Volume 54, Number 2 Summer 2012

NEWS OF THE LEPIDOPTERISTS' SOCIETY

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Gorgonidia buckleyi (Arctiinae), near Amazon Lodge in French Guiana (Photo by Mike Thomas, see article, page 35)

The Amazon Lodge French Guiana

Victor DeMasi

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There are 3 important aspects of any natural history travel.

First is safety. Isolated settings where fauna and flora take refuge may also harbor dangerous individuals. Theft and physical harm are possible in such places (also in New York). A fancy camera rig is a nice grab for a lurking thief. Easy when no one else is around. One might perceive an area as safe but that sense of safety is often really the consequence of ignorance.

The second aspect is accessibility. Many wonderful habitats are hard to find or distant from transportation, a good reason why they remain less disturbed. On my youthful travels in Africa and South America I would often spend the better part of a week locating a location and then spend considerable hours each day getting in and out. Going to remote areas cold turkey tempts with a bit of adventure but plan plenty of time to find good spots.

Third is a place that is naturalist friendly. Export permits, landowner permission, and. reasonably priced room and board, clean drinking water with facilities to process specimens in less than primitive conditions all are necessary for days that promise long hours of field work.

Frédérick Latorre, a French citizen and botanical entrepreneur offers his Amazon Nature Lodge in French Guiana (fr. Guyane) for the naturalist traveler as an excellent destination for those whose time is limited. It satisfies all important aspects.

A group trip to the lodge was proposed by Maishe Dickman, an insect enthusiast who frequents Thursday bug lunches at the Peabody Museum of Natural History at Yale. I am a research affiliate there in a dedicated group of entomologists. Maishe has collected at the lodge 14 times and was a companion on both of my recent dry season trips, September 2010, and October 2011. Bugsters from our lunches favoring other less important groups than Lepidoptera, spouses and later instar children were included in both outings. It was fun studying nature with this mixed bag; group dinners included show and tell with informed identifications and life histories across the entomological spectrum. There was no sense of competition which often emerges in passionate groups who all seek the same beasts.

Reaching Amazon Lodge was for my crowd an uncomfortable all day flight from Miami on Air France, a "local' stopping at Haiti, Guadalupe, and Martinique before an evening touch down in Cayenne, our destination's capitol. It was a packed plane with many colorful characters and screaming kids "in your face" for companionship. These to and return flights reminded me of all day bus travels from my Peace Corps Ethiopia days, standing room jammed, with chickens and furniture tied to the top. Can't be positive but I think these jets have roof racks as well, There are few flight options for the diminutive Cayenne but if I go again I might consider the direct cattle car from Paris.

Greeted at the Airport by Fred's lodge workers, who are always Estonian students (in yearly rotations) frazzled visitors are whisked in an hours time to the jungle destination. The decent Tarmac road rises on a long narrow ridge to an altitude that offers some relief from the steamy capitol.

Amazon Nature Lodge facilities are comfortable but not luxurious. There is no air conditioning. Three full meals per day were included in my plan. Wine was served at every dinner. They're French! Stocked refrigerators in all cabins provide chilled drinks so welcome in hot climes.

Fred did the cooking on both of my trips and despite a vigorous daily field regime with constant sweat I shed no pounds. Dinner was several courses with a wonderful desert. I am gluten intolerant and my special diet needs were addressed with no sacrifice in cuisine. I complemented Fred on the excellent food our last day to which he responded in a shrugged matter of fact "we are French".

Calycopis sp. (Photo by Mike Thomas)

The lodge sits astride a narrow ridge top which falls off precipitously in short walks along many trails that radiate outward. Ridge top forest is second growth with dense impenetrable understory. Steep side slope vegetation is more mature with easy walking underneath and larger trees with nothing seeming to exceed 120 feet. A busy nearby lumber mill high grades the timber leaving the area not virgin in any imagination but still very well developed habitat. Bedrock is easily exposed anywhere you scrape a few leaves aside so I doubt this ridge ever supported the really big sticks that shaded me in the deeps of the Ecuadorian Amazon or East Africa's Kakamega Forest. This place is drenched in the rainy season. Eleven inches fell in a 24 hour period of January 2012, during a continuously showering week that offered only 6 hours of sun. In my cumulative dry season outings of 16 days I only experienced one interrupted afternoon of heavy downpour. I welcomed that relief from the heat. A good equatorial soaking is a singular moment to witness. The dry season at the lodge is hot or really hot with one advised to seek shade in repose post lunch thru late afternoon.

Looking out from Ridgetop (Photo by Roanna Metowski)

I take a hard glance at all things chitinous but leps dominate my passion. At Amazon Nature Lodge I was especially hoping to augment the Peabody's Riodinid holdings and I did. Butterflies were plentiful with a bag of several hundred on each year's trip. This trumps other experiences I've had in dry season collecting in the tropics where there seemed to be no insects whatsoever. The first year offered an abundance of Morphos like I have never seen. 7 species in all including a singular *Morpho eugenia* which flies only in the earliest light of dawn to about 6:30 am. I dragged it down in a forest clearing after several day's sleepy efforts and many wild swings of an extension poled net. *Agrias narcissus* turned up once in bait traps on each trip. Despite months of previous searching other neotropical points these are my only encounters with the genus.

Fred provides a quantity of traps baited by Estonians at no extra charge. One can also borrow some other traps he has for personally chosen locations. Despite a plentiful output of species I had a bit of disdain for Fred's contraptions and determined my second year to set a bunch of my own traps with special baits. I had asked Fred to provide the additional baits which he did -- dead fish, dead meat, and I can't mention the rest. I am a veteran trapper and was determined to show that frenchie a thing or two. My daughter and I set our own trapline in a promising bit of gallery hoisting a bunch of them aloft to sample the different layers. All week our traps produced almost nothing despite a variety of baits including Fred's proven house blend! All this time the lodge rigs kept a steady stream of scaly gossamers coming our way. I was greatly humbled by my efforts, actually failures in the eyes of my Peabody colleagues and especially my daughter, who were all anxious to see a thing or two but actually saw nothing. For this great tropical adventurer to lose such status in his progeny's opinion, ouch!

Orianna DeMasi with trap (Photo by Victor DeMasi)

The great lab facilities at the Amazon Lodge (Photo by Roanna Metowski)

The main lodge cabin includes a screened lab with good lighting for comfortable night work. There are plenty of sinks with running water. Hammocks on shaded porches encourage a nice read or nap in languid afternoon moments for the refugees from the torrid direct sun. Guyane has a lot of fine nature publications many of which are found around the lodge as books and posters.

In two trips in consecutive years, first with my bride Roanna and then with my daughter Orianna we forked over about $2500 each, half of that was for round trips from New York and the balance for lodging and 3 meals. Light trapping is a pricy additional charge per night and distant trips and extras such as special bait preparations also cost. Only Fred the owner knows the charges so don't rely on information from the Estonian students. Ask Fred in advance or your final tally might surprise!

From this experience I am more convinced than ever that Lepidoptera learn the bait location and purposely return. This homing is reminiscent of Mourning Cloaks in our temperate zones which over generations appear at the same spot in the forest, on the very same rock year after year.

Electricity is dependable and several large refrigeration units can fast freeze specimens. Lepidoprtera are kept limp by quick freezing and this also insures that half dead specimens don't swim around in envelopes suffering a slow demise and damage. On other collecting trips to the tropics I was forced to dry specimens to prevent rotting and later relaxing for preparation was not always satisfactory, resulting in some specimens not laying flat.

The Euro rules in this French Territory although Fred is happy to do business in Dollars as well. He provides export permits for all guests upon request. Make sure your yellow fever is up to date and I recommend malaria precautions.

Amazon Lodge was a fruitful outing providing easy access to natural areas, reasonable price for comfortable jungle accommodations, and the reputable Fred for doing business. If you only have a week for an equatorial outing consider this.

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Incredible Katydid wasp mimic, *Aganacus pseudosphex*
(Photo by Mike Thomas)

Note: Larry Gall, past lepsoc president and continuing Lepidopteral enthusiast has organized a cadre of Yale students to computerize the Peabody collection. His results are impressive and the digitalization of butterflies will soon be complete with the dispatch of the Hesperiids. Google Peabody Museum to collections and you can now find (almost) my entire African and South American contributions, many of them as photos. The recently published Connecticut Butterfly Atlas is there as well. French Guiana specimens will be online when the paperwork is complete. Soon Larry starts the moths which he hopes to complete by some holiday in this century.

A Chestnut Tiger, *Parantica sita niphonica* (Nymphalidae: Danainae), marked in Japan and recaptured in China in 2006

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It was discovered recently that a male of *Parantica sita niphonica* (Moore, 1883) marked in Wajima City of Ishikawa Prefecture of central Japan on August 6, 2006 had been recaptured in Pinghu City of the Chechiang Province of China on October 14, 2006 (Figs. 1 & 2). This is the first time that movement of *P. sita* from Japan to a China has formally been documented.

Figure 1. Male recaptured in Ping Hu, China.

Figure 2. Male, spread, recaptured in Ping Hu, China.

Parantica sita is a danaine species that is famous in Asia as a "Butterfly that travels," shuttling between Japan and Taiwan similar to movements of the Monarch Butterfly in North America. The life history of *P. sita* has a long distance seasonal movement, going north from spring to early summer and going south in autumn. This movement has been clarified over the last 30 years by mark-release-recapture activity of many citizen markers.

Details of this recapture are as follows:

Mark: see Fig. 1
Sex: ♂
Mark point: Mt. Hachibuse-yama, Wajima City, Ishikawa Prefecture, Honshu, Japan. Specifically, the vicinity of the Hachibuse-yama side exit of the Kohachi woodland path where the path connects Kohshu-zan (567m. highest peak of Mts. Okunoto) and Hachibuse-yama (543m).
Mark time: 7:24 a.m., August 6, 2006
Mark person: Mrs. Nagako Hiyoshi
The behavior at mark-release point: Visiting flowers of *Eupatorium chinense* L. subsp. *sachalinense* (Fr. Schm.) Kitam. (*Eupatorium glehnii*)
Weather: Clear with a moderate wind.
Temperature: 23 degrees C.
Condition: fresh (no noticeable damage).
Forewing length: 57mm.
Recapture point: Jiu Long Shan forest park, Zhapu, Pinghu City, Chechiang Province, China (N30°35'53", E121°06' 36 ", Figs. 3 & 4)
Recapture date: October 14, 2006
Recapture person: Mr. Chu Chien-chin.

The recapture point is near the distribution boundary of *P. sita niphonica*, a Japanese and Taiwanese subspecies, and *P. s. sita*, a Chinese subspecies. Mitochondrial DNA analysis suggests that there is moderate phylogenetic distance between the two subspecies, and field studies indicate a specific distinctness as well. It would be interesting to investigate further if there is any genetic, morphological and behavioral overlap in and around the recapture location.

