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CORRECTIONS/REVIEWS OF 58 NORTH AMERICAN BUTTERFLY BOOKS

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Abstract. Corrections are given for 58 North American butterfly books. Most of these books are recent. Misidentified figures mostly of adults, erroneous hostplants, and other mistakes are corrected in each book. Suggestions are made to improve future butterfly books. Identifications of figured specimens in Holland's 1931 & 1898 Butterfly Book & 1915 Butterfly Guide are corrected, and their type status clarified, and corrections are made to F. M. Brown's series of papers on Edwards' types (many figured by Holland), because some of Holland's 75 lectotype designations override lectotype specimens that were designated later, and several dozen Holland lectotype designations are added to the J. Pelham Catalogue. Type locality designations are corrected/defined here (some made by Brown, most by others), for numerous names: aenus, artonis, balder, bremnerii, brettoides, brucei (Oeneis), caespitatis, calanus, callina, carus, colon, colorado, coolinensis, comus, conquista, dacotah, damei, dumeti, edwardsii (Oarisma), elada, epixanthe, eunus, fulvia, furcae, garita, hermodur, kootenai, lagus, mejicanus, mormo, mormonia, nilus, nympha, oreas, oslari, philetas, phylace, pratincola, rhena, saga, scudderi, simius, taxiles, uhleri. Five first reviser actions are made (albihalos=austinorum, davenporti=pratti, latalinea=subaridum, maritima=texana [Cercyonis], ricei=calneva). The name c-argenteum is designated nomen oblitum, faunus a nomen protectum. Three taxa are demonstrated to be invalid nomina nuda (blackmorei, sulfuris, svilhae), and another nomen nudum (damei) is added to catalogues as a "schizophrenic taxon" in order to preserve stability. Problems caused by old scientific names and the time wasted on them are discussed.

Introduction

Many books have been published on butterflies. Unfortunately, most of the authors of those books do not get experts to review their work before they publish it, so mistakes go uncorrected. Other mistakes inevitably appear because of production errors, the advance of knowledge, simple lapses, inaccessibility or absence of experts, and every other conceivable reason. Some mistakes were published long ago and were never corrected, and were later repeated in nearly every book, because authors tend to repeat what prior books wrote, even if it was wrong. Many old erroneous hostplants have been repeated endlessly for 100 or even 200 years. And certain charismatic theories spring up, and are repeated endlessly, even if they are wrong (such as eastern N.A. Lycaena phlaeas being an introduction from Europe, or Hesperia juba adults overwintering).

This work examines butterfly books that are popular or recently published, and reviews them, and especially attempts to correct mistakes, in particular misdeterminations of illustrations of butterflies, and errors in their hostplants, behavior, distribution, etc. Sometimes I suggest names of species and subspecies that I believe to be correct instead of the ones used. Subspecies names are sometimes difficult to apply, and for some subspecies I have examined few--sometimes zero—examples, so that some of my opinions here are subjective and may change. Progress marches on, and the names of many of our butterflies will change because of new research, and because of the relentless historical trend of splitting of genera and subspecies and even species. But I do my best here to review these books and correct errors, to aid those butterfly fanciers who want to know the truth and are trying to find it.

I did not have the time to find all the mistakes in these books, so I undoubtedly missed very many or even most of them. I tried hardest to check the identification of illustrated butterflies, and hostplants. I seldom read verbal descriptions of adults or verbal descriptions of ranges.

I haven't reviewed most of the "Butterfly Watching" books, which have exploded in number lately. Those books have very little new information of use to scientist-lepidopterists, as most "butterfly watchers" do not get new hostplants or discover and report new scientific information in a usable manner, because their hands-off ideology causes uncertainty of identification, and they mostly lack the desire to contribute scientific discoveries. Some of the major watcher books are reviewed though.

A Study in Lectotypes: 1) THE BUTTERFLY BOOK. W. J. HOLLAND. Revised Edition, 1931. Doubleday & Co., NY. 424 p., 77 pl. 2) THE BUTTERFLY BOOK. W. J. HOLLAND. 1898. Doubleday & McClure Co., NY. 382 p., 48 pl. 3) THE BUTTERFLY GUIDE. W. J. HOLLAND. 1915. Doubleday, Page & Co., N.Y. 237 p. Correct Identifications of Specimens on Plates and Determination of Type Status of Illustrated Specimens in all Three Books.

The Butterfly Book, by W. J. Holland, was an important book for most of the 1900s. It was first published in 1898, and was completely revised with 29 new plates in 1931. Page ix claims that over 65,000 copies were sold between those dates!, an incredible amount if true. It continued to sell into the 1960s, an amazing longevity for butterfly books. This longevity was evidently due to the color plates which illustrated numerous butterflies in pleasing fashion, and the lack of competing books, because the text contained very little information and was replete with errors and speculations. The best thing about the book is the little stories Holland wrote scattered through the text (listed as "Digression and Quotations" on p. xii), which are fascinating and often humorous (see p. 113, etc.--I think Holland had greater talent as a fiction writer than as a scientist.) However, the 1931 plates are important from a historical perspective, because many of the illustrations are of type specimens named by Henry Skinner, Herman Strecker, Holland, etc., and especially including type specimens of butterflies named by William Henry Edwards in the Carnegie Museum, and from other museums. Holland paid for the publication of vol. 3 of Edwards' Butterflies of North America, in exchange for Edwards' collection. Holland then stored the collection in his home cellar--where many specimens molded--and eventually deposited it in the Carnegie Museum, where Holland was the Director.

This section attempts to correct the identifications of all the specimens on the plates, and properly determine their type status (as holotype, lectotype, paralectotype, paratype, syntype, not a syntype, etc.). Often I was aided by clues provided by F. Martin Brown in his series of papers on William Henry Edwards' types (in Trans. Amer. Ent. Soc. vols. 90-113, from 1964 to 1987). Brown studied Edwards' specimens, which are mostly in the Carnegie Museum after being purchased by Holland, so many of those Edwards specimens were used by Holland for the plates in his three books. Lionel Paul Grey corrected the Argynnis (Speyeria) identifications for me in the early 1960s. In some cases, an examination of the actual specimen would be necessary to be certain of the identification (in some of the Erynnis, an examination of the genitalia would be necessary), but I have done my best to identify them, and have given Holland the benefit of the doubt in those cases in which the specimen could be either the species Holland thought it was or another very similar species.

This project was undertaken along with a study of Brown's papers concerning the types of butterflies named by William Henry Edwards (papers published in the Trans. Amer. Ent. Soc. from vol. 90 to 113)(some of the later papers were coauthored by Lee D. Miller and a few parts were authored by John C. Downey and Paul A. Opler & W. Reinthal). I found some errors and corrections in Brown's papers, including about a dozen corrections of type localities, which are listed below after the corrections of Holland's plates.

In identifying these specimens and redoing the plate legends, we encounter a big problem: the "types". Many specimens in the plates were called "types" by Holland in the text or plate legends of his book, and many of those "types" are actually not types, and thus were called "pseudotypes" by Brown (here I call them "not syntypes", because the word "pseudotype" is not used in the ICZN Code). This is rather technical. According to the Code, a "syntype" is a member of a type series only if a holotype was not designated [if a holotype was designated, then the other specimens should be called paratypes, not syntypes], and when a lectotype is designated from a syntype then the other syntypes become paralectotypes and can no longer be called syntypes. Thus my use of the word "syntype" here is sometimes a bit loose, as many of the specimens I have called syntypes are now properly called paralectotypes, although they may have been syntypes back in 1931 before a lectotype was designated. If a specimen was called a paratype, and a lectotype has been designated, I changed the wording to paralectotype. (I note that most lepidopterists still do not use the word paralectotype.) But other specimens are called paratypes, even though the Miller/Brown checklist states that only syntypes (and not a holotype) exist, which would mean that those "paratypes" are properly called syntypes, but I left those as "paratypes" while indicating that they may be syntypes due to the lack of a holotype; I worded them that way because of the uncertainty that many of those might not actually have been part of the original type series and thus may not be real syntypes or paratypes, and changing the word from paratype to syntype would imply a level of certainty that does not exist.

This problem among Edwards' specimens and names—"types" that are really not types--arose because Edwards labeled his specimens poorly. He failed to place data labels on individual specimens, and instead merely placed a label at the head of a series of pinned specimens in a drawer. And Edwards would not label individual specimens as "types". As a consequence, after Holland purchased the collection, Holland took labels off specimens that Holland thought looked "typical" and sent them to Edwards to have Edwards write the word "type" on them in red ink, and then Edwards sent the labels back to Holland, who placed them on the specimens. Sometimes Holland wrote a "type" label on specimens in Edwards' collection, loosely based on correspondence from Edwards, and unfortunately sometimes Holland placed "type" labels on specimens that were not the real types. Edwards made other mistakes. Edwards sometimes forgot what he had named, and in one case he named the same species three times, having forgotten twice that he had already named it! His second description of nokomis wing pattern was of a much different ssp. than his original description. His handwriting

contained letters that were all highly slanted to the right, and all the letters in his handwriting looked rather similar, making his handwriting illegible to me (Brown loaned me a copy of Edwards' handwritten notebooks in the 1980s, but I could not read them)(maybe Edwards had trouble reading his own notes too?). All this sloppiness inevitably caused errors and uncertainty, which Brown attempted to unravel and correct.

I have attempted to indicate the correct "type" status of the specimens illustrated, at least for the names proposed by W. H. Edwards, as suggested by Brown's research. But for other authors (Herman Skinner, etc.), numerous specimens are called "type" on Holland's plate explanations or in his text (frequently, the text and plate explanations list different specimens as types), and I have no way of knowing whether most of those specimens are actual syntypes (one would have to study the actual specimens and their labels, etc.), so for names not authored by Edwards I have mostly just repeated Holland's designations of "types", some of which may actually not be syntypes. In some cases the text for the species provides clues as to the status of a "type". Page x of the 1931 book states that Holland borrowed many types from other museums, so many of these "types" on the plates may actually be syntypes. P. 337 says that Holland borrowed many Skinner types from Philadelphia Acad. Nat. Sci. P. 197 & 200 say that some figures of Gibson types were reproduced from the originals. Holland evidently used specimens from ANSP and USNM also. So perhaps half or more of the specimens that Holland called "types" are truly syntypes. John Rawlins told me that he has isolated and studied all the types of Hermann Strecker in the Field Museum, which will help when he publishes the study.

Another important point (a nest of worms, some would say) about Holland's "types" has come to light. Holland made no deliberate lectotype designations in his book (the word lectotype did not enter the ICZN code until 1958-1960). However, the ICZN Code (articles 74.5, 74.6) states that if an author singles out a single syntype specimen by using words such as "the type" to refer to it, that his words constitute a lectotype designation. Quoting the code: "74.5. Lectotype designations before 2000. In a lectotype designation made before 2000, either the term "lectotype", or an exact translation or equivalent expression (e.g. "the type"), must have been used or the author must have unambiguously selected a particular syntype to act as the unique name bearing type of the taxon. …" This sentence provides two alternate ways to designate a lectotype, other than by using the term lectotype. So, in those cases in which Holland singled out just one specimen as the "type", and that specimen is a syntype, his action actually constitutes a valid lectotype designation (when he designates two or more specimens as type in text and plates, then the specimens may be syntypes but none are a lectotype designation). For example, Holland clearly designated the female on pl. LIX fig. 21 as the lectotype of callina (see his p. 131-2)(it is actually the holotype, see below). And Holland's lectotype designation of the female (of the pair of Boisduval syntypes) sylvinus on LXXVI fig. 15 trumps the later male lectotype (the male of the pair) of Emmel Emmel & Mattoon. Holland clearly indicates on pl. LXI fig. 28-30 that the fig. 28 youngi (Erebia) "type" is the lectotype, as he called the other two specimens allotype and paratype, thus the subsequent designation of the same male in fig. 28 as lectotype by dos Passos was unnecessary and invalid. Holland designated the ivallda female on LXII fig. 4 as lectotype, so the later designation of the male as lectotype is invalid. Holland designated the valid lectotype of howardi on p. 391, thus Gatrelle's later lectotype is invalid. Holland named a number of butterflies himself, and evidently he almost never declared holotypes for his own names, and just called them types. Evidently, with Holland's sloppiness, even if he calls a figure "type" in text or plates of his book, that specimen should not be automatically considered to be a lectotype designation, because Brown showed that many of those specimens are not even syntypes (a lectotype cannot be designated from a non-syntype, that would be considered a neotype designation, and recent Codes say that neotypes must only be designated during revisionary studies). As an example, consider the messy case of Coenonympha inornata: Holland's text says that pl. XXV fig. 29 is "type", so we could take that as a lectotype designation, even though it is not called type on the plate; Brown called it a pseudotype, but he said the specimen was missing so obviously there was no evidence on the specimen's labels actually proving it was a pseudotype; however Brown did find another inornata specimen possessing Edwards' "type" label that matched the O.D. which Brown designated as lectotype, and Brown insisted fig. 29 was a pseudotype so maybe he thought it didn't match the O.D. well; and because the fig. 29 specimen is missing, the odds of it being a real syntype are maybe only 50% (judging by Holland's poor record of correctly labeling Edwards' specimens as "types"), so based on those miserable odds I cannot accept the missing fig. 29 bug as the lectotype. So, it will take more study of actual specimens to make sure they are real syntypes before being certain about all of Holland's lectotype designations. Of course, when Holland himself named a bug, I consider his "type" designations in this book to be correct designations of lectotype or holotype (the O.D. must be consulted to see whether he designated a holotype, which he seldom did).

dos Passos & Grey (1947, Amer. Mus. Novit. #1370 p. 2-3) did not use any of Holland's lectotype designations in their Catalogue of *Speyeria* (I find that Holland validly designated lectotypes of ten *Argynnis* [*Speyeria*]), because of sloppiness in Holland's book and the book's lack of precise terminology such as "lectotype designation", but they could not find any rule in the Code that says that Holland's lectotypes are invalid. The current Code also seems to indicate that Holland's lectotype designations are valid, and there is no rule stating that they are invalid. The Pelham Catalogue has listed 51 Holland lectotype designations and accepted them as correct, and I accept 75. We also have to realize that the word lectotype (and neotype etc.) did not even appear in the ICZN Code until 1958/1960!, even though by then it had been in usage in the literature for about 50 years! So sloppiness in usage of the various words for type is understandable, because precise terminology was not supported by the ICZN at that time. Working on those types involves slogging through the

old-name sewer, and dealing with imprecise papers, nonexistent and weak ICZN rules, the failure to properly label specimens, deliberate mislabeling of specimens (by Herbert Morrison most notably), shifting museum location of specimens, dermestid beetles and shaky hands causing specimen damage and loss, and human foibles at every turn. Perfection is only a dream in the Old-Name Sewer.

ICZN Code art. 74.1.3. indicates that the valid designation of a lectotype prevents any of the remaining syntypes (which are now paralectotypes) from being named as another lectotype under art. 74.1., which means that the original lectotype is valid even if it is now lost and a 2nd (invalid) lectotype was designated (this applies to howardi, rosa, ines). So if the original is lost, someone cannot designate another. Thus Holland's ines & howardi lectotypes are still valid even though probably lost. Valid Holland 1898 and 1915 and 1931 lectotypes therefore mean that later ones, such as dozens proposed by F. M. Brown in his papers on Edwards' types, are invalid. Brown still did valuable research however, including finding which specimens are syntypes and which are not, which helps us now decide whether any attempted lectotype designation is valid. And most of Brown's invalid lectotypes were the specimens that Holland already validly designated as lectotype. I indicate in the Figure Legends below the specimens that Holland called types but Brown decided were not syntypes (Brown called them "pseudotypes").

Summary of lectotypes. I started this Holland book project in 2005, using the Miller/Brown checklist for reference. The recent J. Pelham Catalogue of the Butterflies… (which I received April 10, 2008) has helped with some of the types. I found 75 lectotype designations by Holland in his three books. The Pelham Catalogue lists 51 of Holland's 1931 "type" designations (I accept 61) and 2 of Holland's 1898 "type" designations (I accept 8 different ones) and none of Holland 1915 "type" designations (I accept 6) as valid designations of lectotypes. I went through Holland 1931 and Holland 1898 and Holland 1915 again, using the Pelham Catalogue to help the effort, and found that I agreed with the Catalogue treatment of type status for most names, but I found a few discrepancies between the Catalogue and my conclusions. I and the Catalogue agree on 41 names that are Holland 1931 lectotype designations (alaskensis [Erebia], apama, arcticus [Papilio], arizonensis [Papilio], atossa, attalus, behrii [Colias], bremneri, brettoides, brucei [Papilio], butleri, cassus, coyote, dion, dorus, drusius [Thorybes], erinna, gibsoni [Oeneis], hippolyta, hirsuta, hollandii, idaho, johnsoni, lena, macaria, melissa, moschus, mysie, nitra, opis, pallida [Colias hecla], pima, pittacus, rosa, silvius, siris, sterope, straton, texana [Cercyonis], ulrica, wheeleri). Three names are considered to be Holland 1931 lectotype designations in Pelham Catalogue that are not valid designations (aliaska, fulvia, hyantis) because the specimen is not a syntype for two of these and was not singled out as a type in Holland's book for the third (there might be a few more of these in the Catalogue, as I have not examined every name in the Catalogue for mentions of Holland's book). I add 20 names that are valid Holland 1931 lectotype designations, which are not listed as such in the Catalogue (brucei [Oeneis], byssus, cabelus, clara, colon, columbia, golovinus, hanhami, howardi, iduna, ines, ivallda female, liliana, mardon [the Catalogue wrongly calls this a Holland 1898 lectotype designation], morrisoni (Stinga), semplei, simius [the Catalogue wrongly calls this a Holland 1898 lectotype designation], sylvinus female, youngi [Erebia], yukonensis [Coenonympha][Pelham Catalogue mistakenly calls this specimen yukonensis holotype, but O.D. failed to designate a holotype]). I also add eight more names as Holland 1898 lectotype designations (aemilia, barnesi, beani [Euphydryas], carolina [Amblyscirtes], duryi, ethela, itys, platina), three of which Pelham wrongly considered to be a Holland 1931 designation (aemilia, barnesi, duryi). I add six more names as Holland 1915 lectotype designations (atlantis, dymas, flora, macounii, perse, wittfeldi), two of which Pelham wrongly considered to be Holland 1931 lectotype designations (dymas, perse). For these names, Holland singled out a single specimen in the book as "type". One name (floridensis [Eurytides]) would be a Holland 1898 lectotype designation, except the figured specimen is the holotype by monotypy; a second name (pseudodorippus) would be a Holland 1931 lectotype designation except it is an aberration and thus is surely the holotype by monotypy; and another name (yehl) would be a Holland 1898 lectotype designation except the specimen is the holotype in FMNH. The details of each lectotype designation by Holland are given below in the corrected plate legends of the book. For one of these names, ines, the Catalogue states that it is a valid Holland designation if the type can be found, but as noted above a lectotype designation remains valid even if the lectotype is lost. The names thekla & inornata cannot be proven to have Holland 1931 lectotypes because the specimens are lost, and the case of the name wrighti is too dubious to consider it to have a Holland 1931 lectotype. There are many other names that were singled out as type by Holland and thus would be Holland lectotype designations, except those taxa already have holotypes (usually the specimen Holland singled out as "type")(lectotypes can only be designated of syntypes, in order to take the place of a holotype that was never designated in the original description), including the names oslari (Phaeostrymon), mojave, albocincta, & leussleri, and notably including these five names: The jamaicensis [Pyrrhocalles] bug was stated to be the borrowed type on p. 392 thus it is evidently holotype (but if there was no holotype designated in OD, then this is Holland's lectotype). The gunderiae bug can't be a lectotype because it is an aberration that is a unique specimen that is holotype by monotypy according to O.D. The callina bug has been called a lectotype, but it is the holotype as Higgins wrote (see pl. LIX legend below). But the following bugs are messier. The colorado (Hesperia) bug (pl. LII fig. 1) is very doubtfully lectotype of colorado because the figure is H. nevada, so I think it is very doubtfully a syntype (though it could be, if the syntypes contained several species). The calais bug is called the holotype in Pelham Catalogue but Miller/Brown wrote that type may be lost (MCZ)? (the Pelham Catalogue is probably correct on this and most of these disagreements). If any of these prove not to have holotypes, as

might be possible in colorado & calais, then they will have Holland lectotypes. So, more research is needed in books and museums to conclusively fix some of these types. An examination of hundreds of original specimens in CM and other museums would be necessary to determine the correct "type" status of some of the names. People who do revisionary work should look at the original descriptions and try to look at the various types/syntypes.

