

NEWS

of the LEPIDOPTERISTS' SOCIETY

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Why Not Collect Micros?: Getting Started

by John A. De Benedictis
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Collectors who are frustrated by the ever lengthening list of protected butterflies and losses of collecting sites might consider studying the so-called microlepidoptera. The rewards, advantages, and potential contributions to science abound. Many micros are far more spectacular than butterflies. You can investigate a rich, but poorly known component of the biodiversity. You almost certainly will find undescribed species and new biological information.

In northern California, a natural habitat of modest size (a square mile or so) has more than 300 micro species, 5-10 times as many butterfly species. Many other parts of the U.S. are richer still. In long term inventories of California sites, the lists of micros continue to grow at a more or less constant rate after years of collecting. So if you're looking for a lifelong hobby, instead of going all over the world and never catching all the butterflies you're after, you may as well save considerable travel expense and vacation time by surveying a nearby natural site for micros. You'll never catch all the micros there.

A major deterrent to collecting micros is identifying them. However, with butterfly systematics besieged by so much disagreement over nomenclature and over recognition of many taxa, micro taxonomy and nomenclature are, in many respects, less confusing and more stable. It will take some effort, but putting names on micros is not hopeless. Most species in many families of microlepidoptera (e.g., Pyralidae, Tortricidae, Oecophoridae) are described. In families with a great proportion of undescribed species (e.g., Gelechiidae, Blastobasidae, Tineidae), most species can be identified to genus.

New books on micros are appearing all the time. Many will enable you to sort most micros to family. Later, you can consult a monograph, compare specimens to an identified collection, or badger a specialist for specific identifications. Not surprisingly, many specialists will gladly exchange their expertise for the information you can obtain from the field

I learned to recognize and appreciate micros by rearing them from immatures. I found it much easier to remember the identities and biological information of species reared from larvae as compared to those captured as adults. Many families, genera, and species can be identified from their larvae, foodplant, and mines or feeding habits. Rearing is the best way to collect many species, especially leafminers. Specimens are frequently in perfect condition (at least until you try to spread them) and are much easier to identify than the flight-worn moths collected at blacklight.

An easy, economical rearing method was shown to me by Jerry Powell while at the University of California, Berkeley. At Berkeley, we reared moths in 8 x 4 x 18 in. clear plastic bags of 1.5 mil thickness. Produce bags won't do, so you'll have to make a modest investment. The bags must be thick enough to prevent desiccation and deter most larvae from chewing through. They must be large enough to allow condensation to form without drowning larvae or promoting rapid decay of the foodplant. Bags can be reused many times.

Unlike most macros, many micros are a snap to rear. With experience, you'll find that you can successfully rear out adults on some plants such as Quercus, Prunus, and Ceanothus even if you almost totally

...many specialists will gladly exchange their (identification) expertise for the information you can obtain from the field.

neglect them. On the other hand, you'll be challenged by larvae on plants such as Lupinus, herbaceous composites and many umbels. Prepare to be surprised. You'll constantly find polyphagous species

on new hosts and discover previously uncollected species on plants you've examined over and over again.

Larvae can be found throughout most of the year and feeding on all parts of plants and in leaf litter, stored products, animal waste, bird nests, etc. New spring foliage is particularly productive. Some plants, especially native woody trees and shrubs, are much richer than others such as annuals and exotics. You can collect some larvae with a beating sheet, but it's better to collect larvae in their feeding niche. Look for frass, silk-tied shelters, galls, and leaf or stem mines. I have even randomly clipped sprigs of plants and reared moths without ever having seen the larvae.

There's no need for a net, so there's none of the snickering and derisive remarks from passers-by that butterfly chasers have to endure

There's no need for a net, so there's none of the snickering and derisive remarks from passers-by that butterfly chasers have to endure. Just pack several plastic bags and pruning shears in your field kit. I also carry a hand lens, trowel, paper towels, and a few snap-top vials. Most larvae can be placed in the plastic bags with a few sprigs of the larval host as they are collected. It's usually not necessary and sometimes illegal to dig up the host plant. Extra foodplant can be refrigerated, but you can simplify rearing and maximize chances of obtaining adults by collecting the more mature larvae.

You need not rear each larva individually, but it's wise to make separate rearing lots of every different larval type on each host. Put the larvae with their host on a few layers of paper towels in plastic bags. Large lots should be divided into several bags. Enclose an index card in each bag with a unique rearing lot identification code as a cross-reference to your rearing notes. Writing codes on bags or paper towels is less desirable, as they may have to be replaced. The code should be affixed to reared adults and parasites, cocoons or pupal shells, pressed larval mines, preserved mines, preserved larvae, and other artifacts retained from the lot.

The paper towels in the bags help regulate moisture and enable the contents to be removed easily for examination and maintenance. Check the bag carefully before opening. Adults may conceal themselves beneath or between the paper towels. Many larvae hide or pupate under the towels or in folds in the neck and corners of the bag. If necessary, you can protect these specimens by cutting them and some of the surrounding plastic and paper towels from the bags for transfer to new ones.

Initially, keep each bag inflated to make a soft-walled terrarium. Inspect lots every one to three days for maintenance and collection of newly-emerged adults and parasitoids. To make this easier, use clothespins rather than twist-tie closures. Frequent reversal of the bags, removal of frass and rotting plant material (check for larvae and pupae before disposal), and limiting the number of larvae and amount of host plant will reduce accumulation of condensation and losses to mold and disease. You occasionally may need to remove the contents temporarily or leave the bags open for several minutes to dry excessively wet material. Later, particularly in arid climates, you may need to mist the contents to prevent the host plant from withering too rapidly and to keep pupae and prepupae from drying.

A few words of warning: Be patient. While the 17 years and longer it took for some of Powell's yucca moths to emerge is exceptional, many species spend weeks or months as prepupae or pupae. Second,

rearing can be addictive. You may find yourself devoting many hours to this activity at the expense of your day-to-day responsibilities. Limit your collections or you'll be rearing more micros than you're able to handle. Lastly, never kill a freshly emerged adult. If you don't wait 12 hours or so for the wings to harden fully, they may shrivel, curl, or remain too soft to be properly mounted.

Many species of micros and even many macros can be successfully reared in plastic bags without having to control temperatures or photoperiods. In some cases, it may take many attempts before you'll rear an adult, and you may need to use special techniques. Such techniques, larval collecting methods, recording rearing and collection data, and preparing and labeling specimens are topics for future articles.

Acknowledgment

Many thanks to Jerry Powell, University of California, Berkeley, and Dave Wagner, University of Connecticut, Storrs, not only their comments on the content of this article, but also for infusing me with their enthusiasm for microlepidoptera rearing.

Suggested Reading

1. Sokoloff, P. 1980. Practical hints for collecting and studying the microlepidoptera. *The Amateur Entomologist* 16:1-40.

This "how to" on microlepidopterology contains a wealth of information on collecting adults and immatures, rearing and breeding, mounting, record keeping, and an excellent bibliography of mostly western European literature.

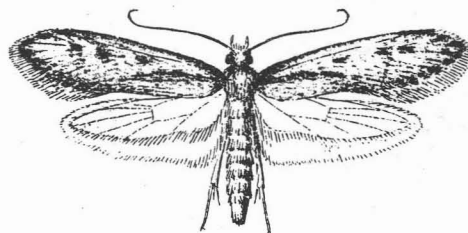
2. De Benedictis, J. A., D. L. Wagner and J. B. Whitfield. 1990. Larval hosts of microlepidoptera of the San Bruno Mountains, California. *Atala* 16:14-35.

This portion of my first Lepidoptera survey could have been titled, "Why I spent so long in graduate school". Our paper lists the hosts and describes the niches and feeding habits of about 160 species of micros. Some immatures are pictured. Try to beat our species total at your survey site.

3. Godfrey, G. L., E. D. Cashatt and M. O. Glenn. 1987. Microlepidoptera from the Sandy Creek and Illinois Region: An annotated checklist of the suborders Dacnonypha, Monotrysis, and Ditrysis (in part) (Insecta). *Illinois Natural History Survey, Champaign, IL. Spec. publ. 7. 44 pp.*

With 954 species, this is likely the largest published microlepidoptera survey in the U.S. It contains only the identified portion of the 50-year survey. Many host plants are listed, but larval feeding niches are not described.

Be patient. Many species spend weeks or months as prepupae or pupae.



Killing Butterflies to Save Butterflies: A Tool for Tropical Forest Conservation in Papua New Guinea

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Concern over the effects of overcollecting on rare and endangered butterflies and moths, led the Lepidopterists' Society to prohibit advertisements for birdwing butterflies. This review is provided in the hopes of educating all Lep Soc members on the current situation with butterfly conservation and utilization in Papua New Guinea, so they understand how essential the legal trade in birdwings and other insects is for the survival of these species.

Introduction to Papua New Guinea's "Butterfly Business"

PNG's Remarkable Insect Resources

Papua New Guinea (PNG) is the only country to designate insects in its national constitution as a natural resource (Independent State of Papua New Guinea, 1975). And only PNG has a central agency -- the Insect Farming and Trading Agency (P.O. Box 129, Bulolo, Morobe Province) -- charged with utilizing those insects sustainably. Undoubtedly, PNG's spectacular birdwings (Papilionidae; genera *Troides* and *Ornithoptera*), which includes the world's largest (Fig. 1) and second largest butterflies (*Ornithoptera alexandrae* and *O. goliath*, respectively) (Parsons, 1991) were largely responsible in stimulating such high level government interest.

PNG's insects are important natural resources for a simple reason: Many are worth good money. Their value comes from their bright

colors, size, and exotic shapes. Apart from giant butterflies, PNG's insects include the world's largest bush grasshopper (*Silicofera grandis*), longest walkingstick (*Eurycnema goliath*) (Peter Clark, pers. comm.), one of the largest moths (*Coscinocera hercules*) (Fig. 3), plus a myriad of oddities, including moths with sinister faces (Sphingidae,

Papua New Guinea's insects are important natural resources for a simple reason: Many are worth good money.

Notodontidae) (Fig. 2) and spider silhouettes (Pyralidae: Nymphulinae) etched on their wings (Orsak, unpubl.). Over 800 butterfly species (Parsons, 1991) inhabit New Guinea. PNG's butterflies and other insects are indeed a rich natural resource.

Legislative Protection for Papua New Guinea's Insects

In 1967, the PNG colonial government, following advice from National Entomologist Joseph Szent-Ivany (1967), designated seven birdwing species as PNG's national insects, under the 1966 Fauna Protection Ordinance: *O. alexandrae*, *O. chimaera*, *O. goliath*, *O. meridionalis*, *O. paradisea*, and *O. victoriae*, and *O. allotei* -- now considered to be a hybrid between *priamus* and *victoriae*. Casual collection of all was prohibited (Shaw, 1969). Two additional PNG birdwings, *O. priamus* and *Troides oblongomaculatus*, are so widespread and common in PNG, that no protection was ever thought necessary for those species (although some island subspecies of *priamus* are quite rare).

The U.S. Fish & Wildlife Service has listed *O. alexandrae*, the world's largest butterfly, as an "endangered" species (Dunlop, 1989). This generally prohibits its importation into the USA. The international "Convention on International Trade in Endangered Species" (CITES) legislation (CITES, 1973), which has 100 nations as signatories, lists all birdwings on its Appendix II, except for *alexandrae*, (which is on appendix I.). *O. priamus* and *Troides*, while not protected by PNG

Listing all birdwings on CITES was done for convenience in identification, not because anyone believed all birdwings are endangered.

legislation, come under the international treaty umbrella. Listing all birdwings on CITES was done for convenience in identification, not because anyone believed all birdwings are endangered. Nevertheless, this means that all birdwing specimens collected today for export must be accompanied by a CITES stamp (which looks like a postage stamp). These stamps are the tool by which the birdwing trade is monitored. The IUCN Conservation Monitoring Centre (219 (c) Huntingdon Rd., Cambridge, England, UNITED KINGDOM CB3 0DL) keeps track of yearly trade in birdwings.

A requirement with Appendix I species is that all must be reared, if they are to be exported/imported for commercial purposes (when they are bred, they are automatically considered to be Appendix II specimens, even though the species itself resides on Appendix I). Collection of wild specimens for noncommercial purposes is permissible, but a CITES sticker is required for export/import, and authorities must be convinced that the harvest will not affect the population negatively. For Appendix II species, which contains nearly all birdwings, commercial harvests can be carried out for wild populations, but in ways that will not further threaten the populations.

CITES acts only indirectly as a species-protection device. It has no power over within-country utilization. Thus, it is up to each country to make laws regulating harvests, and/or protecting habitat. There is an element of artificiality in all this endangered species legislation. For example, in PNG, some butterflies (e.g., *Papilio moeneri*) are rarer than any CITES-listed birdwing. Yet, they receive absolutely no protection. On the other hand, the PNG government has gone one step further than CITES in requiring that all birdwings, even the common species, be farmed if they are to be exported.

The Insect Farming and Trading Agency of Papua New Guinea

To utilize PNG's insect resource, the Insect Farming & Trading Agency (IFTA) (Figure 4) began in 1978 (Clark & Landford, 1991). It sells roughly US \$400,000 worth of insects annually to collectors,

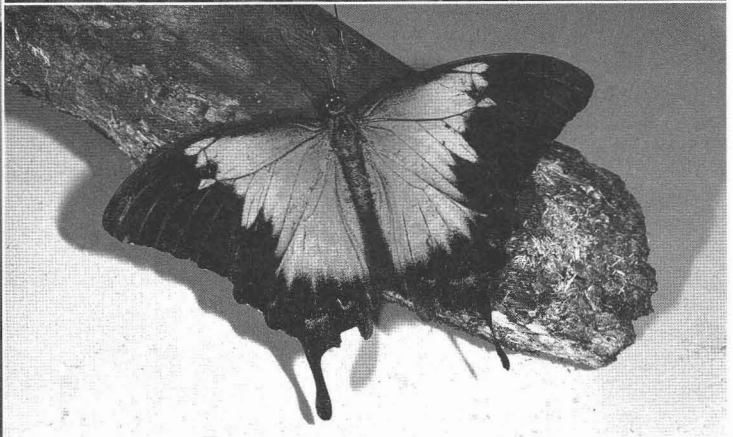
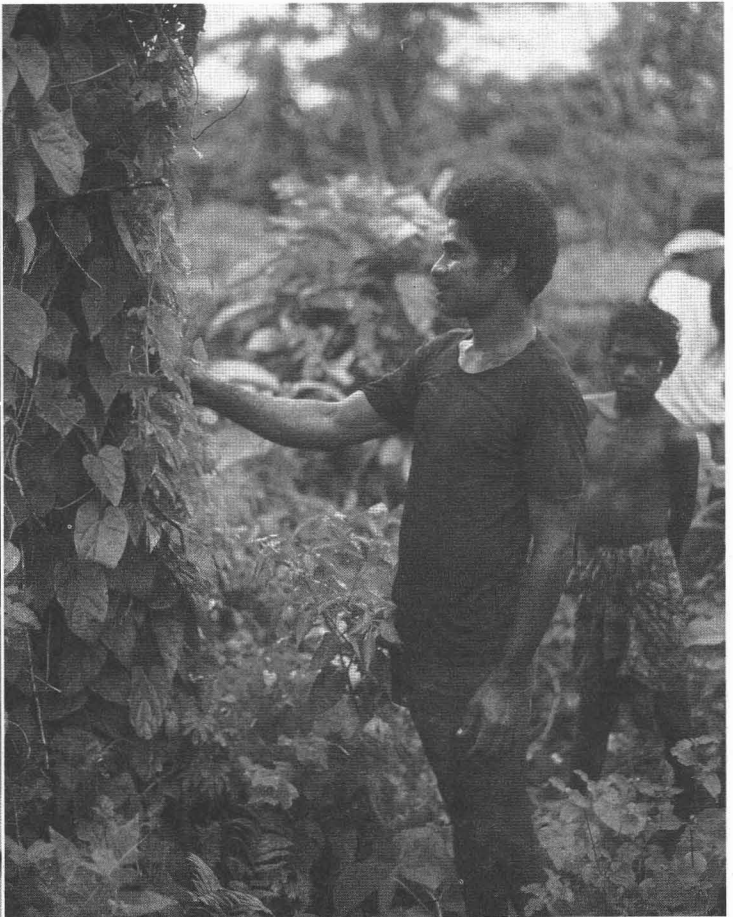


Figures clockwise from upper left:

Figure 1: (a) Female and (b) caterpillar of the world's largest butterfly, Queen Alexandra's Birdwing (*Ornithoptera alexandrae*). The species only occurs in Oro Province, Papua New Guinea. Twenty-five years of prohibiting its collection and sale, both on a national and international level, have produced no slowdown in the destruction of its habitat. Being able to ranch and sell specimens, a desire of the Papua New Guinea government, could give villagers a powerful incentive to look after the species and its forest haunts.

Figure 2: A notodontid moth with a remarkable "sinister image" (see Trivers, 1982). This is but one example of the remarkable lepidopteran oddities to be found in New Guinea. The presumed purpose of the image is to frighten naive birds.

Figure 3: The Hercules (*Coscinocera hercules*) is one of the world's largest moths, and a sellable commodity. Photo: Peter Bryant.



Figures clockwise from upper left:

Figure 4: Processing insects at the Insect Farming and Trading Agency (Bulolo, Morobe Province). The IFTA is the world's only central agency charged by the government with the responsibility of utilizing commercially valuable insects in a sustainable manner.

Figure 5: A villager looks after the *Aristolochia tagala* foodplants utilized by two of Papua New Guinea's famed birdwing butterflies.

Figure 6: *Papilio ulysses* is one of Papua New Guinea's most beautiful butterflies. Its market reaches beyond that of collectors and naturalists, to include tourists, who buy specimens mounted in wall plaques. The species may be reared on native trees (Rutaceae: *Evodia* species) found in secondary forests, but caterpillars suffer high parasitism rates. Spreading out the foodplants is a good strategy to reduce overall parasitism rates.