There is a possibility that many individuals move from Japan to the Asian continent every autumn and from the continent to Japan between spring and early summer. We postulate that a possible migration route could be from Japan going southwest across the East China Sea to China via South Korea. Moreover, it is thought that *P. s. sita* does

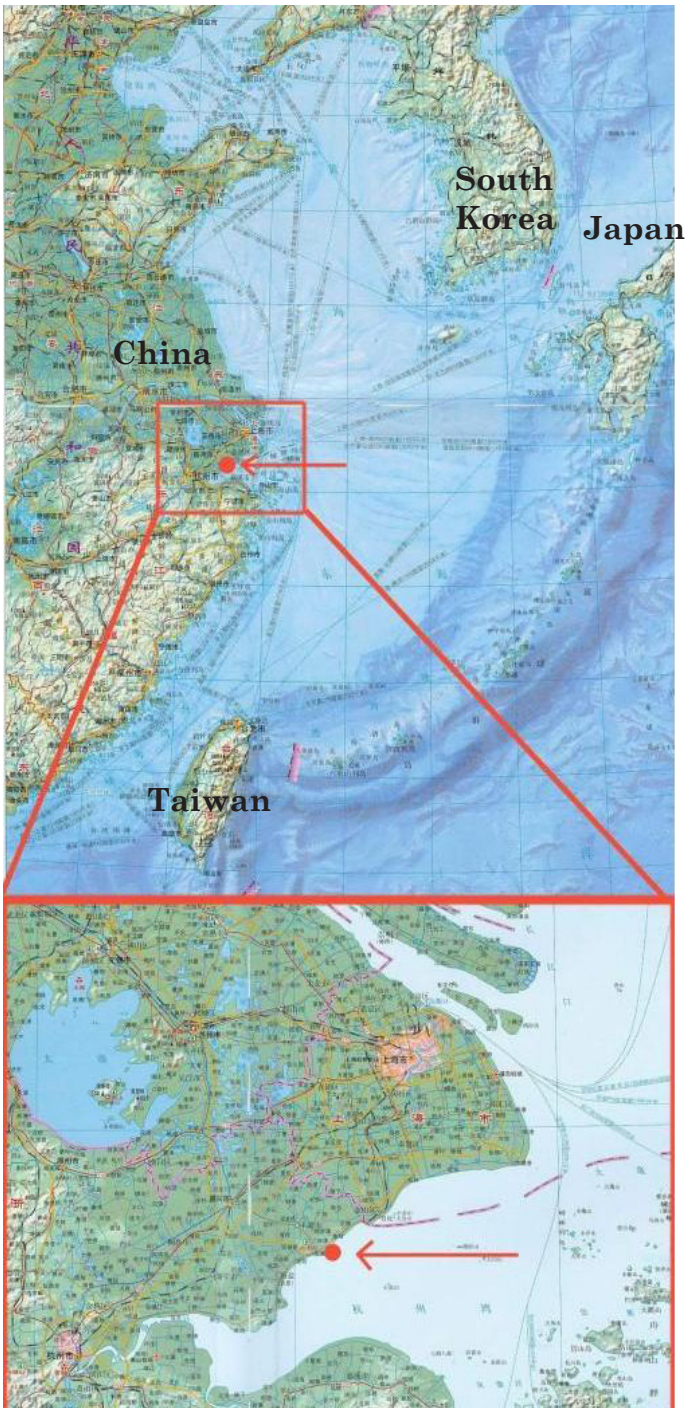

Figure 3. Map showing recapture point in Ping Hu, China.

not move south and north on the continent according to the season, unlike the Japanese/Taiwanese subspecies. Further advances on understanding of *P. sita* movements in China are expected, particularly since there is now clear evidence of possible exchange of individuals with Japan.

The number of recaptures (of all distances) of *P. sita* has increased every year since 1981. In 2008, long distance movements were indicated by three recaptures of Japanese individuals in Taiwan, and by another individual that was marked in Hokkaido being captured in Honshu on the big island of Japan. We continue to be interested in studying the movements of *Parantica sita* (both *niphonica* and *sita*) on the islands of Japan and Taiwan and in mainland China.

An adult male of the Chestnut Tiger butterfly from Japan was re-captured in South Korea, and also in Hong Kong last year in the period from initial writing of this manuscript to printing. Details of recaptures are reported in another paper.

Figure 4. A photograph showing environment at recapture point in Ping Hu, China.

Callophrys Green Hairstreaks regain traditional names

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The International Commission on Zoological Nomenclature (ICZN) has published their ruling on the names of *Callophrys* butterflies in western North America (Opinion 2291, see ICZN 2012 in Literature Cited below), which finally stabilizes the names used for these butterflies. In 2010 we submitted a petition to the ICZN to stabilize the names of *Callophrys dumetorum* (Boisduval), *Callophrys viridis* (Edwards), and *Callophrys sheridanii* (Carpenter) (Scott et al. 2010). This brief note explains the nature of the ruling and the names that are now valid.

Nomenclatural chaos resulted from disagreement about the identity of the lectotype of *dumetorum*. Tilden (1963) identified the lectotype as the central California lowland *Callophrys*, but Emmel et al. (1998) identified it as the Coastal Green Hairstreak formerly called *viridis* which forced the replacement of the name *dumetorum* by *perplexa* (Barnes & Benjamin) and the name *viridis* by *dumetorum*. (The petition illustrated and discussed the lectotype of *dumetorum* and concluded that it is unidentifiable.) In addition, the popular name *sheridanii* was threatened by the older name *viridis* (even though the name *sheridanii* has been used in the scientific literature more than 229 times for butterflies widespread across western North America) because recent studies suggested that they are conspecific (Warren 2005).

ICZN opinion 2291 means that **the valid name for the widespread lowland California species is *Callophrys dumetorum* (not *perplexa*)**. So, the subspecies of *perplexa* listed in the Pelham Catalogue (Pelham, 2008) now become *C. dumetorum superperplexa* and *C. dumetorum oregonensis*. The opinion designates a neotype of *dumetorum* from Brannan Island, Sacramento Co. California (Fig. 1). Opinion 2291 also means that **the valid name for the Coastal Green Hairstreak that ranges along the California coast is *Callophrys viridis* (not *dumetorum*)**. These names were usually used for those two species in the past. Recent authors suggest that *C. viridis* and *C. sheridanii* are conspecific (Warren 2005, Scott 2008--note that Fisher & Scott 2008 showed that *sheridanii* is conspecific with *comstocki*). Further, Opinion 2291 means that **the valid name for the coastal species is *C. sheridanii viridis* for anyone who believes *sheridanii* and *viridis* to be conspecific**, because the name *sheridanii* now has precedence over *viridis* even though *viridis* was named prior to *sheridanii*. Thus all the numerous subspecies of *sheridanii* listed by Pelham (2008) remain subspecies of *sheridanii* (thankfully they are NOT renamed as *Callophrys viridis* subspecies). For authors who consider *C. affinis* and *C. apama* to be subspecies of *C. dumetorum* (see Scott 2008), the valid names are *C. dumetorum affinis* and *C. dumetorum apama*, because *dumetorum* is the senior name.

Figure 1. Neotype of *Thecla dumetorum* Boisduval, 1852. Dorsal (top), ventral (bottom).

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Hyalophora columbia gloveri (Lepidoptera, Saturniidae) in the Spring Mountains, Clark County, Nevada, and description of a unique larval phenotype

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Abstract. Here we report on a population of *Hyalophora columbia gloveri* (Strecker, 1872) within the Spring Mountain Range, Clark County, Nevada. The phenotype of the adult appears to fall within the range of known *H. c. gloveri* phenotypes, but the final instar larvae possess characteristics that may be unique to this population.

Key Words: Mojave Desert, Great Basin, larval phenotype

The Spring Mountains are the largest mountain range in the Mojave Desert, approximately 2168 sq. kilometers, with a maximum elevation of 3632 meters. The mountain range lies within the northeastern quadrant of the Mojave Desert slightly south and west of a transition zone to the cooler, moister Great Basin. The nearest reported populations of *H. c. gloveri* are in eastern California in the Panamint and White mountains, northwestern Arizona, southwestern Utah, and in central Nevada (Tuskes *et al.* 1996).

The authors have encountered one adult and three final instar larvae over a 15 year period. All records are from the east slope of the range and follow a north / south axis along the central massif covering an area of approximately 15 linear kilometers. The first larva was found on 15 August 1995 at an elevation of 2550 meters in the vicinity of the Hill Top Campground; that individual quickly pupated and without refrigeration eclosed on 20 April 1997. A second larva was found on 3 September 1995 at an elevation of 2400 meters approximately one kilometer north of Lee Canyon on Forest Service Road No.185; it pupated immediately but failed to eclose. The third larva was collected on 17 August 2010 at an elevation of 2160 meters just below the Kyle Canyon Campground (figure 1). This individual pupated on the date of its collection. The pupa was refrigerated from 19 September 2010 to 19 April 2011 but did not eclose. It was refrigerated again from 3 October 2011 to 5 February 2012 and eclosed 6 March 2012; the adult is depicted in figure 2. All larvae were encountered moving on the substrate and a foodplant has not been identified although a number of potential larval foodplant species are known from the area (see Niles and Leary 2007). One adult has been observed in the field, but not collected. It was seen during daylight hours on 7 July 1999, also at the Kyle Canyon Campground location.

Description of Larvae: The ground color of the fifth instar larva from the southern Nevada population is bright green. The dorsal scoli of the meso-, metathoracic and first abdominal segments are red and bulbously enlarged distally. The remaining dorsal scoli are less bulbous in shape with an orangish-red color. The lateral scoli are white distally, with light blue and black bands at the base. The lateral scoli on the last abdominal segment are light blue in color with black at the base. This larval phenotype differs from the larval phenotypes described by Tuskes *et al.* (1996) by a bright green dermal color and the color of the scoli.

Figure 1. Dorsal-lateral view (top) and dorsal view (bottom) of final instar larva of *Hyalophora columbia gloveri*: Lower Kyle Canyon, Spring Mountains, Clark County, Nevada; 17 Aug 2010.

The Spring Mountains are geographically and ecologically isolated from other habitats that could harbor woodland and montane species. This, along with the unique larval phenotype, may suggest a lack of gene flow between this population and other *H. c. gloveri* populations. Further investigation is needed to determine this population's precise taxonomic status and document its complete life history.

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Climate change and Southeastern U.S. island faunas:

Butterflies observed at Sapelo and Cabretta Islands, McIntosh County, Georgia, November 2011

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Our knowledge of the butterflies and moths of barrier islands in the southeastern U.S. is very poor, yet these places are at the leading edge of climate change effects on terrestrial communities. Harris (1972) listed three species of butterflies from Tybee Island (Chatham County), 11 species from Jekyll Island, and 17 species from St. Simons Island (Glynn County), Georgia, for a total of 24 species. These islands are accessible by roads. However, there do not seem to be any published records of Lepidoptera from Sapelo and associated islands, which are only accessible by boat. I visited Sapelo and nearby Cabretta islands on November 10-13, 2011 and report here on the butterflies that I observed.

There are a number of smaller islands around Sapelo Island, which is the largest and only inhabited island of the complex. Just to the southeast is Little Sapelo Island and a few other tiny islands that are surrounded by saltmarsh habitat. These islands are separated from Sapelo Island by the Duplin River. From north to south, Blackbeard Island, Cabretta Island, and Nanny Goat Island flank the eastern side of Sapelo Island and are separated from each other and Sapelo by saltmarshes and creeks.

Access to Sapelo Island is restricted to residents, who live mostly in the village of Hog Hammock, and their guests, staff and visiting scientists at the University of Georgia Marine Institute, Georgia Department of Natural Resources staff who maintain the J.R. Reynolds Wildlife Management Area, and others with authorization. There is a campground on Cabretta Island and a few houses and rooms for rent in Hog Hammock as well as the elegant Reynolds Mansion on Sapelo Island, but visitors must have a local guide. Information about visiting Sapelo Island is available at the Sapelo Island National Estuarine Research Reserve Visitor Center (Route 1, Box 1500, Darien, Georgia 31305) on the mainland and online at **http://www.sapelonerr.org/.**

Sapelo Island is the fourth largest of the coastal barrier islands of Georgia. Although much of the island was cultivated in the past (Sullivan 1989), today it is mostly forested. Habitats on Sapelo Island (Figure 1) include oak hammocks, cane brakes, cypress swamps, pine flatwoods, an Indian shell ring, fresh water ponds and lakes, saltmarshes, old fields, suburban yards, and disturbed areas. Habitats on Cabretta Island are beach dunes, coastal hammocks, coastal prairies, and saltmarshes. Duncan (1982) found 604 species of plants at Sapelo Island.

I camped with a group of friends at Cabretta Island, arriving late afternoon on November 10th. I explored around the campground and nearby areas of Cabretta Island during the morning of November 11th and briefly on other days. November 11 was sunny, but cool and breezy during the day. During the afternoon of November 11 we were given a tour of Sapelo Island by resident JR Grovner. We visited the First African Baptist Church, Chocolate Plantation, Shell Ring, Long Tabby, Hog Hammock, Reynold's Mansion, University of Georgia Marine Institute, and the Lighthouse.

In about two hours during the morning of November 11th on Cabretta Island, I found six species of butterflies (Table 1). There were five tents of *Megathymus yuccae* on a clump of *Yucca aloifolia* near the campground, and two tents on a *Yucca gloriosa* in the dunes. I also found a 3rd instar larva of *Lerema accius* on the leaves of *Sorghastrum elliottii*. Gulf Fritillaries and Monarchs were flying southward along the beach dunes. An adult *Vanessa atalanta* was perching in our campground on the afternoon of November 13th as we were packing to leave.

Table 1. Butterflies observed on Cabretta Island.