Type localities. Art. 76.2. says that the type locality becomes the locality of the lectotype (76.3. says TL becomes locality of neotype), which means that the type localities of some of the bugs for which Holland designated lectotypes, invalidate the TLs of later-designated lectotypes, so will have to be changed to the locality of Holland's lectotype. Most of the localities were rather vague, so there will not be many changes here, though there will be a few (the Oeneis brucei TL was changed a tiny bit; the platina & flora lectotypes should be examined for the locality label, as that locality overrides the locality of dos Passos & Grey's and Brown's later lectotypes; for hanhami, the specimen must be found and its exact locality in Man. or Minn. discovered). The bremnerii TL is now Vancouver.

The Butterfly Book first edition was published in 1898 (it was reprinted many times without change through 1929, then the revised 2nd edition appeared in 1931). The 48 plates of the first edition (pl. I-XLVIII) were identical to plates I-XLVIII of the revised 1931 book. But the explanations of the plates were a little different, as misidentifications in the 1898 book were corrected in 1931 and the nomenclature was brought up to date. The 1898 book has comparatively few mentions of the word type or types etc. (28 mentions of the word "type" including two on the explanation of plate XXX, of which eight are valid lectotype designations; 22 mentions of the word "types"; 1 mention of "paratype"; 2 of "paratypes"; 17 of "typical"; 0 mentions of other kinds of types; I carefully read through the book, and used the computer search feature on www.google.com books, to search the book for these words), which I studied to determine whether those are lectotype designations, with the following results. Holland 1898 made only eight valid lectotype designations: platina on p. 117, beani (Euphydryas) on p. 140, barnesi on p. 156, ethela on p. 211, duryi on p. 230, itys on p. 243, aemilia on p. 325, carolina (Amblyscirtes) on p. 367. Holland 1898 wrote that kodiak is type on p. 207, siva is type on Explanation of pl. XXX, alce is type on Explanation of pl. XXX, and myrtis is type on p. 346 (fig. pl XLVII fig. 11m), but these are not lectotype designations because Brown found that the specimens are not syntypes. Holland 1898 wrote on p. 359 that the fig. of yehl on pl. XLVI fig. 40m is the type, which would be a lectotype designation, except that there is a holotype (in FMNH). Holland 1898 did not make lectotype designations for mardon or simius as the Pelham Catalogue claimed, or for any other name.

The Butterfly Guide, a Pocket Manual for the Ready Identification of the Commoner Species Found in the United States and Canada, was authored in 1915 by Holland, and consisted of photos and brief text for the commoner species found in The Butterfly Book. This is the kind of small popular book we wish we could ignore, but we cannot ignore it, because it included 17 mentions of the word type and one mention of the word paratype, resulting in six valid lectotype designations, for the names atlantis, dymas, flora, macounii, perse, and wittfeldi. The photos in this book are mostly repeated from the Butterfly Book, but reversed left-to-right. P. 78 designates atlantis male lectotype on pl. XIV, which Holland 1931 fig. on pl. X fig. 9m & called a paratype; Brown called it a paratype and it is from Hunter NY thus dos Passos' TL restriction was unnecessary. P. 86 designates dymas lectotype, a female on pl. XX fig. 4, which Holland 1931 fig. on pl. XVI fig. 18f. P.116 designates flora lectotype, a male on pl. L fig. 1, not fig. by Holland 1931, which is evidently one of the 2m1f syntypes Brown noted in CM. P. 142 designates macounii lectotype, a male on pl. LXXVI, which could be a reversed photo of Holland 1931 pl. XXVII fig. 3m, which Brown evidently treated as syntype, and which may be the male syntype that Brown discussed that has #5 on back of label; it is not the same specimen as Brown's invalid lectotype. P. 85-86 designates perse lectotype, a male on pl. XX fig. 3, which Holland 1931 fig. on pl. XVI fig. 19m. P. 151 designates wittfeldi lectotype, a female on pl. LXXXI fig. 2, which Holland 1931 fig. on pl. XXIX fig. 19f, which Brown called the only female syntype; Brown designated an invalid male lectotype. Holland called other illustrated specimens type, which are not valid lectotype designations: The rhodope female and paulus male and silenus male are not syntypes according to Brown. The alicia male is not a syntype as it is from Fla. and the holotype and allotype fig. by Edwards were from New Orleans, and Brown found no syntypes in CM. The rubricata male is not a syntype and Brown designated a neotype. The charon male is not a syntype as it is not one of the 2m1f with type labels (Brown designated 1m of these lectotype, and Holland 1931 fig. the other pair on pl. LXIII figs. 24-25 which look too pale to be charon although the whole plate is too pale). The ridingsii male is not a syntype because Edwards named it from 4 females that were returned to James Ridings (Brown designated a neotype). The nais male is not a syntype, as the real male type was not in good condition in 1881 and was lost by 1968. There is no evidence that the ocola male is a syntype, as the specimen is labeled only "P. ocola Edw." and "Butt. Guide/Pl. 143/Fig. 5".

Misidentifications of photos in The Butterfly Guide: Pl. XXIV fig. 2 is Chlosyne lacinia lacinia. Pl. XXVII is Polygonia faunus male. XXXIV is Vanessa virginiensis female. XXXVI is Junonia coenia female. XLVII is Limenitis lorquini female. XLVIII is Nymphalis californica female. LXX is Cercyonis pegala maritima. LXXII fig. 1 is Cercyonis meadii female. LXXVIII fig. 3 is Calephelis virginiensis female. LXXXII fig. 2 is Strymon melinus male. LXXXIII fig. 2 is Satyrium edwardsii female. LXXXVI fig. 3 is Callophrys polios female. LXXXVI fig. 2 is Callophrys henrici male. LXXXVII fig. 1 is Callophrys affinis perplexa female. XCIII fig. 6 is Brephidium isophthalma exilis female. XCIV fig. 2 is Echinargus thomasi female. CI fig. 3 is Euchloe hyantis lotta female. CIX fig. 2 is Eurema daira male. CXXIX fig. 2 is

Urbanus proteus male. CXXXII fig. 1 is Achalarus lyciades male. CXXXVI fig. 2 is Erynnis horatius female. CXXXVII fig. 2 is E. horatius female. CXXXIX fig. 1 is Oarisma edwardsii male. CXXXIX fig. 3 is Oarisma garita female. CXLIX fig. 3 is Lerodea eufala female. CXLV fig. 2 is Euphyes vestris female. CXLVI fig. 4 is E. vestris female. CXLVII fig. 1 is Poanes aaroni=howardi male. CXLVII fig. 2 is Poanes viator male. CXLVII fig. 4 male & 5 female are Atrytone arogos male.

Correct Identifications and Type Status of Figured Specimens in the 1931/1898 Butterfly Book. In the corrected 1931/1898 plate legends below I note the reasons for the type decisions, and have tried to keep Brown's research visible, for instance by noting all the specimens figured by Holland that Brown discovered to be not syntypes, because Brown was the expert on Holland's types. I was aided in determining lectotype designations by the Miller/Brown checklist and Pelham Catalogue, which indicate whether there is a holotype or just syntypes, etc. Pelham's Catalogue attempted to list all the holotypes & lectotypes figured by Holland, and listed many of the paratypes & syntypes that Holland figured (some of which will no doubt be shown to not be real syntypes) but did not cite all the figs. of paratypes/syntypes.

I have tried to use original spellings of the species and subspecies names (Holland emended some names to paula, oeta, acasta, etc.) in the corrected Holland plate legends below. The Miller/Brown checklist cited the original genus name used in the O.D. for each name, but failed to list original spelling of species/ subspecies/ form names prior to their possible sexual transmogrification, but now we can find the original name in the Pelham Catalogue (at last we find that fuliginosa is the original name!).

Some people may want to make new legends for the plates in their copy of Holland's book, so I list the identification of every specimen on each plate, and put each plate explanation in a separate paragraph.

(Note: the name lupini is so grossly misleading and inappropriate and disgusting—implying that the bug has something to do with Lupinus, which it does not—that I have invoked the *lapsus contrarius* principle of the Biological Catalogue [see Papilio {New Series}#20], which adds the prefix a- or an- [meaning not-] to the front of such misleading names, in order to negate their inappropriateness; thus in this case alupini means "not-lupini".)

Abbreviations: m=male. f=female. CM=Carnegie Museum

Explanation of Plate I (frontispiece). 1. Vanessa cardui cardui m. 2. Vanessa virginiensis f. 3. Polygonia interrogationis m. 4. Colias philodice philodice m. 5. C. philodice philodice f. 6. Nymphalis antiopa f.

Explanation of Plate II (larvae). 1. Colias eurytheme. 2 Phoebis sennae eubule. 3. Eurema lisa. 4. Phoebis sennae eubule. 5. Anthocharis midea midea. 6. Eurema nicippe. 7. Pontia protodice. 8-9. Pieris oleracea. 10. Colias philodice philodice. 11-12. Pieris rapae. 13. Battus philenor philenor. 14. Eurytides marcellus. 15. Papilio glaucus glaucus prepupa. 16. Papilio cresphontes. 17. Papilio polyxenes asterias 2nd stage. 18. Papilio troilus. 19.Papilio troilus 3rd stage. 20. Battus philenor philenor. 21. B. p. philenor 3rd stage. 22. Papilio troilus 3rd stage. 23. Achalarus lyciades. 24. Papilio polyxenes asterias 4th stage. 25. Thorybes pylades?. 26. Papilio glaucus glaucus. 27. Papilio polyxenes asterias. 28. Papilio glaucus glaucus. 29. Thorybes pylades. 30-31. Epargyreus clarus (should be green). 32. Thorybes bathyllus. 33. Epargyreus clarus. 34. Urbanus proteus. 35. Epargyreus clarus 3rd stage.

Explanation of Plate III (larvae). 1-2. Oeneis melissa semidea. 3. Megisto cymela. 4. O. melissa semidea. 5. Danaus plexippus. 6. Megisto cymela. 7. Oeneis melissa semidea 1st stage. 8. Neonympha areolata. 9. Lethe eurydice eurydice. 10. Megisto cymela. 11. Oeneis jutta 1st stage. 12. Neonympha areolata. 13-14. Megisto cymela. 15. Oeneis melissa semidea. 16. Lethe portlandia. 17. Limenitis arthemis astyanax. 18. Cercyonis pegala alope. 19. Limenitis archippus archippus. 20. Asterocampa clyton (horns too large). 21. Limenitis arthemis astyanax. 22. Limenitis a. archippus. 23. Polygonia interrogationis. 24. Limenitis a. archippus. 25. L. arth. astyanax. 26. L. arth. arthemis. 27. P. interrogationis? (comma?) 28. Nymphalis antiopa. 29-30. Precis coenia. 31. Polygonia progne. 32. Polygonia faunus. 33. Polygonia satyrus. 34. Vanessa virginiensis. 35. Vanessa atalanta. 36. Aglais milberti. 37. Vanessa cardui cardui. 38. Polygonia comma.

Explanation of Plate IV (pupae). 1-3. Danaus plexippus. 4-5. Oeneis melissa semidea. 6. Lethe portlandia. 7-8. Cercyonis pegala nephele. 9. Lethe eurydice eurydice. 10-11. Neonympha areolata. 12-13. Limenitis arthemis astyanax. 14. Limenitis arthemis arthemis. 15-17. Asterocampa clyton clyton. 18-20. Limenitis archippus archippus. 21-22. Polygonia interrogationis. 23. Limenitis arthemis arthemis. 24-26. Polygonia interrogationis. 27. Polgonia comma. 28. Megisto cymela. 29-30. Polygonia comma. 31. Polygonia faunus faunus. 32. Polygonia progne. 33-35. Polygonia faunus faunus. 36. Roddia l-album j-album. 37-38. Polygonia progne. 39. Polygonia comma. 40. Polygonia interrogationis. 41-42. Polygonia satyrus. 43. Aglais milberti. 44-45. Roddia l-album j-album. 46-48. Polygonia comma. 49-50. Aglais milberti. 51. Nymphalis antiopa. 52-53. Vanessa atalanta. 54. Vanessa virginiensis. 55. Vanessa atalanta. 56-57. Junonia coenia. 58-59. Nymphalis antiopa. 60-62. Vanessa cardui cardui. 63-64. Vanessa virginiensis. 65-66. Junonia coenia. 67. Junonia coenia?

Explanation of Plate V (pupae). 1-3. Argynnis (Speyeria) cybele cybele. 4. Argynnis (Speyeria) idalia. 5. Argynnis (Speyeria) aphrodite aphrodite. 6. Argynnis (Speyeria) atlantis atlantis. 7. Euphydryas phaeton. 8-9. Euptoieta claudia. 10-11. Boloria bellona. 12-14. Boloria selene myrina. 15-16. Euphydryas phaeton. 17-18. Chlosyne harrisii. 19. Chlosyne nycteis nycteis. 20-22. Phyciodes tharos or P. cocyta. 23-24. Libytheana carinenta bachmanii. 25. Satyrium calanus falacer. 26. Callophrys irus irus. 27. Satyrium calanus falacer. 28. Satyrium liparops strigosa. 29. Satyrium

edwardsii. 30-31. Callophrys gryneus gryneus. 32-34. Callophrys irus irus. 35. Satyrium acadica. 36. Celastrina sp. 37. Satyrium titus titus. 38. Callophrys niphon. 39. Strymon melinus. 40. Callophrys niphon. 41. Plebejus idas scudderi. 42. Cupido comyntas comyntas. 43-44. Celastrina neglecta. 45-46. Feniseca tarquinius. 47-48. Cupido comyntas comyntas. 49. Lycaena phlaeas hypophlaeas. 50. Lycaena thoe. 51-52. Eurema nicippe. 53. Colias eurytheme. 54-55. Colias philodice philodice. 56. Eurema lisa. 57. Pieris oleracea. 58. Pieris rapae. 59. Anthocharis midea midea. 60-62. Phoebis sennae eubule. 63-64. Pieris oleracea. 65. Pieris rapae. 66-67. Pontia protodice.

Explanation of Plate VI (pupae). 1-4. Papilio glaucus glaucus. 5-7. Papilio troilus troilus. 8-10. Papilio cresphontes. 11-12. Eurytides marcellus. 13. Papilio polyxenes asterias. 14-17. Battus philenor philenor. 18-19. Papilio polyxenes asterias. 20. Battus philenor philenor. 21. Achalarus lyciades. 22. Epargyreus clarus. 23. Urbanus proteus. 24. Thorybes bathyllus. 25-26. Epargyreus clarus. 27. Erynnis icelus. 28. Thorybes pylades. 29. Pholisora catullus. 30-32. Erynnis lucilius. 33. Erynnis juvenalis. 34. Erynnis persius. 35. Pyrgus communis. 36. Pholisora catullus. 37. Erynnis martialis. 38. Erynnis brizo. 39. Hylephila phyleus phyleus. 40 Amblyscirtes vialis. 41. Pholisora catullus. 42. Wallengrenia otho? (J. Calhoun 2006 J. Lep. Soc. 60:8 says Abbot's otho may not be Wallengrenia). 43. Atalopedes campestris. 44. Polites themistocles. 45. Amblyscirtes hegon. 46. Lerema accius. 47. Atalopedes campestris. 48. Calpodes ethlius.

Explanation of Plate VII. 1. Danaus plexippus plexippus m. 2. Danaus gilippus berenice m. 3. Danaus gilippus thersippus m. 4. Limenitis archippus archippus m. 5. Limenitis archippus obsoleta=hulstii holotype m.

Explanation of Plate VIII. 1. Dircenna klugi f. 2. Mechanitis polymnia (?) m. 3. Ithomia anaphissa (?) m. 4. Dryas iulia delila (Jamaica) m. 5. Heliconius charithonia ssp. m. 6. Dryas iulia iulia (evidently Puerto Rico) m. 7. Dione vanillae (perhaps ssp. nigrior) m. 8. Euptoieta hegesia. 9. Euptoieta claudia m.

Explanation of Plate IX. 1-2. Argynnis (Speyeria) diana, m, f. 3-4. Argynnis (Speyeria) cybele cybele (near krautwurmi?), m, f. 5-6. Argynnis (Speyeria) cybele leto, neotype m, f.

Explanation of Plate X. 1-2. Argynnis (Speyeria) nokomis apacheana, m, f. 3. Argynnis (Speyeria) idalia (evidently weak ssp. occidentalis) f. 4. Argynnis (Speyeria) callippe nevadensis (not a syntype) m. 5. Argynnis (Speyeria) mormonia mormonia m. 6. Argynnis (Speyeria) aphrodite alcestis (not a syntype) m. 7. Argynnis (Speyeria) zerene bremnerii (a lectotype designation by Holland 1931) lectotype m. 8. Argynnis (Speyeria) aphrodite ethne (not a syntype of electa which is a ssp. of S. hesperis) m. 9. Argynnis (Speyeria) atlantis atlantis lectotype (called paratype on p. 90 but validly designated lectotype by Holland 1915 pl. XIV) m (Hunter, NY).

Explanation of Plate XI. 1-2. Argynnis (Speyeria) callippe callippe, m, f. 3. Argynnis (Speyeria) callippe ssp. (semivirida?) m. 4-5. Argynnis (Speyeria) edwardsii, m, f. 6. Argynnis (Speyeria) hydaspe rhodope f (not a syntype). 7. Argynnis (Speyeria) mormonia bischoffi (not a syntype as Brown wrote on p. 316, as 320 says both syntypes were destroyed) m. 8. Argynnis (Speyeria) hesperis electa=cornelia (may have been a syntype of cornelia, but now lost) m. 9. Argynnis (Speyeria) hesperis nausicaa (not a syntype) m. 10-11. Argynnis (Speyeria) coronis coronis, m, f.

Explanation of Plate XII. 1-2. Argynnis (Speyeria) hesperis hesperis (not syntypes), m, f. 3-4. Argynnis (Speyeria) aphrodite ethne=cypris (text says both specimens are types, thus neither is Holland's lectotype designation), lectotype m, paralectotype f. 5-6. Argynnis (Speyeria) egleis oweni (text says both specimens are types, thus neither is Holland's lectotype designation), lectotype m, paralectotype m. 7. Argynnis (Speyeria) mormonia eurynome m. 8-9. Argynnis (Speyeria) callippe rupestris 2m. 10. Argynnis (Speyeria) zerene hippolyta lectotype (designated lectotype by Holland 1931 on p. 93) m. 11-12. Argynnis (Speyeria) callippe juba=sierra=laura, m lectotype of laura, f. 13. Argynnis (Speyeria) mormonia artonis (not a syntype) m.

Explanation of Plate XIII. 1. Argynnis (Speyeria) cybele cybele m. 2-3. Argynnis (Speyeria) coronis semiramis, m (may be paralectotype), f (not a syntype). 4. Argynnis (Speyeria) nokomis nitocris holotype m. 5-6. Argynnis (Speyeria) coronis halcyone (not syntypes) 2m. 7-8. Argynnis (Speyeria) zerene zerene=monticola 2m. 9. Argynnis (Speyeria) callippe macaria lectotype (text p. 98 says type, so designated lectotype by Holland 1931) m. 10. Argynnis (Speyeria) callippe juba=laura=sierra (unsilvered var.)(not inornata, which is a syn. of rupestris)(not a syntype of inornata) f. 11. Argynnis (Speyeria) callippe liliana (text p. 98 says "type", a Holland 1931 lectotype designation; Pelham Catalogue says that this specimen is possibly a fig. of the dos Passos & Grey lectotype, which is in AMNH, but dos Passos & Grey don't mention that; it is not a lectotype if further research shows that it is not a syntype) m. 12. Argynnis (Speyeria) adiaste atossa lectotype (designated lectotype on p. 100 by Holland 1931; it has no locality but allotype locality is Tehachapi [Mts.] which is TL) m. 13-15. Argynnis (Speyeria) egleis egleis, m, m, f.

