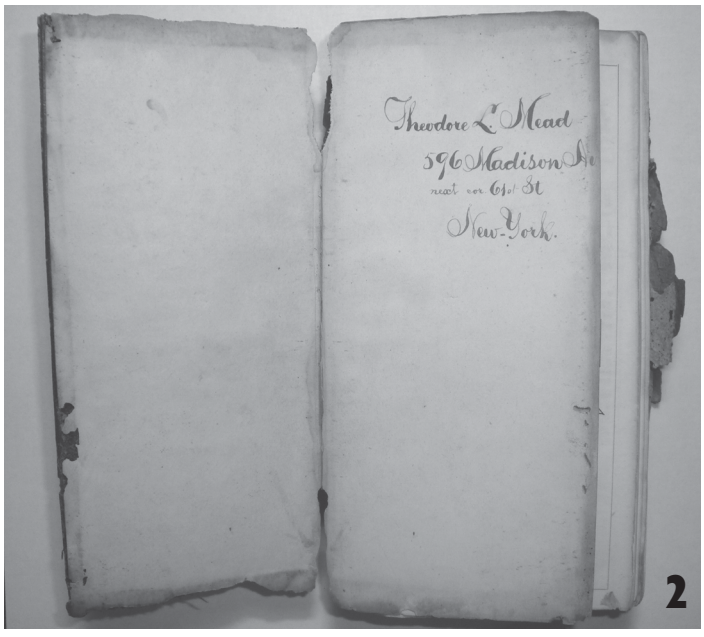

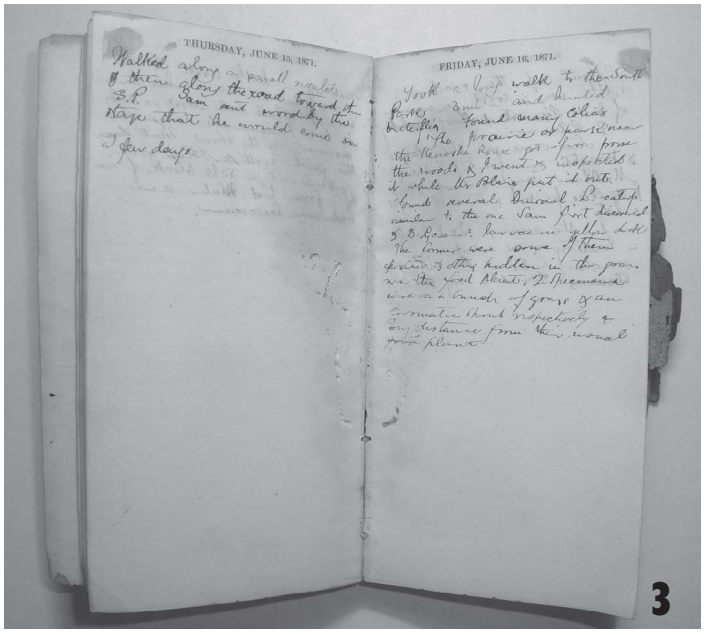

Fig. 2. *Mead's inscription on the first page of his journal.* ***Fig. 3.*** *Mead's journal entries for June 15-16, 1871.*

Conservation Matters:
Contributions from the Conservation Committee

More on Butterfly Releases

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In the previous Conservation Matters column Dr. Robert Pyle articulated his case against butterfly releases. But like conservation issues outside of lepidopterology, the conservation committee of the Lepidopterists' Society was not of one mind regarding a position that would ban all (out-of-range and/or commercial) butterfly releases. The essence of our opinion is that we believe there is room to allow some kinds of releases, and in particular we hope that children, teachers, and other educators will have the option to purchase and raise some species of caterpillars, experience the wonder of metamorphosis, and then have the option to release the creatures.

There are few educational experiences that rival that of observing a butterfly's developmental transformations. The mystery of metamorphosis is compelling as an entry point into the life sciences. One could also scarcely imagine a more powerful and healthy metaphor to a child's own development. Participating in a butterfly's metamorphosis can be a tangible, beautiful example of the Cinderella or ugly duckling story, of rebirth and new beginnings. Children need this and respond well to it. This argument alone is enough for us to resist a blanket restriction on butterfly releases.[1]

Dr. Pyle reasoned that butterfly releases can compromise the biogeographic data that we might collect for a given species. We agree, but such arguments carry less force for cosmopolitan animals. For example, the painted lady butterfly (*Vanessa cardui*) is a highly migratory species. Moreover, it has been the subject of worldwide releases spanning decades. Its genes are already mixed—biogeographic arguments no longer apply, at least to North American mainland populations.

While biogeographic non-interference should be a goal for many human actions, this is not always possible or pragmatic. Humans have moved plants and animals for economic, recreational, societal, political, scientific reasons, and at times even as a matter of public safety. We see no reason why educational purposes, such as affording a child exposure to metamorphosis, should not also count. Were arguments for biogeographic purity pushed to an extreme, we could not have outdoor pets or plant our yards with native species, because each time a pollen grain is set adrift by wind or a seed carried off by a bird, we could be contaminating gene pools, compromising biogeographic data, and altering organismal phenologies.

To avoid releasing non-local butterflies, Dr. Pyle advocated that teachers go out and collect local caterpillars which could then be raised and released. Not always easy: local hunts will be season- and weather-dependent. Many educators will not know what they are collecting, and without a name teachers and students often will not know how to care for their caterpillars: flower moths are seed predators that die if fed leaves; sallows straggle if offered only older leaves; prominents will waste away if fed only new leaves. Some fully fed caterpillars require peat for pupation, others punky wood.

Other problems arise. Few wild-collected caterpillars will eclose within two weeks of pupation. Moths often emerge under cover of darkness (and thus are not easily observable by students). Most will have to be overwintered for six months or longer before they will eclose—a great many will die in the classroom and have long lost the attentions of the students they were intended to inspire. With painted lady kits, children can watch one of the most spellbinding phenomena on our planet: metamorphosis. A "first eclosion" has been an epiphanous moment for many a young (knee-high-to-a-grasshopper) lepidopterist/ entomologist/ biologist/conservation

[1] We would respectfully disagree with a suggestion that a painted lady once changed and sporting wings should then be held (until its death) to teach a lesson about biogeographic data. Raising a caterpillar is as much about care, responsibility, and attachment as it is about metamorphosis. Releasing the newly hatched adult, the metaphor of transformation and rebirth, is the expectation. Extinguishing this life in a freezer or waiting until it has shredded its wings and died in a cage is anticlimactic and more than a little antithetical—most teachers would soon abandon the exercise.

biologist. We bolster our ranks and a love for nature by exposing more people to this animal and the phenomenon of metamorphosis, not fewer.