Figure 7: Wall mounts containing Papua New Guinea butterflies. These are a major source of income for the Insect Farming & Trading Agency. Although some decry the killing of butterflies, these specimens may have given villagers the only incentive they will ever have to protect the forest.

naturalists, artists, scientists, and museums world-wide, oftentimes via overseas dealers. Butterflies, especially birdwings, form most of these sales (National Research Council, 1983). Retail prices of PNG insects (F.O.B. Bulolo) ranges from about US \$0.10 to hundreds of dollars. One-of-a-kind gynandromorphs and other variants fetch more. PNG's insect resources have been reviewed by Pyle and Hughes (1978). Butterfly farming in PNG also has been reviewed (National Research Council, 1983; Hutton, 1985). All this was recently updated with a summary of IFTA's activities and responsibilities (Clark & Landford, 1991).

What is Butterfly Farming/Ranching?

In PNG, butterfly ranching, not butterfly farming, is promoted. Butterfly ranching is when adult butterflies are free-living. Butterfly farming is when the breeding population is confined in a cage.

In butterfly ranching, villagers grow and plant out foodplants utilized by local butterflies (Figure 5). They concentrate mainly on larval foodplants, which for birdwings are Pipevines (*Aristolochia* spp.). The villager lets nature take its course most of the time. That is, once foodplants are established, free-living females find those foodplants on their own to lay eggs. Only when the caterpillars are full-grown, or have become pupae, does the villager bring them indoors or place them in a screened cage. The villager kills the emerging butterflies after the wings are dried, then later sends or brings them to the IFTA to be sold (see Parsons, 1982; Hutton, 1985).

Status of the "Insect Business" and its Conservation Potential

Selling Butterflies to Conserve Forest: Recent Activities in PNG

Butterfly ranching has been touted as an ideal tool for protecting tropical forests (Morris, 1983; National Research Council, 1983; Clark & Lundford, 1991). It fits the current "conservation-through-development" strategy, which has proven to be far more effective at protecting wildlife in the Third World, compared to the old "national park" strategy, which has largely failed (Wells & Brandon, 1992; Hannah, 1992).

Despite this conservation potential, many Americans and Europeans see dead butterfly specimens as wildlife destruction, not conservation. Some vehemently oppose collecting and displaying dead butterflies (Figure 7). Having served as President of the Xerces Society (1977-1980) and as their board member for over

10 years, I hope my butterfly conservation credentials are firm. Since 1987, I have been privileged to see, in detail, the true situation with butterflies in PNG. Putting both experiences together, my conclusion is that if the anti-"dead butterfly" people succeed in imposing their will, they can also pat themselves on the back for helping do away with live butterflies, too. Their efforts will remove one of the few incentives to look after butterfly populations, and there is little conservation basis to their concern, anyway. Insect harvesting is usually as sustainable as chicken or pig ranching (see later for details). It is equally hard to find an ethical basis for this ideology, considering that the protestors are usually meat-eating, well-fed, well-clothed, well-housed people...bemoaning the Third World "insect killers" efforts to earn a few dollars.

Once Third World peoples achieve a better standard of living, they too may see the value of saving forest "just for the butterflies". Dozens, if not hundreds of failed conservation attempts (Wells & Brandon,

1992) have shown that promoting wildlife aesthetics is premature for the Third World. For now, more basic human needs have higher priority and they must be met. If tropical forest conservation is truly of concern to everyone in the world, First World people should be putting their money where their mouths are, offering landowners significant incentives to protect their forests. Making people work for their money (as the "butterfly business" requires), while producing conservation spinoffs, is far more effective than simple hand-outs and pay-outs, which create lazy recipients and unsustainable conservation.

In PNG, the conservation-through-development potential of butterflies continues to be developed. Villager awareness programs, carried out mainly by Melanesian Environment Foundation, but also other "grassroots" groups, include talks on butterfly ranching and insect collecting. The overall thrust of these programs is to discuss the bad aspects of commercial logging and other unsustainable use of forests, and introduce villagers to viable alternatives.

The Insect Farming & Trading Agency (IFTA) has greatly expanded in recent years. Currently, they are working with a village raising the world's second largest butterfly, *O. goliath*, the first PNG-protected national insect to be ranching and sold. There is no reason why others cannot follow; Parsons (1983), in the most comprehensive survey and review, concluded that nearly all PNG's "protected" birdwings were not threatened or endangered. IFTA also hopes to eventually start selling ranching *O. meridionalis*.

In 1991, the PNG government began a project to save the world's largest butterfly, Queen Alexandra's birdwing (*O. alexandrae*) (Figure 1). Originally, this was intended to expand into a World Bank "conscience project," mitigating further destruction of *alexandrae*'s habitat through oil palm plantation development, with \$2.2 million in conservation activities. Funding will probably now come through the PNG Department of Environment & Conservation, and the Australian International Development Assistance Bureau (AIDAB). Although *alexandrae* has indisputably declined at its stronghold near Popondetta (Oro Province), significant new, relatively unthreatened populations have recently been discovered (Mercer, 1992; Lester Seri, unpubl. data), which also significantly extends the butterfly's known range.

In a general workshop, several action plans (e.g., Parsons, 1990; Orsak, 1992), and the current government program, ranching of this species, is considered essential to its long-term conservation. This is quite different from investing money in giant cages to study and later farm the birdwing (e.g. New & Collins, 1991), projects that which give virtually no incentive to

villagers for habitat protection. Unfortunately, the butterfly's placement on Appendix I of CITES prevents commercial farming or ranching. To remove this conservation impediment, the PNG government will undoubtedly argue to place *alexandrae* again on Appendix II, where it had resided until 22 October 1987.

At Wau Ecology Institute, a butterfly farming project was funded by the AIDAB from 1988-1992. Project goals included weaning the Institute away from forest-disruptive incomes, such as coffee, and encouraging villagers to grow butterflies. The Institute continues to teach the "butterfly business" and promote ranching of common birdwing butterflies.

At Christensen Research Institute, we are working to ascertain whether *Ornithoptera paradisea paradisea*, rediscovered by Chris Mercer (PNG University of Technology) after an absence of over 80 years, might someday be ranching. Currently known only from a 200-

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hectare primary forest fragment, this butterfly could only be ranched and sold under the same conditions that apply to PNG's other protected insects; landowners must demonstrate to the PNG government, via IFTA, that they are doing things which are helping the butterfly. In this case, the activities are bound to fail unless we learn how to grow the butterfly's rare Aristolochia schlecteri foodplant, how the butterfly interacts with its foodplant, how large the butterfly population is, and what the sustainable harvest might be.

In neighboring Irian Jaya, the World Wildlife Fund (WWF) supports a butterfly ranching project (WWF Manokwari, 1992). Again, the concentration is birdwing butterflies, with villagers planting out large numbers of their foodplants. Unfortunately, these activities started before there was central market control; illegal butterfly dealers have invaded the area (Chris Mercer and Mathew Jebb, pers. commun.), and will probably destroy the market for what would otherwise be several valuable species. This is a good example illustrating why conservation activities cannot occur in a vacuum.

Two American nongovernmental organizations promote butterfly ranching and similar activities. The 22-year old Xerces Society (10 Southwest Ash Street, Portland, Oregon 97204) broadly seeks protection of rare and endangered invertebrates. Early on, XS founder Robert Michael Pyle provided seminal input (Pyle & Hughes, 1978) to IFTA. The non-profit organization WINGS for the Earth (6341 Longcroft Drive, Oakland, CA 94611), is exclusively devoted to encouraging butterfly ranches and insectariums as a "conservation through development" tool. It too is assisting work in PNG.

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Is the "Butterfly Business" Bringing Conservation Results?

In PNG, the butterfly farming business was developed and nurtured mainly by wildlife and conservation officers. Thus, "conservation" was a concern from the beginning. Moreover, development prospects are clearly enhanced by ranching butterflies and collecting insects. This is simply because the participants have greater access to the cash economy, allowing school fees to be paid, medicine to be bought, etc. Both "conservation" and "development" seem to be present. What more could we ask for?

If we look more closely at the conservation aspects of butterfly ranching, however, it is apparent that this is mainly limited to enhancing populations of butterflies. Such a "single-species conservation" strategy was long ago superseded by today's emphasis (WRI/IUCN/UNEP, 1992) on ecosystem and overall biodiversity conservation. Yet, I believe that the "butterfly business" can achieve a broader "forest conservation" outcome, if expanded and reoriented.

How much Money Can Villagers Make From the "Butterfly Business?"

A few Papua New Guineans have made thousands of kina annually (up to US \$14,000 in one case, for farming two somewhat valuable island butterflies), but this is short-term income. Sustainable income is perhaps K50-K200 per year for insect collecting, K100-K500 per year for an established butterfly ranch. However, higher incomes -- around K1000-L1500 -- have been calculated by Peter Clark (IFTA) and other sources (e.g., Pyle & Hughes, 1978; National Research Council, 1983). By Third World standards, all these projections look good. In PNG, they are lower than, or hover around the minimum rural wage (a little over K1000/year). Yet, few Papua New Guineans have access to this minimum wage: only about 15% of the population is formally

employed.

Value of Forest Versus Non-Forest Insects

The IFTA generally pays more for insects that come from the bush, compared to those from disturbed habitats. That is an excellent characteristic for promoting forest protection. For example, protected birdwings -- all of them denizens of primary or advanced secondary forest -- would be worth around K20-K250 per specimen for villagers. Contrast that with the average K1 per specimen for the disturbed forest inhabitant Ornithoptera priamus poseidon, and only 10 toea for the open area inhabitant Troides oblongomaculatus.

There is another correlation too between price and habitat. Since islands have more localized species and subspecies, prices for them are generally more, than for their more widespread mainland relatives. Of course, these island ecosystems are also more vulnerable to destruction by logging, etc.

Why Grow PNG's Butterflies Instead of Collecting Them?

Growing butterflies offers two big advantages over collecting, and these can be exploited for conservation purposes. They are:

(1) Lower labor input to ranch butterflies: Most collected butterflies are slightly damaged, and IFTA won't buy them, in contrast with the "quantity over quality" policy in Taiwan (Severinghaus, 1975) and elsewhere. Thus collectors will spend much more time catching unsellable butterflies, while butterfly ranchers spend little time, and nearly everything they raise will be perfect material.

(2) Higher value of ranched butterflies: This is especially true for some swallowtails (e.g., the iridescent Ulysses swallowtail, Papilio ulysses, Figure 6). Female ulysses are rarely caught, because they do not fly as conspicuously as males, hence are more valuable (ulysses males fetch 80¢; females, \$1.30). When ulysses is raised, villagers obtain as many females as males, which means more money for a butterfly rancher than a butterfly collector.

Can PNG Butterflies be Overcollected?

Collecting causes concern for most conservationists. This concern is usually based on the situation with birds and mammals. Of course, insects can become endangered, even extinct, as America's Glaucopsyche xerces, Speyeria adiastra atossa, Cercyonis sthenele sthenele, and Icaricia icarioides pheres all illustrate. Yet, when the immediate causes of those species' endangerment or extinction is studied, collecting is usually the least likely factor. Habitat destruction is the main culprit; introduction of non-native species plus natural climatic changes also play roles (Orsak, 1981; Pyle et al, 1981; Wells, et. al, 1983; Thomas, 1984; Collins & Morris, 1985; New, 1991). Relictual species can be especially vulnerable, and any insect whose populations were decimated by another factor, can become vulnerable to overcollecting. But with all the tropical forest destruction going on, one wonders if concerns about overcollecting the forest's declining inhabitants aren't a bit misplaced. Especially saddening is when governments, knowing that collectors are an easy scapegoat, pass laws prohibiting collecting, boast that they are saving species in the process ... then let the forest destruction continue, unabated.

Tropical insects, of the rainforests are likely to have somewhat lower reproductive capabilities, compared to insects of transitional or colder habitats, but their capacities remain impressive. PNG's birdwings may

be more vulnerable, since they lay relatively few eggs (Pyle & Hughes, 1978; Parsons, 1983), but they are usually hard to collect: the type specimens of O. alexandrae and O. victoriae had to be brought down with a shotgun!

One supposed example of birdwing butterfly overcollecting, detailed in Pyle & Hughes (1978), concerns the geographically restricted Ornithoptera priamus miokensis on the Duke of York Islands (between New Britain and New Ireland). Now, I am told that the butterfly is locally common. On small Nissan Island (North Solomons Province), priamus birdwings aren't collected, yet I found none present there in March 1992 during a prolonged dry period. But they were there before, and villagers tell me, they have reappeared. Similar seasonality characterizes the rare O. chimaera (Matthew Jebb, pers. commun.) at Bundi. Many PNG insects show seasonality corresponding to wet-dry seasons. When collecting occurs during periods of butterfly abundance, the subsequent natural decline could easily -- but unfairly -- be blamed on overcollecting.

Built-In Conservation Features for PNG Butterflies

Certain features of butterflies, plus certain attributes of IFTA's buying practices, provide built-in conservation measures.

First, male butterflies tend to be collected more often than females; the males are more expendable from a conservation perspective. Examining IFTA's purchase records for the high-demand iridescent blue Papilio ulysses butterfly (Figure 7), one finds that 80%-90% of wild-caught specimens are males. This is despite the fact that females fetch more money (K1.30 versus 80 toea). This same male dominance occurred in the once-giant Taiwan butterfly industry, which exported some 10 million specimens per year (Severinghaus, 1975). Such butterflies were usually collected "puddling" in wet areas. In PNG, hundreds of specimens of Graphium wieski are captured the same way, and about 90% of the captures again are males.

IFTA incorporates a conservation feature by almost never buying damaged specimens. Thus, probably around 90% of wild-captured butterflies cannot be sold. Damaged specimens might be killed anyway by villagers; however, I watched villagers on Woodlark Island release them. Damage is not from any genetic abnormality, and slightly damaged butterflies can still mate and reproduce. Since birdwing butterflies accumulate scratches and other minor damage soon after emergence, it is easy to distinguish reared ones (legal) from caught ones (illegal). That is another factor in favor of conservation.

Third, because this is a supply-and demand enterprise, with a small market, there is negative feedback when too many specimens are collected: the price drops, which usually reduces a villager's motivation. When IFTA gets too many anyway, they may stop buying a species altogether.

Finally, populations of tropical insects are greatly regulated by density-dependent mortality factors, such as predators, parasites and disease. Collectors usually function as just another density-dependent mortality factor. That means, a collector in the area is akin to a flock of birds moving in, or the build-up of a parasite wasp population. Basically, butterfly mortality caused by a collector releases the population from being attacked by some other predator/parasite/disease, as Dethier & MacArthur (1964) found in a failed, purposeful attempt to overcollect a sedentary, fairly rare American butterfly (Euphydryas phaeton).

Butterfly Farming Versus Ranching: Which is the Better Conservation Tool?

The PNG government, following CITES requirements that commercial utilization must not harm wild populations, requires rearing of birdwings listed in Appendix II. Unfortunately, the Australian government strictly interprets the CITES provisions, and prohibits the import of all "ranching" PNG birdwings, because they are not convinced that this insures that naturally occurring populations will not be harmed. They would be far more likely to accept confined, "farmed" specimens (Figure 8a). Yet, "ranching" (Figures 8b, 8c) has greater conservation potential. If foodplants are spread out over a natural habitat, the tie between "making money" and "keeping the forest" is greatly strengthened. Butterfly farming, in contrast (Figure 8a) at best keeps the species, rather than the habitat. Some who argue in favor of farming feel that ranchers will tend to overharvest the wild resource. This is very doubtful, because of the general difficulty of overcollection plus the fact that the additional, planted foodplants should increase the wild population over what it was before.

IFTA originally encouraged garden-like plantings of the butterfly foodplants, but today encourages "bush enrichment" (Figure 8c). This means scattering new foodplants in the forest. This is less effective for open area butterflies, but if the foodplants are clumped in the small, open areas in the forest canopy caused by falling trees, forest-scattered foodplants will usually be exploited by those butterflies too.

Scattering out foodplants makes biological sense, because it scatters out the insect population. Clumped insects are more vulnerable to predation, parasitism, and disease (see, for example: Tinbergen, 1960). Naturally gregarious butterfly caterpillars, whose poisons repel birds and lizards, are nonetheless often times hit hard by parasitoids and disease which aren't affected by those poisons. A PNG example is Papilio laglaizei (Straatman, 1973). Probably the ideal situation for a butterfly rancher to create, is to scatter out small clumps of foodplants throughout the forest.

Collectors usually function as just another density-dependent mortality factor...akin to a flock of birds... or the build-up of a parasite wasp population.

Improving the Prospects of Using Butterflies to Save Tropical Forest

Expand the Market

Markets for many nontimber forest products can be quickly saturated by eager harvesters and collectors. This is true for PNG's butterfly business, which sells mainly to collectors and naturalists. High value insects, most of them forest-dwellers, go exclusively to collectors. If 200 specimens were to come into the IFTA instead of 50, this could destroy that species' market. That saturation point would almost certainly precede any threat of overcollecting. Market expansion would be beneficial rather than harmful, because it makes forest-conservation incentives available to more villagers.