Explanation of Plate XIV. 1-2. Argynnis (Speyeria) callippe meadii (not syntypes) 2m. 3. Argynnis (Speyeria) aphrodite lectotype (syntype, called "type" in text p. 88 thus Holland 1931 designated this specimen as lectotype) lectotype m. 4. Argynnis (Speyeria) adiaste adiaste m. 5-7. Argynnis (Speyeria) mormonia eurynome=clio (not clio syntypes), m, f, m. 8. Argynnis (Speyeria) mormonia opis lectotype (designated lectotype by Holland 1931 on p. 103) m. 9. Argynnis (Speyeria) hydaspe hydaspe m. 10. Argynnis (Speyeria) zerene behrensii (not a syntype) m. 11. Argynnis (Speyeria) aphrodite alcestis f. 12-13. Argynnis (Speyeria) hesperis dennisi=lais, m (not a syntype), f syntype. 14-15. Argynnis (Speyeria) mormonia eurynome, f, m. 16. Argynnis (Speyeria) hesperis wasatchia (not chitone)(not a chitone syntype) f. 17. Argynnis (Speyeria) zerene zerene=monticola f.

Explanation of Plate XV. 1-2. Boloria selene myrina 2m. 3. Boloria eunomia caelestis=alticola m. 4-6. Boloria titania grandis, m, m, f. 7-8. Boloria titania montinus, m, f. 9-10. Boloria freija freija (Alta. phenotype), m, f. 11-12. Boloria freija freija 2m. 13-14. Boloria frigga saga, m, f. 15. Boloria alberta lectotype m. 16. Boloria bellona m. 17. Boloria frigga sagata (not an epithore syntype) m. 18. Boloria epithore (not a syntype) m.

Explanation of Plate XVI. 1. Euphydryas phaeton phaeton m. 2. Euphydryas chalcedona chalcedona m. 3. Euphydryas chalcedona macglashanii m. 4. Euphydryas editha quino=augusta (not a syntype) m. 5. Euphydryas chalcedona colon lectotype (designated lectotype by Holland 1931 on p. 117; TL is required to be locality of lectotype which is "Columbia River") m. 6. Euphydryas anicia capella Colo. m. 7. Euphydryas chalcedona chalcedona (not a baroni syntype) m. 8. Euphydryas editha editha f. 9. Euphydryas anicia capella Colo. m. 10. Euphydryas editha rubicunda (text says "type" so perhaps a syntype and if so would be a Holland 1931 lectotype designation; but male is different from Gunder's 1929 Pan-Pac. Ent. 6[1]:pl. 10m fig. of "type"; Gunder's specimen would seem to be the valid lectotype designation) m. 11-12. Chlosyne sterope acastus (p. 126 says 3 figs. are types, so none is a Holland lectotype designation), m lectotype, m (probable paralectotype, but now lost). 13-14. Chlosyne palla palla 2m. 15. Chlosyne gabbii m. 16. Euphydryas editha taylori paralectotype m. 17. Chlosyne leanira fulvia (not a syntype) m. 18. Microtia (Dymasia) dymas dymas lectotype (designated lectotype by Holland 1915 pl. XX fig. 4, later designated lectotype by Holland 1931 on p. 132) f. 19. Microtia (Texola) elada perse lectotype (designated lectotype by Holland 1915 pl. XX fig. 3, later designated lectotype by Holland 1931 on p. 132) m. 20. Chlosyne leanira wrighti m. 21. Poladryas minuta nympha (text says "types" for both this and LVIII fig. 14, so not a lectotype designation by Holland 1931; Holland 1898 made no mention of type in text or plate, so did not designate lectotype either. Brown declared this male lectotype.) lectotype m. 22. Poladryas minuta minuta aberrant f.

Explanation of Plate XVII. 1. Chlosyne leanira alma m. 2. Microtia (Texola) elada ulrica lectotype (designated lectotype by Holland 1931 on p. 132) m. 3-4. Microtia (Dymasia) dymas chara (probably paralectotypes but now lost) 2m. 5-6. Chlosyne harrisii harrisii, m, f. 7-8. Chlosyne palla altasierra 2m. 9-10. Chlosyne leanira wrighti (text says both are types so this is not a Holland lectotype designation), lectotype m, allotype (properly paralectotype) f. 11-12. Poladryas minuta arachne 2m. 13. Chlosyne hoffmanni hoffmanni m. 14. Chlosyne hoffmanni hoffmanni ab. hollandae holotype f. 15-16. Chlosyne theona thekla, m (Ariz., coll. H. Morrison, may be syntype), m (probable syntype, called "type" in text, now missing, thus if it was a valid syntype it was Holland's designation of lectotype on p. 130, even though now lost [Art. 74.4], but I will ignore the possibility because maybe it wasn't a syntype and being lost it cannot be proven to be a syntype). 17-19. Phyciodes graphica graphica (not vesta syntypes), m, f, spring form f. 20-21. Phyciodes picta picta, f (not a syntype), m (probably not syntype, now missing). 22-23. Phyciodes phaon jalapeno (Texas), m, f (not a syntype). 24-25. Chlosyne gorgone 2m. 26-27. Phyciodes pulchella montana 2f. 28-30. Chlosyne nycteis nycteis, m, m, f. 31. Phyciodes orseis orseis (not a syntype) m. 32-34. Phyciodes pulchella camillus (not syntypes), m, f, spring form m. 35-36. Phyciodes batesii batesii 2m. 37. Phyciodes pulchella camillus m. 38. Phyciodes mylitta mylitta spring form. 39. Phyciodes (Eresia) frisia tulcis=punctata holotype m. 40-41. Phyciodes mylitta arizonensis (not mylitta syntypes) 2m. 42. Phyciodes (Eresia) frisia, looks like ssp. dubia of Venez.-Col. m.

Explanation of Plate XVIII. 1. Phyciodes cocyta selenis m. 2. P. tharos tharos probably as antenna club is oval (or Phyciodes cocyta selenis, as uph has large space) m. 3-4. Phyciodes tharos tharos probably as antenna club oval (may be marcia syntypes, but specimens now missing) 2m. 5. Phyciodes pallida barnesi (p. 138 says pl. XVIII fig. 5m is type, a Holland 1931 lectotype designation; Miller/Brown say holotype is in CM, but Pelham Catalogue says Holland 1931 p. 138 designated this specimen as lectotype, so evidently there was no holotype and this is lectotype; however Holland 1898 p. 156 says this male pl. XVIII fig. 5m is the type, so this is a valid Holland 1898 lectotype designation)(p. 138 says in error "Colorado Springs" where P. pallida does not occur) lectotype m. 6. Argynnis (Speyeria) coronis snyderi (text says paratype) m. 7. Argynnis (Speyeria) zerene platina (p. 97 says paratype, so it must be a syntype, as Pelham Catalogue says dos Passos & Grey designated lectotype in 1947 so there was no holotype; Holland 1898 p. 117 wrote that this pl. XVIII fig. 7m specimen is the type, therefore it is a valid Holland 1898 lectotype designation) lectotype m. 8-9. Phyciodes (Anthanassa) texana texana m (paratype?, now missing), holotype m. 10. Chlosyne lacinia lacinia (or adjutrix) m. 11. Chlosyne lacinia adjutrix m. 12. Phyciodes (Anthanassa) looks like ardys subota from Guat. m (ianthe is a syn. of "Janatella" hera, but fig. isn't that). 13. Euphydryas editha beani (p. 118 says "type", so this is a Holland 1931 lectotype designation; Miller/Brown say holotype is in CM, but Pelham Catalogue says the lectotype was designated by Gunder 1929 Pan-Pac. Ent. 6(1) pl. 11 in ANSP, which is older, thus Holland's 1931 designation is invalid; Pelham Catalogue says this fig. 13 specimen is Gunder's type, but it looks different than Gunder's so isn't lectotype and is probably paralectotype; however, Holland 1898 p. 141 says that this pl. XVIII fig. 13m is Dr. Skinner's original type, which is the valid Holland 1898 lectotype designation and Gunder's is invalid) lectotype m. 14-15. Boloria tritonia astarte, f, m (holotype of victoria). 16-17. Boloria titania helena (text says both are types, so not a Holland lectotype designation), m (not a syntype), m (possible syntype). 18. Lethe creola m. 19. Lethe portlandia missarkae (not creola) f. 20. Lethe anthedon m. 21. Gyrocheilus patrobas tritonia m.

Explanation of Plate XIX. 1. Polygonia interrogationis spring form fabricii m. 2. Polygonia interrogationis summer form umbrosa f. 3. Polygonia comma summer form dryas m. 4. Polygonia comma spring form harrisii m. 5-6. Polygonia

oreas silenus, m (not a syntype), f. 7. Polygonia faunus hylas (S Colo., not a syntype) m. 8. Polygonia faunus hylas (possible hylas syntype) form silvius=orpheus Colo. f. 9. Roddia l-album j-album f. 10-11. Polygonia gracilis gracilis 2m. 12. Polygonia faunus faunus (may be topotype Hunter, Green Co. NY) m. 13. Polygonia faunus smythi W. Va. m. 14-15. Polygonia satyrus satyrus (not the European marsyas) 2m (both now missing).

Explanation of Plate XX. 1-2. Polygonia satyrus satyrus 2m. 3-4. Polygonia progne, winter form, m, m. 5-6. Polygonia gracilis zephyrus, m, syntype m. 7. Junonia coenia f. 8. Junonia genoveva hubneri form pallescens m. 9. Junonia evarete zonalis m. 10. Aglais milberti m. 11. Nymphalis californica m. 12. Vanessa carye annabella f. 13. Anartia jatrophae guantanamo m.

Explanation of Plate XXI. 1-2. Marpesia zerynthia=coresia 2m. 3. Marpesia petreus m. 4. Marpesia chiron m. 5-6. Diaethria clymena 2m. 7-8. Eunica monima, m, f. 9-10. Hypolimnas misippus, m, f.

Explanation of Plate XXII. 1. Limenitis arthemis astyanax m. 2. Adelpha bredowii californica f. 3. Limenitis lorquini lorquini m. 4. Limenitis arthemis arthemis m. 5. Limenitis arthemis arthemis X astyanax (f. proserpina) m. 6. Limenitis weidemeyerii latifascia m.

Explanation of Plate XXIII. 1-2. Asterocampa clyton flora, lectotype m, f. 3-4. Asterocampa celtis celtis, m, f. 5 Asterocampa clyton clyton form proserpina (Scott's form geneumbrosa) m. 6. Asterocampa clyton clyton f. 7-8. Asterocampa celtis celtis X montis Colo., m, f. 9-10. Astrocampa celtis reinthali=alicia, m (Florida; not a syntype; too tawny, the same male in The Butterfly Guide is browner like celtis), f. 11. Asterocampa celtis montis lectotype (tawny, but atypical ocelli resembling antonia) m. 12. Asterocampa celtis antonia lectotype m. 13. Asterocampa celtis celtis m.

Explanation of Plate XXIV. 1. Anaea andria f. 2. Anaea aidea morrisonii syntype f. 3. Anaea troglodyta floridensis m. 4. Hamadryas feronia m. 5. Hamadryas fornax m. 6. Siproeta stelenes biplagiata m. 7. Mestra dorcas amymone m. 8-9. Chlosyne lacinia crocale, f, m. 10. Hypanartia lethe m.

Explanation of Plate XXV. 1. Lethe eurydice eurydice m. 2. Cyllopsis gemma m. 3. Megisto rubricata cheneyorum (not a rubricata syntype) m. 4. Megisto cymela (or Megisto eurytris Maynard 1891?) f. 5. Hermeuptychia hermes sosybia m. 6. Neonympha mitchellii m. 7. Neonympha areolata areolata=phocion m. 8. Cyllopsis pertepida dorothea= form edwardsii (Trans. Amer. Ent. Soc. 90:331) f. 9. Coenonympha tullia california=galactinus m. 10. Coenonympha tullia california=eryngii m. 11. Coenonympha tullia ochracea m. 12. Coenonympha tullia (looks like ssp. pseudobrenda) m. 13. Coenonympha tullia inornata m. 14. Coenonympha tullia california f. 15. Neominois ridingsii ridingsii m (not a syntype). 16. Neominois ridingsii stretchii=dionysus m. 17. Erebia magdalena magdalena m. 18. Erebia stubbendorfii ethela (p. 205 says two specimens are type, so this is not a Holland 1931 lectotype designation; however, Holland 1898 p. 211 says "The figure in the plate [XXV fig. 18f] is that of the female type of Edwards' ethela, ethela being a synonym for sofia.", and Brown stated that this female is a syntype, therefore this female is a Holland 1898 lectotype designation) lectotype f. 19. Erebia discoidalis m. 20. Erebia callias syntype m (Brown stated he could not find original specimen matching this, so it may be missing). 21. Coenonympha tullia insulanus Vancouver Is., m. 22. Coenonympha tullia kodiak (not a syntype) f. 23. Erebia mancinus m. 24 Coenonmpha haydenii m. 25-26. Coenonympha tullia elko syntypes (both called types on p. 184, thus not a Holland lectotype designation), 2m. 27. Coenonympha tullia pseudobrenda f. 28. Erebia epipsodea=rhodia m. 29. Coenonympha tullia inornata (called type in text, and missing so stated to be not a syntype by Brown; thus it might have been a syntype and thus might be considered Holland's lectotype, but the odds of it being not a syntype were high so it should not be considered to be a valid lectotype) m. 30. Coenonympha tullia insulanus Vanc. Is., m. 31. Coenonympha tullia pseudobrenda m.

Explanation of Plate XXVI. 1-2. Cercyonis pegala maritima (replaces alope, which is an intergrade of pegalaXcarolina says R. Gatrelle), m, f. 3. Cercyonis pegala nephele m. 4. Cercyonis pegala maritima f. 5-6. Cercyonis pegala boopis (text says near San Francisco), m, f. 7. Cercyonis oetus oetus m. 8. Cercyonis sthenele behrii m. 9-10. Cercyonis pegala nephele (may be olympus syntypes but both are now lost, male is not olympus lectotype), m, f. 11-12. Cercyonis oetus charon syntypes (properly paralectotypes), m, f. 13-14. Cercyonis meadii meadii, f, m. 15-16. Cercyonis pegala boopis=baroni (not syntypes) 2m. 17. Cercyonis pegala gabbii=utahensis (not a gabbii syntype) f. 18. Cercyonis pegala pegala f. 19. Cercyonis sthenele paulus m (not a syntype). 20. Cercyonis sthenele sthenele m.

Explanation of Plate XXVII. 1-2. Oeneis nevadensis gigas, m, f. 3. Oeneis (nevadensis?) macounii (designated lectotype by Holland 1915 pl. LXXVI [bad printing and antenna fakery have made the 1915 & 1931 photos a little different], evidently a syntype and may be the syntype Brown found to have #5 on uns of label) m. 4. Oeneis nevadensis iduna (not a syntype; two figs. claimed to be "types" on p. 194 but only pl. LXII fig. 6m called type on plate, thus pl. LXII fig. 6 is Holland's designation of lectotype) m. 5. Oeneis jutta (ssp. terraenovae or ridingiana or reducta) f. 6. Oeneis bore taygete (Nain, Labrador) m. 7. Oeneis polixenes brucei (stated to be the "type" on p. 198, and Brown wrote that it is a syntype, therefore it is Holland's 1931 designation of lectotype; Brown says this fig. 7 male was coll. at the TL Bullion Mtn. July 3 and is a syntype, but did not consider it for Brown's lectotype designation because the O.D. said Aug.; however, Brown's type does not list Aug. either, and has just the locality "Colo." which does not match the TL, and none of the syntypes say Aug.; the bottom line is that this Aug. discrepancy does not matter, because fig. 7 is a syntype and Holland validly designated it as the lectotype; the valid TL is required to be locality of valid lectotype [this specimen] therefore is Bullion Mtn. [above Hall Valley, Park Co. Colo.]. Holland 1898 made no mention of type therefore did not designate a

lectotype.) lectotype m. 8. Oeneis uhleri varuna (probably not a syntype) m. 9. Oeneis calais ivallda (p. 194 says both book specimens are type, plate does not call this male type, so this male is paralectotype, and pl. LXII fig. 4 calls that female type so that female is lectotype designated by Holland 1931) m. 10. Oeneis chryxus m. 11. Oeneis melissa semidea m. 12. Oeneis uhleri uhleri atypical m.

Explanation of Plate XXVIII. 1-2. Libytheana carinenta bachmanni m. 3. Libytheana carinenta larvata f. 4-5. Apodemia virgulti mejicanus (not syntypes) f, Ariz. m. 6. Apodemia virgulti davenporti=pratti m. 7. Apodemia mormo mormo m. 8-9. Apodemia nais nais, m (coll. Morrison; not a syntype), lectotype f. 10. Apodemia virgulti duryi (designated lectotype on p. 213 by Holland 1931; however Holland 1898 p. 230 stated "The only specimen as yet known is the type figured in our plate [pl. XXVIII fig. 10f].", therefore this is actually a Holland 1898 lectotype designation and not a 1931 designation) lectotype f. 11. Apodemia palmeri palmeri (not a syntype) m. 12-13. Calephelis borealis 2m. 14. Calephelis rawsoni arizonensis (W. McAlpine J. Res. Lep. 10:29)(not a syntype of australis) m. 15. Calephelis nemesis nemesis (not a syntype of nemesis, as F. Brown states it is australis) m. 16. Calephelis virginiensis m. 17-18. Emesis ares (not syntypes), m, f. 19-20. Emesis zela cleis (p. 216 says both specimens are types thus neither is Holland's designation of lectotype), m lectotype (Brown claimed that this specimen was both fig. 19 & Brown's lectotype, but Brown's fig. of lectotype has fw tip a bit more falcate and the spots are a bit different, so even after sagging from moisture there is a little doubt that fig. 19 is Brown's lectotype; if it isn't it would be paralectotype), f paralectotype. 21. Feniseca tarquinius spring form m. 22. Eumaeus atala m. 23-24. Lycaena arota arota, m (could be ssp. virginiensis), f (female looks more like ssp. arota and not virginiensis). 25. Lycaena phlaeas hypophlaeas f. 26-27. Lycaena xanthoides editha (text p. 247 says both are types, thus neither is Holland's designation of lectotype; Pelham Catalogue says these are syntypes currently in FMNH), m, f. 28. Lycaena epixanthe phaedra=amicetus (Boisduval & Scudder did not validly publish amicetus according to Miller/Brown note 348, but Holland validly published amicetus in this 1931 book, thus his 3 figs. on pl. XXVIII & LXIV are syntypes, and Clench 1968 later designated this male lectotype according to Pelham Catalogue) lectotype m. 29-30. Lycaena xanthoides xanthoides, m, f. 31-32. Lycaena thoe, m, f. 33-34. Lycaena helloides, m, f. 35-36. Lycaena gorgon. 37-38. Lycaena mariposa mariposa, m, f.

Explanation of Plate XXIX. 1-2. Lycaena arota arota, m, f. 3-4. Lycaena rubidus sirius (p. 252 says both are types thus neither is a lectotype designation by Holland), m lectotype, f (not a syntype). 5-6. Lycaena rubidus rubidus, m, f. 7-8. Lycaena cupreus snowi (not syntypes), m, f. 9. Atlides halesus halesus m. 10. Parrhasius m-album m. 11. Hypaurotis crysalus crysalus f. 12. Habrodais grunus grunus m. 13. Satyrium favonius autolycus f. 14. Phaeostrymon alcestis alcestis holotype f. 15-16. Satyrium acadica, m (now missing), f (the syn. montanensis according to Brown). 17. Satyrium sylvinus putnami=itys lectotype (designated itys lectotype by Holland 1931 on p. 238; however Holland 1898 p. 243 already designated this female the valid lectotype) lectotype f. 18. Calycopis cecrops f. 19-20. Satyrium calanus calanus=wittfeldi, f lectotype (designated lectotype by Holland 1915 pl. LXXI fig. 2), m paralectotype (p. 236 says both specimens are types, thus neither is a lectotype designation by Holland1931). 21. Callophrys spinetorum f. 22. Satyrium favonius favonius m. 23-24. Erora laeta laeta, m, f (f now missing). 25. Satyium tetra=adenostomatis paratype m. 26. Satyrium calanus falacer m. 27. Satyrium edwardsii f. 28. Satyrium liparops liparops f. 29. Callophrys gryneus castalis=discoidalis Tex. (now missing) m. 30. Satyrium auretorum auretorum=tacita m. 31. Strymon melinus f. 32. Callophrys gryneus gryneus=smilacis (not castalis) Md. m. 33-34. Satyrium saepium saepium, m, f. 35. Ministrymon leda form ines lectotype (p. 240 says this is type, and Brown says this is "paratype" syntype, so this is Holland's 1931 designation of lectotype, which may now be in USNM or AMNH) f. 36-37. Satyrium saepium saepium=chalcis, m, f. 38. Strymon acis bartrami f. 39. Chlorostrymon simaethis tacita f.