Scientific Name	Common Name	Totals
Megathymus y. yuccae	Yucca Giant-Skipper	Tents
Lerema accius	Clouded Skipper	Larva
Phoebis sennae	Cloudless Sulphur	1
Danaus plexippus	Monarch	5
Agraulis vanillae nigrior	Gulf Fritillary	15
Vanessa atalanta rubria	Red Admiral	1

On November 12-13, I searched for butterflies on Sapelo Island especially along Cabretta Road and East Perimeter Road from Hog Hammock to west of the First African Baptist Church. Much of the pine forest north of Dogpatch Road and in the R.J. Reynolds Wildlife Management Area had burned recently, and although late in the year, some wildflowers were blooming again. Flowering *Pityopsis graminofolia* and a *Liatris* species were attracting butterflies, especially along the roadsides.

Table 2. Butterflies observed on Sapelo Island.

Scientific Name	Common Name	Totals
Urbanus proteus	Long-tailed Skipper	3
Erynnis zarucco	Zarucco Duskywing	2
Panoquina panoquin	Salt Marsh Skipper	2
Panoquina ocola	Ocola Skipper	1
Lerodea eufala	Eufala Skipper	5
Hylephila phyleus	Fiery Skipper	1
Eurema daira	Barred Yellow	1
Pyrisitia lisa	Little Yellow	3
Colias eurytheme	Orange Sulphur	1
Phoebis sennae	Cloudless Sulphur	2
Calycopis cecrops	Red-banded Hairstreak	1
Strymon melinus	Gray Hairstreak	4
Leptotes cassius theonus	Cassius Blue	4
Hemiargus ceraunus antibubastus	Ceraunus Blue	5
Danaus plexippus	Monarch	3
Agraulis vanillae nigrior	Gulf Fritillary	24
Vanessa virginiensis	American Lady	2
Vanessa atalanta rubria	Red Admiral	2
Junonia coenia	Common Buckeye	18
Hermeuptychia sosybius	Carolina Satyr	1

I found 20 species of butterflies on Sapelo Island in about 6.75 hours of searching on November 11, 12, and 13, 2011. Mornings were cold and there was frost on the dune plants on November 12th. I noticed some frost damaged plants on Sapelo Island the next day, but butterflies were still flying during the daytime. Gulf Fritillaries and Common Buckeyes were the most abundant butterflies.

Although very late in the year, I found a total of 22 species of butterflies on Cabretta and Sapelo Islands in just a few days of searching. Only six of these (Ceraunus Blue, Fiery Skipper, Eufala Skipper, Salt Marsh Skipper, Orange Sulphur, Little Yellow) had also been listed by Harris (1972) for other Georgia islands. The most unexpected butterflies were several Cassius Blues (Figure 1) which were associated with flowering *Rhynchosia minima*, a likely host plant, at the Chocolate Plantation, and a single Orange Sulphur, which seemed out of place in the pine flatwoods of the J.R. Reynolds Wildlife Management Area.

Much more field work needs to be done on barrier islands in the southeastern U.S. In order to document how climate change is affecting the fauna and flora, baseline lists of species need to be compiled soon. I heartily thank Carol Lippencott of Gainesville, Florida for organizing the Sapelo Island adventure.

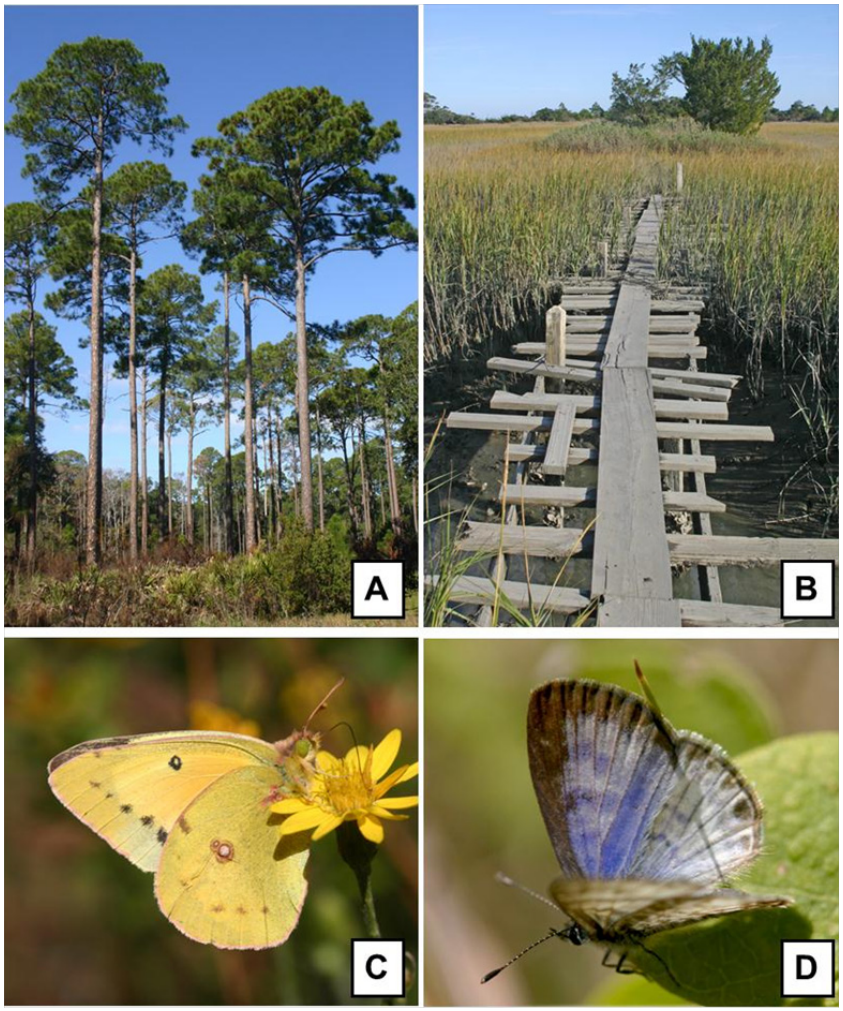

Figure 1. Sapelo Island, Georgia habitats and butterflies. A) Pine flatwoods at the J. R. Reynolds Wildlife Management Area, B) trail to Cabretta Island through the saltmarsh, C) an Orange Sulphur (*Colias eurytheme*) nectaring on *Pityopsis graminifolia*, D) a Cassius Blue (*Leptotes cassius theonus*) at the Chocolate Plantation.

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Swamp Metalmarks (*Calephelis muticum*) found in Alabama

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On May 28, 2011, Vitaly Charny discovered that he had photographed a Swamp Metalmark (*Calephelis muticum*) at Cane Creek Canyon Nature Preserve in northwest Alabama, approximately 300 miles from its nearest previously known population. Charny had planned to run his usual butterfly-monitoring route at the Preserve, but at the last minute he and his wife Larissa decided to investigate a newly opened pathway. While taking a break at a small clearing, Charny noticed two diminutive orange butterflies swirling above clusters of Daisy Fleabane (*Erigeron* spp.). One looked unusually small, so he quickly snapped some shots with his digital camera. The identity of the first butterfly was predictable (a male Pearl Crescent, *Phyciodes tharos*), but the other was a complete surprise. The tiny individual was clearly a metalmark, by all accounts, far out of range. Little Metalmark (*C. virginiensis*) is generally considered the only resident metalmark in the southeastern United States, but when Charny studied his photos, he realized that this dark-bodied butterfly was no Little Metalmark. Believing he was looking at a Swamp Metalmark, he sent images to Dr. Paul Opler, who confirmed the ID.

Calephelis muticum is associated with grass/sedge wetlands in the Upper Midwest, Ohio Valley and Ozark Mountain regions, extending as far south as Kentucky and Arkansas. Despite the production of multiple broods in its more southern populations, Swamp Metalmark is almost never common, and many records consist of just one or only a few individuals. Even in Missouri, its stronghold, populations are small and highly isolated, with many not having been seen in decades (Bess, 2005). In Illinois, the species has been absent since the 1980's, and re-introduction attempts are underway (Odway, 2008). The Arkansas population has not been observed in over thirty years (Bess, 2005). Kentucky's population is highly imperiled, its only known sustained colony in danger of eradication from potential loss of habitat (Loran Gibson, personal communication, February 28, 2012).

Swamp Metalmarks are always found in close association with their primary larval food plants, and these native thistles (Swamp Thistle, *Cirsium muticum*; Tall Thistle, *C. altissimum*; and Carolina Thistle, *C. carolinianum*) (Bess, 2005) are much more common than the butterfly. At Cane Creek Canyon Nature Preserve, Sara Bright and Paulette Ogard determined that Tall Thistle (*C. altissimum*) is the sole host plant. Thistles are biennials—plants that require two years to complete their life cycle. They produce only an evergreen basal rosette of leaves during their first season; a tall flower stalk emerges during the second year of growth. Once seeds are set, dieback and decomposition follows. According to several reports, *C. muticum* deposit eggs on non-flowering, first-year basal rosettes (Bess, 2005; Borkin, 2005; WDNR, 2011). However, Bright and Ogard observed that females from the first flight oviposited on the emerging flower stalk. During repeated visits over an eight-week period, they found caterpillars of all instars (as many as thirty-five in one day) and one chrysalid, all on second year plants. Conversely, females from the second flight chose non-flowering, first-year plants as oviposition sites, presumably because the majority of the subsequent larvae over-winter and require the protection and continued food resource provided by the thistle leaves. In January 2012, Ogard and Bright located three mid-instar caterpillars clinging to the underside of leaves, each on a different basal rosette. Two of the three larvae were found near windowpane-shaped chew patterns characteristic of metalmark caterpillars. The marks were fresh, indicating that the caterpillars had taken advantage of warm winter temperatures to eat.

The Alabama *C. muticum* colony produced multiple broods during summer 2011. Vitaly Charny's first sighting was in late May. A second flight occurred in late July/August with a high count of ten butterflies. In October, Charny observed four individuals, representing a partial final brood. How did Swamp Metalmarks come to reside in northwest

Swamp Metalmark (*Calephelis muticum*) at Cane Creek Canyon Nature Preserve, Colbert Co., Alabama, June 4, 2011 (Photo by Vitaly Charny)

Swamp Metalmark (*Calephelis muticum*) larva (photo by Sara Bright)

Alabama? Charny theorizes that as glaciers shrank following the last Ice Age, butterflies with the same affinities, like Little Metalmark (*C. virginiensis*) and Georgia Satyr (*Neonympha areolatus*), remained primarily in their southern refugia, while others, like Swamp Metalmark (*C. muticum*) and Mitchell's Satyr (*N. mitchellii*) followed the receding glaciers farther north, remaining in areas that met their similar needs. At Cane Creek Canyon Nature Preserve, more recent activities helped create the proper habitat. Beavers have long maintained an active presence, and their tree felling opened holes in the forest canopy that allowed sun-lovers like Tall Thistle to gain a toehold in the calcareous soils that are preferred by the plant and typical of the area. Since it is a beaver impacted wetland, the Preserve's habitat is not fire-dependent, unlike many of the other locations that support *C. muticum*.

Cane Creek Canyon Nature Preserve is one of several sites that Vitaly Charny visits regularly to monitor butterfly populations. The Preserve is a 700-acre privately protected scenic natural area in the Little Mountain region of Colbert County, Alabama. Situated around a complex of small sandstone canyons, the area has rugged topography that includes a number of waterfalls, creek cascades, boulder fields, and rock shelters. It serves as a sanctuary for native flora and fauna and is home to several rare plant species (Friends, 2011). Alabama's butterflies are well represented. Those that frequent woodlands, canebrakes, and wetlands are particularly notable; for example, the Preserve supports eight satyr species (Satyrinae), large numbers of Silvery Checkerspots (*Chlosyne nycteis*), both of the cane-eating Pearly-eyes (*Enodia portlandia* and *E. creola*), and a healthy population of Lace-winged Roadside-Skippers (*Amblyscirtes aesculapius*). It provides refuge to imperiled species like Yehl Skipper (*Poanes yehl*) and Swamp Metalmark and to species not commonly found in Alabama such as Delaware Skipper (*Anatrytone logan*), Common Sootywing (*Pholisora catullus*), Checkered White (*Pontia protodice*), and Coral Hairstreak (*Satyrium titus*). Charny conducted 23 counts in the Preserve from March 2010-March 2012 and documented 72 species with a total of 2336 individuals.

Cane Creek Canyon Nature Preserve has been granted official "nature preserve" status through a conservation easement with The Nature Conservancy of Alabama. "Leave no trace rules apply," and collecting is strictly prohibited. The Preserve is open year-round to the public at no charge for hiking and other outdoor educational and recreational activities (Friends, 2011). Jim and Faye Lacefield, who own and maintain the property, have been actively involved in all activities surrounding the discovery and life history documentation of *C. muticum* at the site and are committed to its long term conservation at Cane Creek Canyon Nature Preserve.