Species that IFTA can sell to non-collectors have bigger markets. That's why prices of the Ulysses swallowtail and Priamus birdwings have remained stable for many years. That market could be increased further, if people in the First World who now buy tropical forest products to help tropical forest conservation, were to buy butterflies for the same reason. However, the idea of "dead butterflies" repels many tropical conservation supporters (who somewhat hypocritically, do not express their concern about killing animals by becoming vegetarians). Thus, although market expansion is essential if butterflies are to become significant incentives to protect tropical forest, major roadblocks have been set up by people in developed

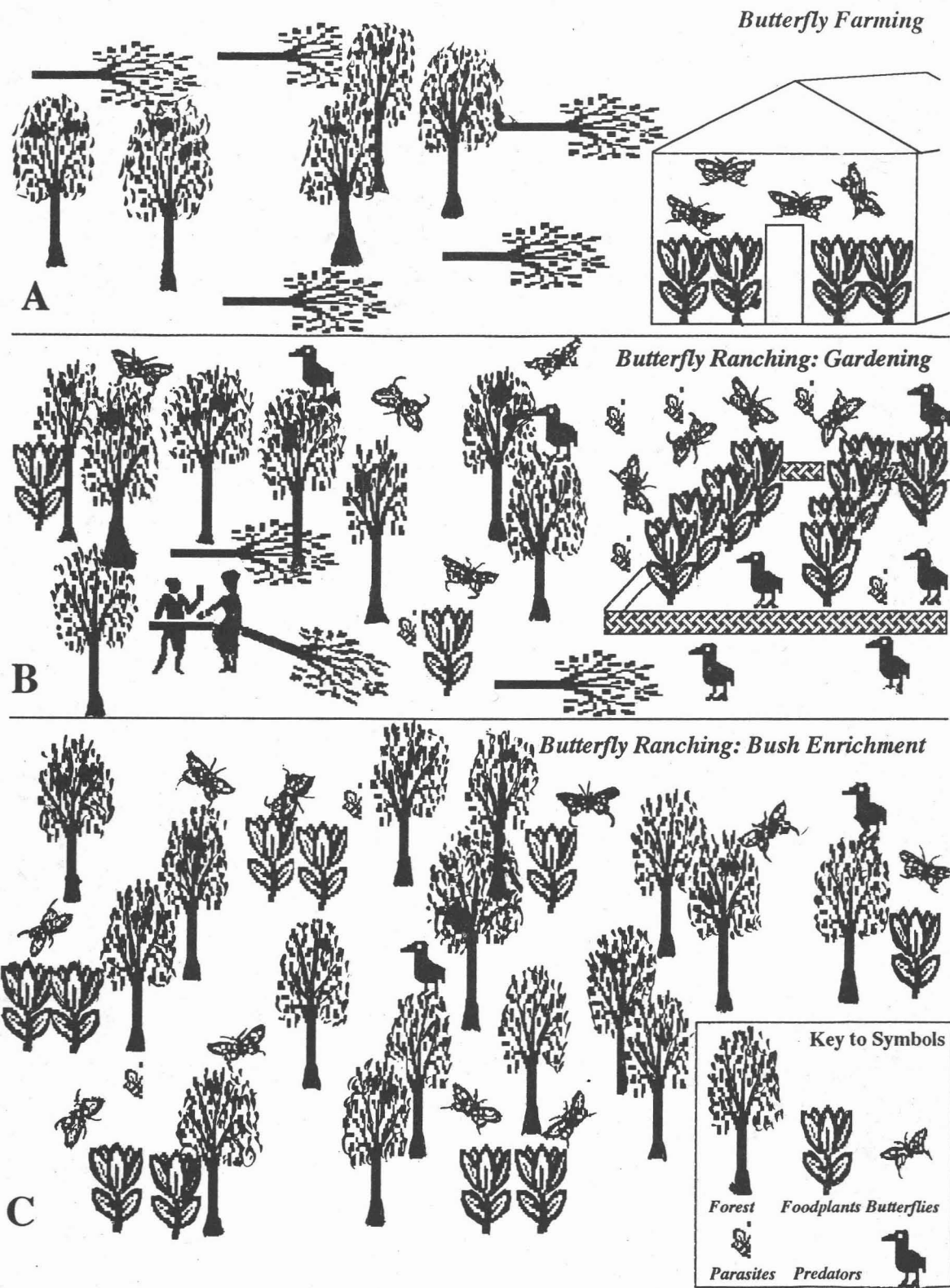


Figure 8: A schematic diagram distinguishing (a) butterfly farming, (b) butterfly ranching via garden plantings, and (c) butterfly ranching involving the "bush enrichment" strategy now promoted by the Insect Farming & Trading Agency. Single-species conservation is promoted by all strategies, but the most desired ecosystem/habitat conservation can only be promoted through the "bush enrichment" strategy. Ironically, the Convention on International Trade in Endangered Species technically accepts only the first, "farming" strategy, for raising birdwing specimens, although CITES stickers may now be placed on PNG-ranched specimens, and most countries (apart from Australia) accept their import.

countries.

Buy Only From IFTA or Dealers Who Buy From IFTA:

Unfortunately, more and more Papua New Guineans see that they could earn more if they sold butterflies direct to overseas dealers and collectors, rather than going through the IFTA middleman. They do not realize that IFTA stays afloat not through the common insects villagers usually bring in, but through the rare, exceptionally high value insects. Even then, IFTA is not profit-making. The markup on common, lower value insects -- the kind most villagers sell -- usually just covers processing costs.

If exportation of PNG insects becomes decentralized, Papua New Guineans ultimately will lose. Small markets for rarer species will be saturated; prices will collapse. The evidence comes from the Victoria Birdwing (*Ornithoptera victoriae*). Once carefully marketed and released by IFTA, the Solomon Islands government got interested in the potential profits, and dumped large numbers of *victoriae* on the market. The sad situation in Irian Jaya, with illegal dealer purchases, has similarly affected the price of *O. goliath*.

If you buy from dealers who buy directly from PNG villagers, you may save money, but you will help destroy any long-term incentive PNG villagers have to conserve those butterflies and their habitats. If you buy a birdwing, and that specimen has been legally exported/imported, you always should receive a CITES stamp with each specimen. If you buy any other butterflies or insects from PNG, insist on a photocopy of the PNG government's export permit, as proof that those specimens came from a government-approved exporter (IFTA).

Some dealers do not provide CITES stamps with the birdwings they sell, saying that their specimens were collected before CITES listing. With each passing year, that becomes more dubious. It is your option, as a buyer, to insist on CITES stamps and permits (one per specimen) and evidence of a PNG export permit (which can cover an entire shipment of specimens). It is totally up to you whether you want to insure that villagers receive maximum returns and stable market prices for their birdwings, and that requires you buying only birdwings accompanied by a CITES stamp.

Discover More Butterfly Foodplants

We can't ranch butterflies unless we know what they eat. Sadly, we know foodplants and life histories for relatively few PNG butterflies (e.g., Parsons, 1991). The exceptionally beautiful and sought-after PNG swallowtail butterfly *Graphium wieski*, sold by the thousands, is an example. Perhaps some of this missing knowledge is present within indigenous communities, but probably more often not, since few such insects would have been "useful" in a traditional context. Volunteer amateur lepidopterists could contribute by working out life histories. More known foodplants mean more butterfly ranching opportunities. That helps PNG villagers, as well as PNG butterflies.

More and Better Educational Devices!

We only have Parsons (1982) manual on butterfly farming, a few ad-hoc, hand-drawn posters created through the Wau Ecology Institute, and a more detailed poster hand-drawn by Melanesian Environment Foundation volunteers. The main obstacles to creating more such devices is lack of money and time. Special needs are: (1) a more general manual on the "insect business", with more illustrations; (2) a color catalogue of most desired insects, which IFTA could pass out to villagers; and (3) large, printed color posters that PNG

environmental awareness groups could use in promoting butterfly ranching, sustainable collecting, and conservation of their habitats.

Conclusions

Usually the first question villagers ask me when I describe the "insect business" to them, is "how much money can I make?" Clearly, this will be the driving force for the foreseeable future. It is the will of the people, distorted as it may be. The key to creating sustainable development projects is to accept that will, but channel it into useful outcomes. The people's will is "development"; the useful outcome would be enhanced protection of tropical forest.

Tropical butterflies are hard to overcollect. Tropical forests are easy to destroy (Figure 9). Thus, there is obvious value in using tropical butterflies to save tropical forests, while promoting development in the Third World.

A big attribute of the "butterfly business" is that it promotes an especially tight link between conservation and development. In essence, "butterfly well-being leads to people well-being". That is a powerful connection and incentive for conservation. Apart from collecting and selling butterflies, one of the only other incentives with a similar, tight link is "ecotourism". This is obviously more palatable

(from the perspective of the First World) than killing butterflies. But ecotourism potential in PNG, as well as other tropical countries is low: "...it is important to remember that only a small minority of protected areas attract significant numbers of visitors...In particular, the potential for many tropical moist forest sites to attract large numbers of tourists is limited." (Wells & Brandon, 1992).

Villagers in PNG are willing and eager to enter the "butterfly business", to earn money and achieve development. There are clear ways to direct that motivation, so it promotes forest conservation. But the last key to the conservation gate is held by American and European citizens and conservation organizations. They must buy the butterflies! They must help learn more about life histories and foodplants! They must support the development of new products from PNG butterflies, which are more palatable to the public-at-large! If those in the developed countries fail to help Papua New Guineans earn income through forest products such as butterflies, they will be the ultimate hypocrites, if they later complain when Papua New Guineans turn instead to earning income from unsustainable logging.

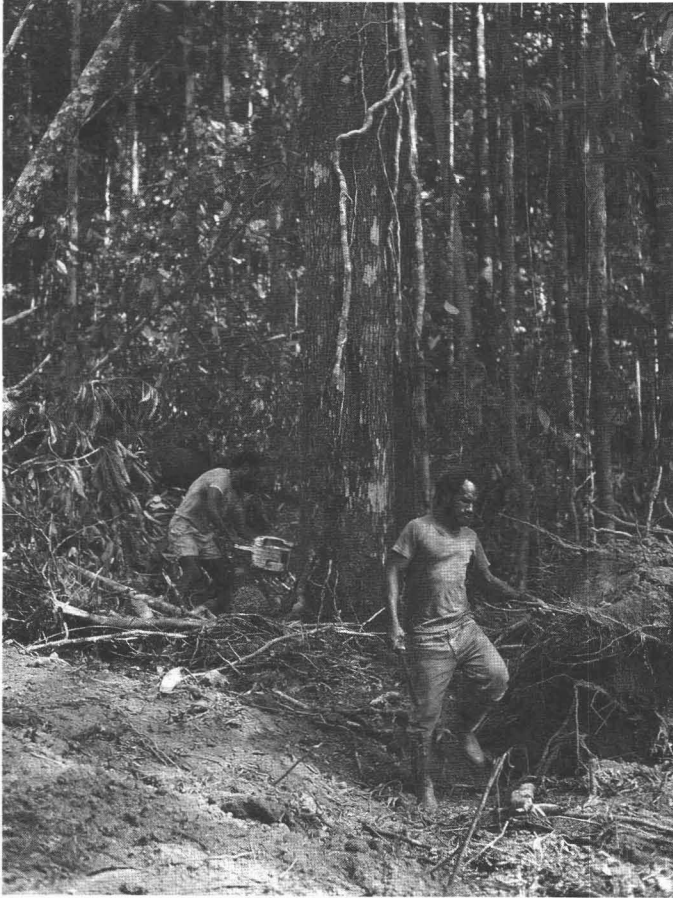
Killing butterflies can have positive implications for butterfly populations. In utilizing butterflies this way, Papua New Guineans will not only have their wildlife resources available for economic utilization now, but available in the future for the enhanced spiritual fortification, that people in developed countries now enjoy for their wildlife. Killing butterflies to save butterflies...that is the lesson of effective wildlife conservation in the Third World today.

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...there is obvious value in using tropical butterflies to save tropical forests...

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Figure 9: (top) Commercial logging in lowland Morobe Province, Papua New Guinea, a place where tribal landowners have few money-making alternatives; (bottom) forest remnants in Morobe Province's Markham Valley foothills shows the ultimate fate of PNG's lowland forests, following repeated disturbance.



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Experiments with Migrating Vanessa cardui (Nymphalidae)

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In the past, some field and laboratory experiments utilizing Vanessa cardui (Linnaeus) have been conducted, mainly on fecundity, broodedness, temperature, sexual maturity, sex ratio, migration distance travelled, juvenile hormone, and polyhedral viruses (Schrader, 1928; Loeliger, 1950; Martin, 1953; Smith and Xeros, 1953; Hammad and Raafat, 1972; Shapiro, 1980; Herman and Dallman, 1981). We performed many additional, preliminary experiments on V. cardui during their large spring migrations through central California

in 1991 and 1992. One set was conducted on orientation behavior of larvae, pupae, and adults at a population-outbreak site 5-10 km W of Bishop (1340-1380 m), Inyo Co., in 1991 (D.G.), while the other involved adult reaction to various light stimuli at Jerseydale (1100 m), 14 km NE of Mariposa, Mariposa Co., in 1992 (O.S.). All directions were determined by compass. The results appear to shed some light on the migration phenomenon in this species.

Bishop

At this site larvae crawled over the ground in many different directions in the morning, each in its own straight-line direction. Larvae physically moved or prodded into new directions immediately returned to their original alignments.

Four groups of 10 small to medium-sized larvae were collected at 0830 on 29 May; each group of 10 had crawled in one of four different directions ($\pm 5^\circ$ of N, S, E, and W). On 30 May those in each of the four containers were released on the ground in direct sun and crawl directions were recorded between 0630-0715. Due to loss and/or cannibalism, actual remaining numbers were nine for each of three directions and five in the W direction (32 total). With a possible deviation of up to 180° from their previous directions, none deviated by more than 70° , 87% were within 35° , and 69% were within 15° . The results indicate that after one elapsed day, the larvae crawled in a direction approximate to that seen on the previous day.

On 30 May, six small larvae were collected, their crawl directions determined, and each was then placed in an individual container. After one day, five of the six crawled in nearly the same direction as seen on the previous day when released, with one moving in a perpendicular direction. These turned their heads in various directions and often moved in small circles before crawling in a given direction. After three days, four of the five remaining larvae of the original six crawled in nearly the same direction as when first collected and one went in the opposite direction. Possibly there is a selective advantage for larvae to crawl in differing directions since at least some will survive, as opposed to all crawling in one direction where there might be no foodplants or pupation sites.

Newly-emerged *V. cardui* were seen to radiate from the Bishop outbreak site in straight lines in nearly all compass directions during 1986 and 1991. On 5 June, 22 of 32 pupae (69%) found on the hostplant *Amsinckia tessellata* Gray (Boraginaceae) had their cremasters "pointing" between NNW and W. Nine pupae were collected on 5 June that were pointing E through N to WSW (mean = NNW). Five of the six adult *V. cardui* that had emerged and were released at 1030 on 11 and 13 June flew S-SE (mean = SSE) upon release from the container (their first flight); the sixth flew NNW. They maintained this flight direction until out of sight. Thus, most flew approximately opposite to the mean direction that the pupal cremaster had pointed, i.e. in the direction that the dorsal surface of the pupa was facing. The results leave open the intriguing possibility that flight direction is a function of pupal dorsum orientation, although larger sample sizes linking pupal orientation with adult flight direction for each individual would be necessary to better establish this.

For 12 large larvae collected 28-30 May, crawl directions were recorded and then compared with the direction they flew as adults after they emerged in mid-June. Flight direction was nearly the same as the larval crawl direction in four, yet flight direction was nearly opposite to the crawl direction in four, and flight direction was perpendicular to the crawl direction in four. A similar experiment was performed with 17 small larvae collected 30-31 May that emerged in mid-June and early July. In this group, flight direction was nearly the same as the crawl direction in five, nearly the opposite in three, nearly perpendicular in three, at obtuse angles in three, and at acute angles in three. Thus there appeared to be little correlation between larval crawl direction and subsequent adult flight direction.

On 11 June nine *V. cardui* adults flying geographic W were collected

during a period of no wind at 0630. When released on 13 June at 1000-1030, however, seven flew NNW, one flew WSW, and one flew ESE, while the wind was blowing toward the NNW. Interestingly enough, one of those that went with the wind was seen to orient its body W as it flew. Thus the wind may influence their observed flight direction, although more experiments are needed to document this.

There are many difficulties involved with any attempt to record flight directions of released migrators. Agitated *V. cardui* often do not immediately fly in what would have been their preferred flight path; they are apt initially to go with the wind, but many may fly toward or away from the sun's direction. We have not yet found a satisfactory method of releasing migrators so as to reliably measure their preferred flight direction.

Jerseydale

On 21 April five migrating adult *V. cardui* were captured in mid-afternoon and kept indoors in a closed tin container. At 1910 (twilight), they were released by opening the container on the floor two meters below an overhead ceiling light in a warm, heated room. They immediately flew upward in circling flights and then mostly circled rapidly around the light in the glass-bowl fixture for about five minutes. They did not fly very far from the light source during this time. After five minutes they remained perched inside the light bowl. On 4 May at 1800, two migrating specimens released into the room flew immediately to the ceiling light even though it was still daylight outside, then alighted in the room. Tilden (1949) also noted that three *V. cardui* were attracted to commercial lights at night at Salida, CA, in October 1932; these were "fluttering actively around the lights."

On 4 May, 10 migrators were captured and kept in a closed tin container indoors. At 1940 (last twilight), they were released into the air a few meters from an insect black light sheet (15 watt, G.E. fluorescent bulb no. F15T8; see Platt and Harrison, 1988, Fig. 1B for the emission spectrum). Several were seen to fly erratically toward the light and then alight in the grass part way there. By 0110, one had crawled onto the sheet and was torpid. By 0430-0530 it was located on the sheet behind the black light. On 5 May eight migrators were captured and released one meter away from the black light sheet at 1940. These were inactive and perched in the grass in perpendicular and parallel positions relative to the black light. By 0020, one adult had crawled to a position close to the light, while those in the grass remained torpid. Between 0445-0530, it had crawled only a few cm from its 0020 light-source position on the sheet. The nighttime weather on 4-5 May was cool and clear.

On 4-8 May the following experiments using white Liquid Paper and scissors were performed on migrators. Masking and excision are given from the butterfly's dorsal perspective and subsequent behavior from the observer's perspective. There was no control group due to other obligations, although one of us (D. G.) has observed that netted and released individuals often did not immediately proceed in a fixed direction and flew with the wind, climbed, zig-zagged, or landed, while others did resume flying in their original migration direction.