A major advantage of the painted lady (over wild-collected caterpillars) is that its development is brief and well-studied—the class will know within a day or two when eclosion will ensue. There is considerable information on the internet that teachers and students can access, including curricular and co-curricular activities for this familiar animal. There will be much less information for random caterpillars from a school yard. Finally, access to the world's knowledge (e.g., through Google) requires correct identification of a given caterpillar, a task that ranges from not easy to very unlikely.

If only wild caterpillars can be collected and brought into the classroom we will run the risk of excluding urban children…precisely what we don't want. As of 2008, more than half of the world's population resides in cities, where caterpillar hunts are much less of an option. Looking ahead, it seems certain that the proportion of humans living in urban centers will increase.

We support efforts and curricula that get kids outdoors. They are sorely needed. We like Dr. Pyle's idea of a local caterpillar hunt—kids will love it, but this should be in addition to an option to raise a butterfly and let it go, rather than being a teacher's sole option.

There are some who have opposed butterfly releases because releases might contaminate existing gene pools with unfit genes. But the (population genetic) expectation is that introduced "deleterious" alleles would be removed by selection and hence not spread. The amount of "migration" (release) to swamp the effects of selection has to be on the order of the selection coefficient, in other words, a significant fraction of the entire population.

While it is true that released butterflies contaminate biogeographic and/or phenology studies, we do not see this as an issue if very few species are released. In using biogeographic/phenological data to draw inferences on large-scale changes (i.e., proxies for environmental change via climatic change or land use changes), the power in such studies does not arise from multiple observations on the same species (in part, because species evolve[2]), but rather from the meta-analysis of observations across a large number of species. A few "outliers" in one or two species will have little effect on a substantive analysis.

So while we support the position that we limit the number of species that can be released, we do not support a ban on all releases. Much would be lost, for little gain. There are more than 800 species of butterflies and upwards of 13,000 moths in North America that can provide data on phenology, climate change, and other biogeographic phenomena. We no longer use the fruit fly (*Drosophila* (*Sophophora*) *melanogaster*) for biogeography because scientists and students have inadvertently released so many. Science and humanity have been well served by allowing students and scientists to work with this creature world-wide without undue restrictions (whose escape/release is all but inevitable). Surely we can be egalitarian enough to make room for a few butterfly species to be used as lab/classroom organisms or for other types of releases. (Less than one tenth of one percent of the North American lepidopteran species are approved for release.)

Analogous problems to those raised in our essays underlie debates over whether to allow roads to be built into national parks and forests. Most will agree that such wildlands should be left as humanly-unaltered as possible. But if only foot access were to be permitted, few people would know first hand what treasures such tracts contain, and as a consequence there would be diminished numbers of people who care about them. We need more opportunities and experiences to connect people to nature, not fewer. Limited, carefully evaluated butterfly releases expose many to a few of the creatures that have become the objects of our attentions. Some of these people might one day be asked to vote on a measure to protect (or not protect) a butterfly. As with many environmental matters, there is great complexity here. In the end, what will matter most, is to what degree future generations will care about butterflies and the natural world, as expressed through, for example, numbers of park visitors, those voting for environmental legislation or … joining societies such as ours.

Postscript: With new genetic tools, it will soon be possible to genetically tag animals that are sold such that commercial butterflies could be determined as being from non-wild stock. Likewise new (sterile) phenotypes could be bred that would be immediately identifiable. Perhaps then many of the concerns expressed about butterfly releases will be moot.

[2] Species evolve. With single species we do not know if a response, e.g., an Alaskan red admiral) is due to climate or a new genetic combination. Even as we look for more southern species to share our gardens as global climates warm, there will be taxa moving north and others moving south, expanding their ranges, as a consequence of adaption and natural selection and other evolutionary forces unrelated to climate change.

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://alpha.furman.edu/~snyder/snyder/lep/) 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 31, 2010. In most of our Nearctic zones, you have long since put away your cameras, nets, bait traps, light traps and/or lighting equipment by that time anyway.

Important reminder to contributors using MAC computers to submit Season Summary 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.

As the new Season Summary Editor I will hold firmly to the dates. Although I am late this year, 2010, I have moved the due dates out. Any records sent to the Zone Coordinators after December 31, 2010 will not be published until the 2011 Season Summary.

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The Mailbag...

Dear Editor:

Dr. Art Shapiro's article "Are Butterflies in Trouble? If So, Why?" in the Spring, 2010, issue did an excellent job of documenting the loss of lep species. He attributes this trouble to loss of habitat and to climate change—both caused by humans. Unfortunately the article does not go on to say anything about how to decrease the trouble that butterflies are in.

I think that the Center for Biological Diversity has the right idea with their Endangered Species Condoms. We need to make the connection between loss of biological diversity and the growing human population—and the need to prevent unplanned pregnancies. The problem is made worse in the United States by our outrageous consumption.

Half of the pregnancies in this country are unplanned, in part accounting for our high abortion rate. We also have the highest teen pregnancy rate of any rich country—by far.

Many biologists are in a position to help decrease these shameful statistics. As professors who have contact with young people, you have an excellent opportunity to help shape attitudes. In addition to teaching about lepidoptera you can teach about the birds and the bees!

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Flying High: An Adventure in the Alpine Tundra of Colorado

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The pursuit of butterflies not only promises the prospect of observing, photographing, drawing, or collecting unfamiliar species, but also exposes us to new habitats—and sometimes, a new country and culture as well. As a nascent graduate student in Louisiana, I was guided by H.B.D. Kettlewell's 1963 presidential address to The Lepidopterists' Society. There he proclaimed:

"Heaven help the scientist who, using butterflies for science alone, fails to appreciate their beauty and to take advantage of the wonderful places into which they lead us."

Reflecting on my past globe-trotting, I can state unequivocally that each of my adventures has provided unique and profound experiences. Having said that, I would like to share the highlights of a trip whose destination was not some exotic land but a venue here in these United States.

It was the first week in July 1990. I had signed up for a week-long workshop titled "The Biology of Butterflies" conducted by Drs. Boyce Drummond and Thomas Emmel. The event was hosted at The Nature Place, a comfortable and upbeat private educational facility nestled on 6,000 acres of ponderosa pine—those majestic trees with cinnamon-colored bark made famous by the vintage TV series "Bonanza." The center is situated at 8,600 feet in the Front Range of the Rocky Mountains of Teller County in central Colorado. Iconic Pikes Peak looms on the horizon. Today, the facility is designated by the National Park Service as a National Environmental Study Center. It is easily accessible from the communities of Colorado Springs and Florissant.