Explanation of Plate XXX. 1. Callophrys perplexa perplexa m. 2. Callophrys probably perplexa perplexa (Cal.)(identified as viridis by Brown, but has orange unf and grass-green unh so is probably perplexa despite a few white dots), m. 3. Callophrys perplexa perplexa Cal. (not a syntype of affinis) m. 4-5. Satyrium behrii behrii (not syntypes) 2m. 6. Ministrymon clytie holotype f. 7. Calycopis cecrops m. 8. Callophrys gryneus nelsoni f. 9. Callophrys gryneus siva (not a syntype) m. 10. Satyrium titus titus m. 11. Callophrys niphon niphon f. 12. Callophrys irus irus m. 13. Callophrys gryneus nelsoni f. 14. Satyrium titus titus (neon band is bad printer alteration of photo) m. 15. Callophrys augustinus f. 16. Satyrium fuliginosa fuliginosa (not a syntype) m. 17. Callophrys eryphon eryphon f. 18. Strymon martialis m. 19. Celastrina lucia Auctorum?, form marginata (Winnipeg) m. 20. Celastrina lucia form lucimargina m. 21. Callophrys henrici henrici f. 22. Callophrys niphon niphon f. 23. Glaucopsyche lygdamus (not the silvery couperi, looks like ssp. oro) m. 24-25. Possibly P. icarioides fulla, but they look most like Glaucopsyche lygdamus columbia, m (Brown found it missing among icarioides, perhaps because it is in lygdamus drawer), f ("Mt. Hood Ore."). 26. Lycaena heteronea clara (Holland 1898 p. 259 and Holland 1931 p. 253 say "The figure in the plate is that of the type of the female", which sounds a little like he might be just describing the bluer female form; however Holland 1931 p. 253 also lists "Pl. XXX, fig. 26, female, type", which is a definite Holland 1931 lectotype designation; it is a syntype according to Pelham Catalogue [syntypes in MGCL & AMNH]) lectotype f. 27. Leptotes marina f (m?). 28. Plebejus saepiolus hilda (see p. 261)(daedalus belongs to icarioides) f. 29. Plebejus icarioides icarioides m. 30. Euphilotes enoptes enoptes f. 31. Euphilotes (most likely enoptes enoptes or e. tildeni or intermedia) f. 32. Celastrina neglectamajor m. 33. Echinargus isola (not a syntype of alce) m. 34. Glaucopsyche lygdamus couperi m. 35. Glaucopsyche lygdamus (35-36 are not ssp. xerces f. antiacis)(looks like

ssp. columbia) m. 36. Glaucopsyche lygdamus (looks like ssp. couperi) m. 37. Plebejus icarioides pheres m. 38. Echinargus isola f. 39. Euphilotes perhaps glaucon (Not a syntype. Not anna as Brown claimed, thefigure is obviously Euphilotes and could be glaucon. P. 266 calls it type, but the label on this anna specimen in CM reads "Glaucon male/Nev. Morr.", the collector Herbert Morrison, so the original lost Euphilotes specimen could not have been a syntype because Brown wrote that the source of glaucon types was "2m, 1f, taken by Mr. Henry Edwards) m. 40. Plebejus scudderi scudderi=aster paralectotype m. 41. Glaucopsyche lygdamus (ssp. xerces form antiacis?, or could be ssp. incognitus, text calls figs. 35-36 & 41 "behri") f. 42. Plebejus icarioides pheres f. 43. Glaucopsyche lygdamus xerces m. 44. Glaucopsyche piasus piasus f. 45. Echinargus thomasi, perhaps ssp. bahamensis (not catalina, a ssp. of Leptotes cassius from Virgin Is.) f. 46-47. Plebejus scudderi scudderi=aster paralectotypes, f, m. 48-49. Plebejus samuelis (according to Brown, & J. Masters J. Lepid. Soc. 26:153) m (Albany, N.Y.), f (N.Y.). 50. Glaucopsyche lygdamus probably ssp. oro, f. 51. Euphilotes enoptes (battoides has similar ups) m.

Explanation of Plate XXXI (too whitish). 1-3. Celastrina lucia Auct. or C. ladon (#1 form lucia m, now missing; #2 form marginata m, missing; #3 form lucimargina f, ?Long Is.). 4. Celastrina nigra Coalburgh W.Va. m. 5. Celastrina ladon f. violacea W. Va. Apr. 13, m. 6-9. Celastrina neglecta (#8 missing, #9 reared)(Brown det. #6 & #9 as neglecta), m, f, m, f. 10. Celastrina (neglecta) echo S. Cal. W. Wright m. 11-12. Plebejus saepiolus hilda (daedalus belongs to icarioides), m, f. 13-14. Lycaena heteronea (syn. klotsi?), m, f. 15-16. Plebejus saepiolus (looks like N Cal. near-rufescens), m, f. 17-18. Glaucopsyche lygdamus couperi (silvery ups, however the whole plate is too whitish), m, f. 19-20. Glaucopsyche piasus piasus, m, f. 21-22. Philotes sonorensis, m, f. 23-24. Plebejus shasta shasta, m, f. 25. Plebejus melissa melissa Colo. T. L. Mead paralectotype (now broken) m. 26. Plebejus anna anna (not a syntype of melissa)(probably from "Summit" area W of Donner Pass Cal.) f. 27-28. Plebejus acmon, m, spring form f. 29-30. Cupido comyntas comyntas, m, f. 31. Echinargus thomasi (ssp. bethunebakeri or bahamensis) f. 32. Leptotes marina f.

Explanation of Plate XXXII. 1-2. Philotiella speciosa speciosa, m (Pelham Catalogue says this might possibly be holotype, but that is dubious as text only mentions fig. 2 is paratype), f (text says paratype). 3. Hemiargus hanno gyas m. 4. Brephidium (exilis) pseudofea m. 5. Brephidium exilis exilis m. 6. Leptotes cassius theonus f. 7-8. Cupido amyntula amyntula, m, f. 9-10. Plebejus glandon franklinii 2m. 11. Euphilotes, maybe battoides ssp. but looks most like centralis m. 12. Cupido comyntas comyntas m. 13. Plebejus atrapraetextus annetta (det. by F. M. Brown, now missing and ups resembles P. melissa so may really be melissa; not a syntype of annetta) m. 14. Plebejus atrapraetextus annetta (p. 264 says 3 specimens are types so neither is Holland's designation of lectotype) paralectotype f. 15-16. Plebejus podarce podarce 2m. 17. Plebejus glandon rustica (now missing) m. 18. Plebejus icarioides lycea (not a syntype) S Colo. m. 19. Lycaena heteronea heteronea=klotsi f. 20. Strymon melinus ssp. m. 21-22. Nathalis iole, m, f. 23. Euchloe hyantis hyantis m. 24-25. Euchloe ausonides ausonides, m, f. 26-27. Anthocharis cethura deserti, m (aberrant fw apex), f. 28-29. Anthocharis, looks like A. julia flora, m, f. 30. Anthocharis lanceolata lanceolata m. 31-32. Anthocharis sara sara (not syntypes of reakirtii), m, f. 33. Anthocharis cethura pima lectotype (designated lectotype by Holland 1931) m. 34. Anthocharis sara (looks more like ssp. sara)(not syntype of julia) m. 35-36. Anthocharis julia stella (not syntypes of stella), m (aberrant, ssp. unknown), f. 37-38. Anthocharis midea annickae, m, f. 39. Euchloe olympia=rosa lectotype (designated rosa lectotype here by Holland 1931; Pelham Catalogue wrongly says Brown's later invalid lectotype was this male but the two clearly differ in maculation) m.

Explanation of Plate XXXIII. 1. Phoebis agarithe m. 2-3. Phoebis sennae sennae wet season 2m. 4. Phoebis philea m. 5. Colias eurytheme m. 6. Vanessa virginiensis f.

Explanation of Plate XXXIV. 1. Anthocharis cethura morrisoni m. 2. Euchloe (hyantis) lotta f. 3. Euchloe ausonides ausonides m. 4-5. Anthocharis julia flora, m, f. 6. Anthocharis julia julia f. 7. Neophasia menapia menapia m. 8-9. Pontia beckerii (not syntypes), m, f. 10-11. Pontia protodice, m, f. 12. Pontia sisymbrii sisymbrii m. 13. Pontia callidice occidentalis m. 14. Pieris virginiensis neotype m. 15. Pieris, perhaps marginalis marginalis form pallida (a hybrid with P. rapae?, odd-looking with black upf bar) f. 16. Pieris oleracea m. 17. Pieris hulda pseudobryoniae f. 18. Pontia protodice spring form vernalis (not a syntype) m. 19. Pieris oleracea=frigida=acadica (paralectotype of acadica) f. 20-21. Kricogonia lyside, m, f.

Explanation of Plate XXXV. 1-2. Ascia monuste phileta, m, f. 3. Pieris rapae f. 4-5. Appias drusilla neumoegeni, m, f. 6-7. Colias alexandra alexandra (not syntypes), m, f. 8-9. Colias scudderii scudderii, m, f. 10-11. Colias interior, m, f. 12-13. Colias occidentalis chrysomelas, m, f. 14. Colias pelidne pelidne (borders unusually narrow) m. 15. Colias philodice philodice m.

Explanation of Plate XXXVI. 1-2. Zerene eurydice, m, f. 3-4. Zerene cesonia cesonia, m, f. 5-6. Colias meadii meadii (p. 297 says both figs are types, thus neither is Holland's designation of lectotype) lectotype m, paralectotype f. 7-8. Colias eurytheme form ariadne, m, f. 9-10. Colias eurytheme summer form="keewaydin", m (lectotype of keewaydin), f. 11-12. Colias nastes (looks like ssp. gueneei), m, f. 13-14. Colias meadii elis (p. 298 says both are types so neither is Holland's designation of lectotype; Pelham Catalogue says one of the two is possibly holotype & states that current holotype is in Field Museum, but actually there is no holotype as O.D. failed to designate one), m, f. 15. Colias pelidne pelidne m. 16. Colias pelidne pelidne (but looks more like scudderii gigantea) f. 17. Colias behrii lectotype (designated lectotype by Holland 1931 on p. 299) m.

Explanation of Plate XXXVII. 1. Eurema proterpia f. gundlachia=longicauda m. 2. Eurema proterpia m. 3-6. Eurema nicippe, m, pale aberration f, yellow aberration flava m, f. 7-8. Eurema mexicana 2m. 9-10. Eurema salome (not damaris, which is a syn. of mexicana), m, f. 11. Eurema dina westwoodi m. 12. Eurema daira lydia f. lydia (summer form) m. 13. Eurema lisa m. 14. Eurema daira daira=delia winter f. daira m. 15-16. Eurema daira daira summer f. jucunda 2m. 17-18. Enantia melite, m, f.

Explanation of Plate XXXVIII. 1. Papilio zelicaon m. 2. Papilio multicaudata multicaudata m. 3. Papilio pilumnus m.

Explanation of Plate XXXIX. 1-2. Parnassius phoebus behrii, m, f. 3-4. Parnassius phoebus smintheus variants, m, f. 5-6. Parnassius phoebus maximus, m, f. 7-8. Parnassius clodius "baldur", m, f. 9-10. Parnassius clodius clodius, m, f.

Explanation of Plate XL. 1. Papilio polyxenes asterias m. 2. Papilio machaon bairdii (not a syntype) m. 3. Papilio machaon bairdii form hollandii (designated lectotype by Holland 1931) lectotype m. 4. Papilio machaon brucei (designated lectotype by Holland 1931) lectotype f. 5. Papilio brevicauda brevicauda f.

Explanation of Plate XLI. 1. Papilio machaon hudsonianus (Rupert's House, Hudson Bay)(p. 314 says "type" of aliaska, but not a syntype; Pelham Catalogue claims this was Holland's 1931 designation of aliaska lectotype, which if true would make hudsonianus a syn. of aliaska. However, p. 314 also says Holland has another type from Scudder's original material labeled Alaska; thus Holland called two specimens types, therefore neither is a lectotype designation by Holland, and hudsonianus is a valid ssp. And p. 314 says this specimen is from Rupert's House, and Scudder's aliaska types were all from Alaska, thus this male is not a syntype of aliaska) m. 2. Papilio zelicaon form nitra lectotype (designated lectotype by Holland 1931) m. 3. Papilio indra indra f. 4. Battus polydamas polydamas m. 5. Papilio troilus troilus m. 6. Papilio polyxenes asterias aberration calverleyi (evidently holotype; text says type; Miller/Brown say HT may be in AMNH or Albany; Pelham Catalogue says this is holotype probably in CM) f.

Explanation of Plate XLII. 1. Papilio palamedes palamedes f. 2. Battus philenor philenor m. 3. Papilio cresphontes m. 4. Papilio thoas cinyras (Amazons in Rothschild & Jordan, Brazil in text) m.

Explanation of Plate XLIII. 1. Papilio glaucus glaucus (yellow form "turnus") m. 2. Papilio glaucus glaucus, f black form. 3. Colias philodice=hageni f. 4. Vanessa atalanta rubria f. 5. Epargyreus clarus m.

Explanation of Plate XLIV. 1. Eurytides marcellus, spring form m. 2. Eurytides marcellus, spring form m (Holland 1898 named floridensis & designated holotype by monotypy on p. 307 "Another winter form, for which I propose the name floridensis, is represented in Plate XLIV, Fig. 2, by a male specimen.") spring form m. 3-4. Eurytides marcellus, summer form m, spring form (holotype walshii) m. 5. Papilio eurymedon m.

Explanation of Plate XLV. 1. Papilio glaucus rutulus m. 2. Hesperopsis alpheus (not a syntype) Ariz. m. 3. Calpodes ethlius f. 4. Pholisora catullus m. 5. Erynnis afranius m. 6.Urbanus proteus m. 7. Erynnis brizo f. 8. Erynnis juvenalis clitus (evidently not a syntype) m. 9. Apyrrothrix araxes arizonae m. 10. Achalarus lyciades f. 11. Zestusa dorus lectotype (designated lectotype here by Holland 1931) m. 12. Autochton cellus m.

Explanation of Plate XLVI. 1. Systasea pulverulenta (not a syntype of zampa as stated in text; the real type was lost at sea) m. 2-3. Hesperia comma manitoba, m, f. 4-5. Atalopedes campestris, m, f. 6. Atrytone arogos m. 7-8. Poanes melane melane (not syntypes as text claims)(from San Bernardino, W. Wright), m, f. 9-10. Atrytonopsis hianna hianna, m, f. 11-12. Hesperia ottoe (not syntypes as text claims) m (Neb.) f. 13. Hesperia sassacus sassacus m. 14. Poanes aaroni=howardi (not a type on p. 391) m. 15. Poanes viator zizaniae (not a syntype of viator as text claims) Tex. f. 16-17. Euphyes conspicua, m (now missing), f (Long Island). 18-19. Hylephila phyleus phyleus, m, f. 20. Problema byssus byssus (text p. 386 says both figs. on 2 pl. are types, but this is not called type on plate whereas male on pl. LIII fig. 38 is called type on plate, thus LIII fig. 38 is Holland 1931 lectotype designation) paralectotype f. 21. Euphyes pilatka m. 22-23. Polites mystic mystic, neotype m, f. 24-25. Anatrytone logan logan (Kanawha R., W. Va.), neotype of delaware m, neotype of logan f. 26-27. Stinga morrisoni (So. Colo., 7500')(p. 372 says 3 specimens are types, but on plates only pl. LII fig. 15 male is called type, thus the latter is Holland 1931 designation of lectotype, not this specimen), paralectotype m, paralectotype f. 28-29. Wallengrenia otho otho, m, f. 30. Polites themistocles=taumas f. 31. Euphyes vestris metacomet (not ruricola) m (now missing). 32. Pompeius verna m. 33. Lerodea eufala f. 34. Panoquina ocola m (now missing). 35. Oligoria maculata m. 36. Amblycirtes carolina (Holland 1931 p. 362 designates this male lectotype; Miller/Brown say HT in CM suggesting this may be holotype, but Pelham Catalogue says this is syntype [syntypes in ANSP]; actually Holland 1898 p. 367 stated that this specimen is the type, so it is the valid lectotype designation is by Holland 1898) lectotype m. 37. Poanes aaroni paratype (now lost) m. 38. Poanes aaroni syn. howardi (designated lectotype by Holland 1931 on p. 391 [the fig. on pl. XLVI fig. 14 is not type and fig. on LIV fig. 1 is paratype according to p. 391 & plates]; Miller/Brown say HT in CM, but Gatrelle Tax. Report of Int. Lep. Survey 2[2]:6-7 wrote that no holotype was designated and fig. 38 was a syntype; the bug in fig. 38 is now lost [in Gatrelle's paper, pl. XLVI fig. 38m Poanes howardi in 1931 book is the same bug as Phycanassa howardi in 1898 book {which Gatrelle wrote was on pl. 46 then wrongly wrote LXVI, actually XLVI}]; Gatrelle designated a 2nd lectotype in CMNH with "type 7092" label, which is invalid; Holland's earlier 1931 lectotype is valid even though lost. Holland 1898 did not designate a lectotype.) lectotype m. 39. Thorybes mexicana=aemilia (Fort Klamath Ore.)(designated aemilia lectotype by Holland 1898 on p. 325; Miller/Brown say HT should be in CM, but there must not be a holotype as Pelham Catalogue says Holland 1931 designated this lectotype, which is true but Holland 1898

already designated it) lectotype f. 40. Poanes yehl (text says type; this would be a Holland 1898 lectotype designation, but there is a holotype, in FMNH) m.

Explanation of Plate XLVII. 1. Carterocephalus “palaemon” “magnus” Mendocino Cal. m. 2. Ancyloxypha numitor m. 3. Oarisma edwardsii m. 4. Oarisma poweshiek m. 5. Amblyscirtes vialis (Hunter N.Y.) m. 6. Amblyscirtes hegon=samoset (now missing) m. 7. Amblyscirtes aenus aenus f (now missing). 8. Notamblyscirtes simius (designated lectotype on p. 369 in Holland 1931 Butt. Book—Pelham Catalogue says Holland 1898 designated lectotype but he surely meant 1931 as simius is on p. 369 in 1931 book and on p. 341 in 1898 book which was thoroughly revised in 1931. Also, Holland 1898 did not say any specimen was type thus made no lectotype designation) lectotype m. 9. Copaeodes aurantiaca=waco (Ariz., Morrison coll.) m. 10. Pseudocopaeodes eunus eunus=“wrighti” (p. 369 says this is type, and Brown wrote it may have been a syntype but Brown found no Edwards label on it thus there is no proof it was syntype, so this is not a valid Holland lectotype designation; Brown designated the valid lectotype) paralectotype m. 11. Ancyloxypha arene (not a myrtis syntype) m. 12. Pyrgus scriptura f. 13. Pyrgus centaureae (ssp. wyandot evidently, maybe loki) m. 14. Pyrgus ruralis ruralis f. 15. Pyrgus xanthus So. Col. paralectotype f. 16. Amblyscirtes aesculapius=wakulla lectotype m. 17. Celotes nessus Bastrop Co. Tex. m. 18. Pyrgus communis (not P. philetas=occidentalis which has darker ups) m. 19. Heliopetes domicella m. 20. Polites themistocles=taumas m. 21-22. Poanes massasoit massasoit, m, f. 23. Hesperia attalus attalus m (now missing). 24-25. Polites peckius peckius, m, f. 26. Polites mardon mardon (p. 381 says both figs. pl. XLVII fig. 26 male and pl. LIII fig. 12 female are types, but plates say only pl. LIII fig. 12 female is type, so the latter female is a Holland 1931 lectotype designation, even though pl XLVII fig. 26m is a syntype; Pelham Catalogue states that Holland’s 1898 Butt. Book designated the pl. 47 fig. 26 male as lectotype, but Holland 1898 p. 354 & plate explanation does not say that pl. XLVII fig. 26m is a type, so this is NOT a Holland 1898 lectotype designation) paralectotype m. 27-28. Hesperia uncas uncas, m neotype N Col., f. 29-30. Paratrytone snowi Ariz., m, f. 31-32. Poanes taxiles (p. 390 says both specimens are types, so neither is a Holland 1931 lectotype designation), lectotype m, f (evidently paralectotype, now missing). 33-34. Hesperia metea metea, m, f. 35-36. Hesperia leonardus leonardus, m, f. 37-38. Poanes hobomok hobomok, m, f. 39. Poanes zabulon f. 40. Hylephila phyleus phyleus m. 41. Polites vibex vibex=brettus f. 42-43. Polites sabuleti sabuleti, m, f. 44. Hesperia comma (looks like ssp. ochracea) m.