1. *compound eyes covered* (n=9) -- all flew erratically in the sun's direction; two flew directly toward the sun, and two flew a few meters off the ground toward the sun, in the late afternoon.
2. *antennal clubs removed* (n=6) -- five flew erratically toward the sun (one flew in the opposite direction to the sun) both during mid-morning and late afternoon.
3. *compound eyes covered and antennal clubs removed*

- (n=2) -- these fluttered to the ground unable to fly, but then crawled in the sun's direction.
4. *left compound eye covered* (n=2) -- flew in ascending counterclockwise spirals perpendicular to the sun's rays.
 5. *right compound eye covered* (n=2) -- flew in ascending clockwise spirals perpendicular to the sun's rays.
 6. *left antennal club removed* (n=5) -- three flew in the sun's direction, one flew away from the sun, and one flew perpendicular to the sun's rays, turning twice toward the sun briefly, then flew steadily away from the sun in descending back to the ground, these occurring in late morning and late afternoon.
 7. *right antennal club removed* (n=4) -- two flew in the opposite direction to the sun in late afternoon, one ascended erratically and flew perpendicular to the sun's rays, one ascended high overhead then flew toward then away from the sun.
 8. *left antennal club removed, right compound eye covered* (n=5) -- flew in ascending clockwise circles or spirals, then usually flew toward the sun or descended back to the ground. This occurred both in late morning and mid-afternoon. Their descent involved both circling and gliding behavior.
 9. *right antennal club removed, left compound eye covered* (n=6) -- flew in ascending clockwise or counterclockwise circles or erratic flight, then usually flew toward the sun. Several observed descents including both circling and gliding.

Before capture, the migration compass-heading direction of these individuals was NNW-NNE (mostly NNE) on 4-7 May, becoming WNW-NNW on 8 May. These experiments suggest that ocelli give the sun's direction but don't affect flight (experiment number 3), both compound eyes and both antennal clubs (and sometimes just the right antennal club) function in sun-directed flight (1, 2, 6), the left antennal club and sometimes the right club function in flying in the opposite direction to the sun (6, 7), and one eye functions in ascending circling flight (4, 5, 8, 9). It therefore appears that the antennal clubs do perceive direct sunlight direction. Similar experiments to these utilizing migrant *Nymphalis californica* (Boisduval) suggest that the compound eyes control flight in the plane of polarized light (Shields, 1989).

How migrant *V. cardui* are able to maintain a fairly steady flight direction throughout the day while the sun arcs across the sky remains mysterious; possibly the mechanism involves orientation to changing polarized and incident sunlight planes. Tropical migrant butterflies are believed to orient by compensating for the movement of the sun's azimuth across the horizon (Baker, 1981), although there are some unpublished reports of a few *V. cardui* migrating before sunrise and after sunset when direct sunlight would not be a factor. Magnetite is concentrated in the thorax of *Danaus plexippus* Linnaeus and may play a magnetoreceptor role during its migration (MacFadden and Jones, 1985), although it is also known to orient to polarized light (Hyatt and Kreithen, 1986). Many other Lepidoptera do not possess magnetite, but until this can be confirmed in *V. cardui*, the magnetoreception possibility cannot be ruled out.

Acknowledgements.

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Erynnis lucilius confirmed from Illinois

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In 1973, Roderick R. Irwin and John C. Downey published the "Annotated Checklist of the butterflies of Illinois," (Illinois Natural History Survey, Biological Notes No. 81) in which they noted that *Erynnis lucilius* (Scudder and Burgess) "almost certainly occurs at least in northern Illinois, despite the lack of positive records." Also in the checklist, the authors noted that Burns (1964, "Evolution in skipper butterflies of the genus *Erynnis*". University of California Publications in Entomology. Vol 37) had examined an "undoubted" *lucilius* from "Vicinity of Chicago, Illinois." However, since the authors had not examined Illinois specimens that had definitely been associated with the larval host plant of *lucilius*, *Aquilegia* (columbine), and the exact data for the Illinois specimen cited by Burns wasn't available, they did not feel justified in accepting this species as a member of Illinois' butterfly fauna.

Since 1991, Irwin Leeuw, of Chicago, Illinois, has been collecting Illinois butterflies for me. Included in the specimens sent are several *Erynnis lucilius*. Although my initial determination for these *Erynnis* was *E. lucilius*, I sent 3 specimens to H.A. Freeman for verification. Freeman also determined this *Erynnis* to be *E. lucilius*, based on similarities in genitalia and morphological characteristics including wing expanse, when compared with *E. lucilius* from Toronto, Canada, and *E. baptisiae* (Forbes) from Massachusetts. Mr. Leeuw reports *Aquilegia* from the area where these *lucilius* were collected, although the plant is apparently uncommon. All *lucilius* specimens sent are from near Illinois Beach, in north-east Lake County, Illinois. The dates of capture suggest two full broods, in late May - mid June, and late July - mid August, and at least a partial third brood in mid - late

September. The specimen from 29 September 1991 is a fresh male. Mr. Leeuw noted that this *Erynnis* was common near Illinois Beach in early June, 1992. The fact that *lucilius* definitely occurs in at least Lake County suggests that the *lucilius* specimen cited by Burns (1964) may in fact be from Illinois, and not from nearby Indiana, as suggested by Irwin and Downey.

Erynnis baptisiae also occurs near Illinois Beach, but is found mainly from late April - mid May, and early July - August. In Lake County, in May, *E. lucilius* is usually in fresh condition when *E. baptisiae* is becoming worn, and in early August, both species can be found sympatrically in fresh condition. *Erynnis horatius* (Scudder and Burgess), *E. juvenalis* (Fabricius), *E. icelus* (Scudder and Burgess), *E. brizo* (Boisduval and LeConte), and *E. martialis* (Scudder) are also known from the area around Illinois Beach. Currently, 7 species of *Erynnis* are known from Lake County, the highest number known from any Illinois county.

Illinois specimens of *E. lucilius* have been deposited in the insect collections at the Denver Museum of Natural History, Denver, Colorado, Cornell University, Ithaca, New York, and the private collections of A. D. Warren, H.A. Freeman, and R. E. Stanford.

An Open Letter from Utah Lep. Soc.



Dear Lepidopterists' Society Members,

In response to the recent articles in the "NEWS of the Lepidopterists' Society" regarding restrictions on collecting, as well as the ever-growing concern about the confiscations of specimens from collectors, the Utah Lepidopterists' Society has recently held two meetings to educate its members regarding these issues.

On 13 February 1993 members of the Utah Lepidopterists' Society and others present discussed The Lacey Act, the Endangered Species Act of 1973, CITES, and other laws as well as their concern with the recent "search and seizure" of specimens by the Law Enforcement Division of the U.S. Fish and Wildlife Service.

As a follow-up to this meeting, members of the Society have decided to generate and extend legislative recommendations with respect to improving The Endangered Species Act of 1973 and the Lacey Act.

Although this movement is presently regional, it is our hope that we can generate support from other organizations and individuals who are sympathetic to these concerns. Our legislative recommendations, as they now stand, are by no means final nor all-encompassing. **We are concerned about the current situation and are eager to improve it.** However, we need help from other individuals in the Lepidopterists' Society and other organizations in order to provide momentum. We need help in order to draft amendments. We need help from those willing to write to their members of Congress or Senators in order to further these concerns.

As it now stands, we have generated a 12-page proposal as well as 20 or so letters from others who have written their concerns regarding these issues. If anyone reading this letter is sympathetic to what is going on and would like to assist us or would like a copy of what has been assembled up to this point, please contact Jack Harry, P.O. Box 25752, Salt Lake City, Utah 84125, or phone 801-262-9265. A small donation to cover postage and copies would be appreciated.

Sincerely,

Todd L. Stout
Raymond F. Evenson
John L. Richards
Jack L. Harry

Opinion



Conservation vs. Collecting and the Role of Our Society: A Rejoinder

by J. Ben Ziegler
Summit, New Jersey

In his rebuttal (in NEWS Lepid. Soc. No. 1 Jan/Feb 1993) of my recent open letter to Society President Floyd Preston dealing with this controversial subject, John A. Shuey presented a spirited defense of the federal Endangered Species Act (ESA) and related state laws, as benefits his professional association with a large, commercial environmental organization. A recent article in a Kalamazoo, Michigan newspaper entitled "Highway Costs Soar Amidst Efforts to Spare Endangered Butterfly" provided some pertinent background to his commentary. Briefly, it seems that the proposed route for the final 12.5-mile section of the new US 31 would cut through Blue Creek valley and an associated fen in Benton Township which holds perhaps the largest existing population of the "endangered" Mitchell's Satyr (*Neonympha mitchellii*) butterfly, according to Mr. Shuey, who was identified as a representative of the Battelle Great Lakes Environmental Center in Traverse City, Michigan which had been engaged by the Michigan Department of Transportation to determine the potential effect of highway construction on the butterfly. After making the routinely undocumented charge that the numbers of the "nearly extinct species" had been "decimated" in part by collectors, the article went on to state that Mr. Shuey's investigation of the site, during which he reported having been shot at by an unknown assailant (hopefully he received hazard pay!), documented a population of several hundred individuals of Mitchell's Satyr, indicated that other endangered turtle and snake species might also be present, and led to the conclusion that highway construction and pollution from bridge traffic and de-icers could harm or even kill off the butterfly. The newspaper article concluded with the statement that any necessary modification of the bridge construction plan or alternative relocation of the highway would increase costs by millions to tens of millions of dollars and add up to 6 to 8 years to the project. This is reminiscent of the notorious Snail Darter/TVA Tellico dam fiasco and many other more recent controversies of similar nature involving ESA.

In paying homage to ESA Mr. Shuey gave the impression that uncritical support of all aspects of ESA in its current form is a litmus test for a politically-correct attitude toward conservation practices in general. To the contrary, I have drawn attention to the fact that current usage of the word "conservation" connotes many different meanings and that many knowledgeable observers, recognizing the profound differences between invertebrate and vertebrate animals in life histories and reproductive mechanisms and capacities, support the preservation of lepidoptera habitat (generally conceded to be by far the major factor in lepidoptera conservation) while opposing the restrictions on collecting imposed by ESA as being intrusive, oppressive, anti-science and practically devoid of any documented or really plausible effect in preserving lepidoptera species.

Mr. Shuey wants his children and grandchildren to experience the same "simple pleasures of nature". I would express a similar thought

a little differently by saying that I would like all young people in future to have the same opportunity that all of our great lepidopterists have had to collect and to study collections of all species of lepidoptera as the only way to properly and fully appreciate these insects. This process is indispensable to the discovery, nurture and development of the budding avocational and professional lepidopterists who will continue to advance our scientific knowledge of the lepidoptera. Beyond that, it is also a *sine qua non* for a better general as well as specialized understanding and appreciation of all existing species. One might agree that it is commendable to educate a general public, which is now barely able to recognize a Monarch or a Tiger Swallowtail and for the most part really knows little and cares less about lepidoptera, to a more complete appreciation of these insects as a part of the natural world. However, the notion that it is possible to accomplish this at other than a primitive level merely by field observation of these insects is overly optimistic. There are a great many taxa, including many of the "rarest" and scientifically most interesting, which can be discriminated effectively only by the comparative examination and detailed study of a series of pinned specimens in a collection. Inter-species discrimination would seem to be indispensable to appreciation of all species. And as for "simple pleasures", the close-up observation of, for example, Mitchell's Satyr in its accustomed tamarack bog haunts infested with sink holes, poison sumac, biting flies and pygmy rattlesnakes, and of *Mitoura hesseli* in the well-nigh impenetrable Atlantic White Cedar swamps which it frequents, are more in the nature of hard work requiring a high degree of dedication, perseverance and stamina.

Mr. Shuey seems to take particular exception to my statements regarding a "mystical belief" in the overriding importance of lepidoptera conservation in the broadest sense and for its own sake as opposed to other considerations, by which I meant collection and scientific study. I was referring to the anthropomorphic and quasi-religious mind-set that admonishes us e.g. to put ourselves in the butterfly's place, or that announces that butterflies now have legal "rights" not granted hitherto (It is of interest that a large segment of the general public believes that not even the human fetus has any legal or moral/ethical rights), or that instructs us that lepidoptera are now considered to be non-game wildlife to be appreciated more desirably through observation alone and most preferably not collected and sacrificed. Of course, it goes without saying that these views are legitimately held by their proponents, but it must be understood that they are by no means universally accepted.

Mr. Shuey detects two types of villain lurking in the dark recesses of our Society, namely the "lepidopteran-stamp" collectors on the one hand and on the other the unregenerate game hogs who believe that they have a god-given right to collect anything on earth, and the more the better! The former supposedly flail about madly and mindlessly completing "life-lists" by filling their cabinets with examples of every imaginable (and some unimaginable) taxon, while the latter flock like piranhas in a feeding frenzy around every endangered species habitat in sight, greedily and gleefully hastening the process of extirpation and/or extinction. However, these dire accusations are not accompanied by any indication of the identity or the exact numbers of these malefactors; Mr. Shuey writes variously of "some individuals", "many collectors" and "a few bad apples". I would wonder whether the identifiable (and I should think relatively few) "bad apples" among our membership might not be better dealt with through peer pressure and Society-imposed discipline rather than by the widely-cast net of a cumbersome, inefficient and wasteful legal process which ensnares and harasses many innocent by-standers in the pursuit of these evil-doers and involves all of us in tedious bureaucratic tangles. In extreme cases, the Executive Council of our

Society has the authority to expel any member for cause.

This brings up the general question of legality and ethics and especially "legislated ethics" mentioned by Mr. Shuey. Like beauty, ethics lies in the eye of the beholder; like religion, it is purely a matter of personal insight and opinion and is not a permissible subject for governmental legislation in our free society. A clear distinction should be drawn between ethicality and legality; there is no necessary connection between the two. Public laws are not graven in stone; they may be reinterpreted, amended or repealed. For example, there is no express mandate in ESA requiring the protection of species of lepidoptera or any other invertebrate animal, for that matter; the selection of particular species or groups of species to be protected is left entirely to the discretion the U.S. Fish and Wildlife Service. At any given time, an action which is judged to be illegal may not necessarily be universally considered to be unethical and *vice versa*. It is also essential to draw a clear distinction between dissatisfaction with the scope or language of a law and the endorsement of illegal activities. If, as we are told, law enforcement personnel often misperceive the former to be the latter, then that is their problem for them to correct. If lepidopterists disagree with the construction and/or the interpretation of existing law or with the philosophical or factual basis thereof, they have every right to hold and to express that opinion. Certainly, the mainline conservation organizations do not hesitate to send their lobbyists to the Congress to promote their agenda.

Mr. Shuey states that "It is time for us to acknowledge that [ESA] was [written] as a far reaching concept designed to preserve the natural heritage of our country for future generations". This is a grand generality to which no one can object; however, the devil is in the details and the proof of the pudding is in the eating! At my request, my congressman recently sent me copies of the latest version of ESA 1973 as amended together with extensive background information from official sources on the gestation of this and allied legislation in the Congress. The only named public supporters of this legislation were identified as "environmentalists and conservation groups" in general, and specifically as lobbyists for the National Audubon Society, National Wildlife Federation, Defenders of Wildlife, Natural Resources Defense Council, Defenders of Wilderness, etc. I found no reference to any input from individuals or organizations specifically devoted to scientific research in any of the biological sciences, let alone entomology in general or lepidopterology in particular. The record shows that ESA 1973 was enacted into law amidst the turmoil of the Watergate scandal, unbeknownst to the general public and without any comprehension of the extremely controversial ramifications that it would eventually

**ESA "has been used or misused...
to promote special-interest
agendas..."**

have in a great many aspects of public life in general and scientific research in particular. I would respond to Mr. Shuey's high-minded sentiments by suggesting that ESA is hardly a fountainhead of all wisdom in helping to achieve a reasonable balance among the competing interests of conservation, science, economics, commerce and general public policy. On the contrary, the record shows it to be a single-minded and rigidly autocratic document expressly designed to impose the strict conservationist ethic mentioned earlier. It has been used or misused by various individuals and organizations to promote special-interest agendas having no demonstrable relation to sound public policy and has arguably created more problems than it has solved.

We are informed that unless our Society passively accepts the current attacks on our vital interests and unreservedly joins the conservationist camp in order to counteract the negative publicity and stereotyping allegedly arising from our toleration of the destructive collecting practices and illegalities perpetrated by the "bad apples" in our midst,

almost all field collecting may be doomed and our science may disappear from the scene. To the contrary, I suggest that most if not all of the negative publicity currently directed against collectors and collecting arises from propaganda, at best misinformed and mistaken or at worst knowingly false, disseminated by one or another of the mainline conservation organizations or their individual adherents. This repetitious drumfire of disinformation is based entirely upon the intuitively plausible and attractive but completely unsubstantiated notion that it is not only possible to extirpate a lepidoptera population and/or cause the extinction of a lepidoptera species by "overcollecting" but that this has actually happened many times. To the contrary, it has been reported in the scientific literature that calculated attempts to eliminate local populations of a bee and a butterfly in intensive collecting in the course of experimental population studies actually had the opposite effect. As to the future of our Society, its members have advanced scientific knowledge of the lepidoptera for the almost 50 years of its existence, and I venture to suggest, it will long survive and prosper. Our Society has no need to justify its existence; it is rather for the governmental authorities to demonstrate the knowledge of the subject and the scientific credentials required to establish their credibility with lepidopterists.

To sum up, governmental restrictions on collecting lepidoptera, perhaps reflecting in part some diffuse popular opinion, appear to rest on two assumptions or bases: (1) it is not only possible to seriously diminish or extirpate populations of, and ultimately cause the extinction of species of, lepidoptera but this has actually happened many times, and (2) it is morally or ethically wrong to kill lepidoptera. As has already been stated, the first is unsubstantiated by any rigorous evidence; anecdotal supporting statements often advanced such as "a colony of species X was overcollected by game hogs who took everything in sight and species X has never been seen there since" are at best logically unsound, dubious and inconclusive. The second is entirely a matter of personal opinion.