Up to this point I had never experienced Alpine Tundra—a high mountain, windswept ecosystem that begins above the timberline of the evergreen coniferous forest and extends to the permanent snow line on a number of high mountains mainly in the west but also on a sparse number of peaks in the northeast, for example, Mt. Washington, New Hampshire (6,288 feet), Mt. Katahdin, Maine (5,268), and Mt. Albert, Quebec, Canada (3,786 feet). [A related ecosystem, called Arctic Tundra, is found in the far north—usually above the Arctic Circle—where the boreal coniferous forest reaches its northern growth limit. Because Arctic Tundra is determined by latitude, the ecosystem occupies much more land area than its montane counterpart. Lands are flat, water-logged, and snowbound most of the year. It, too, is not very accessible except via air. Both Arctic and Alpine Tundra are inarguably fragile ecosystems primarily because of their short summer growing season.] Although Alpine Tundra remains a place apart, the ever increasing habitat harbors many specialized plants and animals—including butterflies. Since July is prime time for butterfly activity in the central Rockies, I was inspired to visit The Nature Place.

The workshop consisted of 27 participants, including several young folks. Days were comfortable but nights were definitely chilly—our modern cabins were equipped with fireplaces and stacks of wood for igniting before retiring. During daytime we attended lectures, workshops, and field trips. For me the most unforgettable outing was to Horseshoe Mountain (el. 13,898 feet), ranked among the 100 highest peaks in Colorado. The peak is located in the Mosquito Range and the Pike National Forest, east-southeast of Leadville in Park County.

Horseshoe Mountain was a good hour-and-a-half away. Therefore, we departed the center about eight in the morning after a hearty, western breakfast. Most of the journey was via paved road. First we traveled through tall, open ponderosa pine forest—the Transition Life Zone of C. Hart Merriam. As we gained elevation, the pines gave way to dark green, needle-leaved, fir and spruce trees characteristic of the subalpine zones termed Canadian and Hudsonian (I whimsically call this the "Land of the Christmas Trees."). Eventually, we veered off onto a dusty dirt road. Now the forest began to thin and we emerged into a rather open area studded with krummholz, those dwarfed, twisted trees whose limbs appear flag-like due to strong, directional winds. Krummholz delineates the boundary between forest and barrens. A mile or so farther and we had officially entered the Alpine Tundra Life Zone. A first for me!

At an elevation of 11,200 feet we entered the Leavick Valley, named after an old silver-gold-zinc mining town near by. As we traveled up this narrow valley, thick low clouds settled in and engulfed and dampened everything. Unfortunately, we could see nothing but a few feet of the road ahead. Finally, our leaders pulled into a graveled parking spot. There we parked and were instructed to begin readying our gear. Now at an elevation of 12,200 feet, temperature was in the low 40s, chilling us to the bone. Of course, the pea-soup clouds still prevented us from seeing any landmarks. But in no less than ten minutes, the ambient light brightened. Perhaps the clouds were thinning? We crossed our fingers.

Sure enough, within minutes we could see cameos of clear sky. Moments later and all remaining wisps of clouds

vaporized. And there we were, standing beneath a domed, clear sky pierced by a blazing sun whose rays felt like a heat lamp. Immediately, the thin air warmed, and the wind subsided. More importantly, however, we now had an unobstructed view of the landscape. The parking area gave access to a rolling, treeless, and rock-strewn meadow whose backdrop was one of the world's classic cirques. (A cirque is a high-altitude, three-sided, steep-walled basin carved by the scouring action of a previous glacier. Indeed, the perfect U-shape of the cirque inspired the name "Horseshoe Mountain.") The meadow was stippled with dwarf wildflowers and a considerable number of snowpacks that had yet to melt.

Our leaders cautioned that although the scene was photogenic, we should not tarry. Dr. Emmel: "In this high country hail, sleet, and even snow are possible on any given day and with little warning." With that in mind, we were advised to remove our outer layer of winter clothing, cover all exposed skin with sunscreen, and then hike the meadow in search of butterflies

"Butterflies?" I quipped: "Where should we look?" For certain, there were lots of diminutive plants bearing yellow and white flowers growing amongst the granite rocks and boulders. But the flower display definitely lacked the luster of those storied lupine-filled meadows in the Cascade Mountains of Washington and Oregon, Furthermore, the cold temperatures seemed anathema to any insect attempting to fly. I was rueful, confused.

And then it happened. As if some silent command had been uttered by the proverbial "Keeper of the Butterflies," there was an explosion of dozens of yellow and orange butterflies—no doubt sulphurs (pierids)—from the greenery. As the butterflies gained altitude, they began wheeling and reeling about, animating and pixelating the azure sky. Some individuals descended to ground level to nectar on wildflowers. The sulphur vanguards were quickly joined by other medium-sized butterflies—basically white but with small patches of black and a pair of red and black ocelli on each hindwing—telltale markings of parnassians, aka apollos (primitive relatives of swallowtails). These butterflies, though, fluttered near ground level in search of their stunted host plants, stonecrop (*Sedum*), which were fairly common around rocks. At any given moment I could have counted between 30-40 individual butterflies on the wing.

This was "Theater in the Wild." The butterflies were ubiquitous throughout the meadow. In my wildest dreams, never would I have imagined that so many individual butterflies could inhabit such a restricted habitat at such an altitude. Not wishing to waste one precious moment, I reflexively sprinted off in pursuit of a sulphur that had glazed my head. Mistake! Having resided at sea level most of my life I was unaccustomed to the thin mountain air; therefore, I quickly found myself terribly short-winded. My two sprints followed by a swing of the net sent me to my knees exhausted, debilitated. Having missed the butterfly, I rested for a few moments but than staggered to my feet to again give chase to a nearby butterfly. Another swing, another miss, and—you guessed it—another crumple to the damp ground.

Lying there with my heart pounding, my chest heaving, my head throbbing, and beads of perspiration rolling down my face, I noticed that my classmates were still in the parking area, standing and starring in my direction. Undoubtedly, bemused by the comedy unfolding before them, they burst forth in waves of laughter as I waved in embarrassment. One male participant shouted "Go tiger, go!"—referring to my alma mater, Louisiana State University. I, also, began to chuckle. Realizing I had to try to redeem myself, I shed my jacket and wobbled to an erect stature. With so many butterflies on the wing, I had no problem in selecting another quarry close at hand. Off I went! Two quick sprints, a swing, and another intimate contact with the ground. But this time the outcome was different: the specimen was in the net. My relentlessness had paid off. Now a robust applause erupted from the spectators who had continued to watch to see how my "cat and mouse" antics would play out. (Let's face it, for most lepidopterists, scratch the label and what lies underneath is a kid at heart.)