Explanation of Plate XLVIII. 1. Erynnis persius m. 2. Erynnis brizo brizo=somnus m. 3. Erynnis zarucco terentius f. 4. Erynnis martialis m. 5. Thorybes bathyllus f. 6. Thorybes pylades pylades f. 7. Erynnis horatius f. 8. Lerema accius m. 9. Erynnis pacuvius pacuvius f. 10. Erynnis lucilius (?) m. 11. Erynnis juvenalis juvenalis f. 12. Erynnis funeralis m. 13. Achalarus casica=epigena m. 14. Hesperopsis libya libya m. 15. Erynnis horatius f. 16. Staphylus hayhurstii (Indian River Fla.) f. 17. Erynnis icelus m. 18. Colias eurytheme albino f.

Explanation of Plate XLIX. 1. Phocides pigmalion okeechobee m. 2. Phocides polybius lilea m. 3. Phocides urania m. 4. Dyscophellus euribates m. 5. Polygonus leo=amyntas m. 6-7. Proteides mercurius mercurius=idas, m, f. 8-9. Epargyreus exadeus, m, f. 10. Epargyreus zestos m. 11-12. Urbanus dorantes dorantes, m, syn. rauterbergi paratype m. 13. Urbanus simplicius m. 14. Urbanus teleus=eurycles m. 15. Codatractus arizonensis paratype m. 16. Codatractus carlos f. 17. Chioides catillus albofasciatus f. 18. Chioides zilpa m. 19. Aethilla memmius=hahneli paratype m.

Explanation of Plate L. 1. Thorybes confusis paratype m. 2. Thorybes confusis (spots wider than normal but spot in cell M_3 far from spot in cell CuA_1) paratype f. 3. Thorybes mexicana mexicana=nevada (?, atypical) paratype (properly syntype, as there is no holotype) m. 4. Thorybes drusius (Holland 1931 designation of lectotype) lectotype m. 5-6. Thorybes mexicana mexicana 2m. 7-8. Cogia hippalus, f (not a syntype), m (may be a syntype). 9. Autochton pseudocellus m. 10. Cabares potrillo m. 11. Cogia outis paratype m. 12. Cogia calchas m. 13-14. Cogia caicus moschus, lectotype (designated lectotype by Holland 1931) m, paralectotype m. 15. Pyrgus oileus (doubtfully orcas, which is the Costa Rica-S. Amer. ssp.) m. 16-17. Pyrgus oileus oileus=syrichtus, f, m. 18. Pyrgus oileus oileus=montivaga m. 19-22. Pyrgus communis, m, f, m, f. 23. Pyrgus communis (not occidentalis, which is a syn. of P. philetas) m. 24. Pyrgus philetas holotype f. 25-26. Heliopetes laviana, m, f. 27-28. Heliopetes ericetorum, m, f. 29. Heliopetes macaira macaira pale form (not nivella)(according to Evans’ Amer. Hesperiidae), m. 30-31. Heliopetes macaira macaira 2m. 32. Pholisora mejicanus m. 33-34. Staphylus mazans (received from Staudinger, so evidently ssp. ascalaphus paratypes from S Mex.-S Amer.), m, f. 35. Staphylus ceos (not a syntype) Ariz. m 36. Hesperopsis libya lena lectotype (designated lectotype by Holland 1931) m (Montana). 37. Chiomara asychis m. 38. Xenophanes trixus m. 39. Achlyodes thraso thraso (probably Chiriqui, Panama) m. 40-41. Ephyriades brunnea, m, f.

Explanation of Plate LI. 1-2. Gesta gesta invisus, m, f. 3-4. Erynnis brizo brizo=somnus (multiple specimens are called type on p. 350 & on plate, thus none is a Holland lectotype designation) lectotype (designated by J. Calhoun) m, paralectotype f. 5. Ephyriades brunnea f. 6. Ephyriades zephodes f. 7. Erynnis brizo burgessi paratype m. 8. Erynnis brizo lacustra m. 9. Erynnis “scudderi paratype” (looks like pacuvius to me; some of these Erynnis would require genitalic dissection for positive identification) m. 10. Erynnis tristis tristis m. 11. Erynnis horatius m. 12. Erynnis propertius propertius m. 13. Grais stigmaticus m. 14. Timochares ruptifasciatus m. 15. Piruna pirus (Water Can., Socorro Co. NM, not a syntype) m. 16-17. Oarisma garita, 2m. 18. Carterocephalus palaemon skada (Rampart, Alaska, not a syntype) m. 19-20. Piruna polingii (plate says 19 is paratype, text says 20 is paratype), 2m. 21. Copaeodes aurantiaca m. 22-23. Copaeodes minima (not syntypes), m Comfort Tex., f Tex. 24-25. Amblyscirtes nysa (both figs. are called types on p. 364

& on plate, thus neither is a Holland designation of lectotype), m (not a syntype), lectotype f. 26-27. Amblyscirtes eos=comus (W Tex.), f (text says type of comus, but not a syntype), m (neotype of comus). 28-29. Erynnis persius=avinoffi syntypes (male is holotype, female allotype, according to O.D.), m, f. 30. Amblyscirtes celia paratype m. 31. Amblyscirtes cassus lectotype (designated lectotype by Holland 1931) m. 32. Amblyscirtes phylace S Colo. holotype f. 33-34. Amblyscirtes alternata, f, m. 35-36. Amblyscirtes exoteria=nanno (Ariz., H. Morrison, not syntypes), m, f. 37. Thymelicus lineola m. 38. Amblyscirtes fimbriata=bellus (Huachuca Mts., Ariz., not a syntype) m. 39. Amblyscirtes oslari paratype m. 40. Copaeodes aurantiaca=waco=candida (Ariz., H. Morrison) f. 41. Choranthus haitensis paratype m. 42. Amblyscirtes nereus (Ariz., H. Morrison, not a syntype) m. 43-44. Polites (Yvretta) carus (both figs are called types on p. 369 & on plate, thus neither is a Holland lectotype designation), m (Ariz., not a syntype), lectotype f. 45-46. Polites (Yvretta) rhesus (both figs are called types on p. 369 & on plate, thus neither is a Holland lectotype designation), lectotype m, paralectotype f. 47. Choranthus radians m. 48-49. Hesperia comma laurentina, m, f.

Explanation of Plate LII. 1. Hesperia nevada m (so doubtfully a syntype of colorado unless it was misidentified in type series—and I greatly doubt that this is the specimen declared colorado lectotype by Barnes & McDunnough [1916] as some people might interpret Pelham Catalogue—because this is the wrong species and fig. 2 is not called type on plate; p. 371 says both figs. are types but plate says only fig. 1 is type, so fig. 1 would be a lectotype designation, but I do not consider it to be a valid Holland 1931 designation of colorado lectotype because it is very doubtfully a syntype of colorado). 2. Hesperia comma colorado (p. 371 says figs. 1-2 are both types, but this is not called type on plate, so doubtfully a syntype) f. 3. Hesperia comma idaho (designated lectotype by Holland 1931; Brown & Miller wrongly claimed that Barnes & McDunnough 1916 [Contrib. Nat. Hist. Lepid. 3 #2:127] designated it earlier as lectotype. Actually Barnes & McDunnough wrote "*Idaho* Edw., described from Oregon, Washington, and California is a form with paler, yellowish green underside of secondaries, on which the white markings stand out very distinctly; we would restrict the type to the male from *East Calif.* in the Edwards' Collection." They would have—but did not. They would have designated a lectotype if they had said that "we restrict the lectotype"; instead Holland 1931 validly designated this lectotype.) lectotype m. 4. Hesperia comma assiniboia paratype m. 5-6. Hesperia comma hulbirti X harpalus "oregonia" (worthless intergrade name)(p. 372 & plate say that both specimens are types, therefore neither is a Holland lectotype designation) (Cal., O. Baron), m lectotype, f paralectotype. 7-8. Hesperia juba, m, f. 9. Hesperia juba=ogdenensis holotype f. 10. Hesperia viridis m. 11. Hesperia woodgatei paratype m. 12-14. Hesperia nevada (p. 372 & plates say that all 3 specimens are types, thus none is Holland lectotype designation) paralectotypes (lectotype is in MCZ, fig. 12 sent from Scudder, 13-14 in Mead coll.), m (not holotype), f, f. 15. Stinga morrisoni (evidently syntype given by Edwards to his brother-in-law Theodore Mead [as in Problema byssus]; p. 372 calls this plus the two figs. on pl. XLVI types, but on plates only this fig. 15 is called called type, thus this pl. LII fig. 15 male is lectotype designation by Holland 1931) lectotype m. 16. Hesperia comma idaho (or colorado) m. 17-18. Hesperia comma harpalus=cabelus (not "Nev.")(H. Morrison)(p. 373 says both specimens are types, but only fig. 17 is called type on plate, which is thus Holland 1931 designation of lectotype), lectotype m, paralectotype m. 19. Hesperia comma harpalus (not "Nev.")(H. Morrison)(p. 373 & plate says that both specimens are types, thus neither is Holland 1931 designation of lectotype) lectotype m. 20. Polites sabuleti (doubtfully a harpalus syntype but perhaps a harpalus paralectotype f that was misidentified) f. 21. Hesperia sassacus=manitoboides f. 22. Hesperia dacotae paratype m. 23. Hesperia sassacus f. 24. Hesperia attalus attalus (Tex.)(designated lectotype by Holland 1931) lectotype f. 25-27. Hesperia attalus slossonae=seminole, m, f, m. 28. Hesperia metea licinus (Tex.) holotype m. 29. Hesperia leonardus montana paratype m. 30-31. Hesperia leonardus pawnee, m paratype (or just Neb. topotype; Pelham Catalogue says syntype as there is evidently no holotype/lectotype, Miller/Brown say type location unknown), f (Mont., not a syntype according to text). 32-34. Hesperia meskei meskei, paralectotype of straton (Indian River Fla.; Brown wrote that this is straton) m, holotype of meskei (Bastrop Tex.) f, lectotype of straton (designated lectotype of straton by Holland 1931) (Indian River Fla.) m. 35-36. Ochlodes sylvanoides sylvanoides, m, f. 37-38. Ochlodes sylvanoides sylvanoides=napa (not syntypes), m Colo. D. Bruce, f Idaho Springs Colo. T. Mead. 39-40. Ochlodes agricola agricola=nemorum, m, f. 41. Ochlodes sylvanoides sylvanoides=pratincola m. 42-43. Ochlodes agricola verus (p. 378 & plate both say both specimens are types, thus neither is a Holland lectotype designation) Havilah, Kern Co. Calif., lectotype m, paralectotype f. 44. Ochlodes agricola agricola=milo holotype m. 45-46. Ochlodes agricola agricola, m, f.

Explanation of Plate LIII. 1. Ochlodes yuma yuma m (Jensen P.O., Uintah Co. Utah). 2. Ochlodes yuma yuma=scudderi, paratype m. 3. Polites origenes origenes Coalburgh W.Va. melanic m. 4. Polites origenes rhena (not a syntype) m. 5. Polites mystic m (alcina is a syn. of rhena)(perhaps a paratype of alcina and misidentified). 6. Polites themistocles=taumas f. 7. Polites origenes origenes f. 8. Euphyes vestris f (now missing). 9. Polites sonora siris (Mt. Hood, Ore.) (designated lectotype by Holland 1931) lectotype m. 10-11. Polites sonora sonora, m (p. 381 says paratype), f. 12. Polites mardon mardon (p. 381 says both figs. on pl. XLVII fig. 26m & pl. LIII fig. 12f are types, but in plates only LIII fig. 12f is called type, thus the latter female is a Holland 1931 lectotype designation; Pelham Catalogue incorrectly stated that Holland 1898 designated pl. XLVII fig. 26 as type, which Holland did not do) lectotype f. 13. Polites sonora utahensis paratype m. 14. Polites peckius peckius f. 15-16. Polites draco (Colo.)(p. 382 & plate both say that both specimens are types, thus neither is Holland lectotype designation) lectotype m, paralectotype f. 17. Polites sabuleti tecumseh m. 18-19. Polites sabuleti chusca holotype m, f. 20. Polites mystic mystic f. 21-22. Polites baracoa, m, f. 23. Polites mystic dacotah

(Colo.) holotype m. 24-25. Polites vibex brettus 2m. 26. Polites vibex praeceps=brettoides (Tex.) (designated brettoides lectotype by Holland 1931) lectotype m. 27. Polites vibex vibex m. 28. Polites vibex praeceps=stigma paratype m. 29. Wallengrenia otho clavus=curassavica f. 30. Anatrytone logan lagus (E Mont., not a syntype) m. 31-32. Polites origenes origenes Coalburgh W.Va., m, f. 33-34. Euphyes arpa, m, f. 35. Euphyes pilatka (Indian River Fla.) f. 36-37. Euphyes dion (Whiting, Ind.), (designated lectotype by Holland 1931) lectotype m, paralectotype f. 38. Problema byssus byssus (text p. 386 says both specimens are type, but plates says only pl. LIII fig. 38 is type, thus this fig. 38 is Holland 1931 designation of lectotype) lectotype m. 39. Problema bulenta (text p. 386 says this is kumskaka paratype, but plate says only det. Scudder [in error], and specimen is not P. byssus kumskaka; it cannot be a kumskaka paratype) m. 40-41. Euphyes vestris vestris=osceola paratypes, m, f. 42-45. Poanes hobomok hobomok, m, female form pocahontas f, pocahontas=quadaquina paratype f, pocahontas=alfaratta holotype f. 46-47. Poanes zabulon 2m.

Explanation of Plate LIV. 1. Poanes aaroni=howardi paratype f. 2. Poanes viator viator (Ont., not a syntype) m. 3. Atrytonopsis vierecki paratype m. 4-5. Atrytonopsis python python, holotype m, paratype f (Brown mistakenly illustrated this female and called it the holotype). 6-7. Atrytonopsis hianna loammi, m Lutz Fla., f (now missing). 8. Hesperia attalus slossonae (Fla., H. Morrison) f. 9-10. Thespieus macareus 2m. 11. Atrytonopsis pittacus (designated lectotype by Holland 1931) lectotype m. 12. Atrytonopsis python margarita (evidently paratype) m. 13-14. Atrytonopsis hianna deva (Ariz., H. Morrison, not syntypes), m, f. 15-16. Atrytonopsis lunus (p. 393 & plates both say both specimens are types, thus neither is Holland lectotype designation), lectotype m (Ariz., H. Morrison), f (probable paralectotype). 17. Nastra neamathla neamathla paratype m. 18-19. Nastra lherminieri, m, f (odd hw shape but evidently not Oarisma). 20-21. Panoquina panoquin, m (Fla.), f. 22. Lerema accius (not a syntype of ocola; Brown said the figured bug was missing but he was looking in the ocola drawer and it is surely in the accius drawer) f. 23. Panoquina panoquinoides panoquinoides paratype m. 24. Panoquina panoquinoides errans paratype m. 25. Panoquina lucas=sylvicola m. 26. Euphyes dukesi dukesi (text says type, plate says paratype; called holotype by Pelham Catalogue) paratype or holotype m. 27-28. Megathymus yuccae coloradensis 2m 29. Agathymus aryxna aryxna m. 30. Megathymus streckeri streckeri m. 31-32. Agathymus polingi polingi paratypes, m, f. 33. Agathymus alliae alliae m. 34-35. Megathymus cofaqui cofaqui, f, m.

Explanation of Plate LV. 1. Lycorea halia atergatis m. 2-4. Argynnis (Speyeria) nokomis coerulescens (p. 85 & plate says two specimens are types, thus neither is a Holland lectotype designation), f paralectotype, m lectotype, f paralectotype. 5-6. Argynnis (Speyeria) cybele carpenteri (p. 87 & plate says both are types, thus neither is Holland lectotype designation), lectotype m, allotype (properly paralectotype) f. 7. Argynnis (Speyeria) hydaspe purpurascens paralectotype m. 8. Boloria selene nebraskensis holotype m. 9-10. Boloria frigga gibsoni=lehmanni, holotype m, allotype f. 11. Boloria eunomia triclaris m (the black wing bases esp. on right are evidently smut). 12. Boloria polaris m. 13. Boloria selene terraenovae holotype m (too melanic, more smut?). 14-15. Boloria bellona toddi, holotype m, allotype f. 16-18. Boloria titania (chariclea) butleri, m & f (not syntypes), lectotype (designated lectotype by Holland 1931) m. 19-21. Boloria selene atrocostalis=albequina (p. 107 & plate says two specimens are types, thus none is a Holland lectotype designation) syntypes, m, f, m. 22-23. Boloria titania (chariclea) arctica, m, f. 24-25. Boloria alaskensis alaskensis, m holotype, f. 26. Boloria bellona bellona=pardopsis holotype f. 27-28. Boloria improba improba, m, aberration youngi holotype m.

Explanation of Plate LVI. 1. Argynnis (Speyeria) cybele charlotti f (evidently syntype; Pelham Catalogue calls this holotype, which is in USNM). 2. Argynnis (Speyeria) cybele krautwurmi holotype f. 3. Argynnis (Speyeria) egleis utahensis paratype m. 4. Argynnis (Speyeria) hydaspe rhodope=sakuntala paralectotype f. 5. Argynnis (Speyeria) coronis coronis=californica paratype m. 6. Argynnis (Speyeria) mormonia luski paralectotype f. 7. Argynnis (Speyeria) mormonia erinna (designated lectotype by Holland 1931) lectotype m. 8. Argynnis (Speyeria) mormonia washingtonia (text says paralectotype) m. 9. Boloria selene atrocostalis=jenningsae holotype m. 10. Euphydryas anicia maria paratype (properly syntype as there is no holotype) m. 11-12. Boloria eunomia dawsoni paratypes, m, f. 13. Chlosyne whitneyi damoetas paratype m. 14-15. Chlosyne definita definita paratype (properly paralectotype, as there is no holotype) 2m. 16. Chlosyne sterope (acastus) neumoegeni paratype m. 17. Boloria kriemhild=laurenti paratype (properly syntype as there is no holotype or lectotype) m. 18-19. Euphydryas chalcedona chalcedona=cooperi (not syntypes), m, f. 20-21. Euphydryas anicia carmentis paratypes, m, f. 22. Euphydryas gillettii paratype (properly paralectotype, as there is no holotype) m. 23-24. Euphydryas anicia magdalena paratypes, m, f. 25. Chlosyne palla flavula paratype (properly syntype, as there is no holotype or lectotype) m.