Mr. Shuey maintains that ESA *et al.* in their present form are the only available means of "managing" populations of many "endangered" species of lepidoptera to ensure their survival and that by inference lepidopterists must tolerate the resulting bureaucratic hindrances and obstructions to their field, research and student training activities that necessarily accompany this "management". To the best of my knowledge and belief, the notion that "endangered" species of lepidoptera can be effectively "managed" by restrictions on collecting is essentially mythical and undocumented by any hard evidence. For my part, I call upon science-oriented lepidopterists in the tradition of W. H. Edwards, S. H. Scudder, W. J. Holland, J. A. Comstock, A. B. Klots, C. H. Remington, Harry K. Clench and many others to stand up and be counted for the defense and promotion of avocational and professional lepidopterology by opposing the restrictions on collecting contained in ESA and similar legislation.



A Rejoinder re: Arthur M. Shapiro's review of Reissinger

by Ulf Eitschberger
13-A Humboldtstrasse
D-8688 Marktleuthen, Germany

I cannot comprehend why Shapiro's statements about Reissinger's work are so cutting and destructive [in *Jour. Lepid. Soc.* 45 (4) 377-379 (1991)]. What did Reissinger do? He did not, like a "Typologist" describe 28 subspecies out of 30 individuals of *Colias alfacariensis* from the gigantic area comprising the Palearctic. He merely analyzed over

17,000 individuals and combined the numerous populations into eighteen subspecies. Therefore, to compare him with Bryk or Eisner is absurd. Why the comparison with these men at all, whose accomplishments compared to their time were immense?

In addition, Reissinger cannot be accused of describing a presumably extinct subspecies of *Colias alfacariensis* of North Africa, represented by existing examples in collections.

At best this can be used as an accusation against mankind, who has been responsible for the Exodus of species from the face of the earth ever since the beginning of industrialization. For the describing body of Natural Science however, it is not unusual to describe long extinct organisms. We only need to be reminded of the countless species of animals and plants of the past millions of years that were described after petrification. In the future, we will become familiar with the practice of describing new species on the basis of pinned examples in collections...long after their extinction. In another decade there may be no amateur entomologists in view of a worldwide harrassment of collectors (to "protect" the species). Even after this, species will of course continue to become extinct and millions of undescribed taxa will disappear without ever having been seen by human eyes or appreciated by the human intellect. But then there will be no more extinctions of species for the responsible organs of world society, since none will know them as a result of the shortage of researchers caused by the prohibition of collecting.

Why does Shapiro bring the amateur entomologist, here personified by Reissinger, into discredit? How large would the entire body of today's entomological knowledge be without the much reviled amateur entomologists of the past 200 years?

Would we be more advanced now if in those days only professional entomologists had been allowed to work? In book format we would miss a Huebner, Freyer, Seitz and Verity, just to name a few.

To want the amateur entomologist put into a corner, to want to dictate to him what he can study and what he should keep his hands off, is more than presumptuous.

This is prompting my slightly provocative question: What differentiates an amateur entomologist from a professional entomologist? The professional entomologist is paid for his work, whereas the amateur entomologist often invests all of his free time and assets, which requires a lot more heart and courage.

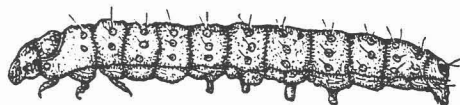
After this necessary deviation, back to Reissinger's *Colias alfacariensis* monograph.....A synopsis can only occur after minutely painstaking analysis of a species or group of species. But before this can happen at all, there have to be people available, that are willing and able to do so. I am very positive that the taxa described by Reissinger would survive the scrutiny of objectively minded third parties, despite Reissinger's "antiquated" methods.

"Modern" professional taxonomists are welcome to use all possible high-tech methods, as long as their methods are not just temporarily "in" and the results of the user are subject to interpretation. The usefulness of the method should, without a doubt, be firmly established, which of course in any case is applicable to the classical methods that are to be tested and retested for each isolated case in point and for each species in particular.

In our times, where words like human dignity and tolerance are on many lips, I miss these attributes in many critical reviews I have read in the last years.

Only he, that works and publishes, can make mistakes. Anyone who criticizes should be aware that the one who publishes has done his best, at least this is our presumption. In this light, none will object to

well intended, constructive criticism (since the purpose of any work is, that it can be used to be built upon). Destructive, partially even unfounded criticism is of course, embarrassing for all concerned. (In this spirit, I regret the sins of my youth and ask anyone whom I might have hurt this way for forgiveness).



Another Opinion Common vs. Scientific Names

by Michael Gochfeld
Piscataway, NJ

Since I am actively involved in preparing a faunal butterfly paper, I have followed the discussion of "common" names with more than casual interest. I have always held that scientific names tend to be stable spatially, but may vary over time, following the vagaries of lumping, splitting, generic reassignments, and large-scale taxonomic revisions. Common names seem more durable; for example the Monarch, Tiger Swallowtail, and Silver-spotted Skipper haven't changed names in the 40 years that I have been watching them. However, for many species, particularly less well-known ones such as skippers that weren't covered in popular books, the common names may vary from place to place, and from author to author. Scientific names will continue to prevail in international discussions, but I predict that common names will gain increasing use in the coming decade.

Because lepidopterists have emphasized scientific over common names, the common names of butterflies have not had the same chance to become as widely utilized as the common names of birds. In this regard I agree with Calhoun's "Opinion" (1992, No. 5: p.89). thus common names haven't become "common" enough, and indeed many tropical butterflies have no "common" name yet. Yet common names have tremendous value in education, popularization, and conservation.

The learning of one name need not preclude the other, and indeed, as Calhoun has pointed out, linking the two, will facilitate beginners learning scientific names. But this will work best, if the names are standardized and stabilized. To that end the newly formed North American Butterfly Association is laboring diligently to review names in common use, to choose names that are both appropriate and familiar, and in some cases to coin names that indeed can become "official" common names through widespread acceptance and usage.

The wider the geographic net, the more challenging the task. For example, the names used for North American species should bear some relationship to those chosen for Neotropical congeners. Since outside of vertebrates, butterflies are the best known and best studied taxa, I predict that even in Southeast Asia and the Neotropics, common names will gain acceptance in the coming decades. As is currently the case with bird names, efforts will be made to achieve standardization there too, greatly increasing the value of such names. Common names may still pose a problem regionally. The same species occurring in Europe and North America have different common names, and it is quite likely that neither Europeans or Americans will be anxious to relinquish familiar names. For that purpose, the scientific name provides a bridge.

Virtually all ornithological papers, even the most technical, in virtually every language, include both the common name and the scientific name at the point where the names are first mentioned. Whereas papers on avian systematics go on to use the scientific names throughout the text, those on distribution, physiology, behavior,

breeding biology, and ecology, are much more likely to rely on common names. Papers on butterflies of well-known regions should certainly at least mention the common name for each species (if there is, indeed, a common name).

Part of the confusion over common names may be an illusion. Using J.Y. Miller's (1992) "The Common Names of North American Butterflies" (Smithsonian Institution Press, Washington, DC) as the starting point, I found that for most widespread and common species, a single common name prevails. Miller summarized nomenclature use from 10 publications. As an example, the name "Silver-spotted Skipper" was used in 7 of the publications, and the recognizable "Silver-spotted Hesperid" was used in another. Two other archaic names, used only once, can be considered idiosyncratic.

There are relatively few species, outside of the skippers, for which two or more names have each been used by multiple authors. For some of the exceptions, the different names apply to subspecies that were formerly named as distinct species. In general, names for common species find relatively common usage...not a bad situation at all. It is an illusion to think that scientific names are more stable; take for example the Tiger Swallowtail, for which two generic names but a single common name have been used in most recent publications. Stabilization of common names for other groups such as pierids and particularly skippers, will be more challenging than for swallowtails. For example, skippers offer such competing names as Peck's versus Yellow-patch skipper and Aaron versus Saffron Skipper, and choices will need to be made.

As more and more lay people are drawn to butterfly watching and conservation, I predict that common names will prevail, pretty much whether technical people like it or not. I suggest that reliance solely on scientific names for butterflies threatens to fragment lepidopterology, by excluding readers and members who choose not to learn scientific names, which, from book to book, are just as confusing as common names.

The articles printed in this column are opinions expressed by members. They do not necessarily represent the opinion of the NEWS Editor, Editorial Board, or Executive Council of the Lepidopterists' society. Disparaging or damaging remarks directed at other members, unsigned letters and articles are not printed (anywhere) in the NEWS.



Thankfully, the Society has not received notification of any members' deaths

Announcements and Notices



ICZN

The following application was published on 25 March 1993 in Vol. 50, Part 1 of the Bulletin of Zoological Nomenclature. Comment or advice on this Application is invited for publication in the Bulletin and should be sent to the Executive Secretary, I.C.Z.N., c/o The Natural History Museum, Cromwell Road, London SW7 5BD, U.K.

Case 2851 *Nacaduba* Moore, [1881] (Insecta, Lepidoptera): proposed

precedence of *Pepliphorus* Hübner, [1819]

Toshiya Hirowatari
Entomological Laboratory, College of Agriculture, University of Osaka
Prefecture, Sakai, Osaka, 593 Japan

Abstract. The purpose of this application is to conserve the name of the Oriental and Australian lycaenid butterfly genus *Nacaduba* Moore, [1881]. It is proposed that it be given precedence over the senior subjective synonym *Pepliphorus* Hübner, [1819], rarely used in this sense.

Bring Ball, Bat or Glove to annual meeting!

If you like to toss the ball around or like to hit things with a bat, please bring your ball, bat or glove to the annual meeting of the Lepidopterists' Society in Fort Collins, Colorado. Just the thing to occupy a few idle moments at the meeting, help work out the kinks acquired from a long airplane ride, or following a long day of listening to lepidoptera papers.

Lepidoptera Publications For Sale To Endow Student Award

The Lepidopterists' Society is attempting to establish a permanent endowment to fund the Harry K. Clench Award for the best student paper delivered at the annual meeting of the Society. To raise money for this worthy cause, various entertaining, informative, rare, valuable, and otherwise interesting books, periodicals, and other publications on Lepidoptera have been donated to the Society for purposes of selling to all persons with a wholesome passion for moths, butterflies, caterpillars, and their kind.

Dating from 1844 to 1993, many of the offered items are from the personal library of Harry Clench in whose honor the Society has named its student award. To obtain an OFFICIAL LIST OF PUBLICATIONS FOR SALE and instructions for placing an order, send a self-addressed, stamped envelope at once to the following address:

Clench Award Book Sale
c/o Invertebrate Zoology
Carnegie Museum
4400 Forbes Avenue
Pittsburgh, PA 15213

The first list of items for sale will be sent one month after this announcement is published. Any person wishing to donate books or

You can help too!
Send for a sale list today!
Remember Harry Clench!

other publications to The Lepidopterists' Society for inclusion on later sale lists for this endowment, please forward such volumes to the above address as soon as possible. The Society needs your duplicate publications and unwanted literature for this worthy cause! Many volumes have been given! You can help too!

If books and publications about Lepidoptera don't excite you, but you still want to donate to the Clench Endowment Fund, then just send your donation (large or small) directly to the Treasurer of the

Lepidopterists' Society with a letter stating your intent (address on the back page of this newsletter).

Support student lepidopterists! Send for a sale list today! Remember Harry Clench!

Plateau Mountain off limits for collecting

Ted Pike of Calgary, Alberta has sent word that the famous Plateau Mountain of Alberta is now an ecological preserve, and as such is out of bounds for collecting. He has attempted to obtain information regarding the specific boundaries, regulations and permit process required for research purposes... "but those details appear not to have been resolved. The owner of the oil and gas development rights, Husky Oil, has agreed to patrol the area regularly, and will charge anyone seen on the mountain with trespassing. Since their personnel are on the mountain daily, collectors are very likely to be caught. I will forward more details as they become available".

Lep Soc Member in Who's Who

J. Ben Ziegler will be listed in the forthcoming second edition of Marquis "Who's Who in Science and Engineering"; he is a current biographee in Marquis "Who's Who in the East" and Bowker "American Men and Women of Science". He received the B.S. with distinction in Chemistry from the University of Rochester and the M.S. in Chemistry and Ph.D. in Organic Chemistry from the University of Illinois. He is author or co-author of 16 scientific papers on synthetic or structural organic chemistry, holds 9 patents on organic chemical synthesis and is author or co-author of 6 scientific papers on the biology and systematics of eumaeine hairstreak butterflies.

Association for Tropical Lepidoptera's Photo Contest Results

The results of the Association for Tropical Lepidoptera's 1993 annual photo contest were announced recently. There were 54 entries. The winners were: Butterfly adults -- First Place: George O. Krizek (*Hamadryas chloe* - Rondonia), Second Place: George O. Krizek (*Agrias amadon* - Rondonia), Third Place: Noel McFarland (*Neophasia terlooti*); Immature Stages -- First Place: J. J. Young (*Troides hypolitus*), Second Place: H. H. Chuah (*Lexias* sp.), Third Place: Noel McFarland (*Phoebis agarithe*); Moths -- First Place: J. de Tonnacour (*Xylophanes* sp.), Second Place: Noel McFarland (*Monoctenia falemaria*), Third Place: J. de Tonnacour (*Hyalurga fenestra*).

Knock, Knock?

.....Who's there?.....

That is the question that was posed to me by several concerned Lepidopterists' Society members after they perused the March/April issue that contained the 1992 Season Summary. Several states had little or no participation. One member pondered the thought that there were simply no lepidoptera to be found in certain states...and interestingly some states had lots of butterflies, but no moths!

Some lepidopterists' may think that their collecting season can reveal nothing new in the way of "records"...but there is collecting data that is worthwhile. New hostplant information is very important. Altitude and temperature can be interesting in some areas (Collecting moths at a light trap/sheet in a snowstorm can be very interesting!) Recording the habitat of the species is very interesting to members who do not live in your locality. Just as the eastern lepidopterist's antennae perk up when reading the fine print regarding an interesting sounding locality in Arizona, the westerner's heartbeat quickens when he/she reads of an interesting catch in a habitat unknown to the west.

Everyone who actually reads the Season Summary compares the information contained in that report with what they already know...be it a little or a lot! Though the Editor has not received a final report regarding the survey conducted in conjunction with dues renewal...rumor has it that the Season Summary is popular with many of our members....helping them break the diapause of winter by reading of last years wonderful collecting season.

So, just on the off-chance that you care, and did not realize that YOUR state, (or your neighboring state, or a state that you are planning to visit) did not submit any data for the Season Summary...and to please those members who enjoy reading the Summary...and to ensure the employment of a typist to type the Summary....here is a list of those states that did not submit reports! It's time to go collecting !

The List

Alabama, Connecticut, Minnesota, Missouri, New Jersey, North Carolina, Rhode Island, South Carolina, Tennessee, Bermuda, Labrador and Newfoundland, the entire Northern Neotropics, and with one exception...all of South America!

The Lepidopterists' Bookshelf



RECENTLY PUBLISHED BOOKS

Allen, Michael. 1993. **MARVELLOUS (sic) MOTHS OF NEPAL.** The Sphingidae (Hawk Moths), Saturniidae (Atlas, Lunar and Emperor Moths) and Brahmaeidae. Know Nepal Series No. 6. Craftsman Press Company, Ltd., 487/42 Soi Wattanasilp, Rajprarob Road, Pratunam, Bangkok, Thailand. 72 pp., 188 color photographs in 21 plates, inside and outside covers. Softcover, 14.5 x 21.5 cm, no ISBN, \$10.00 U.S. (postpaid).

A well designed and sturdily published guide to the larger moths of Nepal, covering 143 species: 119 Sphingidae, 22 Saturniidae, and 2 Brahmaeidae. Illustrations are for the most part crisp, but almost are all printed at much less than life size. Species descriptions include locality data, but no descriptions of behavior or life histories are given, although four larvae are illustrated.

Arita, Y. and J. B. Heppner. 1992. **SEDGE MOTHS OF TAIWAN.** Tropical Lepidoptera, Volume 3, Supplement 2: 1-40; 90 text figures, including 42 photographs, 16 in color, 1 map. Available from Association for Tropical Lepidoptera, P.O. Box 141210, Gainesville, FL 32614-1210. Softcover, 21 x 28 cm, \$7.50 (members) or \$13.50 (non-members), plus \$2 postage (\$3.50 outside USA).

Arita and Heppner have revised the Glyphipterigidae, or sedge moths, of Taiwan. Included among the 29 species known for Taiwan are 22 new species! (Rarely does a revision include over 75% new species.) A checklist of the 126 known Oriental and Palearctic species of Glyphipterigidae is also provided, with species segregated into new species groups.

[To be reviewed in the Journal.]

Carpenter, Frank M. 1992. **TREATISE ON INVERTEBRATE PALEONTOLOGY, PART R: ARTHROPODA 4, VOLUME 3: SUPERCLASS HEXAPODA.** The Geological Society of America, Inc., Boulder, Colorado, and The University of Kansas, Lawrence, Kansas. 655 pp. in two volumes, 265 text figures. Hardcover, 17.5 X 25 cm. ISBN 0-8137-3019-8. \$90.00.

Nearly 30 years ago, Frank Carpenter was invited to prepare the volume on the Hexapoda for this comprehensive and definitive catalogue of the world's fossil invertebrates. He agreed, but early work on the project took a back seat to his teaching and administrative responsibilities at Harvard University. Not until 1974, when Carpenter became Professor Emeritus, was he able to devote full time to the project, which led to the submission of the first draft of the manuscript in 1982. Ten years and several subsequent drafts later, this excellent piece of work has finally been published, a boon to those of us interested in fossil insects (all six of us). The Lepidoptera occupy only 12 pages of this work, but the catalog of described species and the bibliographic citations (complete through 1983) are invaluable. There is also a concise summary of the evolutionary history of the insects as revealed by the fossil record.

Carter, David. 1992. **BUTTERFLIES AND MOTHS. THE VISUAL GUIDE TO OVER 500 SPECIES OF BUTTERFLIES AND MOTHS FROM AROUND THE WORLD.** Eyewitness Handbooks. Dorling Kindersley, Inc., 232 Madison Avenue, New York 10016. 304 pp., 600 color photographs. Flexbound, 15 x 22 cm, ISBN 1-56458-062-8. \$17.95.