The authors hope that news of this discovery in northwest Alabama will spur those in nearby states to search likely habitats for this extremely uncommon butterfly so that both can be preserved and protected.

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Cane Creek Canyon Nature Preserve, Colbert Co., Alabama, June (Photo by Vitaly Charny)

Memphis montesino Pyrcz collected in Guyana, S. America & notes concerning a few Riodinids from the same habitat

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Memphis montesino Pyrcz (Charaxinae) was described fairly recently, Pyrcz (1995), from two males and a female from Venezuela's Pantepui region. I first became aware of this rarely collected species in Andrew Neild's excellent "The Butterflies of Venezuela, Part 1: Nymphalidae I (Limenitidinae, Apaturinae, Charaxinae)" (1996), the section Tribe Anaeini co-authored by T. Pyrcz and A. Neild and the *M. montesino* photos taken by T. Pyrcz.

After failing to find a matching *Memphis* female in the extensive *Memphis* collections at the Smithsonian Natural History Museum and American Museum of Natural History, the figures and description of *M. montesino* in Andrew's volume provided the match for a large female *Memphis* (Fig. 1) I had collected in Guyana in Feb/Mar 1993.

Figure 1. *Memphis montesino* female, dorsum (top) and venter (bottom). (Photos by Dr. Patricia Gentili-Poole)

In the discussion of the species in the book, Andrew and Tomasz had predicted that the species would be found in adjoining Guyana's Pantepui region. Little did they know, that a future friend/colleague had already collected it there, totally unaware at the time of capture of its scientific value but with a strong inkling of its rarity! Also of note is that the type specimens had been in Venezuela's MIZA collection for many years before T. Pyrcz's description (1995)!

The three Venezuelan specimens were collected at elevations of 850m and 1000m, elevations suggesting a premontane to lower montane habitat for the species. The Guyana female was taken at a much lower elevation, 250m in the incomparable Kaieteur Gorge (Fig. 2). Because of microclimatic factors relating to the physiography of Kaieteur Gorge: the gorge escarpments, a large river and large waterfall; the forest in the gorge, especially the closer one gets to the tremendous Kaieteur Falls, manifests elements associated with premontane and montane forests (even montane cloud forests), most apparent with much heavier moss and epiphyte loads on forest surfaces.

This female, the only individual of the species I ever saw or collected, was taken along a small stream in a ravine. It perched on a shrub at approximately two meters above the ground and was perched for a few minutes before I went over and collected it; my vague memory cannot recollect whether the wings were open or closed as it perched.

I have also collected three Riodinid species as well at Kaieteur Gorge/Falls: *Mesosemia phace* Godman, *Hyphilaria anthias* Hewitson and *Napaea fratelloi* Hall & Harvey, that are probably most typically considered premontane/lower montane species. In fact, I have seen/collected *M. phace* and *H. anthias* at 100m in riverine forest along the Potaro River within the gorge. Despite the interesting anomalies of *M. montesino* and this Riodinid trio, my extensive fieldwork in this locale points to an overwhelmingly lowland butterfly fauna there, and I believe this is true of the flora as well.

I'm pretty certain this type of distribution pattern, supposed premontane and lower montane species being found at much lower elevations, manifests itself with these aforementioned and a few other species in innumerable other locales in the vast, mountainous and largely unexplored Pantepui region of Venezuela, Guyana, Brazil and outlying tepuis in Columbia and Surinam. What is not so certain

is the delimiting factor(s) of such distributions – microclimatic (as mentioned above), soil substrate of host plants (largely sandstone derived in this region), geographic evolution leading to population isolation, a combination of these and/or other factors? Certainly a great deal more fieldwork and study is needed before any pronouncements are made.

As noted by Pyrcz (1995), more study is also needed to ascertain whether *M. montesino* will remain a full species in a species complex with its allopatric two closest relatives: *M. elara* Godman & Salvin (mountains of Costa Rica and Panama) and *M. phoebe* Druce (Andes of Ecuador, Peru and Bolivia). Pyrcz favored this view, rather than the three being three disjunct races of one superspecies.

Author's Notes: I donated the Guyana female *M. montesino* to the Smithsonian. How it came to reside in that institution's fantastic Neotropical butterfly collection, a number of years after I collected it, is a story by itself!

After reading my manuscript, Andrew Neild gave me additional information concerning this magnificent *Memphis*. Andrew notes that, "Since its description it has been collected infrequently in the cloud forest of the Sierra de Lema (SE Vzla – eastern Bolivar state) at around 1350-1440m." What Andrew later relates, I found so interesting, I will reproduce it here in its entirety. "In 2001 I found an immaculate male specimen in the Cornell University collection which was collected in Dec. 1941 (!!) by Pablo Anduze on the upper river Surukun (SE Bolivar state), a tributary of the river Caroni (the elevation is not given, but will have been between approx. 850-1,000m). This specimen was examined by W. T. M. Forbes, who wrote a paper in 1942 entitled "Note on the butterflies of Venezuelan Guiana" (Bol. ent. venez. 1: 25-36), but for some inexplicable reason did not include this species, even though he evidently intended to describe the specimen -- a red-framed label in [his?] hand-writing says "Holotype, *Anaea galaxias* Forbes". Now that is a fantastic name!!!

Based mainly on biogeographic considerations, Andrew strongly believes *M. montesino* is a distinct species from its supposed sister species. He states neither *M. elara* nor *M. phoebe* has yet to be found in Venezuela's Andes and *M. montesino* is isolated in the Pantepui from suitable habitat by the extensive lowland arid Llanos.

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Figure 2. Kaieteur Gorge, approximately 100 m elev., Potaro River, Pantepui Region, Guyana (Photo by Steve Fratello)

Acknowledgements

Dr. Tomasz Pyrcz, besides uncovering this fantastic *Memphis* species, has made many amazing discoveries in his prolific explorations of Neotropical montane regions. My friend Andrew Neild has given Neotropical butterfly enthusiasts a stellar work and resource, with his Venezuelan butterfly volumes, the second volume just recently published. His additional notes concerning *M. montesino*, as always, given graciously and selflessly, account for a better manuscript. For the opportunity and privilege of spending 75 days in one of the world's most sublime natural areas, Kaieteur Falls and Gorge, I Thank God.

Digital Collecting:

Processing and organizing your photos

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You've done a fabulous trip to somewhere exotic and have thousands of great photos of butterflies or moths, or other wildlife, and now you're back home. What do you do with all those photos? What many people do is just copy them onto their computer under the trip name, Peru January 2012 for example. However, as you get more and more trips built up, it becomes a nightmare trying to remember where you saw that wonderful *Arcas cypria*. Was it in Ecuador in 2009 or Peru in 2010? Some organization becomes more and more important as you collect more photos.

The first thing you need to do is download your photos off your camera chip onto your computer. Some people like to keep the chips, so they always have an original backup. Again, this makes sense for a few trips, but as the years go by and you get a drawer full of chips, you're rarely going to spend the time to go back and find that one particular photo. You may think you'll always remember where that special shot was taken, but unless your memory is far better than mine, it will fade in the mists of time. Plus you may change cameras, update technology, and end up with old chips from years before that you can't access any more.

I prefer to download my photos every night while I'm in the field, unless I'm camping somewhere without electricity. I always carry a laptop on trips mainly to deal with photos. You need to create a format for naming your photos with all the relevant information you will want in the future.

Rhetus dysoni taken in Boquete, Panama
Oct 20, 2010 about 1400m

This is exactly the same information you would put on a label on the specimen pin: location where it was taken, date, maybe elevation and name of species. I also include the initials of the photographer, as I have over a hundred photographers sending me their photos.

The format I use starts with the name of the species, then the country as a three character code (PAN, COL) then a brief name of the location, the photographer's initials, the date (01JUN12) and sometimes other info such as MD or FV for male dorsal/female ventral. This format allows the computer to sort all your photos by species, then country, then photographer. You may end up with many photos of the same species; good labels allow you to quickly see which countries you have photographs from, and which dates.

When I download the photos each night I often don't know the species depicted in each photo. It sometimes takes months of research once I'm back home to figure out the species - that's part of the hunt. But you can download the photos at night and just put the country code, location code, photographer and date, and windows will copy all your photos across from that chip and number them 1 to however many are on the chip.

It's a good idea to keep a list of all the abbreviations you come up with for different locations: the name of the lodge, the park, reserve or town, whatever you want to call a particular collecting/photography location so you can find it again. This would be a good place to keep GPS data, as many cameras stamp that on the photos as well. I carry an altimeter so I have a rough idea of how high a location is. My list of location codes is over 25 pages long - it has proved to be invaluable as a memory jog. On my old photos, back in 2002 or 2003, I wasn't keeping very good track of places, and now I regret it. So on new places I put lots of detailed info on the location list.

Once you get the chips downloaded, you can start reviewing your photos. At this point the delete button comes into play. I will take many photos of a cooperative subject, especially if it is a new species for me, or one I'm not sure of the id. Maybe 30 – 40 shots, trying to get the perfect dorsal and/or ventral. I'll take different settings on the camera, experimenting to see what will look best on the computer. I never know in the field which is better, as the light is constantly changing, so it never hurts to take a lot of variety. I usually start without a flash, even in dark conditions, as many butterflies will jump the

flash, especially skippers. It's much easier to lighten up an underexposed photo on the computer than to try and fix an overexposed shot. I will also start shooting while I'm still quite far away from a new individual, then take a step closer and shoot some more, take another step and shoot some more. If it cooperates I can eventually get right on top of it and get those frame filling shots. When I'm reviewing my photos at night I start from the latest shot and work towards the beginning. Once I get 4 or 5 great shots I can always delete the remaining 10 or 20 taken at the beginning of the stalk. But if the butterfly flies away before I get that perfect photo, at least I've got something to work with, maybe good enough for an id shot.

Rhetus arcius thia, female, Hotel Taninul in San Luis Potosi, northeastern Mexico

When I start naming the photos, typing in the scientific name of the species, I then do a "save as" and copy the named photo into a taxonomic group. I keep my photos in taxonomic folders for the 6 families of butterflies, then split up some of those into smaller subfamilies, especially *Nymphalidae*, which I split up in to 14 subgroups. As I work through my new photos and name them, I then delete each from the original file. So I have a steadily shrinking pile of unnamed shots.

Once the photo is named and copied into my master files, if I want to do anything with it from that point on I always copy it. That way my original is always available, and all I have done to the original is apply the name. I often crop and resize a shot to email to experts for help with id's, or send it to friends to show off, or put it on FaceBook. I save the cropped shot by just adding a 'c' at the end of the file name. This keeps it right behind the original named file, and makes it easy to find your cropped shots later. If you're putting a photo online or emailing it, crop it as small as possible. Otherwise it takes forever to upload and for others to receive it. I use 640 x 480.

Rhetus arcius beutelspacheri from Finca Monte Carlo, above Pacific coast, Oaxaca, Mexico taken Nov 2, 2010 about 1000m.

I do all the above processing, the naming and cropping, in a free software called irfanview. You can download it at www.irfanview.com. It's great stuff, you can't beat the price, and it is very fast. I use photoshop for serious work when I'm preparing a photo for printing, or reading tiff files or lots of other things, but for simple reviewing of photos and naming them, I really like irfanview. Other people of course have other preferences, and many of my photographer friends love lightroom, especially if they're shooting raw or using better cameras. It's a personal choice.

I estimate it takes as much time to process and name the photos as it took in the field to get them. Getting the photo is just the first step. But having them organized and readily accessible makes it worth the time, at least for me. It is a great way to learn the species and get familiar with the names as well. I currently have over 90,000 named photos in my master files, and without some sort of organization I would be lost.

Rhetus arcius castigatus from Los Tarrales Lodge, near Atitlan Volcano, Guatemala, taken June 3, 2007.

Announcements:

Joint Meeting of the Lepidopterists' Society and the Societas Europaea Lepidopterologica, July 23-29, 2012

The 2012 Lepidopterists' Society Annual Meeting held jointly with the Societas Europaea Lepidopterologica will take place July 23-29. The meeting will be held at the Denver Museum of Nature & Science (DMNS).