Explanation of Plate LVII. 1. Euphydryas chalcedona dwinellei m. 2-3. Euphydryas chalcedona paradoxa=perdiccas (p. 117 & plate say both specimens are types, thus none is Holland lectotype designation), lectotype m, allotype (properly paralectotype) f. 4-5. Euphydryas chalcedona olancha, m, f. 6-7. Euphydryas chalcedona sierra, m, f. 8-9. Euphydryas chalcedona hennei=”quino”, m, f. 10-11. Euphydryas anicia anicia, m, f. 12-13. Euphydryas anicia helvia, m, f. 14. Euphydryas bernadetta bernadetta paratype (properly paralectotype, as there is no holotype) m. 15-16. Euphydryas anicia eurytion syntypes, m, f. 17. Euphydryas chalcedona macglashanii=truckeensis f. 18-19. Euphydryas anicia capella paratype (properly paralectotype, as there is no holotype), m, f. 20-21. Euphydryas anicia alena paratypes, m, f. 22-23. Euphydryas anicia morandi holotype m, allotype f. 24-25. Euphydryas chalcedona irelandi holotype m, allotype f. 26-27. Euphydryas editha edithana=monoensis paratypes, m (p. 123 & Pelham Catalogue calls this monoensis holotype but plate says it is paratype, and the fig. look a little different from Gunder’s fig. of holotype), f. 28-29. Euphydryas editha aurilacus

(or a syn. of rubicunda) paratypes (text says holotype & allotype)(Pelham Catalogue calls fig. 28 holotype but the fig. looks a little different from Gunder's fig. of "type", so probably Gunder's is holotype and Holland's is paratype), m, f.

Explanation of Plate LVIII. 1. Euphydryas anicia wheeleri paratype (G. Austin, Syst. W N.A. Butt. chap. 50:635) m. 2. Euphydryas editha colonia m. 3. Euphydryas anicia (ssp. wheeleri?) m. 4-6. Euphydryas editha editha, f (not a rubicunda syntype as claimed in text), m, f. 7. Euphydryas editha quino=augusta (not a syntype) f. 8. Euphydryas editha baroni (not a syntype) f. 9. Poladryas minuta arachne (label on specimen "minuta Colo."; not a syntype of arachne) f. 10. Poladryas minuta arachne=ab. gunderiae (Beulah, Colo., H. Nash)(actually named in 1930, not on p. 128)(called type on p. 128 & on plate, thus a Holland 1931 lectotype designation, as Pelham Catalogue is vague as to whether O.D. named a holotype; however this is certainly a unique specimen, so it is the holotype by monotypy, as the original description clearly states "The type is a female.") holotype f. 11. Poladryas minuta monache m. 12-13. Poladryas minuta minuta (not syntypes), neotype m, f. 14. Poladryas minuta arachne (not nympha; not a syntype) f. 15. Poladryas minuta nympha (Chih., Mex.) f. 16-17. Chlosyne gabbii, m, f. 18. Poladryas minuta arachne=gilensis holotype f. 19-20. Chlosyne palla calydon (p. 125 & plate say both are types, so neither is Holland designation of lectotype) syntypes, m, f. 21-22. Chlosyne palla palla, m, f. 23. Chlosyne sterope sterope (designated lectotype by Holland 1931) lectotype f. 24. Chlosyne palla palla=eremita (or weak ssp.) f. 25-26. Chlosyne whitneyi whitneyi=malcolmi, m, f. 27. Chlosyne sterope acastus (not a syntype as text states) f. 28-29. Chlosyne hoffmanni segregata paratypes, m, f. 30-31. Chlosyne cyneas, m, f.

Explanation of Plate LIX. 1. Euphydryas chalcedona chalcedona f. 2. Euphydryas anicia capella (not nubigena, not a type, not Calif., prob. Colo.) m. 3-4. Euphydryas anicia brucei (p. 118 & plate say both are types, thus neither is Holland designation of lectotype; Brown designated this lectotype), lectotype m, paralectotype f. 5. Chlosyne theona theona m. 6. Chlosyne leanira fulvia (Pelham Catalogue wrongly says this is lectotype designated by Holland 1931; actually p. 131 says pl. XVI fig. 17 is type but plate says nothing, while plate says pl. LIX fig. 6 is type but p. 131 says nothing, thus two bugs are called type in book, therefore neither is a Holland lectotype designation) lectotype (designated by Brown) m. 7-8. Chlosyne theona thekla (not syntypes of bolli), m, f. 9-10. Chlosyne leanira leanira, m, f. 11. Chlosyne harrisii harrisii=albimontana holotype m. 12-13. Chlosyne harrisii liggetti (p. 126 & plate says both are types, thus neither is Holland lectotype designation) syntypes, m (Pelham Catalogue calls this holotype), f. 14. Phyciodes (Anthanassa) texana seminole f. 15-16. Microtia elva elva, m, f. 17. Chlosyne erodyle m. 18. Chlosyne lacinia crocale=rufescens f. 19-20. Chlosyne californica, m, f. 21. Microtia (Texola) elada callina ("Sonora" in error, evidently S Mex.)(on p. 131-2 Holland clearly designates this f the lectotype in this book [F. Brown 1965 J. Lep. Soc. 19:209 discusses this situation and figures both female and male syntypes], because Boisduval's O.D. indicated the TL is Sonora and the X on this female's label is his indication that "the specimen was to be returned because he needed it to hold the name in his own collection.", thus Barnes & McDunnough's [1916] designation of the Mexican syntype male as lectotype is invalid, and Holland designated the female as lectotype/holotype; however there were two syntypes so Brown thought there was no holotype and a lectotype was needed, but because Bdv. indicated Sonora was the TL and Bdv. placed the X on the female's label and not the male's label indicating the Sonora female was his choice of type, the female should be considered the holotype as Higgins [1960] declared it) holotype f. 22. Phyciodes mylitta arida (plate says type, but p. 137 says this is just "a typical specimen" thus is not the holotype and is not a lectotype designation by Holland; it is probably a syntype; J. Rawlins selected another male in CM with "type 7020" label that he thinks is the true holotype, see Papilio [N.S.] #10; a female in CM also is labeled type) syntype m. 23. Boloria improba improba f. 24. Polygonia oreas oreas (not a syntype) f (uns should be checked to be positive it is oreas, though ups looks like oreas). 25. Argynnis (Speyeria) zerene gunderi m. 26. Polygonia faunus rusticus (Calif.; not a syntype) m. 27. Polygonia oreas oreas neotype m (should check uncus, as this photo looks like possibly zephyrus, Brown's photo of remounted ups and uns is too dark on uns though ups looks like oreas). 28. Anartia amathea fatima m. 29. Eunica tatila tatila m. 30. Limenitis archippus archippus=ab. pseudodorippus (Pelham Catalogue says there are only "syntypes", making this a Holland 1931 lectotype designation, however it is an extreme aberration thus is surely a unique specimen that is holotype by monotypy, as Holland 1898 wrote that he has the original Strecker type) holotype f.

Explanation of Plate LX. 1. Historis odius m. 2. Historis acheronta m. 3-4. Myscelia ethusa, m, f. 5. Dynamine serina dyonis m. 6. Asterocampa clyton texana paratype f. 7-8. Boloria titania grandis paratype (properly syntype at most, as there is no holotype or lectotype), 2f. 9-10. Boloria titania ranieri paratypes (properly syntypes, as there is no holotype or lectotype), m, f. 11. Paramacera xicaque allyni m. 12. Boloria improba improba m. 13. Boloria tarquinius tarquinius (Baffin Is.) m. 14-15. Boloria eunomia nichollae holotype m, allotype f. 16. Coenonympha tullia ampelos (Ore.) m. 17-18. Coenonympha tullia ampelos=columbiana paratypes, 2m. 19-20. Coenonympha tullia inornata=benjamini (weak ssp.) paratypes, m, f. 21-22. Coenonympha tullia kodiak=yukonensis, (p. 182 says both specimens are types, but pl. LX says fig. 21 is type & 22 is paratype, thus this is Holland 1931 designation of lectotype; Miller/Brown say there is no holotype; Pelham Catalogue wrongly says this is holotype, but O.D. has no designation of holotype; thus fig. 21 is lectotype) lectotype m, paratype (properly paralectotype) f. 23-24. Coenonympha tullia insulanus paratypes, f, m. 25-26. Coenonympha tullia furcae, m, f.

Explanation of Plate LXI. 1-4. Erebia disa steckeri (p. 203 & plate say all four are types, thus none are designated lectotype) syntypes, m, m, f, f. 5-6. Erebia fasciata paratypes (properly paralectotypes, as Miller/Brown says there is no holotype), m, f. 7-9. Erebia fasciata form avinoffi, holotype f, allotype f, paratype f. 10-11. Erebia stubbendorfii ethela (p.

205 & plate says two specimens are type, so neither is a Holland 1931 lectotype designation; Holland 1898 designated lectotype of pl. XXV fig. 18 female), paralectotype (wrongly designated lectotype by Brown) m, paralectotype f. 12-15. Erebia stubbendorfii pawlowskii=alaskensis, f, lectotype (p. 206 & plate call this type, a Holland 1931 lectotype designation) m, paratype (properly paralectotype, as there is no holotype) m, paratype (properly paralectotype, as there is no holotype) m. 16. Erebia discoidalis discoidalis m. 17. Erebia mancinus m. 18-19. Erebia vidleri, m, f. 20. Erebia epipsodea form brucei f. 21-23. Erebia rossii kuskoquima (weak ssp.)(two specimens are called type on plate [none in text], thus neither is Holland designation of lectotype), m syntype, f syntype, m probable syntype. 24-27. Erebia epipsodea, f (allotype of syn. remingtoni), m (syn. rhodia), f (syn. rhodia), m (holotype of remingtoni). 28-30. Erebia dabanensis youngi, lectotype (called type on p. 205 & plate, which is Holland's 1931 designation of lectotype, as there was no holotype--dos Passos' later designation of this male as lectotype was therefore invalid) m, allotype (called type on p. 205 but allotype on plate; properly paralectotype) f, paratype (called paratype on p. 205 & plate; properly paralectotype) f.

Explanation of Plate LXII. 1. Oeneis nevadensis (pale, so ssp. iduna?) m. 2. Oeneis nevadensis nevadensis m. 3. Oeneis nevadensis gigas m. 4. Oeneis calais ivallda (syntype; p. 194 says two specimens are types, but only this one called type on plate, thus this female is Holland's 1931 designation of lectotype) lectotype f. 5. Oeneis (nevadensis?) macounii (not a syntype) m. 6. Oeneis nevadensis iduna (p. 194 says both specimens are type, but plates say only this one is type, thus a Holland 1931 designation of lectotype; TL is required to be locality of lectotype which is "Mendocino") lectotype m. 7. Oeneis calais calais (Rupert House, James Bay, Que.)(which would be a valid Holland 1931 lectotype designation, except there was a holotype, which Miller/Brown say is lost, but Pelham Catalogue evidently says this is holotype) holotype f . 8-9. Oeneis chryxus, f, m. 10-11. Oeneis jutta alaskensis (both specimens are called types on p. 195 & plate, thus neither is a Holland lectotype designation) evidently paralectotypes, m (may be lectotype, as Masters & Sorenson later designated lectotype male in CM), f. 12. Oeneis uhleri uhleri, probably male. 13-14. Oeneis uhleri uhleri=varuna (N.D.)(several specimens are called types on p. 196 and on plate, thus none is Holland lectotype designation), lectotype m, paralectotype f. 15-16. Oeneis alberta alberta, m, f. 17. Oeneis jutta jutta? (maybe O. norna?, but does not look like norna photos)(Finland) m. 18. Oeneis jutta alaskensis (Alaska) f. 19-20. Oeneis polixenes katahdin paratypes (properly paralectotypes, as there is no holotype), m, f. 21. Oeneis polixenes subhyalina=peartiae holotype m. 22. Oeneis jutta jutta (Finland) m. 23-24. Oeneis melissa assimilis 2m. 25-26. Oeneis melissa (looks like ssp. gibsoni) "oeno", f, m.

Explanation of Plate LXIII (too pale). 1-3. Oeneis melissa assimilis=semplei, lectotype (p. 200 says all 3 figs. are types, but on plate only fig. 1 is called type, and the other two are called allotype and paratype, so this is a Holland 1931 semplei lectotype designation) m, allotype (properly paralectotype) f, paratype (properly paralectotype) m. 4-5. Oeneis melissa beani, m, f. 6-7. Oeneis polixenes polixenes, m, f. 8. Oeneis melissa semidea m. 9-10. Oeneis melissa gibsoni (p. 200 says fig. 9 is allotype & fig. 10 is holotype, and the "sp. nov." implies that this is the O.D., and Miller/Brown say HT is in CM; however Pelham Catalogue says O.D. was really in 1930 in Ann. Carn. Mus. 20:51, which evidently designated no holotype; so, fig. 10 is a Holland 1931 lectotype designation as Pelham states), paralectotype f, lectotype m. 11. Lethe eurydice fumosus paratype m. 12. Cercyonis sthenele silvestris (not a syntype) f. 13. Cercyonis oetus oetus (not a syntype of silvestris) f. 14. Cercyonis sthenele silvestris (not a syntype) m. 15. Cercyonis pegala maritima m. 16. Cercyonis pegala wheeleri lectotype (designated lectotype by Holland 1931) f. 17. Cercyonis pegala boopis f. 18. Cercyonis pegala nephele (not a syntype of boopis) (lectotype of incana, which is a syn. of nephele) m. 19. Cercyonis sthenele paulus (not a syntype) f. 20. Cercyonis pegala (Ore., nephele X gabbii) f. 21. Cercyonis pegala maritima= weak ssp. texana (designated texana lectotype by Holland 1931 here) m. 22. Cercyonis oetus oetus (pale like ssp. pallescens) lectotype m. 23. Cercyonis sthenele paulus f. 24-25. Cercyonis oetus charon (p. 192 & plate says both specimens are type, thus neither is Holland lectotype designation) syntypes (properly paralectotypes, as lectotype is in CM), m (abnormal), f (both are too pale as whole plate is too pale). 26-27. Oeneis polixenes polixenes (N Labrador)(ssp. polixenes because Pelham Catalogue defined TL as Chateau Bay, Labrador coast), f, m.

Explanation of Plate LXIV (too white). 1. Apodemia palmeri marginalis paratype f. 2-3. Lasaia narses (not in U.S.) paratypes, m, f. 4-5. Eumaeus toxea (=minijas="minyas"), f, m. 6-7. Callophrys augustinus iroides, m, f. 8. Callophrys irus irus f. 9. Callophrys polios paratype m. 10. Callophrys mossii mossii (not a syntype according to text) m. 11. Callophrys fotis fotis (Ariz.) f. 12-13. Arawacus jada 2m. 14-15. Cyanophrys longula (not pastor), m, f. 16. Callophrys [viridis—I have petitioned to protect sheridanii from the name viridis] sheridanii (not a syntype) m. 17. Callophrys affinis apama (p. 229 & plate say this is type, a Holland 1931 lectotype designation, preceding Brown's later invalid lectotype) lectotype f. 18. Callophrys gryneus loki paratype f. 19. Satyrium auretorum auretorum=tacita holotype m. 20. Callophrys xami xami m. 21. Satyrium calanus falacer m. 22-23. Chlorostrymon maesites telea 2m. 24-25. Satyrium californica californica (not syntypes) 2f. 26. Strymon melinus melinus=pudica m. 27-28. Satyrium sylvinus dryope, m (not a syntype), m. 29-30. Ministrymon azia 2m. 31. Satyrium sylvinus putnami=itys m. 32. Electrostrymon angelia boyeri (text says from Haiti) m. 33-34. Satyrium sylvinus putnami, m, f. 35-36. Strymon istapa modesta, m, f. 37-38. Ministrymon leda (not syntypes), m, f. 39-40. Lycaena cupreus cupreus (p. 252 & plate say both are types, thus neither is Holland lectotype designation), male (not a syntype), paralectotype female. 41-42. Lycaena epixanthe phaedra=amicetus Holland 1931, paralectotypes of amicetus, m, f. 43. Lycaena helloides (Winnipeg) m. 44. Lycaena florus "castro" florus (not a syntype) m. 45. Lycaena phlaeas hypophlaeas=ab. fasciata paratype m. 46. Callophrys irus hadros paratype m. 47-49.

Lycaena mariposa charlottensis, holotype m, paratype m, allotype f. 50. Lycaena hermes (broken tails fixed on printing plate)(not a syntype) neotype m.

Explanation of Plate LXV (too white). 1-3. Lycaena nivalis nivalis (not syntypes of syn. ianthe despite text), m, f, f. 4-5. Lycaena dione, m, f. 6-8. Satyrium auretorum=spadix, m, f, m. 9. Strymon avalona (p. 241 says paratype [properly paralectotype]) m. 10. Strymon melinus atrofasciata m. 11. Satyrium favonius autolycus m. 12. Phaeostrymon alcestis alcestis m. 13. Phaeostrymon alcestis oslari syntype (p. 237 & plate says type, so would be a Holland lectotype designation except Pelham Catalogue & Miller/Brown says it is holotype, which is in USNM) holotype m. 14. Satyrium auretorum (not tetra, not a tetra syntype), m. 15. Satyrium favonius ilavia pale aberration, paratype (evidently syntype, as there is no holotype or lectotype) f. 16. Satyrium saepium saepium=provo paratype m. 17. Satyrium saepium saepium=chlorophora paratype m. 18. Plebejus icarioides icarioides m. 19. Plebejus icarioides icarioides=mintha (not a mintha syntype according to Brown, so cannot be Holland lectotype designation) m. 20-21. Plebejus icarioides lycea, m (not a syntype, and now missing), f (S Colo.). 22. Plebejus icarioides fulla (not a syntype)(mislabeled "Mt. Hood" according to Brown) m. 23. Plebejus icarioides fulla=ardea (not a syntype, despite text p. 259)(Cal.) m. 24. Plebejus icarioides evius (Pasadena Cal.) f. 25-27. Plebejus icarioides blackmorei paratypes, m, f, m. 28. Plebejus saepiolus saepiolus (Mendocino Cal.) m. 29. Plebejus saepiolus amica (Victoria BC, syn. "insulanus") m. 30-31. Plebejus saepiolus amica=insulanus (text says paratypes) 2m. 32-34. Plebejus saepiolus hilda, paratype m, paratype f, m. 35. Plebejus icarioides pheres (San Fran.) m. 36-38. Plebejus icarioides pembina, m, f, m. 39. Plebejus saepiolus (looks like ssp. gertschi) f. 40. Plebejus icarioides lycea (Ariz.)(not "helios") m. 41-43. Glaucopsyche lygdamus xerces, m, form polyphemus m, form behrii=mertila holotype f.

Explanation of Plate LXVI. 1. Plebejus icarioides pardalis f. 2-3. Glaucopsyche lygdamus columbia, paratype m, m. 4-6. Glaucopsyche lygdamus oro, m, f, m. 7-8. Glaucopsyche lygdamus couperi, m, f. 9. Glaucopsyche lygdamus xerces form antiacis f. 10-11. Glaucopsyche lygdamus xerces, m, f. 12. Plebejus samuelis (det. Nabokov & Brown)(not a syntype of scudderi) m. 13. Cupido amyntula (ssp. amyntula or maritima?)(the name kodiak belongs to P. saepiolus)(Fort Yukon, Alaska) m. 14. Plebejus atrapraetextus alaskensis, f (Rampart, Alaska). 15. Plebejus scudderii scudderii=subarcticus paratype, m (Great Slave Lake region). 16. Plebejus anna anna (not a syntype of annetta)(Nordin, Donner Pass, Cal. according to Brown) m. 17. Plebejus melissa melissa lectotype (lectotype designation by Holland 1931 here) f. 18-20. Plebejus melissa melissa, m, f, m. 21-23. Plebejus anna anna (not syntypes or paratypes despite p. 264 & plate), neotype m, f (not syntype), m (not syntype or paratype). 24-25. Plebejus acmon-group, f, m. 26-28. Plebejus alupini alupini (not syntypes), m, f, m. 29. Plebejus alupini alupini (not chlorina, not syntype of chlorina) m. 30. Plebejus chlorina monticola (not a syntype of chlorina, contrary to text) m. 31-33. Plebejus emigdionis, m, f, m. 34. Plebejus neurona paratype m. 35. Euphilotes battoides battoides f. 36. Euphilotes (battoides) glaucon oregonensis paratype m. 37. Euphilotes bernardino bernardino paratype m. 38. Euphilotes glaucon intermedia paratype m. 39-40. Euphilotes rita rita paratypes, 2m. 41-43. Euphilotes ancilla ancilla (p. 266 says all 3 are paratypes), m, f, f. 44. Euphilotes mojave mojave (this would be a Holland 1931 lectotype designation, but Pelham Catalogue says this is holotype) holotype m. 45. Philotes sonorensis extinctis m. 46. Euphilotes spaldingi spaldingi paratype m. 47. Glaucopsyche piasus sagittigera=catalina m. 48. Glaucopsyche piasus daunia m. 49-50. Plebejus podarce podarce, f, m. 51. Zizula cyna (not a syntype contrary to text p. 271) m.