[See review by Boyce Drummond in this issue of the NEWS.]

Chowdhury, S. N. 1992. **SILK AND SERICULTURE.** Directorate of Sericulture, Government of Assam, Guwahati-781 005, Assam, India. v + 206 pp., 29 figures (including 4 color photographs). Hardcover, 13 x 22cm, no ISBN, price unknown. Text in English.

A delightful book dealing with all aspects of culture of mulberry silk, including processing technology, and with additional chapters on wild silks such as muga, eri, and tasar (tussah). There are, moreover, chapters with details on history of silk production and commerce from its ancient origins in China, through the European markets (the ancient Silk Road till the present century), to international commerce in the world today. This volume has good balance between ancient and modern sericulture and between Asian and European involvement in the industry.

Common, I. F. B. 1990. **MOTHS OF AUSTRALIA.** Melbourne University Press.

UPDATE: This excellent book, recently reviewed in the Journal (Vol. 46, No. 4: 311-313) by Jerry Powell and Ric Peigler, was listed as costing \$150 Australian or about \$200 U.S. Although the U.S. dollar equivalent of \$150 Australian is only about \$102, the book is being marketed in the U.S.A. at prices ranging between \$150 and \$200 U.S. depending on the distributor. Fortunately, Professor Common informs me that the book can be ordered from the ANIC Bookshop, % CSIRO Division of Entomology, G.P.O. Box 1700, Canberra, A.C.T. 2601, Australia (phone 06 2464119), for \$112.50 Australian or about \$76.50 U.S. (plus postage and handling). This is good news for all lepidopterists as it makes this indispensable book much more affordable.

CSIRO Division of Entomology. 1991. **THE INSECTS OF AUSTRALIA. A Textbook for Students and Research Workers (2nd ed.).** Melbourne University Press, Carlton, Victoria

3053, Australia. 1137 pp., copious text figures. Hardcover, 2 volumes, ISBN 0-522-84454-5. \$168.75 Australian (about \$115.00 U.S.). Available from ANIC Bookshop, % CSIRO Division of Entomology, G.P.O. Box 1700, Canberra, A.C.T. 2601, Australia (phone 062464119).

Although the format of the first (1970) edition of this comprehensive work has been retained, knowledge about insects has greatly increased. All the original chapters have been entirely rewritten and substantially expanded and three new chapters have been included. This new edition is the work of more than 70 experts from around the world. Chapter 41, Lepidoptera (Moths and Butterflies) (pp. 817-915), is by Lepidopterists Society members E. S. Nielsen and I. F. B. Common.

Dennis, Roger L. H. (Ed.). 1992. **THE ECOLOGY OF BUTTERFLIES IN BRITAIN**. Oxford University Press, 200 Madison Avenue, New York, NY 10016. xii + 354 pp., numerous text figures. Hardcover, 20 x 25 cm, ISBN0-19-854025-6. \$86.00.

Eleven chapters by ten contributors pack this book full of interesting and useful information about the ecology and behavior of British butterflies, summarizing the wealth of new information generated since the publication of E. B. Ford's classic **BUTTERFLIES** in 1957. As with Ford's book, the dominant theme of this volume is evolution. The chapter titles are: (1) Islands, regions, ranges, and gradients; (2) Adult behaviour; (3) Eggs and egg-laying; (4) Butterfly populations; (5) Avoidance, concealment, and defense; (6) Monitoring butterfly movements; (7) Butterflies and communities; (8) Diversity within populations; (9) Case studies in evolution; (10) An evolutionary history of British butterflies; and (11) The conservation of British butterflies. The subject matter progresses from lower to higher levels of organization and complexity: from individual behavior and adaptations (chapters 2 & 3) to populations (chapters 4, 5, & 6) and communities (chapter 7), and finally to genetic and evolutionary theory (chapters 8-10).

[Currently being reviewed for the Journal.]

Fibiger, Michael. 1993. **NOCTUIDAE EUROPAEAE, VOLUME 2: NOCTUINAE II**. Entomological Press, Sorø, Denmark. 230 pp., 11 color plates, numerous range maps. In English and French in parallel columns. Hardcover, 22 X 29 cm, ISBN 87-89430-02-6. DKK 680 (about \$115 + postage). Distributed by Apollo Books, Kirkeby Sand 19, DK-5771 Stenstrup, Denmark.

This is the second volume of a comprehensive 12-part series (available to subscribers for a 10% discount) that will treat the entire noctuid fauna of Europe, which is better known than that of any other part of the world. Volumes I and II together cover the Noctuidae; Volume III will contain illustrations of male and female genitalia of this subfamily. In this volume, taxonomic and nomenclatural changes are numerous, and one new genus is described.

[To be reviewed in the Journal.]

Fiedler, Konrad. 1991. **SYSTEMATIC, EVOLUTIONARY, AND ECOLOGICAL IMPLICATIONS OF MYRMECOPHILY WITHIN THE LYCAENIDAE (INSECTA: LEPIDOPTERA: PAPILIONOIDEA)**. Bonner zoologische Monographien, Volume 31: 210 pp. Softcover, ISBN 3-925-382-33-X. DM 40.00 (about \$26.00) + ca. DM 5 postage. Order from Zoologisches Forschungsinstitut & Museum Alexander Koenig, Bibliothek, Adenaueralle 150-164, D(W)-5300 Bonn 1, Federal Republic of Germany.

This publication summarizes (in English) Dr. Fiedler's work to date on myrmecophilous Lycaenidae. Fiedler has published over 35 papers on this subject during the past six years, mostly in European journals and much of it in German, including his 1990 dissertation for the

University of Frankfurt.

[To be reviewed in the Journal.]

Heppner, J. B. & H. Inoue (eds.). 1992. **LEPIDOPTERA OF TAIWAN, VOLUME 1, Part 2: Checklist**. Association for Tropical Lepidoptera & Scientific Publishers, in cooperation with Taiwan Forestry Research Institute & Taiwan Museum. Order From Association for Tropical Lepidoptera, P.O. Box 141210, Gainesville, Florida 32614-1210. Softcover, 21.5 x 28 cm, 304 pp., color cover. ISBN 0-945417-77-2. \$29.95 (\$2.00 p&h in USA, \$3.50 elsewhere).

This catalog of the Taiwan butterflies and moths records all names, including synonyms, of the 3000 species described to date. A 50 page introduction gives a summary of Taiwan survey localities since 1981 and maps of Taiwan, the classification adopted (plus family/subfamily index), and an extensive bibliography of all major papers involving Taiwan species. This book is the result of several years work by over 30 authors and is the preliminary volume for the color-illustrated series to come.

[Currently being reviewed for the Journal.]

Inomata, Toshio. 1990. **KEYS TO THE JAPANESE BUTTERFLIES IN NATURAL COLOR**. Hokuryukan, 3-21 Kanda Nishiki-cho, Chiyoda-ku, Tokyo 101, Japan. In Japanese. 64 + 224 pp., 402 text figs., 103 color plates. Gold stamped hard cover with transparent wrap, slipcased; 15.5 x 21.5cm, no ISBN, 4800 Yen (about \$39.00 U.S.).

Lavishly illustrated, this beautifully produced book boasts 103 two-page color plates illustrating 1967 specimens that illustrate the range of variation found in Japan's 256 species of butterflies. For those who couldn't afford Inomata's earlier **ATLAS OF JAPANESE BUTTERFLIES** [see review by T. C. Emmel in *JLS* 44(1): 42-43], which sold for over \$700, this is an affordable alternative.

[Currently being reviewed for the Journal.]

Lane, C. P. 1992. **THE STATUS OF THE KARNER BLUE BUTTERFLY (*Lycaeides melissa samuelis*: Lycaenidae) and its associated plant resources in Minnesota, 1991**. Minnesota Department of Natural Resources Final Report. 38 pp. Available for \$2.00 (microfiche) or \$5.30 (photocopy) from Fish and Wildlife Reference Service, 5430 Grosvenor Lane, Suite 110, Bethesda, Maryland 20814-2158. Specify MIN 229280096, Newsletter 94, Article 44.

Malcolm, Stephen B. and Myron P. Zalucki (eds.). 1993. **BIOLOGY AND CONSERVATION OF THE MONARCH BUTTERFLY**. Natural History Museum of Los Angeles County, Science Series No. 38. Natural History Museum of Los Angeles County, Los Angeles, California 90007. 419 pp., 2 color plates, numerous B&W photographs and text figures. Hardcover, 18 X 26 cm, ISBN 0079-0943, \$90.00 (+ \$9.00 p&h; order from Museum Bookstore, Natural History Museum of Los Angeles County, 900 Exposition Boulevard, Los Angeles, California 90007).

"Everything you wanted to know about the Monarch but were afraid to ask" might make a good subtitle for this massive compilation of fascinating minutiae about America's favorite butterfly. Written by 50 contributors, this academic tome has 44 chapters organized into 10 sections. The section titles, with the number of chapters in parenthesis, are: Introduction (1), Systematics (1), Chemical Communication (3), Mating Behavior (3), Host Plant Use, Cardenolide Sequestration, and Defense against Natural Enemies (6), Physiological Ecology and the Annual Cycle (4), Migration (9), Overwintering Biology (8), Conservation (8), Conclusions (1).

[To be reviewed in the Journal.]

Minno, Marc C. & Thomas C. Emmel. 1993. **BUTTERFLIES OF**

THE FLORIDA KEYS. A Mariposa Press Edition by Scientific Publishers, P.O. Box 15718, Gainesville, Florida 32604. Hardcover (ISBN 0-945417-88-8; \$24.95) or Softcover (ISBN 0-945417-87-X; \$14.95), 22 x 28.5 cm, 168 pp., 29 color plates, 52 color figures and line drawings. Order from publisher (add \$2 postage per copy; \$3.50 outside USA).

Color plates and text photographs identify all 106 recorded species of butterflies and skippers from the Florida Keys and southernmost Florida (65% of all Florida species). Many species, especially skippers, have the life history illustrated, and there are 8 color plates of larvae. An extensive Introduction summarizes the climate, historical perspective, vegetation and plant communities, evolutionary ecology of the butterfly community, and conservation of the Florida Keys. The species accounts provide information under these headings: Description, Distribution, Natural History, Flowers Visited, and Status. A Check List, References, Glossary, and Index complete the volume.

[Currently being reviewed for the Journal.]

Pinratana, Brother Amnuay. 1992. **BUTTERFLIES IN THAILAND, VOL. 1 (PAPILIONIDAE AND DANAIIDAE)**, Third Revised Edition (photographs by A. Pinratana, text by J. N. Elliot, checklists by Y. Kimura). Distributed by Brother Amnuay Pinratana, St. Gabriel's College, Bangkok 10300, Thailand. 174pp., map, checklists, 92 color plates. Hardcover, 19 x 27 cm, no ISBN. \$33.00 U.S. (postpaid).

This is an updated version (with help from Col. John Eliot, England) of the first of the six volumes in the series on Thai butterflies published by the Brothers of St. Gabriel between 1977 and 1988. Well-produced, this book features superb color plates and many new butterfly records for Thailand, even in these two well-known families.

[Currently being reviewed for the Journal.]

Poinar, George O., Jr. 1992. **LIFE IN AMBER**. Stanford University Press, Stanford, California. 350 pp., 8 color plates, 147 B&W text figures, including 8 maps. Hardcover (with color jacket), 16 X 23.5 cm, ISBN 0-8047-2001-0. \$55.00.

Poinar's new book is a compendium of current knowledge about life forms preserved in amber. It surveys all groups, from microbes to vertebrates and plants, that have been reported from amber deposits throughout the world, beginning with the oldest pieces dating from about 300 million years ago. In addition to describing the formation of amber and the location, geological history, and early exploration of the major world amber deposits, Poinar discusses what amber fossils can tell us about evolution and speciation, cellular preservation, and paleosymbiosis. Lepidoptera known from amber include Micropterigidae, Eriocraniidae, Incurvariidae, Tineidae, Psychidae, Lyonetiidae, Oecophoridae, Elachistidae, Scythrididae, Symmocidae, Cosmopterigidae, Gelechiidae, Plutellidae, Yponomeutidae, and Tortricidae; butterflies are not well-represented, although there are reports of Papilionidae, Lycaenidae, and Riodininae.

Pyle, Robert Michael. 1993. **THE THUNDER TREE: LESSONS FROM AN URBAN WILDLAND**. Houghton Mifflin, New York. 220 pp. Hardcover, 14.5X 21.5 cm, ISBN 0-395-46631-8. \$19.95.

Lepidopterists are familiar with Bob Pyles' several books on butterflies, most notably the Audubon Society Field Guide to North American Butterflies and the Handbook for Butterfly Watchers, the latter recently revised and reissued in paperback by Houghton Mifflin. But the founder of the Xerces Society is also an excellent writer of natural history essays and his first collection, WINTERGREEN: LISTENING TO THE LAND'S HEART, won the coveted John Burroughs Medal for the best natural history book of 1987. Now comes his second book of essays, THE THUNDER TREE, in which he explores the Highline Canal, an irrigation ditch that snakes through the suburbs of Denver.

Weaving the long history of the canal with reminiscences of his boyhood days along its banks, Bob eloquently demonstrates how vital it is to reach out to the natural world wherever it is found and to strengthen our collective connection and commitment to it. And yes, butterflies figure significantly in these essays.

[Currently being reviewed for the Journal.]

Scoble, Malcolm J. 1992. **THE LEPIDOPTERA: FORM, FUNCTION AND DIVERSITY**. Natural History Museum Publications. Oxford University Press, 200 Madison Avenue, New York, NY 10016. xl + 404 pp., 321 text figures. Hardcover, 18 x 25 cm, ISBN 0-19-854031-0. \$78.00.

This book summarizes in one volume all major features of the order (except internal anatomy) and is intended for all those interested in the general biology and diversity of Lepidoptera. There are three parts to the book: Part I describes the functional morphology of adults and immature stages, with special attention paid to the organs of hearing, sound, and scent; Part II is a cursory overview of lepidopteran ecology (foodplants, pollination, predator/prey relationships, etc.); Part III provides a synopsis of every family of Lepidoptera, with paragraphs on diversity, adult morphology, immature stages, and biology for each entry. Although there is considerable overlap with I. F. B. Common's (1990) MOTHS OF AUSTRALIA, Scoble's book is worldwide in scope and includes butterflies and skippers as well as moths.

[To be reviewed in the Journal.]

Sedenko, Jerry. 1991. **THE BUTTERFLY GARDEN: CREATING BEAUTIFUL GARDENS TO ATTRACT BUTTERFLIES**. (Forward by Beth Callaway). A Running Heads Book. Villard Books, New York. 144 pp., numerous color photographs. Hardcover, 18.5 x 23 cm, ISBN 0-394-58982-3. \$25.00.

This attractive, non-technical book features profiles of 25 species of butterflies, with numerous crisp color photographs of all life stages, and with brief descriptions of adult and larval foodplants. The author's long experience as a gardener shows in the book's extensive listing of flowers, shrubs, trees, vines, and herbs guaranteed to attract a variety of species. These listings are arranged by flowering season and height and their creative use is suggested in two complete garden plans: one modest and one grand. Several appendices add to the usefulness of the book. These include: where to order plants by mail, public butterfly gardens to visit (6 are listed), how to locate the native plant society in your state, and a list of butterfly organizations. Sad to say, the latter listing has only four entries (Entomological Society of America, Young Entomologists' Society, Xerces Society, and the Lepidoptera Research Foundation) --- The Lepidopterists' Society was not among them! Suggestions for further reading [on butterflies (14 entries), butterfly gardening (3 entries), and general gardening (17 entries)], a USDA Plant Hardiness color map, and an index complete this short book.

Smith, Colin. 1993. **BUTTERFLIES OF NEPAL (CENTRAL HIMALAYA)**. Craftsman Press Company, Ltd., 487/42 Soi Wattanasilp, Rajprarob Road, Pratunam, Bangkok, Thailand. 380 pp., 643 species illustrated in color. Hardcover, 15 x 22 cm, ISBN unknown, \$60 U.S. (postpaid).

A field guide to all 643 species known from Nepal.

Smith, Collin. 1993. **ILLUSTRATED CHECKLIST OF NEPAL'S BUTTERFLIES**. Craftsman Press Company, Ltd., 487/42 Soi Wattanasilp, Rajprarob Road, Pratunam, Bangkok, Thailand. 96 ppl, 122 color plates. Softcover, 15 x 22 cm, ISBN unknown, \$20 U.S. (postpaid).

Illustrates 1375 butterfly specimens representing 673 species, sub-species, and forms.

Smith, Colin. 1993. **BEAUTIFUL BUTTERFLIES. A COLOURFUL INTRODUCTION TO NEPAL'S MOST BEAUTIFUL INSECTS.** Know Nepal Series No. 3. Craftsman Press Company, Ltd., 487/42 Soi Wattanasilp, Rajprarob Road, Pratunam, Bangkok, Thailand. 32 pp., color plates. Softcover, 15 x 22 cm, ISBN, \$5.00 U.S. (postpaid).

A very brief but colorful introduction for beginners to some of Nepal's showier insects.

Stanford, Ray E. & Paul A. Opler. 1993. **ATLAS OF WESTERN USA BUTTERFLIES, Including Adjacent Parts of Canada and Mexico.** Published and distributed by the authors, Denver and Fort Collins, Colorado (order from Ray E. Stanford, 720 Fairfax Street, Denver, CO 80220-5151). x + 275 pp., one foldout map, 1040 distribution maps. Softcover (comb binding), 22x 28 cm, no ISBN, \$17.00 (postpaid).

Based on the authors' extensive experience in the western U.S. over the past 45 plus years, and drawing on published records (from over 300 publications) and on extensive data shared by over 320 individuals, this book presents distribution maps for all species found in the United States west of the 100th meridian and in Mexico and Canada within 100 miles of the U.S. borders. A fold-out map that names all counties serves as key to the range maps, which are unlabeled and simply present one dot in each county in which a species is known to occur.