If you haven't registered yet, registration is now $165 for non-students and $135 for students. The DMNS has created an easy to use registration system for the meeting that can be located at the following web address:

http://www.dmns.org/lepidopterists-annual-meeting

Accomodations are provided by the Red Lion Hotel and are reserved at a special rate of $69/night. Make hotel reservations on your own using the registration link provided above. For the complete schedule, see the Winter 2011 News of the Lepidopterists' Society (53:4, pgs. 126 - 132).

Visit the Gillette Museum Lepidoptera Collection after the Lep Soc Meetings

Attendees at the Lep Soc meeting who wish to study the Lepidoptera holdings at the Gillette Museum of Arthropod Diversity at Colorado State University, one hour drive north of Denver, may make advance arrangements to visit during the week of July 30-August 3 by contacting Paul Opler [paulopler@comcast.net] immediately (early July is too late)! Get directions and list of holdings from Paul as well! This collection is large [2700 drawers] and is especially strong in butterfly and macromoth groups.

Significant donations have been made by the Bagdonas family, Barbara Bartel, Norris Bloomfield, Don E. Bowman, Ken Davenport, John DeBenedicits, Scott Ellis, Cliff Ferris, Mike Fisher, Chuck Harp, Richard Holland, Robert L. Langston, Ranger Steve Mueller, John Nordin, Al Rubbert, James Scott, Ray and Kit Stanford, J. Bolling Sullivan and David Wikle. Many others have made smaller donations. We are grateful for all of this kindness!

National Moth Week July 23-29, 2012 *Exploring Nighttime Nature*

The first annual National Moth Week will be held July 23 – 29, 2012. Visit the National Moth Week website at www.nationalmothweek.org for more information. The complete announcement can be seen in the News of the Lepidopterists' Society Fall 2011 issue (53:3, pg. 83).

David Moskowitz, Senior Vice President, EcolSciences, Inc., 75 Fleetwood Drive, Suite 250, Rockaway, NJ 07866 **www.ecolsciences.com**.

Summer Class/Workshop on California Butterflies/Moths

Registration for these workshops is through San Francisco State University and the location is the San Francisco State summer field campus near Bassetts on state highway 49 [see **www.sfsu/~sierra**]. Reservations and deposits for the class and workshop must be made with J.R. Blair of San Francisco State (**jrblair@sfsu.edu**).

Biol 315 -- Butterflies of the Sierra Nevada (1)
Introduction to the natural history and ecology of butterflies. Lectures and slide talks cover the fundamentals of butterfly biology. We travel (carpool) to a wide variety of local Sierra Nevadan habitats to identify and observe adult butterflies and their behavior, their larvae, and their host plants.
Paul Opler & Evi Buckner July 8-13 $348

Moths of California
An informal introduction for studying and observing moths. Emphasis will be on collecting and processing adult moths and recording observations based on the techniques described in our book, Moths of Western North America. The workshop is recommended for persons interested in moths or those studying insect/plant relationships, or managing biodiversity conservation.
Paul Opler & Jerry Powell July 13-15 $250

The 2012 Lepidoptera Course

The 2012 Lepidoptera Course will be held at the Southwestern Research Station in the Chirichahua Mountains in SE Arizona from 11-20 August. The focus is to train serious amateurs, citizen-scientists, and academic professionals in lepidoptera identification, classification, and biology. The staff for the 2012 course includes Deane Bowers (U of CO), John Brown (USDA, Smithsonian), Jason Dombroskie (Cornell), Lee Dyer (U of NV), Paul Goldstein (Smithsonian), Jim Miller (AMNH), Ray Nagle (U of AZ), Chris Schmidt (CNC), David Wagner (U of CT), and Bruce Walsh (U of AZ). The course fee (which includes room and board) is $1070 for students, $1170 for non-students. Application deadline is 11 June 2012. Further details, and a link to the application form, can be found at www.lepcourse.org. For any questions, contact Bruce Walsh, **jbwalsh@u.arizona.edu**

Corrections:

1. In John Calhoun's article "Notes on Megathymus yuccae as illustrated by Boisduval & LeConte **[1837]**, . . ." (Vol. 54:1, 8-13) I accidentally typed "**[1873]**" in the title -- it should read as it does here.
2. On the back cover of the 2011 Season Summary, I wrote "Kenelm Philip" with an extra "l" in his last name (see caption for *Boloria astarte distincta*). I apologize profusely.

James K. Adams, Ed.

More Announcements:

A Request for Help:

Contributions of Locality Data Needed for the Moth Photographers Group Website

By early January there were at least some mapping data for just over 11,000 species of lepidoptera recorded from the U.S. on MPG. However, in many cases, the available data are too small to present a realistic picture of the range of a species. Members of this society can help to improve the picture by contributing data from their collections, whether the collection is of spread specimens or of photographs.

Your records contributed to this project will also benefit mapping programs at Butterflies and Moths of North America and Butterflies of America. Data files sent to MPG will be passed on to those groups and will also be made available to compilers of databases for individual states or provinces. Maps, or links to maps, will also be made available to organizations such as Encylopedia of Life, Wikipedia and others that disseminate species information on the Internet.

Most of the known large databases, including the one for this Society's Season Summaries, are already part of this project. But there are many individuals who have, or could compile, collection data that would significantly enhance these maps. There are probably also a large number of researchers and museum workers who have extensive data for specialized groups of species. We need all of it, and we especially need everything available for the micromoths.

Please send your data to Bob Patterson at **BPatter789@aol.com** where you can also get more information if you need it. If you would like to volunteer to extract data from the literature (state publications, journal articles, monographs) I will appreciate hearing from you.

Bob Patterson, Moth Photographer's Group Guru

(For original announcement, with sample map and date chart, see the Spring issue of the NEWS (54:1, pg. 19))

Lophocampa maculata data needed

Help Needed with Research Project: observations, photos, specimens needed of the spotted tussock moth, *Lophocampa maculata*, from all areas of North America. I am trying to define the present range of this species in the far north of Canada and the desert southwest in particular. I especially need data from Pacific coastal populations: San Francisco, CA to Southern Oregon and Vancouver, BC to Juneau, AK and the Southeast: GA to PA. Contact Ken Strothkamp, Lewis & Clark College, (**kgs@lclark.edu**) for more information.

Ken Strothkamp, Chemistry Department, Lewis & Clark College, Portland, OR 97219

Lepidoptera Research Foundation: Grants for Student Travel

The Lepidoptera Research Foundation, which is dedicated to support scholastic research and public education, is providing travel grants to support students attending relevant scientific meetings. The idea of providing travel expenses to expand collegial associations and permit lecture or poster presentations by productive individuals seems logical. With the current state of our finances, the Foundation is offering four $1000 grants for this purpose for the 2012 academic year. Please apply to Rudi Mattoni if you could benefit and further information will be forthcoming. The application process is quite simple.

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Rhetus dysoni taken in Boquete, Panama Oct 20, 2010 about 1400m, photo by Kim Garwood (see page 48)

THE LEPIDOPTERISTS' SOCIETY
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Conservation Matters: Contributions from the Conservation Committee

Moth decline in the Northeastern United States

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The matter of moth decline in the Northeast and southern Canada, particularly of larger moths, has been of concern for a half century (Muller 1968-1979, Hessel 1976, Schweitzer 1988, Goldstein 2010). Below I offer an assessment, based on my 23 years in New England. Mine is a prospective piece meant to raise the issue of moth decline to a larger audience—it is a call for study, a research agenda—offered in the absence of the quantitative data needed to make rigorous species-by-species status assessments. As a caveat to what I outline below, I should add that local, regional, and continental biota changes are the norm and that all animal and plant distributions change through time. Ranges and abundances may, in fact, be inherently much more dynamic than is generally understood. At issue here, is not change, but the rate and nature of changes.

Lepidoptera and other herbivores are under considerable evolutionary pressures from below and above, fated to be in never-ending battles with their hostplants (the bottom-up forces) and natural enemies (the top-down forces). Parasitoids, and no doubt birds, are particularly relevant to the persistence of any lepidopteran population. Lepidoptera (and other fecund taxa) live on a knife's edge: in each clutch of eggs only a single pair need survive to replace the previous generation: greater than 95% mortality is the norm, and in taxa with more than 200 eggs mortality rates would be expected to approach or even exceed 99%. Even modest changes in climate, local ecology, natural enemy complexes, etc. could doom a population's persistence.

Connecticut's moth fauna may rank as the best known in North America, given the state's small size, homogeneous landscape, and density of sampling. Sydney Hessel, Alexander Barrett Klots, Herman Wilhelm, Ben Williams, and Charles Remington were long-term resident moth collectors; additional collectors of note include Douglas Ferguson and Dale Schweitzer, who held positions at Yale University. I have collected micro and macrolepidoptera since my arrival in 1988. Perhaps more than any other, Connecticut is a good state by which to assess the "health" or status of the moth and butterfly fauna of a small region (state), even in the absence of quantitative, long-term data.

The most general but least documented observation is that numbers, especially those of larger moths, seem to be diminishing. This conclusion is echoed by virtually all who have run lights in their yards for more than a decade: Tony Roberts in Maine; Warren Kiel in New Hampshire; Mark Mello, Ed Peters, and Darryl Willis in Massachusetts; Sam Adams and Tim McCabe in New York; Don Lafontaine in Ottawa; and Ben Williams and myself in Connecticut.

Hickory horned devil (*Citheronia regalis*). Members of the genus *Citheronia* were among the first moths to disappear from New England. The last *C. regalis* record for the region was Syd Hessels's 1956 collection from Washington, CT (Ferguson, 1971).

A phenomenon upon which there is broad agreement is the collapse of the region's saturniid and sphingid faunas with most species seemingly less common than decades before. In my state of Connecticut, we had 15 resident Saturniidae (including one introduced species): four of these have been extirpated and no less than four others are in marked decline (Table 1). Just in the past decade, many former locales for the io (*Automeris io*) have stopped supporting this moth. The late Robert Muller (in litt.) wrote to me of the days when he was a boy growing up in southeastern Connecticut (in the 1930s and early 1940s) when he and his father used to go cocoon collecting in the winter and would carry a shopping bag to hold all the promethea (*Callosamia promethea*) and cecropia (*Hyalophora cecropia*) cocoons that they found. He lamented that by the time he had kids of his own, numbers had started to wane. I recall seeing promethea cocoons on my drives to work when I first started working at the University of Connecticut in the late 1980s. I have not seen a viable cocoon of either promethea or cecropia anywhere in the state on any drive in more than decade--where leaves are absent from our trees for six months of the year. Don Adams, who has

been collecting, rearing, and mostly releasing saturniines in southeastern Massachusetts since the 1950s reports considerably reduced numbers of cecropia and promethea cocoons over the past six decades. (I suspect that much of this decline of promethea, cecropia, and even the disappearance of cynthia (*Samia cynthia*), is due to bird predation on cocoons.)

Diminished numbers of sphingids were mentioned by all ten collectors listed above. Of Connecticut's 35 resident or formerly resident sphingids: two are extirpated; one is historic and likely gone; and at least 14 others are in decline with some of these evidently close to extirpation (Table 1). Formerly common and widespread species like the hog sphinx (*Darapsa myron*) are noticeably less abundant. The genus *Sphinx* seems to be especially hard hit, which indicates that there is a phylogenetic component to the collapse, which itself is suggestive that something in the natural enemy complex of the genus has changed. Numbers of *Ceratomia*, too, have fallen off markedly. The waved sphinx (*C. undulosa*), one of Connecticut's most common large moths historically, is markedly down from previous years. Numbers of all the eyed sphinxes are falling. The demise is on-going, with numbers diminishing appreciably with each passing decade.