Our group fanned out across the polka-dot meadow. Two small tarns (alpine clear, meltwater pools) added to the postcard quality of the view. With my "How **Not** To Catch A Butterfly In High Altitudes" lesson well learned, we collectors wrangled only those butterflies that could be netted with ease, all the while keeping in mind the policies on conservation and collecting as outlined by The Lepidopterists' Society. Those folks not interested in collecting busied themselves with photography; one pre-teenager interested in art, opted to sketch the cirque.

As temperatures continued to warm into the low 60s, insect activity increased. But then, a small, billowy white cloud with a dark center materialized overhead. It floated slowly across the sky, plunging the meadow into shadow. Within seconds of the shade, all the butterflies that were flying plummeted to the ground virtually en masse as if they were lead weights! Not a single individual remained airborne.

We were captivated, entranced. After no more than five minutes, however, the sun returned. And as if by magic, the vanished butterflies re-materialized and continued with "business as usual." This synchronized "up and down" behavior continued for nearly two hours. [During our workshop we hypothesized that the ability of these butterflies to access ground protection quickly was probably a survival adaptation to an ecosystem where sunlight can be short lived and a shadow can portend freezing precipitation and severe wind, both potentially fatal. In addition, we concluded that the dark coloration of

many of the butterflies—particularly near the body—coupled with long hair-like wing scales near the abdomen were also adaptations for absorbing and trapping heat from fickle sunlight in a cold environment.]

The rank and file species we collected and photographed in this microcosm were: Queen Alexandra's Sulphur (*Colias alexandra alexandra*), Scudder's Sulphur (*Colias scudderii*), Pink Edged Sulphur (*Colias interior*), Mead's Sulphur (*Colias meadii*), 'Rocky Mountain' Parnassian (*Parnassius phoebus smintheus*), Melissa Arctic (*Oeneis melissa*) and Chryxus Arctic (*Oeneis chryxus*). The parnassians were particularly easy to net because they flew close to the ground in search of their host plant: stonecrop (*Sedum*), a succulent that grew in the protection of rocks. By contrast, the dark-colored arctics were sedentary, usually perched on lichen-encrusted rocks. While basking they usually held their wings closed but angled their bodies to the left or right for maximum sun exposure. (Some arctics would be so tilted that they were almost horizontal.) In such a position the darkish, mottled coloration of the butterflies blended almost perfectly with the grainy granite rocks and the blotchy crustose lichens.

With the sunny weather still holding and our psyches and bodies still pulsing with energy, we decided to investigate a nearby talus outcrop (talus is an accumulation of rock debris fallen from the wall of a cliff—in essence, a huge jumble of rocks) for three specialized butterflies: 'Snow's' Lustrous Copper (*Lycaena cupreus snowi*), Magdalena Alpine (*Erebia magdalena*), and Uhler's Arctic (*Oeneis uhleri*). Picking our way on the loose rocks was treacherous. Indeed, most of us had one or two mishaps. But despite the danger, our efforts were quickly rewarded when a small, brilliant coppery red butterfly—*'Snow's' Lustrus Copper*—darted past just above the rocks. A larger solid black species—the Magdalena Alpine—followed close behind. Of course, with our mobility severely limited, no one succeeded in netting either of the butterflies. As we held firm to our positions in fear of accident, other similar butterflies made their appearance.

We were taunted but needed a plan. Perhaps cooperation might work? We decided to station ourselves about 15-20 feet apart so that we could command coverage of just about the entire area being traversed by the passing butterflies. The simple scheme worked better than we had anticipated. Within the hour, we each had secured specimens of both the "copper" and the "alpine." (The dark Uhler's Arctics were usually stationary, content to bask in the strong sunlight. A quick plunge of the net and they were ours.)

While on the talus, we were rewarded with a bit of non-butterfly lagniappe: a pika or cony (*Ochotona princeps*), aka, "haymaker." This is a small mammal related to rabbits. Pikas are buff/gray in color, sport short ears, and have no visible tail. On sunny days they often perch on rocks and voice short squeaks that carry considerable distances in the thin air. They are commonly called "haymakers" because they clip grass growing amongst the talus debris, set the greenery to dry in the sun, and then store the cured "hay" within their rock cavities for the long winter months (these mammals don't hibernate and so have to feed periodically even during the winter). For me, the sighting of a pika was a life-long wish-come-true.

With such inimitable activity, the hours raced by. About one o'clock in the afternoon we decided to return to the parking area for our box lunches. Just in time, too. A bank of dark stratus clouds began to sweep in from the southern horizon. Within 30 minutes, the entire sky was a marbled gray, temperatures dropped dramatically, and a stiff, cold wind began to blow. By the time we had redressed for winter, packed our equipment, and boarded the vans, a few large snow flakes began to fall.

All in all, a trip to the high country of the Rockies (or some other Alpine Tundra ecosystem) affords a lepidopterist with an opportunity to experience species and behavior that cannot be encountered elsewhere. And although I have concentrated most of my life with the study of tropical habitats, I must admit, that my visit to the treeless high country of Colorado has woven itself tightly into my memory of wonders.

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Membership Update...

Julian Donahue

This update includes all changes received by October 18, 2010.

New and Reinstated Members:

members who have joined/renewed/ been found/or rescinded their request to be omitted since publication of the 2008 Membership Directory (not included in the 2008 Membership Directory; all in U.S.A. unless noted otherwise). Listed by name only; complete information will be found in the 2010 Membership Directory being mailed with this issue of the News.

Beatty, Craig R

Benton, Michael R.

Bettman, David J.

Bura, Veronica (Ms.)

Carter, Jack.

Cox, Leven (Mr.)

Crnic, Ivan, Jr.

Ebsen, Maxwell

Fisher, John F.

Fleischer, Richard S. (M.D.)

Fowler, Karen (Mrs.)

Garrett, John

Garrett, Paula Jacoby (Mrs.)

Harke, Vince L.

Holer, Nicholas R. (Ph.D.)

Honda, Jeff (Ph.D.)

Lynch, Louise I.

Malcolm, Stephen B. (Ph.D.)

Matheson, Sarah M. (Mrs.)

McKown, Shannon K. (Ms.)

Morantes, Andres (Mr.)

Pinheiro, Lívia R. (Ms.)

Plotkin, David

Raugh, Stan

Reynolds, Bryan E.

Robinson, Martha W. (Ms.)

Scott, Jaclyn L. (Mrs.)

Taron, Douglas (Ph.D.)

Tilby, Roger

Zaleski, Philip

Address Changes

(all U.S.A. unless noted otherwise):

listed by name only; complete information in the 2010 Membership Directory being mailed with this issue of the News.

Belmont, Robert A.

Collins, Michael M. (Ph.D.)

Dowell, Robert V.

Ebner, Jim

Kawahara, Akito (Ph.D.)

Ludtke, Alvin F.