Stone, John L. 1992. **KEEPING & BREEDING BUTTERFLIES AND OTHER EXOTICA: PRAYING MANTISES, SCORPIONS, STICK INSECTS, LEAF INSECTS, LOCUSTS, LARGE SPIDERS AND LEAF-CUTTER ANTS.** Blandford, London (distributed in the U.S. by Sterling Publishing Co., Inc., 387 Park Avenue South, New York, NY 10016-8810). 192 pp., 16 pp. of color photographs, numerous B&W photographs & line drawings. Hardcover, 14.5 x 22.5 cm, ISBN 0-7137-2293-2. \$24.95.

The stated purpose of this short book is to provide the basic knowledge required to breed and care for a wide range of insects. Although there is an emphasis on butterflies (some 80 species are covered), no moths are included! The other groups for which rearing information is provided are scorpions, stick insects, leaf insects, praying mantises, locusts, leaf cutting ants, and large spiders. For each species there are three entries: Distribution, Foodplant, and General Notes, in which basic features of the life history of the insect are described. Actual rearing suggestions are summarized in a separate chapter that covers both temperate and exotic (i.e., non-European) species.

[To be reviewed for the NEWS.]

Wright, Amy Bartlett. 1993. **CATERPILLARS: A Simplified Field Guide to the Caterpillars of Common Butterflies and Moths of North America.** Peterson First Guides. Houghton Mifflin Company, New York. 128 pp. 54 color plates, several line drawings. Softcover, 9.5 X 18.5 cm, ISBN 0-395-56499-9. \$4.95.

Here is the first and only popular guide to North American caterpillars, in which 120 common species of lepidopteran larvae are illustrated in color, along with their adult forms and many of their hostplants. The author/artist studied scientific illustration at the University of Maryland and at the Smithsonian Institution. She has illustrated several books on insects and gardening and contributed many of the illustrations for E. O. Wilson's most recent book, *The Diversity of Life*.

[To be reviewed in the NEWS.]

Anyone with knowledge of publication of new titles of books, videotapes, or audiotapes of interest to lepidopterists, and especially of books published outside the United States, are requested to send full particulars to the Book Review Editor of the Journal, both for inclusion in this column and to allow for timely review in the Journal. Publishers are invited to send review copies directly to the Book Review Editor for consideration for review in the Journal. Members interested in reviewing books for the Journal should send their requests or interests to:



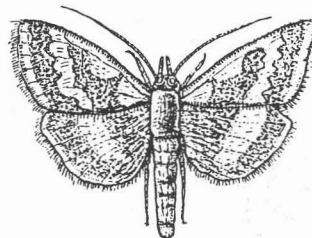
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BOOK REVIEWS

Carter, David. 1992. **BUTTERFLIES AND MOTHS. THE VISUAL GUIDE TO OVER 500 SPECIES OF BUTTERFLIES AND MOTHS FROM AROUND THE WORLD.** Eyewitness Handbooks. Dorling Kindersley, Inc., 232 Madison Avenue, New York 10016. 304 pp., 600 color photographs. Flexbound, ISBN 1-56458-062-8. \$17.95. (Also available in hardbound).

David Carter has worked at the Natural History Museum, London, for 29 years and is manager of the National Collection of World Moths. Best known, perhaps, for his work on caterpillar biology, Carter is author of the *OBSERVERS' BOOK OF CATERPILLARS* and *COLLINS' FIELD GUIDE TO THE CATERPILLARS OF BRITAIN AND EUROPE*. Here he uses his talents to produce one of the attractively designed natural history survey books published as the series called *Eyewitness Handbooks* (in addition to *Butterflies and Moths*, the series to date includes guides to *Rocks & Minerals*, *Shells*, *Fossils*, *Cats*, and *Trees*). Although this guide covers only about one third of one percent of the world's fauna, it is a good introduction to all major groups of Lepidoptera and is skillfully designed to indicate for each species: scientific and common names, distribution, habitat, time of flight, wingspan, and distinctive characteristics; brief notes on larval and adult biology are also included. All of this information is packed into a half-page of graphics, photographs, words, and symbols to give a succinct snapshot of the species that makes for easy comparison among the different groups of butterflies and moths. Succumbing to the usual bias toward bright colors and daytime habits, Carter devotes 151 pages to butterflies and only 109 pages to the much more numerous moths of the world.

Introductory material includes tips on distinguishing between butterflies and moths, the basics of lepidopteran life histories, conservation considerations, suggestions for observation, rearing, and butterfly gardening, and a concise explanation of zoogeographical regions of the world. A glossary and index complete the guidebook, which lists Society member Paul Opler as the U.S. Consultant.



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Research Notices



Arctiid Research WANTED: Ova, larvae, pupae, or adult Arctiidae for Behavioral Research, especially *Cosmosoma myrodora*, *Syntomeida ipomoeae*, and *Composia fidelissima*. Will buy or trade for Ecuadorian arctiids (papered). Please contact Bill Conner, Department of Biology, Wake Forest University, Box 7325 Reynolda Station, Winston-Salem, NC 27109. Phone 919-759-5023. FAX: 919-759-6008.

REQUEST FOR INFORMATION - Seeking insect stories:

The BBC Natural History Unit in Bristol, UK has recently embarked on a major new six-part series exclusively about insects. The series will take a "science fiction" style look at the alien world of insects. Visually stunning computer effects mixed with live action are one strength of the series. The other is provided by the insects themselves - extraordinary creatures carrying on extraordinary lives, most of which have never been previously filmed.

Our aim is to seek out the most new, exciting and bizarre insect stories to include in six programmes with the following themes: - insect design, reproduction, feeding, migration and dispersal, social insects and man/insect interactions. We are particularly keen to film mass migrations of butterflies other than the famous Monarch Butterflies of Mexico. We would therefore be pleased to hear from anyone who either has some good insect stories or could notify us of any visually spectacular butterfly migration they may be observing that we could get to quickly to film. If you are able to help with either of these requests please contact: Wendy Darke (Tel: 44 272 742164) or Ian Gray (Tel: 44 272 742428) FAX no: 44 272 237708. BBC Natural History Unit, Broadcasting House, Whiteladies road, Bristol, BS8 2LR, UK.

Skippers WANTED for genitalia photography. I am dissecting and photographing the genitalia of male North American (primarily N of Mexico) skippers, with a view to preparing a book on the subject. If you will send pinned or papered specimens, I will return them, intact except for part of the abdomen, together with the dismantled genitalia preparation (uncus, valvae, etc.) and an 8" X 10" photograph of the preparation in successive stages of dissection. Alternatively, we can exchange. For a list of skippers that I already have and therefore don't need, and an exchange list (mostly Western US), contact Roderick K. Clayton, 4176 Inglewood Blvd. Apt. 9, Los Angeles, CA 90066.

The 44th Annual Meeting of The Lepidopterists' Society will be held at Colorado State University, Fort Collins, Colorado from Thursday, 8 July thru Sunday 11 July 1993, hosted by the Department of Entomology. The Pacific Slope Section of the Society, the High Country Lepidopterists, and possibly the European Lepidopterists' Society will hold their meetings in conjunction. The Idalia Society is sponsoring the meeting, and the Xerces Society will hold its annual meeting concurrently. The officers and the council of the Societas Europaea Lepidopterologica have been invited to participate in the program. The pre-registration form, highlights and additional information is in NEWS #1, 1993.

Highlights were revealed in previous issues of the NEWS!

5th European Congress of Entomology will be hosted by the Royal Entomological Society, 29 August through 2 September 1994 at the University of York, United Kingdom. Broadly interpreted themes include: Insect life histories; Habitat management, creation & restoration, Population processes & spatial dynamics, Biodiversity: Does taxonomy matter?, Management of pests & beneficial insects and Insects as indicators of environmental quality. Offers of papers and workshops welcome. The European Congress takes place at four year intervals and is the only forum to cover Entomology in its widest sense across Europe. For details and further mailings contact IFAB Communications, Institute for Applied biology, University of York, York YO1 5DD, UK. Phone: +44 (0)904 432940 FAX: +44 (0)904 432917

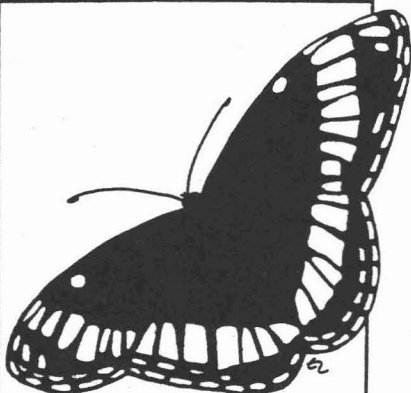
An international symposium "Ecology and Conservation of Butterflies" will be held 10-12 September 1993 at Keele University, Staffordshire, U.K. Speakers include Phil DeVries, Paul Opler, Ernie Pollard, and Tim New. For details write to Dr. A.S. Pullin, Department of Biological Sciences, Keele University, Staffs ST5 5BG, UK.

The 4th National Pesticide Conference is scheduled for 1-3 November 1993 in Richmond Virginia. For more information contact Diana L. Weigmann, Conference Director, Virginia Water Resources Research Center, Virginia Polytechnic Institute & State University, 617 N. Main Street, Blacksburg, VA 24060-3397. (703) 231-6673.

1994 - The 9th European Congress of Lepidopterology is scheduled for 5 - 9 September 1994. The Congress will be held at "Lednice na Morave", Czechoslovakia.

Forthcoming Meetings

LEPIDOPTERISTS' SOCIETY
44th Annual meeting



fort collins, colo.

Corrections and Minor Changes to the 1992 Membership Directory



(make appropriate changes in Alphabetical List of Members)

HARRINGTON, DON: change street address to "One Nature Place"; FAX: (214) 548-9119.

HOLDEN, LANSING: change apartment number to "#G-14"



New & Reinstated Members

(NOT included in 1992 Membership Directory; all in U.S.A. unless noted otherwise)

ANDERSON, BOB: Box 3, Sandy Hook, Manitoba R0C 2W0, CANADA.

ANDERSON, ERIK WM.: 215 Pembroke Road, Naperville, IL 60540.

BARD, ALANA H.: 3151 South Babcock Street, #186, Melbourne, FL 32901.

BERMAN, EVAN: 1541 West 22nd Street, Miami Beach, FL 33140.
 BLEVINS, BRIAN: 2003 East 12th Street, Davenport, IA 52803.
 EBERT, HELEN M.: 57 Cleft Rock Road, Levittown, PA 19057.
 EGBERT, ROBERT (Dr.): Box 438, College Heights, Alberta T0C 0Z0, CANADA.
 FOO, T.L.: Universal Hobbies, P.O. Box No. 0845, Ang Mo Kio Central, SINGAPORE 9156.
 GARRAWAY, ERIC (Dr.): Dept. of Zoology, University of the West Indies, Mona, Kingston 7, JAMAICA.
 GATSCHET, TIM (M.D.): P.O. Box 189, Victoria, KS 67671-0189.
 GRANT, BRUCE (Dr.): Department of Biology, College of William & Mary, P.O. Box 8795, Williamsburg, VA 23187-8795.
 HARRISON, T.L.: 534 North 7th Street, Charleston, IL 61920.
 HAYWOOD, JANET M.: 9802 Bloomfield Street, #29, Cypress, CA 90630-3474.
 HUFFMAN, NOAH: Rural Route 01, Box 128, Bennett Hill Road, Central Lake, MI 49622.
 JANSEN, BILL: 257 Santa Monica Way, Santa Barbara, CA 93109.
 KAY, MARC A.: 4111 25th Street West, Bradenton, FL 34205.
 KLIMOVA, TATIANA A.: 4020 Tanglewood Trail, Chesapeake, VA 23325.
 LAMOND, BILL: 2 High Street, #2, St. George, Ontario N0E 1N0, CANADA.
 McCULLOUGH, JEAN: 2442 Belvoir, Cleveland, OH 44121.
 MIKULA, RICK: Hole-in-Hand Butterfly Farm, 147 West Carleton Avenue, Hazelton, PA 18201.
 MILLER, SANDRA: 4111 25th Street West, Bradenton, FL 34205.
 MROZINSKI, IRIS: 501 Alan Drive, New Lenox, IL 60451.
 MULLIN, JACK: 100 Woodlawn, #4, Geneva, OH 44041.
 ORSAK, LARRY: Christensen Research Center, P.O. Box 305, Madang, PAPUA NEW GUINEA.
 OSBORNE, KEN H.: 250 River Street, #422, Santa Cruz, CA 95060.
 PARKER, RON: 59 Knox Court, Denver, CO 80219.
 PARKINSON, GAYLORD: 1428 Robbins Street, Santa Barbara, CA 93101.
 PETERSON, HAROLD: 5086 Shields Road, Holly, MI 48442.
 PETERSON, MERRILL A.: Section of Ecology and Systematics, Corson Hall, Cornell University, Ithaca, NY 14853-2701.
 PICKETT, STEPHEN C.: 428 East 11th, Dumas, TX 79029.
 PRIMMER, ERNEST C. (D.D.S.): 4225 Glass Road, NE, Cedar Rapids, IA 52402-2547.
 QUINN, MICHAEL A.: P.O. Box 194, Snook, TX 77878-0194.
 REUTER, RAYMOND: 7414 Gatewood Drive, Crestwood, KY 40014.
 RIGGS, KEITH: Rural Route 04, Box 33, Great Bend, KS 67530.
 RITTNER, OZ: 5 Davidson Street, Rishon-le-Zion, ISRAEL 75357.
 ROSE, H.S. (Dr.): Department of Zoology, Punjab University, Patiala, Punjab, INDIA.
 SIMPSON, NANCY: 4327 Rio Vista Avenue, Sacramento, CA 95821.
 SMITH, SCOTT JAY: 2752 Leonard Ried Avenue, Sarasota, FL 34234.
 STAPLES, JOHN E.: 389 Rock Beach Road, Rochester, NY 14617-1316.
 TOOT, JAMES ALLEN: 6841 Day Drive, #726, Parma, OH 44129-5450.
 VAN SCHAİK, PIETER: P.O. Box 441, Cavendish, VT 05142.
 WARREN, TOM: 2210 Cornell Drive, Riverview, FL 33569.
 WEISSMANN, MICHAEL J.: Rocky Mountain Butterfly Consortium, P.O. Box 377, Westminster, CO 80030-0377.
 WESTWOOD, A.R. (Dr.): 118 River Pointe Drive, Winnipeg, Manitoba R2M 5P1, CANADA.
 WILLIAMS, RACHELA.: Rocky Mountain Butterfly Consortium, P.O. Box 377, Westminster, CO 80030-0377.
 WOLF, AMY: 1140 Dousman, Green Bay, WI 54303.
 WOLF, RANDY: 3340 Providence Drive, Suite 363, Anchorage, AK 99508.

DAVISON, ROBIN: 3316 Massey Road, Everson, WA 98247.
 ESTES, BILL: 3706 Pyle Road, Chadds Ford, PA 19317.
 HARDBARGER, ROBERT J. (Capt.): HHC/12th EN BN, Unit #29733, Box #593, APO AE 09028.
 JOHNSON, ELIZABETH: 167 Little York-Mt. Pleasant Road, Milford, NJ 08848.
 LACEY, WILLIAM: 2502 North 49 Avenue, Omaha, NE 68104.
 MIKKOLA, KAURI (Dr.): Finnish Museum of Natural History, P.O. Box 17, P. Rautatiekatu 13, SF-00014 University of Helsinki, FINLAND.
 MUISE, GREGORY D.: 817 Aero, Schertz, TX 78154.
 NAUMANN, STEFAN: Motz Strasse 56, 1000 Berlin 30, GERMANY.
 OLSON, WALTER L. (M.D.): 122 Royer Court, Louisville, KY 40206.
 PEDERSEN, TORBJORN: P.O. Box 4095 Aspoy, 6021 Alesund, NORWAY.
 RANKIN, LAURA: 217 84th Street, Holmes Beach, FL 34217.
 ROMAN, STEPHEN J.: 5335 Oxbow Place, Champlin, MN 55316-3561.
 SAVIGNANO, DOLORES A.: 252 West Street, #15, Amherst, MA 01002.
 SYME, PAUL D. (Dr.): 49 Huntington Park, Sault Ste. Marie, Ontario P6A 3P3, CANADA.
 TURNER, TOM (Dr.): 2321 State Road 580, Clearwater, FL 34623-1134.
 WELLES, SUSAN J. (Dr.): Department of Entomology, 219 Hodson Hall, University of Minnesota, St. Paul, MN 55108-6125.
 WENZKE, JOHN J.: 2121 East Philadelphia Street, York, PA 17402.

The Market Place

Buy • Sell • Exchange • Wants



BUY - SELL - EXCHANGE: POLICY STATEMENT

Items submitted for inclusion in this section are dealt with in the manner set forth on page 20 of the Jan/Feb 1993 NEWS. Please note that in keeping with the guidelines of the Society, henceforth no mention of any species on any threatened or endangered species list will be accepted in these items. This will include all Ornithopterans now and for the foreseeable future. Items will be accepted from members only and will be printed only once unless entry in the maximum of two successive issues is requested. Please keep items short. A maximum of 100 words is allowed. SASE in an ad stands for self-addressed stamped envelope. Ads may request bids by mail on a time-limited "best-offer" basis. OBO in an ad stands for "or best offer". For example: "Watching Washington Butterflies, by Pyle, 1974. \$10 OBO received by 1 Dec 1992".

The Society, as always, expects all notices to be offered in good faith and takes no responsibility for the integrity of any advertiser. Any disputes arising from such notices must be resolved by the parties involved outside of the structure of the Society. However, aggrieved members may request information from the Secretary regarding steps which he/she may take in the event of alleged unsatisfactory business transactions.

Note: U.S. Department of Agriculture (USDA) may require permits for transport of live lepidoptera in any stage. Please inquire.