Presently, 65 species of butterflies and moths (out of a state total just over 2300) are thought to be extirpated or historic for Connecticut. Reasons for the losses can be ascribed for many of these: habitat destruction, loss of early successional habitats and afforestation, coastal development, overgrazing by deer, climate change, etc. Light proliferation, and in particular, elevated bat predation by night, and bird predation by day, likely has had some impacts (Muller 1979 and Doug Ferguson personal communication), although there is little if any data to support claims that light pollution has been a major cause of moth decline (Eisenbeis 2006, Frank 2006, Schweitzer et al. 2011). Many losses are simply a matter of natural changes in forest type: Connecticut is transitioning from a largely agricultural to a largely forested landscape. There is little argument that development in, and mismanagement of, the state's pitch pine-scrub oak barrens accounts for a great fraction of losses, but it is the unexplained declines of formerly common species that prompted this article. The linden looper (*Erannis tiliaria*) was a widespread geometrid across Connecticut through the 1990s, but it has become scarce and in some areas undetectable. The red-humped caterpillar (*Schizura concinna*) was a widespread occasional pest of orchard crops and ornamentals—I have not seen its caterpillar in years, and its congener *Schizura apicalis* has become rare enough to warrant treatment in Schweitzer et al. (2011). I am unaware of any sightings of the zebra caterpillar (*Melanchra picta*) in more than 10 years. Both the latter two and the imperial moth (*Eacles imperialis*) (Goldstein 2010) remain common on some offshore islands in Massachusetts, a situation that suggests, again, a natural enemy (or a suite of natural enemies) on the mainland is affecting survivorship of all three. The nearly simultaneous disappearance of Harris' checkerspot (*Chlosyne harrisi*) and silvery checkerspot (*C. nycteis*) butterflies--the first a wet meadow obligate and the second a woodland and trap-rock ridge denizen--is also suggestive of a shared common enemy. Other unexplained losses and declines include the chain-dot geometer (*Cingilia catenaria)* and our datana moths; even the once ubiquitous yellow-necked caterpillar (*Datana ministra*) has become uncommon. The spotted datana (*D. perspicua*) has not been seen in 50 years. The contracted datana (*D. contracta*), has in fact contracted from its former range, and is now highly localized in Connecticut, Massachusetts, and Rhode Island (it remains common southward and westward).

One suspect is *Compsilura concinnata*, a tachinid fly that was introduced from Europe to control two exotic lymantriine tussock moths: the gypsy moth (*Lymantria dispar*) and the brown-tail moth (*Euproctis chrysorrhoea*), as well as the native range caterpillar (*Hemileuca oliviae*), and others (see Elkinton and Boettner 2012). (There have been multiple introductions of this polyphagous parasitoid beginning in 1906—continuing at least through 1986 (Sanchez 1996.) In addition to these two introduced pests, this tachinid is known to attack more than 200 native species of Lepidoptera from more than a dozen families (Webber and Schaffner 1926, Schaffner and Griswold 1934, Schaffner 1959, Arnaud 1978, Clausen 1978, Boettner et al. 2000, Strazanac et al. 2001). During gypsy moth outbreaks, *Compsilura* densities can reach 10,000 adult flies per hectare (Gould 1990, William et al. 1992). Because gypsy moths are only present for the fly's spring generation, *Compsilura*'s second, third, and fourth generations must seek out and parasitize native caterpillars. Boettner et al. (2000) demonstrated staggeringly high mortality rates from this tachinid in two native giant silkmoths in

Compsilura concinnata. Females of this tachinid parasitoid insert their larvae directly into the host larva, which enables it to circumvent the host encapsulation-immune system. Typically death follows in as few as 5 to 7 days. Photo: Mike Thomas & D. Wagner.

Table 1: Status of Saturniidae and Sphingidae in Connecticut

SATURNIIDAE	
Eacles imperialis	extirpated; woodland and oak scrub habitats
Citheronia regalis	extirpated; woodlands
Dryocampa rubicunda	abundant
Anisota stigma	extirpated; oak woodlands, but esp. oak barrens in Northeast
Anisota senatoria	oak woodlands; increasingly localized, but still occasionally (infrequently) abundant locally
Anisota virginiensis	declining drastically; now very local
Hemileuca maia	state endangered; rare and exceedingly local; larvae at Killingly and Oneco recently
Hemileuca lucina	declining; nowhere known to be common; wetlands and powerline ROW's
Automeris io	declining; becoming increasingly localized
Antheraea polyphemus	common; more common than a decade ago
Actias luna	evidently stable; second-generation adults becoming increasingly frequent
Samia cynthia	extirpated; formerly New Haven on ailanthus
Callosamia promethea	declining; markedly less common than in past times, but an early successional species
Callosamia angulifera	not enough data to stay; still locally common
Hyalophora cecropia	declining; becoming increasingly localized especially in wildlands; often in suburbs
SPHINGIDAE	
Agrius cingulatus	fall migrant
Manduca sexta	no longer common at lights
Manduca quinquemaculata	very rare; may no longer be resident, but certainly was previously
Manduca jasminarium	extirpated; last seen around 1960s
Dolba hyloeus	common; numbers dramatically up relative to previous three decades
Ceratomia amyntor	very scarce; significantly down in recent years
Ceratomia undulosa	recently common; becoming infrequent; marked decline over past decade
Sphinx canadensis	rare and local in northwest section of state
Sphinx chersis	in rapid decline; much scarcer than a decade ago
Sphinx kalmiae	formerly common, becoming scarce
Sphinx gordius	still locally common
Sphinx lucitiosa	extirpated; Britton 1920; northern; fens and riparian areas
Sphinx drupiferarum	historic and probably extirpated
Lintneria eremitus	uncommon as adult; more commonly reported as a larva
Lapara coniferarum	very local in pine barrens; worthy of state protection
Lapara bombycoides	locally common
Smerinthus jamaicensis	formerly widespread and common; evidently declining
Smerinthus cerisyi	mostly Litchfield County
Paonias excaecatus	our most common sphingid but declining
Paonias myops	formerly widespread and common; markedly less common
Paonias astylus	locally common but numbers dropping
Laothoe juglandis	common
Pachysphinx modesta	declining
Erynnis ello	stray
Hemaris thysbe	very common to abundant
Hemaris gracilis	very local; state threatened
Hemaris diffinis	very common to abundant
Eumorpha pandorus	evidently declining
Eumorpha achemon	rare; perhaps no longer resident
Eumorpha fasciata	stray; being seen with increasing regularity
Eumorpha vitis	stray
Sphecodina abbottii	common but less so in recent years
Deidamia inscripta	common but less so in recent years
Amphion floridensis	common but less so in recent years
Darapsa versicolor	locally common
Darapsa myron	common but less so than in previous decades
Darapsa choerilus	common (formerly known as *D. pholus*)
Xylophanes tersa	stray
Hyles gallii	very common
Hyles lineata	infrequent; perhaps not even a long-term resident

Massachusetts (see also Kellogg et al. 2003). The declines of many Saturniidae, Sphingidae, some Notodontidae, and others mentioned here could well trace to *Compsilura* (see discussion in Schweitzer et al. 2011), but one can't be sure without more study. One observation that strongly points to a parasitoid such as *Compsilura* is that a sweeping percentage of the species at issue here are gregarious as larvae, including *Anisota*, *Callosamia*, *Datana*, *Hemileuca*, *Schizura concinna*, and *Melanchra picta*, as well as both checkerspot butterflies. Large body size and/or longer development times also seem to be risk factors (Dale Schweitzer personal communication). In sum, many of the declines appear to relate more to natural enemy complexes than to development, afforestation, light or chemical pollution, climate change, and other threats. But without more data, it would be premature to assign blame to *Compsilura*. As easily, introduced lady beetles such as the Asian Lady beetle (*Harmonia axyridis*) or other enemies (both native and exotic) are at play.

Not all species are declining. Many southern species are establishing. For example, Connecticut added two new, year-round resident swallowtail butterflies in just the past decade: the pipevine swallowtail (*Battus philenor*) and most recently the giant swallowtail (*Papilio cresphontes*). Last fall, a fresh individual of *Glenoides texanaria*, a widespread southern geometrid, was taken for the first time. Some newly established exotics such as the large yellow-winged dart (*Noctua pronuba*) are enjoying extraordinary ecological release. Formerly rare species are now routinely encountered, e.g., the white-m hairstreak (*Parrhasius m-album*) and shivering pinion moth (*Lithophane querquera*). There is indication that datanas have rebounded somewhat from their numbers of a decade ago (Dale Schweitzer personal communication). Even some larger moths seem to be more numerous than in past decades: both luna (*Actias luna*) and especially polyphemus (*Antheraea polyphemus*) are being seen in greater numbers, which may be tied to the ever-increasing proportion of second generation adults (which were quite scarce in Connecticut prior to the turn of the century). The longer growing season and warmer summer temperatures of the last decade have even led to first reports of a facultative second generation of promethea in Massachusetts, beginning about ten years ago (Don Adams personal communication).

An important aspect of this mystery is the variation across the Northeast. Some areas still are reporting high saturniid diversity: e.g., Joe Garris in Stillwater, New Jersey is seeing good numbers of cecropia, luna, tulip tree silkmoths, and others species that have declined elsewhere. With the exception of *Ceratomia*, Steve Johnson has not noted appreciable declines in the moth diversity in southern Pennsylvania. Coastal Massachusetts seems to be less affected than central counties (Goldstein 2010, Mark Mello personal communication). But on the whole, moth biomass at sheets and in blacklight traps is waning. The region's human population is not growing fast enough for either habitat loss or light pollution to be the core causes for the decline. At Ben Williams's rural property in Pomfret, Connecticut, where he has been light trapping for six decades, there has been little difference in urbanization, agricultural practices, light pollution, or other tangible human impacts--decline has been steady and on-going with the most noticeable changes and losses accruing over the past decade. Across many parts of the Northeast, previously occupied habitat now sits empty. Something is amiss.

Data are needed. Long-term monitoring data are best, even if only for a subset of species: e.g., for all saturniids, sphingids, many notodontids, and perhaps a pre-selected group of common species that represents a wide range of taxa and ecological niches. There is ample reason to use sentinel egg and larval studies (where lab-reared early stages are placed out in the wild for a time and re-collected for lab rearing of natural enemies) to obtain field measures of key mortality factors. Good candidates for "sentinel species" would be those that show marked differences in abundance on the mainland versus Massachusetts's nearshore islands (as for example red-humped caterpillar and the contracted datana). Sphingids, and especially *Sphinx*, *Ceratomia*, or the various eyed sphinxes, could prove to be telling sentinel taxa. If anyone knows of existing data sets or records that could be used to assess the status of the region's moths and especially historical abundances, please contact me. Such data would help document the decades over which the decline occurred, and in so doing help identify likely causes.

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Hyalophora columbia gloveri Spring Mountains, Nevada

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Figure 2: adult male, Hyalophora columbia gloveri, dorsal surface, from larva illustrated in figure 1.

Acknowledgements

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Callophrys Green Hairstreaks regain traditional names

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Packard, A. S. 1895. Monograph of the Bombycine Moths of North America (including their transformations and origin of the larval markings and armature). Part I. Notodontidae. National Academy of Sciences, Volume VII, First Memoir. Washington, D.C. 49 plates; # 1-6 b&w photos of adults, # 7 color of adults, # 8-37 color drawings of immature stages (with tissue covers), # 38-48 line drawings of wing veins and head capsules, # 49 missing. 9 full-page distribution maps at end of volume. 390pp, volume size 9" x 11 ½". Covers, binding, title pages missing. Several groups of text pages missing: 1-6, 11-14, 17-32, 81-96. 542

Packard, A. S. 1914. Monograph of the Bombycine Moths of North America. Part III. Ceratocampidae (exclusive of Ceratocampinae), Saturniidae, Hemileucidae, and Brahmaeidae. Editor T. D. A. Cockerell. Nat. Acad. Sci., Vol. XII, First Memoir. Washington, D.C. 113 plates; 32 colored of immature stages, 20 of wing vein drawings, remainder photos mostly of adults and some immature stages. 516pp, volume size 9" x 11 ½". Covers, binding, all text pages and plates intact. 542

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.

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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.

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For Sale: High quality critically acclaimed book, The Butterflies of Venezuela, Part 2 (Part 1 also in stock). 1451 photographic figures (84 colour plates) display all 196 species (355 subspecies) of Venezuelan Acraeinae, Ithomiinae, Libytheinae, Morphinae, and Nymphalinae. 8 new species, 91 new subspecies, 4 neotypes, 10 lectotypes. Laminated hardback, 22 x 30 cm. 272 text pages, 26 detailed genitalic figures, 2 tables, 4 maps. Price GBP £110 (+ p&p). Details, reviews, sample plates: www.thebutterfliesofvenezuela.com 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** 541

Livestock

FOR SALE: Captive bred Philippine butterfly pupae, year round. Contact Imogene Rillo, P. O. Box 2226, Manila, 1099 PHILIPPINES, email: **clasinse@gmail.com** 541

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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. For more information visit **www.leptraps.com**, or contact Leroy C. Koehn, Leptraps LLC, 3000 Fairway Court, Georgetown, KY 40324-9454: Tel: 502-542-7091 534

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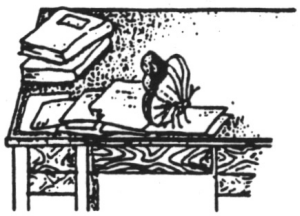

From the Editor's Desk

James K. Adams

For the most part, everything is moving along swimmingly for me in the production of the News. I seem to understand most of the basics I need to produce something presentable to you, the consumer Lepidopterist. With the completion of this newsletter, I have now edited four issues, the equivalent of one year, though I've done those issues in significantly less than a year (December to June). Thanks for all of your submissions, and I look forward to the next year. Please be aware of the submission deadlines that are published on the third to last page of each issue.