Mazry Jacob, Pedro A. (Dr.)

Mery, Benoit

Moore, Rex E.

Murphy, Shannon (Ph.D.)

Nazari, Vazrick (Ph.D.)

Oemick, Donald A.

Philip, Kenelm W. (Dr.)

Priestaf, Richard Carl

Redman, John F. (M.D.)

Rota, Jadranka (Ph.D.)

Sabourin, Michael

Warren, Andrew D. (Dr.)

White, Raymond R. (Dr.)

Wienberg, Ronald D.

Wolfe, Kirby

Yanek, The Ven. John, D.D.

Young, James John

Metamorphosis...

Freeman, Erna Louise Morris Freeman, passed away May 27, 2010. After graduating high school she met Hugh Avery Freeman, who had moved to Lancaster to accept a teaching position, and they married May 6, 1939. Avery's teaching career took them to White Deer and Pharr during the early and mid-'40s before they settled down in Garland, Texas in 1948 to raise their family while Avery taught at Southern Methodist University, then Forest Avenue High School, then finally Hillcrest High School. Between Avery's career and his passion for lepidoptery, the couple traveled widely throughout the United States and Mexico. Louise loved people and spoke often about the fun they had and the people they met along the way before Avery's death in 2002.

Seaborg, Norman G., of Lockport, Illinois, USA, the summer of 2010. Mr. Seaborg, interested in Lycaenidae and Coleoptera, had been a member of the Society since 1965.

The Marketplace

***IMPORTANT NOTICE TO ADVERTISERS:* If the number following your advertisement is "522" then *you must renew your advertisement* before the next issue! Remember that all revisions are required in writing.**

Books/Videos

New book on American butterflies: R.R. Askew &P.A. v.B. Stafford: Butterflies of the Cayman Islands. Hardback, 24x17cm., 172 pages incld. 6 color plates and 119 color photos. Maps and other figures. US $69.50. Also available: Larsen: Butterflies of West Africa. Hardback 28x21cm.865 pages in two volumes. 125 color plates depicting 1,400+specimens. US $276.00. Monastyrskii: Butterflies of Vietnam, softcover, 21x15cm., Vol. 1: Satyrinae. 199 pages incl. 35 color plates, US $64.00. Many others available. Visit website: www.apollobooks.com or contact Peder Skou, Apollo Books, Kirkeby Sand 19, DK-5771 Stenstrup, Denmark, or ask for a copy of our 2010-11 catalogue. 522

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

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

Specimens

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

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

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

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

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

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

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

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

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

Send all advertisements to the Editor of the News!

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

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

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

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

Research

Material needed for research project on geographic differences in Lophocampa maculata. Eggs, larvae (all instars) or adults useful. Will pay for shipping. Please contact Ken Strothkamp, Chemistry Dept., Lewis & Clark College at kgs.lclark.edu 522

Seeking egg masses of the Catalpa Sphinx, Ceratoma catalpa (Sphingidae) for research on the chemical ecology of this species. Please contact Deane Bowers at: deane.bowers@colorado.edu or (303) 492-5530. I am happy to reimburse for express shipping. Send to: Deane Bowers, Dept. of Ecology and Evolution, Ramaley N122, UCB 334, University of Colorado, Boulder, CO 80309. 522

The Ecoinformatics lab of Dr. Jeremy Kerr at the University of Ottawa is conducting an analysis of mobility for butterflies in Canada. In the absence of experimental mobility data for the vast majority of species, I will rely on the cumulative knowledge of Canada's lepidopterists to construct a mobility index. I am distributing a survey to people with field experience with butterflies and skippers of Canada. Surveys of lepidopterists in the UK and Finland have produced mobility estimates remarkably similar to those obtained from field experiments. If you have field experience with Canadian butterflies then I hope you will take the time to complete my survey. Visit: www.science.uottawa.ca/~jfitz049/survey.html for more information on this project and to download the survey. Email me: rburk091@uottawa.ca with any questions or comments you may have. 522

Equipment

A new Light Trap with Plastic or Aluminum Vanes: 12 VDC or 120 VAC with 15 Black Light or the new 36 Watt CF Twin Tube plasma UV. Rain Drain and Beetle Screens, Photoelectric Switch are optional. New Self Ballast Mercury Vapor Lights 250 Watt, 500 Watt and 750 Watt. For more information, visit our web site at: www.leptraps.com, or contact Leroy C. Koehn, Leptraps LLC, 3000 Fairway Court, Georgetown, KY 40324-9454: Tel: 502-542-7091

New Tropics Bait Traps: 12 inch diameter 42 inches in height with a six inch cone top. Mosquito netting in Forest Green, Camouflage or White. A Plastic platform is suspended with plastic eye bolts and S hooks. Available in Tropical style for butterflies and flat bottom style for moths. Traps weigh less than 6 ounces. Excellent for travel to the tropics. For more information, visit our web site at: www.leptraps.com, or contact Leroy C. Koehn, Leptraps LLC, 3000 fairway Court, Georgetown, KY 40324-9454: Tel: 502-542-7091

Livestock

Looking to buy both live and dead *Lacrymosa* specimens. Contact: Matthew Gowan email: filmmaker8706@gmail.com

For Sale: Captive bred Philippine butterfly pupae, year round. Imogene Rillo, P. O. Box 2226 Manila 1099 Philippines email: clasinse@mindgate.net 524

Announcement

Lepidopterists' Society T-Shirts

A new supply of Lepidopterists' Society t-shirts are now available and with this new supply comes a new price: $12.00 each. Shipping remains unchanged at $5.00 for the first shirt, $2.00 for each additional shirt (U.S. and Canada; inquire for shipping charges to other countries). There is also a new size available: XXL, in both colores (navy blue or yellow).

The t-shirts are high quality, 100% cotton, preshrunk and proudly display a 7-inch diameter Lepidopteristsí Society logo on the front. For ordering form please see the mailing insert that came with this issue, or indicate quantity, color and size desired and send along with a checkto Kelly Richers, Treasurer, The Lepidopteristsí Society 9417 Carvalho Court, Bakersfield, CA. 93311-1846.

Announcement

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

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

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

There is an online application form at

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

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

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

Observations of Diurnal Gregarious Roosting in the Butterfly *Smyrna blomfildia* Fabricius (Nymphalidae: Nymphalinae) in Western Mexico

Gerald E. Einem[1] and William Adkins[2]

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Keywords: gregarious roosting behavior, reproductive diapause, seasonality, synchronous activity, Mexico

Most species of butterflies roost singly but some roost gregariously (or communally). At night, on cloudy days, or during cool weather butterflies perch at roosting sites, often with their wings closed. Species that hibernate or aestivate as adults may roost all day for months at a time (Opler & Krizek, 1984; Scott, 1986). When roosting, butterflies often assume a particular posture and orientation; and some, such as the Mourning Cloak (*Nymphalis antiopa* L.), and other *Nymphalis* and some *Polygonia* species, roost while in a state of torpor (Einem, 2003). Moreover, butterflies frequently roost at a characteristic roosting site. For example, the Black Swallowtail (*Papilio polyxenes* F.) roosts singly at locations where it can bask in the sun as long as possible before it assumes a roosting posture for the night (Rawlings & Lederhouse, 1978).