Explanation of Plate LXVII. 1-3. Hemiargus hanno gyas, m, f, m. 4-5. Hemiargus hanno zachaeina, m, f. 6. Plebejus shasta (could be ssp. minnehaha) m. 7-9. Plebejus optilete yukona, m, f, m. 10. Celastrina neglecta gozora (Honduras) m. 11-12. Cupido amyntula herrii, m, f. 13. Celastrina neglectamajor (Pittsburgh, Penn.) f. 14. Ascia josephina krugii (Puerto Rico) m. 15-16. Ascia monuste phileta (mating pair), m, f. 17. Ascia monuste monuste (syn. or ssp. crameri, holotype m, O.D. Ann. Carn. Mus. 1931 20:225-265, TL Surinam, according to J. Calhoun Holarctic Lepid. [1997]) holotype m. 18. Ascia monuste raza (S Baja Calif., see note 262 of Miller/Brown) paratype f. 19. Phoebis agarithe f. 20-21. Colias pelidne skinneri (p. 296 & plate say both are types, so neither is Holland lectotype designation) evidently syntypes (now paralectotypes), m, f. 22-23. Phoebis statira floridensis, m, f. 24-25. Pieris (napi) hulda hulda (not syntypes), m neotype, f. 26. Pontia callidice occidentalis form calyce holotype m. 27. Euchloe hyantis (p. 285 & plate say type, which would be a lectotype designation by Holland 1931, as Pelham Catalogue lists it. And Brown mentioned that it could possibly be a syntype if any exists. This is a tough decision, but because Brown's lot #4 of non-syntypes had the same "Hyantis Cal[a]" label as this fig. 27 specimen, there is no proof that this is a syntype. And Brown wrote that it did not fit Edwards' description and lacked Edwards' "type" which Edwards wrote across two specimens that are evidently syntypes. So I accept only Brown's lectotype.)(doubtfully a syntype) m. 28. Euchloe olympia (not a syntype) m. 29. Pontia callidice nelsoni holotype m. 30. Colias tyche boothii (Pelham Catalogue suggests? that this is lectotype, which is in USNM) lectotype m.

Explanation of Plate LXVIII. 1. Zizula cyna holotype f. 2-4. Echinargus ammon ammon (not filenus, the Cuban ssp. of H. hanno), f, f, m. 5-6. Lycaena phlaeas feildeni, m, f. 7-9. Plebejus glandon franklinii=suttoni, syntypes (p. 269 says all three are types, and two of them are called type on plate, so not a Holland lectotype designation; it was named in this book and Miller/Brown & Pelham Catalogue say there is no holotype), syntype (Holland surely intended this to be holotype) m, syntype (Holland labeled it female so surely intended it to be allotype but it is male) m, paratype m. 10-12. Lycaena epixanthe epixanthe m, f, f. 13. Colias philodice philodice melanic f. 14-15. Colias occidentalis christina (not syntypes),

m, f (both coll. Geddes, probably Manitoba). 16-17. Colias occidentalis occidentalis (p. 293 & plate says both specimens types thus neither is Holland designation of lectotype) syntypes, m (atypical with oranger uph spot, and little black uph smudge, and no upf black dash), f (could be christina). 18-19. Colias harfordii=barbara (p. 294 & plate says both specimens are types thus neither is Holland designation of barbara lectotype) syntypes, m, f. 20-21. Colias harfordii (p. 294 & plate says both specimens are types thus neither is Holland designation of lectotype) syntypes, m, f. 22-23. Colias edwardsii edwardsii=emilia (not emilia syntypes), m, f (this could be pseudocolumbiensis). 24-25. Colias edwardsii edwardsii (p. 295 & plate say both are types, thus neither is a Holland designation of lectotype), lectotype m, paralectotype f. 26. Colias occidentalis christina (paler ups form)(not astraea syntype) m (Banff, Alta.). 27. Colias occidentalis sacajawea (not astraea syntype) f (Judith Mts. Mont.). 28-29. Colias palaeno palaeno (Lapland), m, f. 30-31. Colias palaeno chippewa, m (now missing), f (lectotype of chippewa W. H. Edwards [not Kirby] & lectotype of helena W. H. Edwards). 32. Colias nastes gueneei (Southampton I.)(rossii looks like nastesXhecla & is a syn. of C. tyche boothii) m. 33. Colias tyche boothii form chione (p. 299 says type, so this would be a Holland 1931 designation of lectotype of chione, except plate says it is from Southampton Is., and p. 299 says "Chione originally described from Boothia Felix is not uncommon in Baffinland and is quite common on Southampton Island.", thus this is not a syntype because those were from Boothia Felix; Pelham Catalogue says syntypes are in UMO & USNM) m.

Explanation of Plate LXIX. 1-2. Parnassius eversmanni thor, m, f. 3-6. Parnassius phoebus apricatus=golovinus, lectotype (plate says type, so a Holland 1931 designation of golovinus lectotype, and there is no holotype) m, m, allotype (properly paralectotype) f, f. 7-8. Parnassius clodius ssp. "claudianus" (ssp. pseudogallatinus from BC?—the ssp. of P. clodius are all rather worthless), m, f. 9-10. Parnassius clodius weak ssp. menetriesi, m, f. 11. Parnassius clodius weak ssp. altaurus (aberrant) m. 12-13. Parnassius phoebus smintheus=sayi (not syntypes), m, f. 14. Parnassius phoebus hermodur=invalid name "minusculus" (Miller/Brown note 186, an aberration) m. 15. Parnassius phoebus hermodur (ssp. somewhat uncertain)=alt. f. nanus m.

Explanation of Plate LXX. 1. Battus devilliers m. 2. Papilio glaucus rutulus=arizonensis(p. 319 & plate say type, thus a Holland 1931 designation of lectotype), lectotype m. 3. Papilio glaucus canadensis form arcticus, paratype (properly paralectotype, as there is no holotype) f. 4. Papilio glaucus glaucus=australis m. 5. Papilio machaon oregonia (p. 316 says paratype, but not a syntype) m. 6-7. Papilio glaucus canadensis, m (Longue Lac near Nipigon Ont.), f (Great Slave Lake). 8. Papilio polyxenes coloro (or P. p. asterias form pseudoamericus) (but exactly resembles my P. polyxenes americus from Colombia, so mislabeled?), m (Ariz.). 9. Papilio indra pergamus (p. 317 says type so evidently syntype; Pelham Catalogue says this is holotype, which is in AMNH) holotype m. 10. Papilio aristodemus ponceanus f. 11. Eurytides celadon m. 12. Papilio polyxenes asterius, form curvifascia, paratype m.

Explanation of Plate LXXI. 1-2. Dryas iulia largo, holotype m (Clench later named this "cillene" specimen the holotype of largo; Key Largo Fla.), f. 3. Smyrna karwinskii m. 4. Argynnis (Speyeria) hydaspe hydaspe (p. 94 & plate say type, which would make it a Holland 1931 lectotype designation, however p. 95 says "I figure one of Boisduval's types of *A. hydaspe*, which was sent by the author to W. H. Edwards, and is now in my possession.", indicating that there are several types, so this is just a syntype not a lectotype designation; dos Passos & Grey designated a male lectotype in USNM, but there is a female syntype, so fig. 4 may be that female syntype) syntype f. 5-6. Argynnis (Speyeria) mormonia mormonia (not syntypes), m, f. 7. Polygonia faunus rusticus form silvius (Yosemite Cal., uns has few spots)(p. 150 & plate say type, the original type used & labeled by Edwards, thus a Holland 1931 lectotype designation), lectotype f. 8. Papilio ornythion (however, it also looks identical to P. astyalus bajaensis m) m. 9-10. Cercyonis sthenele paulus (Provo, Utah), m, f. 11. Anteos clorinde m. 12-13. Neophasia terlootii, m, f (normal f=princetonia). 14. Anthocharis julia browningi paratype (Miller/Brown say HT in CM, Pelham Catalogue says syntypes in ANSP implying this is just syntype) m. 15. Anthocharis midea midea=flavida (a syntype later designated lectotype in 1954 according to Pelham Catalogue) lectotype m. 16. Atrytonopsis ovinia edwardsi m. 17-18. Megathymus streckeri texana=albocincta (p. 402 says both specimens are types but only fig. 17 is called type on plate, thus fig. 17 is a Holland 1931 designation of lectotype; however Pelham Catalogue & Miller/Brown says fig. 17 is holotype, in CM; O.D. says only that albocincta will be illustrated in this book) holotype m, paratype m.

Explanation of Plate LXXII. 1. Megathymus ursus ursus holotype m. 2. Hypothyris lycaste m. 3. Oeneis polixenes yukonensis holotype m. 4. Oeneis polixenes subhyalina=peartiae f. 5. Oeneis melissa assimilis=arctica holotype m. 6. Oeneis uhleri cairnesi holotype m. 7-8. Boloria tarquinius natazhati holotype m, probably paratype f (very bad print). 9. Boloria tritonia distincta holotype f. 10-12. Megathymus streckeri texana=leussleri (p. 401 says all 3 figs are types, but only this is called type on plate, thus a Holland 1931 lectotype designation, however Pelham Catalogue & Miller/Brown say it is holotype in CM) holotype m, m (paratype, as p. 401 says type), allotype f. 13-14. Agathymus stephensi stephensi, m paratype, f. 15-17. Hesperia uncas lasus (vic. Great Salt Lake), m, f, f.

Explanation of Plate LXXIII. 1-2. Limenitis archippus floridensis=eros (p. 165 says fig. 2 is type of eros, plate says fig. 1 is type of eros, thus this is not a Holland 1931 designation of lectotype), lectotype (designated by Brown) m, paralectotype m. 3-4. Erebia rossii rossii, m, f. 5. Euchloe hyantis lotta (p. 285 says paratype [properly syntype, as there is no holotype or lectotype]) m. 6. Pseudocopaeodes eunus eunus holotype m. 7. Phyciodes (Janatella) leucodesma f. 8-9. Euphydryas editha hutchinsi, f, m. 10-11. Hesperia lindseyi lindseyi (p. 376 & plate say both specimens are type, thus

neither is Holland designation of lectotype) syntypes, m, f. 12. Euphyes vestris (not "ruricola")(this specimen, called ruricola type on plate and paratype on p. 388, coll. in Calif. by Lorquin, was designated lectotype m of ruricola Bdv. [by Brown, Miller, & Clench, Trans. Amer. Ent. Soc. 106:77, 1980], but the ruricola O.D. describes a small yellow skipper like Thymelicus lineola, so this lectotype is invalid, not a syntype of ruricola. However this photo looks rather tawny! like Polites themistocles, but Brown Miller & Clench identified it as vestris. Syst. W N.A. Butt. p. 22 concludes [correctly I think] that ruricola is a nomen dubium.). 13-14. Glaucopsyche lygdamus couperi=afra (plate says both specimens are type, p. 262 says only fig. 14 is type, so neither is a Holland lectotype designation because fig. 14 is not a syntype), m (doubtfully a syntype, as text says only fig. 14 is type), f (not a syntype). 15-16. Ancyloxypha arene, m Duenas Guatemala, f S. Geronimo (Guatemala?). 17-19. Satyrium fuliginosa fuliginosa (not syntypes), m, f, f. 20-21. Hesperia leonardus pawnee=ogallala paratypes, 2m. 22-24. Colias hecla hecla, m (probably Colias canadensis), f, f. 25. Eurema proterpia form gundlachia m. 26-27. Colias tyche boothii, f, m. 28. Colias nastes moina f. 29. Colias philodice philodice albino f. 30. Phoebis neocypris m.

Explanation of Plate LXXIV. 1-2. Boloria kriemhild (p. 107 & plate says 3 specimens are type, thus none is a Holland lectotype designation) syntype (Pelham Catalogue says lectotype, which is in FMNH) lectotype m, same m uns. 3-6. Boloria kriemhild syntypes, f Utah (mislabeled Ariz. on plate), same f uns, f (mislabeled Colo.), same f uns. 7-8. Boloria evidently euphrosyne (=andersoni, photo of USNM holotype, evidently from Europe but mislabeled "Brit. Colo."), holotype m. 9-10. Chlosyne harrisii hanhami (plate says both are type, p. 127 says only fig. 10 is type, thus fig. 10 is a Holland 1931 lectotype designation [if these are syntypes, of course], and TL is locality of this female, which needs to be determined, evidently in USNM), m, f. 11-12. Coenonympha tullia pseudobrenda (this male designated lectotype of brenda by Brown, then later declared not a syntype by Austin & Gray), m. 13-16. Myscelia cyananthe skinneri syntypes (properly paralectotypes), m, m uns, f, f uns.

Explanation of Plate LXXV. 1-2. Callophrys johnsoni (p. 230 & plate say type, a Holland 1931 lectotype designation) lectotype, f, same f uns. 3. Parnassius clodius menetriesi ab. immaculata (Old Faithful Geyser, Yellowstone) holotype m. 4. Colias hecla=albino form pallida Skinner & Mengel (Greenland)(p. 298 & plate say type, thus a Holland 1931 lectotype designation), lectotype f. 5. Battus philenor hirsuta (p. 313 & plate say type, thus a Holland 1931 lectotype designation), lectotype f. 6. Papilio glaucus canadensis form arcticus (p. 319 & plate says type, thus a Holland 1931 designation of lectotype) lectotype m. 7-7a. Achalarus toxeus=coyote (p. 337 & plate say type, thus a Holland 1931 designation of lectotype; Pelham Catalogue agrees, though Miller/Brown say HT in CM) lectotype m. 8-8a. Codatractus valeriana=mysie (p. 339 & plate say type, thus a Holland 1931 designation of lectotype), lectotype m. 9-9a. Pyrrhocalles jamaicensis (p. 392 & plate say type, thus would be a Holland 1931 designation of lectotype, but p. 392 suggests it is the borrowed holotype) holotype m. 10-10a. Oeneis calais caryi holotype (says p. 197) m. 11-11a. Oeneis uhleri nahanni holotype m. 12-12a. Atrytonopsis cestus (not a syntype) m. 13-14. Hesperia metea licinus=aberration horus (Dallas, Tex.) holotype f. 15-16. Erynnis tristis tatius holotype (see p. 355) m. 17-17a-18-18a. Problema bulenta, m, f. 19. Oeneis melissa assimilis=simulans holotype (see p. 200) m. 20. Oeneis uhleri cairnesi holotype (p. 197, evidently same specimen as LXXII fig. 6) m.

Explanation of Plate LXXVI (the names of figs. 1-3 and 21-22 need updating). 1-1a. Caria domitianus (or maybe C. rhacotis?) m. 2-2a. Caria (not melicerta, maybe Symmachia?) "type" m. 3-3a. Caria "ino" (looks very little like ino; all 3 Caria figs. are bad) m. 4-4a. Apodemia multiplaga paratype m. 5-5a-6-6a. Apodemia phyciodoides holotype m, allotype f. 7-7a-8-8a. Calephelis nilus=perditalis paratypes (Miller/Brown say HT USNM, but Pelham Catalogue say syntypes USNM, so these may be syntypes), 2f. 9-9a. Calephelis virginiensis=louisiana holotype (Opelousas, Louisiana) m. 10-10a. Apodemia hepburni m. 11-11a. Calephelis wrighti (evidently holotype, as p. 219 says these are Wright's figs. and Pelham Catalogue says Wright figs. of ups/uns are holotype) holotype m. 12-12a. Satyrium favonius ontario m (bad figure). 13-13a. Hypostrymon critola (p. 241 text says copy of holotype figs.) m. 14. Satyrium auretorum auretorum holotype m. 15. Satyrium sylvinus sylvinus (p. 237 & plate say type, thus a Holland 1931 designation of lectotype; fig. 15 is the female syntype illustrated by Oberthür, & does not resemble the male syntype later designated lectotype by Emmel Emmel & Mattoon [Syst. W N.A. Butt. chap. 2 p. 9], who stated that Oberthür's fig. was of the female syntype, thus this female is the valid lectotype designation by Holland 1931, and the later lectotype is invalid) f. 16. Satyrium calanus falacer aberration heathi holotype f. 17-17a. Chlosyne endeis m. 18. Battus philenor philenor form? acauda=corbis f. 19. Parnassius phoebus apricatus holotype (p. 310, Kodiak I.) m. 20-20a. Oeneis alberta daura (p. 196 says holotype from "Mt. Graham") holotype f. 21. Spalgis lemolea=ssignata pupa. 22. Spalgis epius pupa. 23. Feniseca tarquinius pupa.

Explanation of Plate LXXVII. Papilio glaucus glaucus.

Index corrections/additions: antiacis, Lycaena, 261. apama, Thecla, 229. arizonensis, Codatactus, 333. autolycus, Thecla, 238. calais, Oeneis, 195. calydon, Melitaea, 125. catalina [really Echinargus thomasi], pl. XXX fig. 45. couperi, Glaucopsyche, 262. critola, Thecla, 241. gilensis, Melitaea, 129. hanhami, Melitaea, 127. ianthe, Anthanassa, pl. XVIII fig. 12. inornata, Coenonympha, 183. kuskoquima, Erebia, 203. orcas, Hesperia, pl. L fig. 15m. oslari, Thecla, 237. taumas, Polites, 381. Thecla croesioides, 225. zampa, Systasea, 344.

CORRECTIONS TO F. MARTIN BROWN'S PAPERS ON THE TYPES OF BUTTERFLIES NAMED BY WILLIAM HENRY EDWARDS (these papers appeared in Trans. Amer. Ent. Soc., volumes 90-113, 1964-1987, the Hesperiidae papers coauthored by Lee D. Miller, and a few lectotypes authored by Paul A. Opler & Walfried J. Reinthal)

In the corrections that follow, I list the current name of the butterfly, then volume & page of Brown's text in Trans. Amer. Ent. Soc., then details of the correction. Some of the corrections are minor (typos, switched figures, etc.), but I have corrected many of the type localities, including six that were wrongly designated as "Archer Co. Texas" by Brown. The wrong specimen was illustrated as lectotype in one case. Other miscellaneous corrections are made.

Dozens of the lectotypes designated by Brown are invalid, because they were preceded by lectotype designations made in Holland's 1931 & 1898 Butterfly Book and 1915 Butterfly Guide, as noted above, and referenced below. Holland 1898 made 3 and Holland 1915 made 6 and Holland 1931 made 41 lectotype designations for Edwards' names. Brown credited Holland for 3 of these lectotype designations, credited dos Passos & Grey for 5, and Higgins for 1, while Brown incorrectly took credit for 24 lectotype designations, and Brown & Miller incorrectly took credit for 16, which were actually designated by Holland. But in most of these cases, Holland's and Brown's lectotypes are the same specimen, so the only change is who designated the lectotype. (Of course, the first designation of a specimen as lectotype is valid, and all later designations of that specimen or any other specimen are invalid.) Only in 13 cases are the later invalid lectotypes different specimens from Holland's.

Obviously, Brown's work was still valuable in doing the museum study and historical research to determine which specimens were syntypes and which were not, etc. Brown proved that numerous Holland "types" were actually not even syntypes.

When comparing the butterflies illustrated in Holland's 1931 Butterfly Book, with the same specimens illustrated by Brown, it unfortunately becomes obvious that many of the specimens have sustained considerable damage to wings, antennae, and sometimes to abdomen. Evidently repeated handling of the specimens, and perhaps dermestid beetles, have taken their toll. Thus public museums may not be the safest places to house butterfly specimens.