In my four issues, I have received a grand total of one item of e-mail for publication in "The Mailbag". Don't forget to e-mail me with any comments you might have on ways that I could improve the News, or with comments you would like to add to any of the articles that are published.

I would like to think that, come next newsletter, there will be no corrections to publish. So far, I seem to have a minor correction or two each time. This time around, I sincerely apologize to Kenelm Philip, whom I've known for many years, as I misspelled his last name with an extra "l" on the back of the Season Summary for 2011.

Leaf removal behavior by Zebra Swallowtail, *Eurytides marcellus* (Cramer) butterfly larvae

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

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Keywords: Zebra swallowtail, leaf removal, caterpillar leaf damage, plant-insect interaction, search images.

As a result of selective pressures exerted by parasitoids and predators, insects deploy a wide variety of defensive structures and behaviors, many of which have been shown to be effective (Brower, 1984; Matthews & Matthews, 1987; Eisner, 2005; Greeney et al., 2012). This report concerns Zebra Swallowtail, *Eurytides marcellus* [Fig. 1], larval behavior, which may be an adaptation to prevent parasitoid attacks and/or bird predation and/or to stimulate the growth of new leaves on the host plant.

Figure 1. Summer form Zebra Swallowtail (*Eurytides marcellus*) on a host plant (Pawpaw [*Asimina*]) (Photo by Jerry F. Butler)

Caterpillars, palatable to insectivorous birds, tend to behave in a manner that minimizes apparent leaf-feeding damage, while unpalatable larvae lack this behavior (see Heinrich, 1971; Heinrich, 1979; Heinrich & Collins, 1983; Heinrich, 1993). In these studies, last-instar moth caterpillars palatable to Black-capped Chickadees, *Poecile atricapilla*, were smooth skinned and cryptic or had soft plumose hair; however, unpalatable caterpillars were bristly, spiny and/or aposematically colored. To minimize apparent leaf-feeding, some palatable moth larvae have been shown to disguise or remove evidence of leaf damage using one or more of three strategies: (1) trimming the leaves, (2) eating the whole leaf, or (3) chewing off partly eaten leaves at the petiole. Unpalatable species of moths and butterflies often leave partly eaten leaves with tattered edges, and may feed and rest on the leaf surface in direct sunlight. Heinrich & Collins (1983) data indicate that birds can discriminate leaf damage, and leaf damage may determine the locus of foraging activity.

Of 35 species of larval moths in four families studied by Heinrich and Collins, 27 were palatable to chickadees. Of these, 14 species chewed off partly eaten leaves, while none of the five species of unpalatable larval butterflies in three families studied clipped off partly eaten leaves. The butterfly larvae studied, as, for example, the Mourning Cloak larvae, *Nymphalis antiopa* L., left the leaves in tatters and were not observed behaving in a manner that would disguise or remove evidence of leaf feeding. *Nymphalis antiopa* larvae (spiny with red spots) are gregarious making their leaf-feeding evident to human observers, even from a great distance.

Zebra swallowtail larvae suffer significant mortality from the parasitoid *Trogus pennator* (Fabricus), a wasp of the family Ichneumonidae, which attacks the larvae of various swallowtail butterflies. Field studies show that *T. pennator* are attracted both to *Asimina* plants damaged by caterpillars and to those that are not; however, damaged plants are approached and landed upon at a greater rate and are inspected for a longer time than are undamaged plants (Sime, 2005). Both visual and olfactory cues are used to locate the plants. Under experimental conditions, *T. pennator* has been shown to favor plants damaged by swallowtail butterfly larvae over the same species of plant that has been artificially damaged or damaged by saturniid moth larvae, suggesting that *T. pennator* responds to swallowtail-specific odors that emanate from larvae feeding damage (Sime, 2002).

Furthermore, predatory vespid wasps may use visual and olfactory cues of plant damage in their search for prey. Aldrich et al. (1985) found that the eastern yellow jacket, *Vespula maculifrons*, is attracted to volatile compounds released by damaged leaves and Cornelius (1993) found that the vespid wasp, *Mischocyttarus flavitarsis*, may use leaf shape as a basis for detecting caterpillar feeding damage. Damman (1986) observed two species of vespid wasps that attacked and killed *Eurytides marcellus* larvae.

In our study of the mature larvae of Zebra Swallowtail butterfly (*Eurytides marcellus*) [Fig. 2 (A) and (B)], we report what may be the first observations of (specifically,

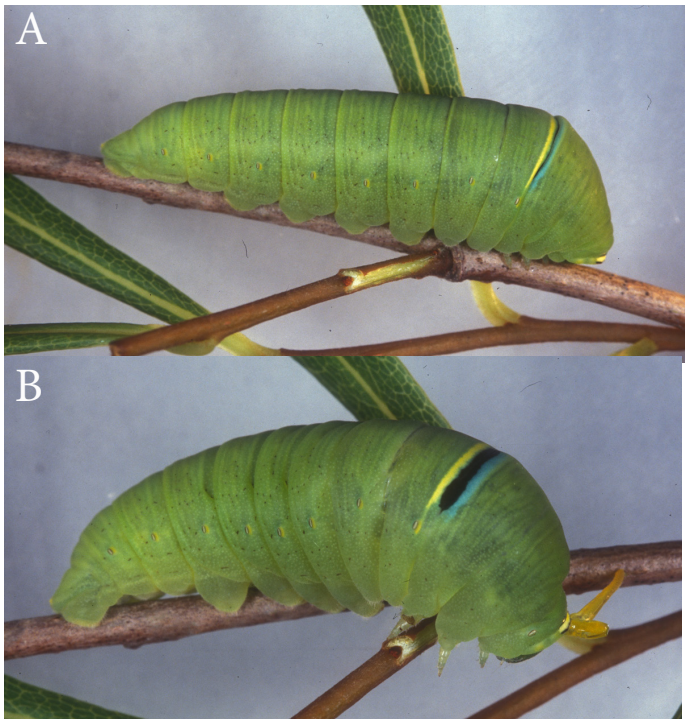

Figure 2. (A) *E. marcellus* larva resting (undisturbed larva usually show a reduced or none of the transverse multicolored band). (B) Disturbed larva displaying the blue, black and yellow band, an enlarged body and a yellow, extruded osmeterium. (Photo by Jerry F. Butler)

butterfly) caterpillars completely severing (until they fell to the ground) partly eaten leaves at the petiole. In addition, we discuss possible adaptive advantages of severing the partly eaten leaf by *E. marcellus* larvae, briefly review the defensive structures and behaviors of *E. marcellus* larvae, and compare the process of leaf removal by the Monarch, *Danaus plexippus* (L.), butterfly larvae to leaf removal by *E. marcellus* larvae.

Observations:

On 3 August 2009 at 19:15h in Gainesville, Florida, I (GEE) observed in the field a mature, mostly green form of *E. marcellus* larva on a Dwarf Pawpaw (*Asimina pygmaea* [W. Bartram] Dunal) [Fig. 3], chewing on a leaf petiole about 1.5 mm from its attachment to the stem. The larva chewed at one location on the swollen base of the petiole of a leaf on which it had been feeding until it was severed and the leaf fell to the ground beneath the plant. Thereafter, for almost one minute, the larva continued to chew and/or feed at the severed end of the petiole stump, leaving a small portion of the petiole (about 1 mm) attached to the stem. Above this stump on the same stem, were four similar petiole stumps but no leaves, suggesting that the larva had previously severed these petioles as well.

Females of *E. marcellus* lay their eggs singly, and the larvae are cannibalistic toward younger larvae found on the same plant (Tveten & Tveten, 1996) so the same larva

Figure 3. The larval host plant, Dwarf Pawpaw, *Asimina pygmaea*, observed in this study. (Photo by G. E. Einem)

may have excised all of the leaves, leaving only petiole stumps. Leaves below the last severed leaf were attached to the stem and did not show leaf damage from larval feeding.

On three other *A. pygmaea* plants, mature larvae observed in the field were seen engaged in various stages of feeding and severing petioles. All severed leaf blades had the transverse cut typical of *E. marcellus* leaf damage. The larvae begin feeding at the leaf blade apex and consume one-half to three-quarters of the leaf before they cut the petiole near the base [Fig. 4B, C]. When severing a petiole, the larvae position themselves on the stem just below the base of the petiole where they remained after the leaf fell.

Early instar larvae observed feeding on the young leaves of a Slimleafed Pawpaw (*Asimina angustifolia* Raf.) cause a different pattern of leaf damage, many small cuts along the leaf margin [Fig. 4A], and the larvae were not observed cutting or feeding at the petiole.

Other species of larval butterflies chew or feed on the petiole; however, the petiole is only partly severed and the leaf does not fall to the ground. For comparison to *E. marcellus*, leaf removal on milkweed (*Asclepias curassavica* L.) by a late instar larva of the Monarch (*D. plexippus*) was observed at the same field site (pers. ob., GEE). The larva chewed the underside of a petiole near the base until the leaf drooped vertically (but was still attached to the stem). The larva then crawled down the underside of the leaf blade to the apex (the narrow, pointed end) where it fed, consuming all of the leaf blade and petiole except for about 2 mm of the petiole base. *D. plexippus* feeding was very rapid; all of the leaf except for the petiole stump was consumed in 17 minutes. When feeding, *E. marcellus* and *D. plexippus* larvae may leave the stem with many petiole stumps above the leaf on which the larvae is feeding. In

Figure 4. (A) Feeding damage by early-instar *Eurytides marcellus* larvae on a Slimleafed Pawpaw, *Asimina angustifolia* leaf; (B & C) Feeding damaged (transverse cuts) by mature *E. marcellus* larvae on Dwarf Pawpaw, *A. pygmaea*. Mature larvae had severed the petioles [below] causing these leaves (B & C) to fall to the ground.); (D) Intact Dwarf Pawpaw, *A. pygmaea* leaf. (Photo by W. Adkins)

short, *E. marcellus* mature larvae discard partly eaten leaves by chewing through the petiole while *D. plexippus* may first partly sever the petiole of a leaf without larval feeding damage and then eat the entire leaf, leaving only the petiole stump.

Discussion:

Milkweed Butterflies. We provide an observation of *D. plexippus* partial leaf severing of an undamaged *Asclepias* (milkweed) leaf to the complete severing of leaves damaged by *E. marcellus* larvae for comparison of leaf-handling behavior in an aposematic *D. plexippus* larvae to the (green form) cryptic (green form) larvae of *E. marcellus*. For *D. plexippus*, however, the difference may have more relevance to the *Asclepias* host-plant latex content than defense against predators or parasitoids. Milkweed butterfly larvae (subfamily Danainae) including Monarch larvae cut leaves near the base releasing latex before feeding on the leaf blade (Minno, et al., 2005), suggesting that the latex may interfere with larval feeding. We propose that the complete petiole severing (discarding the leaf) by *E. marcellus* is a defensive measure unlike the partial severing by *D. plexippus* larvae which, being aposematic, would not seem to benefit from avoiding discovery by disguising or removing evidence of feeding.

Defense Mechanisms Reviewed. *Eurytides marcellus* larvae have a variety of defense mechanisms including structural, behavioral and chemical as follows:

(1) The Osmeterium. When disturbed, *E. marcellus* larvae extrude a yellow forked eversible gland, the osmeterium [Fig. 2B], normally hidden behind the head. The gland is coated with volatile isobuteric acid and 2-methly buteric acid (Eisner et al., 1970) which have been shown to be an effective seasonal defense against small spiders and ants but not most other predators (Damman, 1986). Nevertheless the parasitoid *T. pennator* is repelled by the osmeterium, especially if it touches the wasps' antennae (Sime, 2005).