In most families of butterflies some type of gregarious roosting is known. DeVries et al. (1987) have described three major patterns of gregarious roosting as follows: (1) **Faculative roosting** — ephemeral (usually 24 h) congregations formed during migration as in the Monarch (*Danaus plexippus* L.); (2) **Circadian roosting** — nocturnal aggregations at the same site each day as in the Zebra Longwing (*Heliconius charithonia* L.) (Young & Thomason, 1975) and the nymphaline *Marpesia berania* (Benson & Emmel, 1973); and (3) **Diapause roosting** — seasonal congregations of individuals in reproductive diapause that may leave the roost or return, throughout the day. Diapause roosting is well documented from observations of the winter roosts of *D. plexippus* in Mexico and California (Brower et al., 1977) and to a lesser extent from observation of roosts of Karwinski's Beauty (*Smyrna karwinskii* Hüber) in El Salvador (Muyshondt & Muyshondt, 1974) and Chiapas, Mexico (Warren & Luis-Martinez, 2007) and of Blomfild's Beauty (*Smyrna blomfildia* F.) as described in this report.

Smyrna blomfildia (Fig. 1, p. 98) is a sexually dimorphic species occurring from south Texas to Brazil (Neck 1996). The adult is similar in appearance to its sympatric congener *S. karwinskii* known for its gregarious roosting habits in the mountains of El Salvador and Mexico (Muyshondt & Muyshondt, 1974; Warren & Luid-Martinez, 2007). Although both species have a black spot on the outer (anal) angle of the ventral hindwing, *S. blomfildia* has two black spots, one on the outer angle and a second distinguishing spot on an adjacent toothed projection (Muyshondt & Muyshondt, 1978). When *S. blomfildia* roost or feed (wings closed) the pair of spots is easily seen with close-focus binoculars.

This is the first account of *S. blomfildia* roosting gregariously; furthermore, our observations suggest that this species exhibits a seasonal diapause roosting with nearly synchronous arrival at dawn and departure at dusk, abandoning the roost at night. (I.e., "diurnal gregarious roosting.") Similarities and differences between *S. blomfildia* and *S. karwinskii* roosting behavior are compared and the possible adaptive advantages of such gregarious roosting are discussed.

Roost Location and Habitat

Observations of gregariously roosting adult *S. blomfildia* were made in the state of Nayarit, Mexico. Data was gathered during two consecutive winter-spring, dry seasons. At the larger of two roosts the butterflies aggregated on a house near the top of a hill (39 m elevation) about 1 km from Jaltemba Bay on the Pacific Ocean. Here the butterflies (N=20 or fewer) clustered at a single site on the underside of a brick-and-mortar roof overhang 3.3 m above ground level. The overhang, 1.15 m in depth, surrounded the house on four sides but *S. blomfildia* only aggregated in one small area about 40x40 cm on the southeast corner of the house.

The roost at the house overlooked a garden with a large avocado tree (*Persea americana*), a jackfruit tree (*Artocarpus heterophyllus*) and two *Cecropia* trees. *Symrna blomfildia* larval host plants are nettles (Urticaceae) which grew in nearby vacant lots. A feeding station, supplied daily with bananas, was located 10 m

each season from the roost. During each of two seasons, the presence of *S. blomfildia* at the roost site (well before banana feeding began) suggests that the exact location of the roost (under the eave) had some attraction other than the nearby bananas. In fact, there were other parts of the eave nearer the banana feeding station where the butterflies did not roost gregariously.

A second communal roosting site, a small natural cavity in a tree occupied by four *S. blomfildia*, was discovered at 09:00 h on 21 March 2010 about 0.3 km from the roost at the house. (N.B.: This roost was not studied further during this investigation. And no attempt was made to find other roosts.)

Methods and Materials

The *S. blomfildia* communal roost site at the hillside house was discovered on 11 January 2008 and thereafter visited one or more times each day through 27 March 2009 and then again at the same location from 4 December 2009 through 6 April 2010. Butterflies occupied the roosting site every day within this period of time. During many of the visits to the roost, the time of morning arrival or evening departure, the location and number of individuals on the roost and the ambient temperature were recorded. To observe morning arrival or evening departure, the senior author arrived at the roost one hour before dawn or sunset. Visits to the roost were also made after dark to determine if the roost was occupied at night. Moreover, the number of *S. blomfildia* feeding on bananas and roosting singly in the garden was also recorded.

To follow the movements of and determine longevity, on 21 January 2010, *S. blomfildia* were captured, marked and immediately released. Since *S. karwinskii* will abandon a roost if captured or disturbed (Muyshondt & Muyshondt, 1974), marking of butterflies taken from the roost was not attempted. Instead *S. blomfildia* (N=7) were captured with a butterfly net while feeding on bananas at the feeding station and marked (not individual-specific identified) using an artist's, fine-tipped watercolor brush with a dab of pink latex paint on the ventral hindwing (Fig. 2). Marked butterflies were released at the feeding station. Thereafter marked individuals were examined with close-focus binoculars and, when possible, individually identified by the pink spot and unique wing damage.

Arrival Behavior at the Roost

Each day *S. blomfildia* arrived at the roost at dawn, well before sunrise. The butterflies, flying rapidly, approached the roost from treetop and housetop level, usually landing a few centimeters from butterflies that had preceded them. Occasionally a butterfly would circle beneath the eave one or more times before landing, or land about 0.5 m beyond those already roosting in a cluster and immediately fly again to join the group. After landing, a few individuals walked about 1-2 cm, apparently to get a better grip on the brick and mortar substrate.

The period of time between the first and last butterfly arriving at the roost site during morning twilight was brief and occurred at about the same time each day. For example, during eight days in February 2009, the mean arrival time of the first of five butterflies that arrived each day was 06:23 h (range 06:16 - 06:28 h). The last butterfly arrived on average 4.5 min. after the mean arrival time of the first individuals. The mean temperature during arrival was 19.9º C. During the dawn flight to the roost they were certainly crepuscular, and perhaps even nocturnal, leaving the nighttime location before first light each day; moreover, on some days they arrived with ambient temperatures as low as 17º C. or in rainy weather.