SEARCHING FOR TWO BOOKS: *ILLUSTRATIONS OF THE ZYGAENIDAE AND BOMBYCIDAE OF NORTH AMERICA*, R.H. Stretch, 1872, San Francisco. *AN ANNOTATED CATALOGUE OF THE BUTTERFLIES OF NEW HAMPSHIRE*, by William F. Fiske - Durham - New Hampshire College Agricultural Experiment Station Technical Bulletin #1, 1901. Best price paid, all letters answered. Contact: Louis Hanfield, 133 Messier #301, Mont St-Hilaire, P.Q., CANADA J3H 2W8. Phone 514-467-2091. FAX: 514-467-3745.

FOR SALE: Ova: *A. io*, *A. luna*, *A. polyphemus*, *C. promethea*, *C. regalis*, *E. imperialis*, *H. cecropia*, *H. euryalis*, *H. gloveri*, *S. cynthia*, and *S. pyri*. Others are possible. Send SASE to Mark Schmidt, 8780 Red

Address Changes

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

BRINKMAN, BARTON B.: 16839 West 14th Place, Golden, CO 80401.



Lion-Five Points Rd., Springboro, OH 45066. Willing to trade.

WANTED: Contact with persons who were on ANY serpentine area in the San Francisco Bay Area (esp. Santa Clara Co.), observing or collecting insects in March or April. Building a database of positive/negative observations to compare to current presence/absence and current ecological site conditions. Older information most valuable. Map showing outcrops & roads available. Please call or write: Raymond R. White, 788 Mayview Avenue, Palo Alto, CA 94303. Day 408 263-1814; Eve 415 493-5070.

FOR EXCHANGE: Back volumes and numbers of the *Entomological News* to trade for same needed to complete my set. Send SASE for list of oferta/desiderata to Roderick R. Irwin, Rural Route 3, Streator, Illinois 61364.

FOR SALE: Saturniidae of Guatemala. Genera: *Lonomia*, *Diphiopsis*, *Eacles*, *Copaxa*, *Antheraea*, *Automeris*, *Citheronia*, *Rothschildia*, including *Diphiopsis wolffi* Lemaire, 1992; *Copaxa sophronia* female, and red phase male (new) and *C. escalanti*. Contact Bob Natalini, 118 Old Spies Church Rd., Reading, PA 19606 USA. Phone (215) 370-0817.

WANTED: Contact with Mexican collectors or breeders of Saturniids who might be able to supply me with ova, cocoons and or dried specimens of the following moths *Antheraea polyphemus oculea*, *Antheraea godmani*, *Antheraea montezuma* and others. Lenny Hicks, Route 3 Box 758, Banner Elk, NC 28604.

FOR SALE: Large selection of Coleoptera - Lucanidae. I have about 5000 specimens of worldwide Lucanidae (400 species). Please write for free lists. Sell, Buy Exchange. Uwe Eger, P.O. Box 100604, D - 4630 Bochum 1, Germany. Phone & Fax: 0234/705164

FOR SALE OR EXCHANGE: Ova of *Antheraea polyphemus*, *Actias luna*, *Automeris io*, *A. pernyi*, *Hyalophora cecropia*, *H. columbia*, *H. euryalis*, *Callosamia promethea*, *Papilio troilus* and some other species as well. SASE to Mark A. Howe, RR#1, Box 217, North Horseshoe Drive, Lake Village, IN 46349

FOR SALE OR TRADE: Pupae of North American butterflies. *Papilio cresphontes*, *P. glaucus*, *P. polyxenes*, *Polygonia interrogationis*, *Danaus plexippus*, *D. gillippus*, *Agraulis vanillae*, *Epargyreus clarus*, *Phoebis sennae*, *Euptoieta claudia*, and more. Send SASE for list. Dale Clark, 11518 Desdemona Drive, Dallas, Texas 75228.

FOR SALE: Male *Morpho eugenia*. Taken 1-6-92 in French Guiana. Specimen is unpinned and papered. body is intact. Full collecting data. Slight damage. SASE for photograph. Send offers to Michael Lockwood, 215 Hialeah Ave., Houma, LA 70363.

FOR SALE: Custom made Insect Labels! Send the information and I will print the labels. Depending on amount of information, a sheet of Index Stock can produce more than 300 labels. Printed on Mohawk Superfine Index Stock, made from the purest high alpha fibers and is acid free. Accelerated aging tests indicate permanence in excess of 300 years. Will not bleed in alcohol, but should not be placed into hydrocarbons commonly used for degreasing. Price \$2.00 per sheet including shipping and handling. Minimum order \$10.00. Write: Hiltrud Webber, Rt #3, Box 334-B, Cabool, MO 65689 Call: (417) 962-4375.

FOR SALE: Limited number of reared *Papilio indra fordii*, *P. polyxenes coloro*, *Euphydryas chalcedona corralensis*, *E. c. kingstonensis*, *Chlorostyrimon simaethis sarita*, and other Southern California butterflies. Send SASE for more information. Bids are being accepted on above named specimens. Sam Sun, 1521 Joseph Court, La Habra, CA 90631

FOR SALE: Large selection of Iranian butterflies with perfect quality & data. *All. louristana* spp; *Hyp. helios bushirica*, *A. apollinaria*, *P.*

alexanor, etc.; plus many interesting species from other families with fair prices. Many local rare species are allowed. Write or call for my free large price list. Wazrik Nazary, 33 Barati 92d. sq. west 46 meters Narmak, Tehran 16459 IRAN. Telephone (021) - 7838234.

FOR SALE: Bait traps in two forms. Inquire Wm. Ward, 1474 Melbourne Dr. SE, Girard Ohio 44420-1332 or phone 216-539-5374.

FOR SALE/EXCHANGE: Over 25 species of worldwide Saturniidae available as ova or pupae in 1993 season. Livestock will include: cocoons of *C. hercules*, *A. atlas*, *A. mimosae*, *A. mylitta*, *A. selene*, and ova of *A. artemis*, *A. excreta*, *A. naranja*, *C. brissottii*, *L. katinka* and many more. Please send for current list, prices and further details. Neil Naish, 105 Warminster Road, Chitterne, Nr Warminster, Wiltshire, BA12 0LH, United Kingdom. Telephone: 0985 50536 FAX: 0985 50042.

FOR SALE OR TRADE: I have many papered specimens of lepidoptera from the southwest United States, including *Antheraea polyphemus oculea*, and *Pterourus multicaudatus*, which I would like to sell or trade for Saturniidae and Papilionidae from other areas. Send SASE for list. If interested in trading, please include species and condition of same with first letter. Send to James McMillion, P.O. Box 1324, Pine, AZ 85544, USA.

FOR TRADE ONLY: I have a set of The Butterflies of the Eastern United States and Canada with Special Reference to New England, by S.H. Scudder, 1889, 3 volumes 1958+ pages with 89 plates. I would like to TRADE for The Butterflies of North America, by W.H. Edwards, 1862-1897, 3 volumes 1006 pages with 151 plates. If you have a set of Edwards, and are interested in this offer, please contact: Jim Wiker, R.R. #1, Box 244, Athens, IL 62613. Phone (217)-636-7044.

FOR SALE: About 25 books dealing with Lepidoptera, mostly North American. Includes Scudder's Butterflies of Eastern North America (3 volumes). Many hard to find titles included. Send SASE for list. J.R. Heitzman, 3112 Harris Ave., Independence, MO 64052.

FOR SALE: California Academy Cabinet and 24 drawers for sale. Excellent condition and at a bargain price. J.R. Heitzman, 3112 Harris Ave. Independence, MO 64052.

FOR SALE: *Goliathus albosignatus*, *Goliathus kirkianus*, *Chiasognathus pygmaea*, *Chiasognathus mniszcehi*, *Sphenognathus monguilloni*, *Lamprina micardi*, *Lucanus fortunei*, *Prosopocoilus dubernardi*, *Cheloderus peñai*. Chris Adamson, 5010 Solano Ave., Richmond, CA 94805

WANTED: Ova of *S. cynthia* needed for rearing in May or June. Prefer wild strain from *Ailanthus* food plant. Please send price per 100 ova and availability to James Romer, 7991 E. Hampden Circle, Denver, Colorado 80237.

FOR SALE: Butterflies of the Caucasus, Vol. 1 by Nekrutenko, \$50.00; Butterflies of Borneo, Vol. 1 by Otsuka, \$60.00; Butterflies of Laos by Motono, Negishi and Takakura, \$65.00. Contact: R.T. Shannon, 1/24 Lauderdale Rd, Birkdale, Auckland 1310, New Zealand.

WANTED: I'd like to exchange/sell material from Spain, Taiwan, Philippines, Brazil, Peru, and Europe for material from South Africa (and African Region), Oriental Region (India, Indonesia...), North America and Neotropical Region (Bolivia, Trinidad, Tobago, West Indies...). I rear and photograph also. I am interested in livestock also. Contact Mr. Jose A. Alfaro, C/Rey Francisco 29, 4^o C, 28008 Madrid, Spain.

FOR SALE: Large selection of butterflies and beetles from diverse regions of the former USSR, many rarities available. I specialize in butterflies: Papilionidae, Collanidae, Pierinae, Satyridae; moth: Sphingidae; coleoptera: Carabidae, Cicindelidae, Potosia, Dorcadion,

but have many other families. Write or call for price list. Tatiana Klimova, 4020 Tanglewood Tr., Chesapeake, VA 23325, USA, telephone/fax 804-440-1913.

FOR SALE: Cornell drawers in cabinet. SASE for information. Russell A. Rahn, 3205 W. Rochelle Road, Irving, TX 75062.

FOR SALE: A large collection of tropical butterflies, moths and beetles. A select collection set in glass covered drawers in cabinets that are 5 ft. high. Drawers are 18 in X 18 in X 3 in. There are a total of 12 cabinets in all. Contact Elmer L. Griepentrog, Elsie Rt., Box 740, Seaside, OR 97138. Phone: (503) 755-2259.



MEMBER'S COMMERCIAL NOTICES

TRANSWORLD BUTTERFLY COMPANY, Apartado 6951, 100L San Jose, Costa Rica, Central America. LATEST 12-PAGE WORLDWIDE ILLUSTRATED LEPIDOPTERA CATALOG: Includes Neotropical, African, Palearctic and Indo-australian region butterflies. Many expupae species available. Specialists in Morphidae, Brassolidae and Papilionidae. ENTOMOLOGICAL & NATURALIST TOUR PROGRAMS AVAILABLE. Transworld Butterfly Company celebrates 16 years serving Lepidopterists in December 1992. Latest catalog \$1 or one year's monthly lists via airmail \$6.

IANNI BUTTERFLY ENTERPRISES, PO Box 81171, Cleveland, Ohio 44181, USA. Phone: (216) 888-2310. *LICENSED BY THE US FISH & WILDLIFE SERVICE. Easy to read price lists offer worldwide butterflies, moths, beetles and other unmounted insects in all families and in all price ranges! Personalized service to all - including new hobbyists! Specialties include *Papilio*, *Morpho* (including females), *Heliconius* (including intergrades and hybrids). SUPERIOR QUALITY! PROFESSIONAL INSECT IDENTIFICATION! ACCURATE DATA! DOUBLE BOXING provides safety in transit! ALSO FOR SALE: Austria's finest quality Insect Mounting pins: economical Standard Imperial, Stainless Steel, & double-coated Elephant. BEST PRICES, FASTEST DELIVERY! Send \$5 (\$10 foreign) for 1 year price list subscription.

HARALD SCHMITZ, FAZENDA RANCHO GRANDE, CAIXA POSTAL 361, 78932000 ARIQUEMES, RONDONIA, BRASIL. FAX 0055 69535 4301. The FAZENDA RANCHO GRANDE in central Rondonia, Brasil, offers you a real paradise of insects, birds and mammals for private hobby collecting and photography. NO COMMERCIAL COLLECTORS! We offer 4,375 acres of Rain Forest with 20 miles of trails. German administration, cold drinks. English, German, Spanish and Portuguese spoken. No Malaria, No Cholera. To assure you the finest service, we will accept groups no larger than 12 participants. NO COMMERCIAL COLLECTING BY ATTENDEES WILL BE PERMITTED! Write or FAX for more information.

MIGUEL SERRANO, Tropical Butterflies of America - 6823 Rosemary Drive, Tampa, Florida 33625 USA - specializing in tropical American butterflies, moths, beetles and other spectacular insects from tropical areas of the world. Send \$2 for comprehensive lists with color plate.

Unique Sign

I'm certain that only a lepidopterist can appreciate this sign, which is located on state highway M-40 near the intersection with M-60 in Cass County, in southwestern Michigan. Perhaps as interesting and coincidental is that both communities are located within the range of the Zebra Swallowtail, *Eurytides marcellus*, and its foodplant Pawpaw, *Asimina triloba*, both of which are found in this area. I have driven past this sign for many years and thought perhaps other lepidopterists would find this sign interesting.Mo Nielsen.



Mo Nielsen and "lepidopteral" sign (5 August 1989).

From: The Lepidopterists' Society
Allen Press
P.O. Box 368
Lawrence, KS 66044

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John A. Snyder
Department of Biology
Furman University
Greenville, SC 29613-0001

1725

DEADLINES: Material for the Jan/Feb issue should reach the NEWS EDITOR by 1 Dec of the previous year, and that for the Mar/Apr Issue by 15 Feb, for the May/June issue by 15 Apr and for the July/Aug issue by 1 June, the Sept/Oct issue by 15 Aug and the Nov/Dec issue by 15 Oct. Reports for the Season Summary must reach the Zone Coordinators listed on the front cover no later than 5 January. The NEWS Editor accepts articles in any format, but appreciates double-spaced typewritten copy accompanied by a computer disc in any DOS format. NEWS EDITOR is Stephanie McKown, 650 Cotterell Drive, Boise, Idaho 83709, USA. Phone (208) 323-9547. NEWS FROM EUROPE EDITOR is W.O. De Prins, Diksmuidelaan 176, B-2600 Antwerpen, Belgium. Phone 03/322.02.35 (from USA use 011/32.3.322.02.35). BOOK REVIEW EDITOR is Dr. Boyce A. Drummond, Natural Perspectives, P.O. Box 9061, Woodland Park, Colorado 80866, USA. Phone (719) 687-6596.

INFORMATION ABOUT THE SOCIETY.....

Membership in the Lepidopterists' Society is open to all persons interested in any aspect of Lepidopteroogy. Prospective members should send the TREASURER, Robert J. Borth, 6926 N. Belmont Lane, Fox Point, WI 53217, USA, phone (414) 351-3816, the full dues for the current year, \$25.00 US, together with mailing address and a note about areas of interest in Lepidoptera; student membership (must be certified) \$15; sustaining membership \$35; life membership \$500. Remittances must be in US dollars, payable to the Lepidopterists' Society. All members will receive the JOURNAL (published quarterly) and the NEWS (published bimonthly). A biennial membership directory will comprise the last issue of the NEWS in even-numbered years.

Changes of address (permanent ones only), Additions or Changes in Telephone Numbers or Areas of Interest and Information about Mailing List Rental: Contact the ASSISTANT SECRETARY, Julian P. Donahue, Natural History Museum of Los Angeles County, 900 Exposition Blvd, Los Angeles, California 90007-4057, USA.

Information on Membership and other aspects of the Society must be obtained from the SECRETARY, Dr. William D. Winter, Jr., 257 Common Street, Dedham, Massachusetts 02026-4020, USA. Home phone (617) 326-2634.

Requests for Missed Issues (i.e. those not delivered although dues have been paid on time) should be sent to the TREASURER, Robert J. Borth, address above, or the PUBLICATIONS MANAGER, Ron Leuschner, address below. Defective issues will also be replaced by the TREASURER. Do not request these of the NEWS or JOURNAL editors.

Manuscripts submitted for publication in the JOURNAL are to be sent to Dr. John W. Brown, EDITOR, JOURNAL of the Lepidopterists' Society, San Diego Natural History Museum, P.O. Box 1390, San Diego, California 92112, USA. Work phone (619) 942-5147, home phone (619) 422-1846. See the inside back cover of a recent issue of the JOURNAL for editorial policies. Book reviews for the JOURNAL should be sent to Dr. Boyce A. Drummond, Book Review Editor (address above).

AVAILABLE PUBLICATIONS OF THE SOCIETY.... Order from the PUBLICATIONS MANAGER, Ron Leuschner, 1900 John St., Manhattan Beach, CA 90266-2608, USA. Add \$2.00 postage/handling for first book (\$3.00 outside the USA), plus \$1.00 for each additional one.

CATALOGUE/CHECKLIST OF THE BUTTERFLIES OF AMERICA NORTH OF MEXICO (Memoir #2), Lee D. Miller & F. Martin Brown; includes references to original descriptions and location of type specimens. Members and subscribers: \$12 cloth, \$7 paper; non-members, \$19 cloth, \$10.50 paper.

SUPPLEMENT TO THE CATALOGUE/CHECKLIST OF THE BUTTERFLIES OF AMERICA NORTH OF MEXICO (Memoir #3), Clifford D. Ferris, editor. General notes, plus corrections and additions to the original Memoir #2. Members and subscribers: \$6; non-members \$10.

FOODPLANTS OF WORLD SATURNIIDAE (Memoir #4), Steve Stone. A listing of foodplants for more than 500 species of worldwide Saturniidae. Members and subscribers: \$7.20; non-members: \$12.

COMMEMORATIVE VOLUME, 1947-1972: A 25-year review of the Society's organization, personnel, and activities; biographical sketches; JOURNAL 25-year cumulative index by author, subject, and taxon; clothbound. Members and subscribers, \$8; non-members, \$12.

1992 MEMBERSHIP DIRECTORY (current to October 1992). Biennial directory of members and their addresses, with geographic and interest indices. Not available for commercial use. (NEWS #6 for 1992). \$5.00.

BACK ISSUES of the JOURNAL and of the NEWS of the Lepidopterists' Society. For a list of the available issues and their cost, postpaid, send a SASE to the PUBLICATIONS MANAGER.