(2) Disturbed Larval Behavior. When disturbed, late instar larvae enlarge the body displaying a prominent transverse blue, back and yellow dorsal stripe between the thorax and abdomen [Fig. 2B]. This multicolored stripe is usually, at least partly, hidden from view (Minno, et al., 2005). We suggest that the display has a "startle effect" or is aposematic, possibly advertising that the larva is unpalatable. Also, when disturbed by touching the plant, larvae may stop feeding (GEE) or may drop from the leaves when *T. pennator* wasps land on their leaf or on nearby parts of the plant (Sime, 2005). Dropping off of the host plant is a primary response to predatory wasps, and caterpillars may exhibit orientation behavior that is likely to return them to the host plant (Castellanos, 2011).

(3) Toxic Larvae. Larvae feeding on the foliage of the Pawpaw Tree, *Asimina triloba* (L.) Dunal, contain toxic and emetic annonaceous acetogenins also found in the host plant and in the wings and body tissues of adult butterflies. Feeding experiments with captive starlings suggest that these compounds may act to provide a form of chemical defense against predators (Martin et al., and references therein, 1998).

(4) Cryptic and Hiding. Mature *E. marcellus* larvae, when not disturbed, are cryptic and often hide, feeding or resting on the underside of a leaf, usually with the body parallel to the midrib. When under a leaf the larvae are at least partly hidden from view and direct sunlight. The green form of the larvae, observed in this study, closely matches the color of the leaf, making the exposed body parts difficult to see. Furthermore, another color form of the larva, seen resting on the stem of *A. pygmaea*, has a gray-green abdomen and a red-brown thorax that matches the red-brown color of the stem (GEE). When not resting or feeding,

larvae have been seen leaving the host plant, hiding in the litter beneath the plant (Damman, 1986).

(5) Leaf Removal. As observed in certain species of cryptic moth larvae palatable to birds (Heinrich & Collins, 1983), mature *E. marcellus* caterpillars, observed in this study, will remove a leaf on which they have fed by severing the petiole, causing the leaf to drop to the ground. As suggested by the larval moth studies by Heinrich and Collins, removing evidence of leaf-feeding damage may also protect *E. marcellus* larvae from avian predators which use the damaged leaf as a search image to locate larvae. Leaf removal may provide a source of litter for larvae hiding on the ground; however, if this is the sole purpose of leaf removal, why do larvae not also remove leaves not damaged by larvae feeding? Removal of leaves without larval feeding damage was not observed in this study.

The studies of the parasitoid, *T. pennator* by Sime (2005) suggest that *T. pennator* wasps are visually attracted to *Asimina*, especially to *Asimina* with *E. marcellus* leaf damage. Moreover, the wasps are attracted to the odor of leaf damage caused by swallowtail butterfly larvae (Sime, 2002). We suggest that leaf removal by *E. marcellus* mature larvae significantly reduces the visual and olfactory cues that attract *T. pennator* to *Asimina* plants, thereby reducing parasitism by *T. pennator*. Certainly this host-parasite relationship is a fascinating evolutionary game of hide-and-seek in which a swallowtail-dependent parasitoid cannot always win without losing its host and the race for survival.

Eurytides marcellus larval defense mechanisms pose an enigma. Unlike many unpalatable larvae, the green form and brown form observed in this study are not aposematic, except perhaps when they are disturbed and display the yellow osmeterium and multicolored band. This display may warn a predator of some previous adverse experience (due to annonaceus acetogenins) with an *E. marcellus* larva. We suggest that the cryptic colors and hiding behaviors of the undisturbed larva may act as an early line of defense, preventing even an initial encounter with a parasitoid or predator. If *E. marcellus* larvae presented their defensive colors and odor when undisturbed, they may be attacked more often by naïve predators or parasitoids. Nevertheless the cost of being aposematic may be quite small (see Jarvi et al., 1981).

Cutting the petiole of a partly eaten leaf, instead of eating the entire leaf, may reduce the period of time *E. marcellus* larvae are exposed to bird or *T. pennator* wasp attacks. We suggest the more vascular and tougher part of the leaf (which the larvae discard) may take more time to consume and possibly has less nutritional value. Thus, feeding at a new leaf, beginning at the distal end may be more efficient, i.e., productive without waste of time. Figure 4 B & C shows that *E. marcellus* larvae, when feeding at the proximal part of the leaf, leave behind a portion of the vascular midrib, favoring instead the tender leaf blade on each side of the midrib. Avoiding tough leaf tissue may provide more time for defensive measures: moving away from feeding damage, hiding, or severing a petiole, reducing visual and olfactory clues used by predators or parasitoids when searching for caterpillars.

Further, we propose that larvae, clipping off a partly eaten leaf near the petiole base, reduce evidence of larval leaf damage, diminishing the olfactory and visual cues that would otherwise orient insectivorous birds or predatory wasps to their prey or *T. pennator* to its larval host. For a human observer, petiole stumps are difficult to see as compared to leaf blade damage, which can be seen even at a distance. Besides, the damaged site at the petiole is much smaller than the damaged leaf area, probably reducing odor. The lengthy chewing at the petiole stump, after the leaf remnant falls to the ground, suggests that larvae may somehow be further reducing cues from larval damage helpful for parasitoid orientation. Moreover, mature larvae move away from damaged leaves between feeding bouts, hiding on the plant or in the leaf litter (Damman, 1986), reducing visual and odor cues from the larva itself. As observed by Sime (2005), *T. pennator* females may, nevertheless, at times, carry out longer searches when they thoroughly inspect most of the plant including stems and the leaf litter.

Early instar *E. marcellus* larvae require the tender new *Asimina* growth present in the spring; however, plants observed in Florida will also produce extensive new growth when recovering from a fire (GEE and WA) or extensive defoliation by the *Asimina* dependent pyralid moth, *Omphalocera munroei* Martin (Damman, 1989). *Eurytides* is many brooded in Florida, requiring young growth throughout the summer. Some woody plants refoliate rapidly and extensively if defoliation is 25% (but not 50%) of entire leaves or the same leaf area of partial leaves (Lowman, 1982). Our observations, showing that *Eurytides* larvae remove partly eaten leaves, severing the petiole near the base and leaving many petiole stumps on a stem, suggests that larvae may thereby stimulate new growth, suitable for oviposition and food for young larvae. In this study, however, new growth following extensive defoliation by *Eurytides* larvae was not looked at, but should be investigated.

We propose that *E. marcellus* larvae have four lines of defense against parasitoids or predators. First, hiding leaf-feeding damage by the removal of damaged leaves, and/or moving away from damaged leaves between feeding bouts. Second, the larvae are cryptic and hide, making it difficult for a predator or parasitoid to discover them. Third, if the larvae are found and disturbed, they may drop off the plant or display the osmeterium and multi-colored band, causing a "startle effect" and in some cases repel the predator with noxious odors. Fourth, if the larvae are

eaten or injured, the predator may be repelled by toxic and emetic annonaceous acetogenins which may deter another attack. We know that this is only one set of many possible hypotheses; however, it may give some preliminary structure to the defense mechanisms of these remarkable larvae. Certainly the defense mechanisms employed and their hierarchy may vary with circumstances, such as the species of predator or parasitoid.

Acknowledgments

We thank Jerry F. Butler, University of Florida, Department of Entomology and Nematology, for photographs (Figures 1, 4A & 4B); Dr. Marc C. Minno (Gainesville, Florida) and Dr. Karen R. Sime (Department of Biological Sciences, SUNY Oswego) for reviewing the manuscript and providing valuable suggestions; and Geoff Parks for permission to do field work at the Morningside Nature Center, Gainesville, Florida.

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Orb Weaver Spider, near Amazon Lodge
in French Guiana (Photo by Mike Thomas, see page 35)

An incidental portrait of an aberration

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The Painted Lady (*Vanessa cardui*) and the West Coast Lady (*V. annabella*), as well as some other species of the genus, produce apparently homologous wing-pattern aberrations (referred to by Shapiro, 1984 as the "*elymi*" series after the oldest name for them in *V. cardui*). These forms can be manufactured in the laboratory by applying prolonged cold shock to young pupae, but they also may occur spontaneously; some families of both species appear genetically predisposed to producing them (details in Shapiro, *loc. cit.*).

The item illustrated turned up at a paper-collectibles fair among trade cards, advertisements and postcards grouped topically under "butterflies." It shows an unambiguous and quite accurate rendering of the ventral surface of one of these aberrations, almost certainly of *V. cardui*. It is on rather heavy card stock and it and the bunch of violets are embossed. The winter scene is printed with reflective silver on the surface of melting ice. Despite being of postcard size (13.5 x 8.75 cm) and on suitable stock, it is not a postcard, being unimprinted on the reverse side. It had clearly been glued in a scrapbook. It may have been the top part of a folded card, with the second (message) sheet cut off. The landscape, while it could be anywhere in the northern middle latitudes, is probably intended to be in Britain or continental Europe, given the apparent cathedral or castle in the distance and the twin chimneys on the farmhouse. The entire composition seems best read as conveying the hope of approaching spring.

Both the artwork and the embossed printing style are typical of the very early 1900s, probably about 1905. Such work was done primarily in England and in Germany, and similar postcards are quite common and familiar to collectors. What makes this object unique is that the artist certainly had a real specimen of an "*elymi*" aberration in hand, but presumably had no idea it was unusual.

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

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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. Include printed hardcopies of both articles and graphics. The new 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—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 Volume 54 must reach the Editor by the following dates:

Issue	Date Due
54 3 Fall	Aug. 15, 2012
4 Winter	Nov. 15, 2012
55 1 Spring	Feb. 15, 2013

Reports for Supplement S1, the Season Summary, must reach the respective Zone Coordinator (see most recent Season Summary for your Zone) by Dec. 31. See inside back cover (facing page) for Zone Coordinator information.

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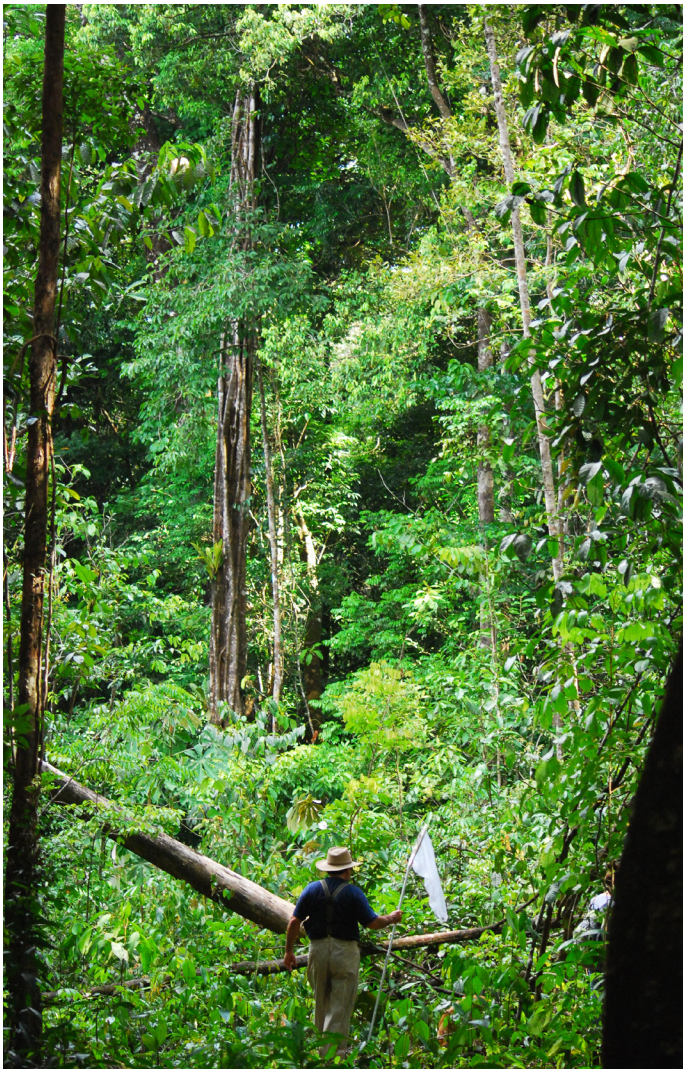
Viviennea moma, (Arctiinae) near Amazon Lodge in French Guiana (Photo by Mike Thomas, see page 35)



The rain forest near the Amazon Lodge in French Guiana (Photo by Roanna Metowski; see page 35)

Kaieteur Gorge: looking across Potaro River, 'Old Man's Beard', approx. 100m elev.; *Mesosemia phace* and *Hyphilaria anthias* are at this locality. (Photo by Dr. Robert Hanner, see page 46)

Cratoplastis diluta, (Arctiinae) near Amazon Lodge in French Guiana (Photo by Mike Thomas, see page 35)