While roosting, *S. blomfildia* perched upside down with wings closed and antennae held forward, nearly parallel to one another, often touching. (Feeding individuals hold the antennae forward in a V-shape.) The forewings were retracted behind the hindwings with only the ventral forewing apex and subapical spots visible. Most butterflies faced away from the wall of the house, facing the open space of the garden and, when gregarious, usually clustered with two or more centimeters between adjacent individuals (Fig. 3). The proboscis was never extended while roosting. Also, *S. blomfildia* were never seen roosting on the white vertical wall of the house below the eave.

Roosting Behavior and Feeding

Shortly after morning arrival, all of the butterflies at the communal roost were motionless; some remained quiescent until dusk, when they departed for the night. However others, as temperatures and light levels increased, were seen leaving or less often joining the roost throughout the daylight hours. By dusk the number of individuals at the roosting site was often fewer than the numbers that arrived at dawn that same day. Individual butterflies (identified by unique wing damage and pink marking), that had left the roost, fed on bananas at the feeding station or roosted singly, widely scattered under the eave of the house well away (2-10 m) from the congregation of butterflies at the communal roost.

Throughout the months of observation *S. blomfildia* were never seen in copula, and three females dissected on 17 January 2010 lacked mature eggs. Both sexes were seen at the communal roost and the feeding station.

Evening Departure

At dusk *S. blomfildia* still remaining at the roost departed over a short period of time. For example, on six days between 29 December 2009 and 7 February 2010, an average of 7.5 butterflies were clustered at the roost just before departures began. The mean departure time of the first individual leaving the roost was 17:40 h (range 17:30 - 17:45 h); the last butterfly departed from the roost on average 7.5 min after the first departure. *S. blomfildia* did not return to the roost until dawn the following day. (Nocturnal activity was not observed except for two observations of

Fig. 1. Dorsal (ABOVE) and Ventral (BELOW) images of a male (LEFT) and female (RIGHT) specimens of *S. blomfildia*. The dorsal surface of the wings was seldom seen, except when the butterfly was in flight. (Photographs provided by Jacqueline Miller, Curator of Lepidoptera, McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, Gainesville, Florida.)

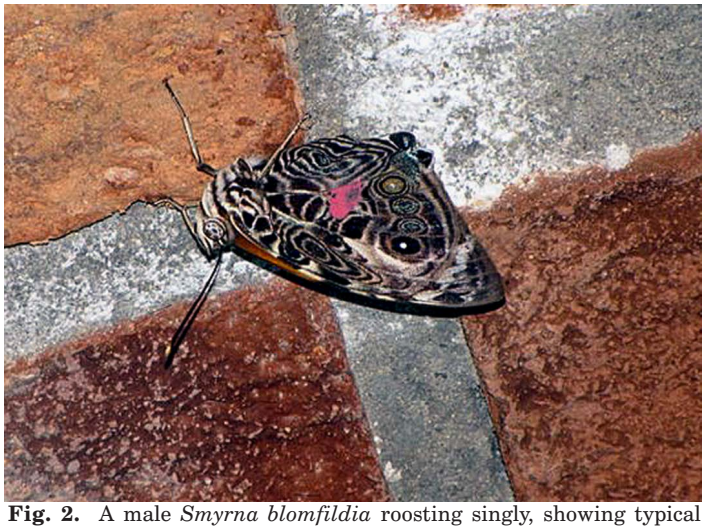

Fig. 2. A male *Smyrna blomfildia* roosting singly, showing typical roosting posture and orientation: roosting upside down (i.e., "dorsal side down") and at right angle to roof surface, with wings closed and antennae directed forward, nearly touching. Note pink latex marking spot painted on hindwing. (Photo by G. E. Einem)

Gregarious Roosting in *Smyrna blomfildia* in Western Mexico

Fig. 3. *S. blomfildia* (N=9) roosting gregariously under the eave of the house. Typically the butterflies face in one direction, towards open space, away from the wall of the house (not seen here, on right). Butterflies arrive at the roost site at dawn and depart at dusk. This roost site is unoccupied at night. Note: some individuals are marked with a pink spot. (Photo by G. E. Einem)

butterflies attracted to an outdoor floodlight.)

During dusk departure from the communal roost, other butterflies (marked and unmarked) that had left the roost earlier that day and did not return, were often feeding on bananas at the feeding station or roosting singly under the eave of the house 2-10 m from those clustered at the communal roost. These butterflies, feeding or roosting singly, departed at dusk nearly in synchrony with those roosting gregariously under the eave of the house.

During both winter-spring dry seasons in which this study was conducted, the number of roosting *S. blomfildia* counted at the roost steadily decreased from seven individuals in mid-January 2008 to one by late-March 2009 and the following season from twenty in mid-December 2009 to as few as five in early-April 2010.

Longevity, Fidelity and Seasonality

At the one roosting site studied, one unmarked *S. blomfildia* and all seven of the butterflies marked and released at the banana feeding station on 21 January 2010 were seen, during the next census four days later, roosting gregariously at the roosting site under the eave of the house. Thereafter on 20 census days, including the last census on 6 April 2010, one or more marked butterflies were observed at the communal roost. On the last day of the census, three of the marked butterflies were present at the roost site, 74 days after they were marked with the pink latex spot on 21 January. *S. blomfildia* butterflies were observed roosting gregariously under the eave of the house from December to April; nevertheless, the site was unoccupied from May through August. (No observations were made in September, October and November.)

Discussion

The *S. blomfildia* butterflies, observed in this study, and its sympatric relative *S. karwiniskii* observed in El Salvador (Muyshondt & Muyshondt, 1974) have a number of adult communal roosting characteristics in common. Consistent with the Muyshondts' observations, our observations are that both species roost gregariously from at least December to April under a roof or in a natural cavity away from direct sunlight. During these months, neither of these species show sexual activity and, when examined, mature eggs are not found in the abdomen. In both species aggregations of butterflies occupy the roost site every day during the roosting season; however, individuals will frequently and spontaneously depart from the roost to feed, and sporadically individuals will join the group. Initial studies of the satyrine butterfly *Manataria maculata* (Hopffer) in Costa Rica have found some roosting patterns similar to those of *Smyrna* (Nathan et al.). This species roosts in groups during the day, occasionally leaving the roost to forage. At night they roost singly in the forest canopy.

Differences between the seasonal gregarious roosting of *S. karwinskii* and *S. blomfildia* concern the geographic location of the roosts and the number and arrangement of butterflies in the aggregations. In Mexico (Beutelspacher, 1975; Warren & Luis-Martinez, 2007) and El Salvador (Muyshondt & Muyshondt, 1974), *S. karwinskii* roost gregariously, principally on mountain tops (1900-2000 m elevation) during the dry season, but are rarely seen there during the wet season. In El Salvador, *S. blomfildia* is seldom seen on the mountain tops year-round. However, both species breed at lower elevations in the same habitat during the wet season. In our study *S. blomfildia* roosts were found during the dry season near sea level (39 m), and the presence of nearby Urticaceae host plants suggests that oviposition and larval development also occur at low elevations. In Costa Rica, *S. blomfildia* occurs from sea level to 1,200 m (DeVries, 1987). In Nayarit, Mexico, *S. karwinskii* was not seen at low elevations during the dry season (pers. obs., GEE), and is rarely found below about 1000 m in Nayarit (Llorente et al. 2004).

Five mountaintop roosts (2000 m) in El Salvador contained from 10 to more than 100 (and in Chiapas, Mexico, over 300) *S. karwinskii* butterflies as compared to the two much smaller roosts of *S. blomfildia* with a maximum of 4 and 20 butterflies as observed in this study. This suggests that the large *S. karwinskii* roosts may result from a large population of butterflies that bred at lower elevations migrating to a relatively smaller geographic area on a mountain top. The *S. blomfildia* roosts in the lowlands may have fewer butterflies from local populations.

The arrangement of the two species of *Smyrna*, perched gregariously under a roof, is noticeably different. In El Salvador and Chiapas, Mexico, *S. karwinskii* were arranged in very densely packed arcs or circles around a central cluster of butterflies, all with heads directed inward. The roosting *S. blomfildia* that we observed in Mexico were less densely perched with one or more centimeters between individuals and with all or most of the butterflies oriented in one direction, away from the wall of the house.

The timing of *S. blomfildia* arrival and departure from the roost site each day is synchronized, showing circadian behavior. Similarly, the Costa Rican skipper butterfly *Celaenorrhinus fritzgaertneri* (Bailey), which roosts gregariously in caves, exhibits a synchronous pattern of arrival and departure (DeVries et al., 1987); however, unlike *S. blomfildia*, they are quiescent during the day and are active at night. Synchronous arrival and departure from a roost site has not been reported for *S. karwinskii*.

The question remains, why do *S. blomfildia* adults aggregate? First, we suggest that a cluster of butterflies might confuse a predator's visual search image. To humans at least, at a distance, the aggregate looks like dead leaves or a patch of fungus, not

individual butterflies. However, this begs the question, why do individual butterflies frequently leave the communal roost and roost singly not far away from the apparent safety of the group? Secondly, as suggested by the Muyshondts (1974), a roost containing male and female butterflies may expedite the sexes finding one another for courting and mating at the end of the dry season. In California Monarch butterflies within colonies mate sporadically in mid-January and in large numbers in mid-February (Hill et al., 1976). In this study, however, *S. blomfildia* was never seen in copula at the roost or elsewhere. Finally, on one occasion, I (GEE) observed an aggregate of *S. blomfildia* react to a small green fly (order Diptera) which circled under the roost. The butterflies reacted in unison, rapidly opening and immediately closing their wings, only one time. The intruding insect immediately flew off and did not return. We wonder, do *S. blomfildia* that roost gregariously obtain benefits from such a group display or mimetic resemblance to an inedible object, not obtained when they roost singly?

Acknowledgments

We thank Jacqueline Miller and Andrew D. Warren (McGuire Center, Gainesville) for reviewing the manuscript and providing valuable suggestions. Also we thank Deborah L. Matthews for photos (Fig. 1) and Martin Lara Aguirre for field assistance.

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Anisota are among the smallest Saturniidae in the world, and pinned specimens are not usually very showy. However, like most Lepidoptera, when the living *Anisota* are photographed close-up with good lighting, their beautiful patterns and colors come into view. Here are three pairs that were reared from eggs in 2009 and 2010 and photographed by Richard S. Peigler. **1)** *Anisota discolor* from Walker County, Texas; **2)** *Anisota finlaysoni* from Hastings County, Ontario; **3)** *Anisota peigleri* from Troup County, Georgia, shown on a Cherokee basket

And now, some *Anisota*...

Pink-striped oakworms (*Anisota virginiensis*) and orange-striped oakworms (*Anisota senatoria*) are both common species in southeastern Canada and northeastern USA. So why hasn't anyone ever crossed the two species in captivity? Here is a photo of a mature larva that is a hybrid between other members of the pink-striped and orange-striped groups. It is a cross between *A. discolor* male from East Texas and *A. finlaysoni* female from Ontario, reared in 2010. Mature larvae of the parental species are colored quite differently, and this hybrid is remarkably intermediate. Photo by Ric Peigler.

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

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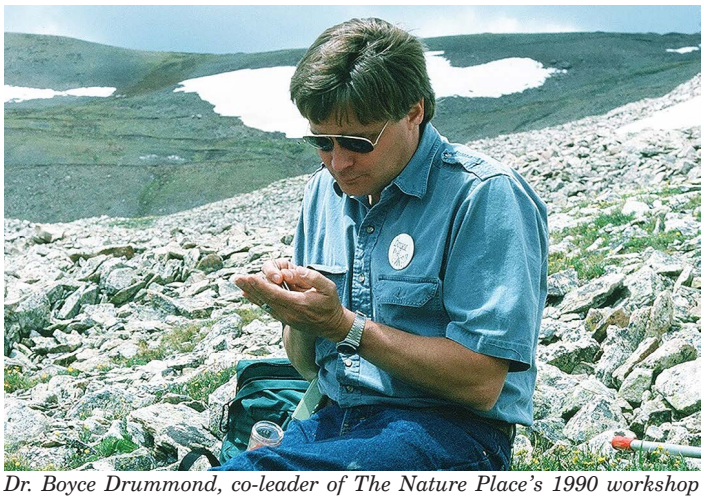
Horseshoe Mountain (elevation 13,898 feet) in central Colorado. The name is based on a glacier-carved cirque that opens onto a treeless alpine meadow located at 12,200 feet. Snowfields are still evident in early July even though wildflowers are blooming in the snow-free areas.

Wildflowers in the alpine meadow at the upper end of Leavick Valley on Horseshoe Mountain. The meadow is at the base of a nearly perfect glacial cirque. Early to mid July is prime time for flowering and butterfly activity even though snow can occur on any given day throughout the year.



Dr. Boyce Drummond, co-leader of The Nature Place's 1990 workshop on "The Biology of Butterflies," exams a 'Snow's' Lustrus Copper, a bright coppery red butterfly that is a specialist on talus and difficult to net because of the loose rocks underfoot.

Class members carefully negotiate a snowfield in order to reach alpine talus to search for butterfly specialists. Pockets of snow often remain in protected areas throughout the entire summer months at these high altitudes above the treeline.

An Adventure in the Alpine Tundra of Colorado (see article p. 90)