Papilio machaon bairdii form hollandii. 101:17, hollandii is not a "backcross", it is just a bairdii with yellow modifier genes making the side of the abdomen widely yellow. The abdomen of bairdii is basically black with 2 ½ rows of yellow dots, but varies from having yellow dots with no yellow wash, to more and more wash, and finally all yellow between the dots. 101:18, Holland 1931 designated same valid lectotype as Brown's invalid lectotype.

Papilio machaon brucei. 101:21, Holland 1931 designated a different valid lectotype pl. 40 fig. 4 female than Brown's invalid lectotype.

Papilio machaon oregonia. 101:22, neotype is female not male.

Papilio zelicaon form nitra. 101:26, Holland 1931 designated same valid lectotype as Brown's invalid lectotype.

Papilio glaucus rutulus=arizonensis. 101:28, Holland 1931 designated same valid lectotype as Brown's invalid lectotype.

Eurytides marcellus f. walshii. 101:29-30, fig. 10 & Holland's fig. is walshii holotype.

Euchloe olympia=rosa. 99:35, Holland 1931 designated a different valid lectotype pl. 32 fig. 39 male than Brown's invalid lectotype.

Euchloe hyantis hyantis. 99:38, 2nd paragraph line 6, "if any exist."

Anthocharis julia stella. 99:41, Holland figured "types" on pl. 32 fig. 35 male & 36 female. 99:43, Barnes & McDunnough 1916 (Contr. Nat. Hist. Lepid. N.A. 3[2]:62 wrote they "would restrict" the type to a male from Yosemite agreeing with O.D. & labeled type in red ink in Edwards coll. in CM; the word "would" means that this is not a valid lectotype designation, and that specimen was apparently not mentioned on 99:43 so may be lost.

Anthocharis julia julia. 99:44, the male fig. by Holland on pl. 32 fig. 34 is NOT "based on" the lectotype, because the black fw bar and hw spots differ greatly between the two. P. 45, julia & thoosa are different.

Anthocharis cethura pima. 99:47, Holland 1931 designated same valid lectotype as Brown's invalid lectotype.

Colias behrii. 99:52, Holland 1931 designated same valid lectotype as Brown's invalid lectotype.

Colias philodice eriphyle. 99:84, TL is actually spelled Lac la Hache.

95:179, 99:118, 106:68, 106:88. James Wilson (not Willis) Tilden.

Coenonympha tullia ampelos. 90:342, Holland figured ampelos on pl. 60 fig. 16 f, but his figs. on plate 25 figs. 21 & 30 were insulanus from Vancouver I.

Coenonympha tullia pseudobrenda. 90:346, Brown's (invalid) brenda lectotype was fig. by Holland on plate LXXIV figs. 11-12. But Austin & Gray 1998 (chap. 47 in Syst. W N.A. Butt) wrote that this was not a syntype of brenda.

Cercyonis oetus charon. 90:366, Holland's figs. were pl. 26 figs. 11 m & 12 f, & pl. 63 figs 25 f & 24 m.

Cercyonis pegala maritima=texana. 90:374, Brown correctly indicated that Holland 1931 validly designated this same specimen as lectotype.

Cercyonis pegala wheeleri. 90:387, Brown correctly indicated that Holland 1931 validly designated this same specimen as lectotype.

Oeneis (nevadensis) macounii. 90:387, Nipigon is in Ontario. 90:390, Holland 1915 The Butterfly Guide evidently designated the valid lectotype, a male on his pl. LXXVI that may be the same specimen as Holland's 1931 pl. XXVII fig. 3m, which Brown evidently treated as a syntype.

Oeneis nevadensis iduna. 90:392, Brown correctly indicated that Holland 1931 validly designated this same specimen as lectotype.

Oeneis polixenes brucei. 90:398, Holland 1931 designated a different valid lectotype pl. 27 fig. 7 male than Brown's invalid lectotype.

Erebia stubbendorfii ethela. 90:403, Holland 1898 The Butt. Book p. 211 designated a different valid lectotype pl. XXV fig. 18 female than Brown's invalid lectotype.

Gyrocheilus. 90:408-9 spells this Girocheilus (why?).

Argynnis (Speyeria) cybele carpenteri has not been found in the Sangre de Cristo Mts. of S Colo. as 91:240 claims.

Argynnis (Speyeria) nokomis. 91:251-2. Washington Co. Utah has ssp. near apacheana. The specimens from Lower Rio Florida and Hotchkiss were both females. Ojo Verde is only ~10 mi. SW of LaSal and is just a small desert wash & gauging station without permanent water that does not now and surely never had a colony of nokomis. 91:254 change nokomis lectotype to neotype.

Argynnis (Speyeria) zerene hippolyta. 91:267, Holland 1931 designated the valid lectotype that dos Passos & Grey later accepted as lectotype.

Argynnis (Speyeria) zerene bremnerii. 91:271, Holland 1931 designated same valid lectotype as dos Passos & Grey's invalid lectotype.

Argynnis (Speyeria) callippe macaria. 91:283, Holland 1931 designated same valid lectotype as dos Passos & Grey's invalid lectotype.

Argynnis (Speyeria) adiaste atossa. 91:293, Holland 1931 designated a different valid lectotype pl. 13 fig. 12 male than dos Passos & Grey's invalid lectotype.

Argynnis (Speyeria) atlantis atlantis. 91:298. Holland 1915 The Butterfly Guide designated the valid lectotype, a male on his pl. XIV, the same syntype specimen later fig. by Holland 1931 on pl. X fig. 9m which Holland 1931 & Brown called a paratype. This lectotype is from Hunter, Catskill Mts., Greene Co. NY, therefore dos Passos' later 1935 restriction to Hunter was unnecessary.

Argynnis (Speyeria) hesperis electa=nikias. 91:308. In Papilio (New Series) #8 I showed that electa belongs to S. hesperis (not S. atlantis) and corrected the electa TL to Twin Lakes, Lake Co., where Mead collected and electa occurs (it does not occur at Turkey Creek Junction).

Argynnis (Speyeria) mormonia bischoffii. 91:316 claims that Holland's pl. 11 fig. 7 male is a syntype, which is an error as p. 320 says an 1874 letter indicated that both syntypes were destroyed; so a neotype was designated. L. Paul Grey later corrected the TL to Anchorage.

Argynnis (Speyeria) mormonia opis, 91:322, Holland 1931 designated same valid lectotype as dos Passos & Grey's invalid lectotype.

Argynnis (Speyeria) mormonia erinna. 91:324, Holland 1931 designated same valid lectotype as Brown's invalid lectotype.

Boloria "epithore". 91:334, Holland's pl. 15 fig. 17 is Boloria frigga, so fig. 17 is definitely a "pseudotype" also.

Boloria astarte astarte. 91:340, Holland's figs. are pl. 18 fig. 14 f pseudotype and fig. 15 m victoria holotype.

Boloria titania butleri. 91:346, Holland 1931 designated same valid lectotype as Brown's invalid lectotype.

Euphydryas chalcedona colon. The O.D. on 92:361 (Papilio 1:45-46) was changed to Bull. Brooklyn Ent. Soc. 3:80 in Miller/Brown (Brown explains this change on 93:320-321). 92:363, Holland 1931 designated same valid lectotype as Brown's invalid lectotype.

Euphydryas chalcedona paradoxa=perdiccas. 92:364, O.D. is listed as Papilio 3:43 1883 in Gunder's revision, and listed as Bull. Brooklyn Ent. Soc. 3:80 1881 in Miller/Brown (Brown explains this change on 93:320-321). N. Kondla states that the O.D. gave TL as "Puget Sound". 92:366, nobody now believes that it ever occurred at Tenino as Brown wrote; this was another mislabeling by Herbert Morrison.

Euphydryas anicia brucei. 92:366, Holland's figs were pl. 59 fig. 3m-4f.

Euphydryas editha baroni. 92:372, Holland's pl. 16 fig. 7 is E. chalcedona, so is not a syntype baroni.

Microtia (Dymasia) dymas. 92:380. Holland 1931 designated a different invalid lectotype pl. XVI fig. 18 female than Brown's invalid lectotype. But actually Holland 1915 The Butterfly Guide designated the valid lectotype, a female on his pl. XX fig. 4f which Holland 1931 pl. XVI fig. 18f fig. and called type & Brown called paratype. It is from "Texas" (TL is still San Antonio).

Microtia (Texola) elada perse. 92:386. Actually Holland 1915 The Butterfly Guide designated the valid lectotype, a male on pl. XX fig. 3, which Holland 1931 fig. on pl. XVI fig. 19m as type & Brown later invalidly designated lectotype. Holland 1931 & Brown later invalidly designated the same specimen as lectotype.

Chlosyne elada ulrica. 92:385, Holland 1931 designated same valid lectotype as Higgins' 1960 invalid lectotype and Brown's invalid lectotype.

Chlosyne leanira fulvia. 92:390 TL declared to be Archer Co. Tex., but the bugs do not occur there so Archer Co. cannot be the TL, the TL was really "West Texas". The type was coll. by Jacob Boll, as were five other taxa named by Edwards whose TL Brown declared to be Archer Co., specifically Pyrgus philetas, Polites vibex brettoides, Yvretta carus, Amblyscirtes eos=comus, and A. eos=nilus. All of these (except comus) were coll. by Jacob Boll, and all their TL's were declared by Brown to be Archer Co. But none of these species actually occurs in Archer Co. (except A. eos), so the Archer Co. TL of these five bugs is obviously an error, so **I hereby correct and restrict the TL of all six (fulvia, philetas, brettoides, carus, comus, nilus) to the Davis Mts. in West Texas**. Note here that Jacob Boll has been confused with Jacob Doll at times (Edwards' O.D. of brettoides mistakenly claimed that Doll not Boll collected it, and Brown himself mistakenly wrote Doll instead of Boll as the collector of philetas), but 106:45 makes it clear that Jacob Boll and not Doll collected all five, as Boll coll. in Texas 1876-1880 and died 1880, whereas Doll did not collect in Texas then and died in 1929 thus lived much later. (Maybe we can call this Boll-Doll confusion the bollworm—how droll.) 92:392, fulvia has 3 gen. in Colo.

Chlosyne sterope sterope=hewesii. 92:406, David Bauer thinks these two are synonyms (and they have the same TL).

Chlosyne sterope sterope. 92:407, Holland 1931 designated same valid lectotype as Brown's invalid lectotype.

Poladryas minuta. 92:411 & 417, minuta and arachne are not sympatric in the foothills and lower mountains in SE Colorado, as Brown claims.

Poladryas minuta nympha. 92:417, Brown's TL of vic. Fort Grant is impossible as only arachne occurs there; nympha occurs in Mex. (and a weak version of it N of Sonoita in extreme S Ariz.—bugs with a strong cream postmedian band like the lectotype occur only in Mexico). P. 419 states that H. Morrison collected material in Mexico just S of Arizona, therefore **I hereby correct the TL to NW Mexico including Sonora, Mexico**, where Morrison collected and the phenotype with cream ups median band actually occurs and where Holland (1931) described many specimens (the cream band does not occur near Fort Grant or in Colo.). This is another Herbert Morrison mislabeling of bugs, as "Southern Arizona."

Phyciodes cocyta selenis=marcia. 92:432, Brown's lectotype of marcia is invalid because it is not a syntype, and additionally it lacks diagnostic antennae, is female not male, and thus cannot be identified to species. This was amply discussed by J. Scott in Papilio (New Series) #10 & #13, and by Ronald Gatrelle in The Taxonomic Report 4:1-19.

Phyciodes pallida pallida. 92:446 another Herbert Morrison mislabeling, of pallida from "southern Colorado."

Phyciodes graphica=vesta. 92:461, TL is New (not Neu, though the original German must have been Neue) Braunfels. Holland's figs. are pl. 17 figs 17-18-19.

Polygonia faunus hylas. 93:339, Holland's figs. are pl. 19 fig. 7 (stated on p. 340 to be a pseudotype) & fig. 8 (stated on p. 341 to be possible syntype). 93:340 last line, change pl. 19 fig. 5 to pl. 19 fig. 8.

Polygonia faunus rusticus form silvius. 93:347, Holland 1931 designated same valid lectotype as Brown's invalid lectotype.

Limenitis archippus obsoleta. 93:366, Holland figures pl. 7 fig. 5 as obsoleta, and mentions hulstii in text (and on plate in 1st ed. 1898), but does NOT mention eros. Brown notes that this specimen is holotype hulstii.

Asterocama celtis antonia. 93:377-9, Reinthal's valid lectotype was fig. by Holland pl. 23 fig. 12 (note smudge on left fw apex and antennae and wings).

Asterocampa celtis montis. 93:380-383, Brown's valid lectotype was fig. by Holland on pl. 23 fig. 11 (compare the two photos).

Asterocampa clyton flora. 93:389. Holland 1915 The Butterfly Guide evidently designated the valid lectotype, a male specimen on pl. L fig. 1, which may be one of the 2m2f syntypes in CM, and was not fig. by Holland 1931. The TL should be determined from the specimen in CM. Brown's later invalid lectotype was fig. by Holland on pl. 23 fig. 1 (compare the photos).

Apodemia virgulti mejicanus. 94:117, Holland's pl. 28 fig. 4 has unh orange like mejicanus, and fig. 5 is from Ariz. so is also mejicanus (cythera does not occur in Ariz.).

Apodemia virgulti duryi. 94:121, Holland 1898 The Butt. Book p. 230 designated same valid lectotype as Brown's invalid lectotype.

Calephelis nemesis. 94:126-129, Brown writes that Holland figured nemesis on pl. 28 fig. 15, and lectotype photo does look like Holland's fig. 15, but later 94:129 Brown claimed that pl. 28 fig. 15 is australis; evidently Brown thought the specimen is australis.

Lycaena nivalis nivalis=ianthe. 95:169, Brown must have meant to designate the TL as the E (not W) side of Lake Tahoe, as only the E side is in Nevada.

Lycaena florus. 95:172-174, Garnett's (not Garrett's) Ranche is really near Lundbreck at mouth of Crowsnest Pass (not near Didsbury), and Bird & Ferris (Can. Ent. 111:637, 1979) declared Brown's lectotype invalid (because it is not a syntype) and designated another valid lectotype.

Lycaena cupreus cupreus. 95:176, Holland figured cupreus on pl. 64 (not 65) figs. 39-40. In Papilio (New Series) #12 I corrected the TL to Tioga Pass, Tuolumne Co. Calif.

Hypaurotis crysalus crysalus. 96:22-23, lectotype is female, not male.

Satyrium calanus calanus=wittfeldi. Holland 1915 The Butterfly Guide designated the valid lectotype, a female on pl. LXXI fig. 2 from Indian River Fla.[Georgiana, Brevard Co. Fla.], which was later fig. by Holland 1931 pl. XXIX fig. 19f, a different specimen than Brown's later invalid male lectotype.

Satyrium sylvinus putnami=itys. 96:40, Holland 1898 The Butt. Book designated same valid lectotype as Brown's invalid lectotype.

Satyrium sylvinus dryope. 96:49, "Saucelito" is now spelled Sausalito.

Ministrymon leda form ines. 96:53, Holland 1931 designated same valid lectotype as Brown's invalid lectotype.

Callophrys affinis affinis. 96:64-65, Holland's pl. 30 fig. 3f is Callophrys affinis perplexa from Calif.

Callophrys viridis. 96:66, Holland's pl. 30 fig. 2 has orange on unf & green unh so is probably C. a. perplexa.

Callophrys viridis. 96:66, line 2 should be p. 227 not p. 127.

Callophrys affinis apama. 96:69, Holland 1931 designated a different valid lectotype pl. 64 fig. 17 female than Brown's invalid lectotype.

Plebejus melissa melissa. 96:372-375, Brown's lectotype is invalid (and his TL restriction to vic. Twin Lakes and La Plata Peak is wrong also), because J. Scott (in Papilio [New Series] #12, 2006) showed that Holland 1931 Butt. Book already validly designated the melissa female on pl. 66 fig. 17 as lectotype. Scott restricted TL to Tinytown, Jefferson Co. Colo., where another syntype is from.

Euphilotes glaucon. 96:406-409, the male on Holland's pl. 30 (not 31 as listed on p. 408) fig. 39 is not Plebejus anna as Brown wrote on p. 408. It is Euphilotes, and thus probably is glaucon as Holland identified it. 96: 408 says it is [or was] in CM labeled "Glaucon male/Nev. Morr.", but Brown said that the specimen currently possessing that label (which has many pinholes) is anna, so evidently that label was switched from the Holland Euphilotes specimen (which is now lost? or mislabeled) after Holland photographed it, to an anna specimen. The male collected by Herbert Morrison cannot be a syntype (Brown noted it was a pseudotype) because Brown wrote that the source of the original types was "From 2m, 1f, taken by Mr. Henry Edwards."

Glaucopsyche piasus daunia. 96:412, Holland's fig. was pl. 66 fig. 48.

Glaucopsyche lygdamus. 96:425, Holland's pl. 30 fig. 35 looks like columbia, fig. 36 looks like couperi.

Celastrina nigra. 96:424-425, the O.D. was Edwards' Butt. N.A. where it was described and figured. W. T. M. Forbes later gave nigra species/subspecies status in 1960.

Celastrina argiolus. 96:430, Holland's pl. 67 fig. 13 is Celastrina neglectamajor.

96:432 misspelled Roy O. Kendall.

96:433 misspelled Vladimir Nabokov.

Zestusa dorus. 101:602, Holland 1931 designated same valid lectotype as Brown & Miller's invalid lectotype.

Thorybes drusius. 101:605, Holland 1931 designated same valid lectotype as Brown & Miller's invalid lectotype.

Cogia caicus moschus. 101:607, Holland 1931 designated same valid lectotype as Brown & Miller's invalid lectotype.

Systasea zampa. 101:613, Holland's fig. was pl. XLVI, fig. 1.

Erynnis juvenalis clitus. 101:617, Holland's fig. was pl. XLV, fig. 8.

Pyrgus philetas. 101:623-624, holotype coll. J. Boll. Brown mistakenly wrote Jacob DOLL here, when he obviously meant Jacob BOLL, as here and on 92:391 Brown quoted Geiser as saying that Jacob BOLL (NOT DOLL) collected in N-C Texas 1876-1880; 106:45 confirms this. Brown restricted the TL to Archer Co. Tex., but the bugs do not occur there, thus TL Archer Co. Tex. is an error (Brown made this error on six names total), as noted above under Chlosyne leanira fulvia, so **I correct the TL of all six including philetas to Davis Mts. of West Texas**.

Pyrgus xanthus. 101:624, Holland's fig. was pl. XLVII, fig. 15.

Hesperopsis libya lena. 101:645, Holland 1931 designated same valid lectotype as Brown & Miller's invalid lectotype.

101:643 Desatoya Mts.

Carterocephalus palaemon. 103:262, Mendocino locale was no doubt correct, because ssp. or syn. "magnus" occurs there. 103:261, spelled mandan.

Copaeodes aurantiaca. 103, 270, Holland's fig. was pl. XLVII fig. 9, LI fig. 40.

Polites (Yvretta) rhesus & P. (Y.) carus figs. are reversed, on 103: pp. 275 & 276.

Polites (Yvretta) carus. 103:275-277, lectotype coll. Jacob Boll. Brown restricted the TL to Archer Co. Tex., but the bugs do not occur there. Thus TL Archer Co. Tex. is an error (Brown made this error on six names in total), as noted above under Chlosyne leanira fulvia, so **I correct TL of all six including carus to Davis Mts. of West Texas**.

Pseudocopaeodes eunus eunus. 103:277 lists the TL as bottoms of Kern River near Bakersfield, according to Morrison (who generally refused to give good locality information), but this TL is an error as the bug does not occur there (more mislabeled specimens from Herbert Morrison). **TL is hereby restricted to Victorville**, the TL of wrightii. Holland's fig. was pl. LXXIII fig. 6.

Stinga morrisoni. 103:280, Holland 1931 designated a different valid lectotype pl. LII fig. 15 male than Brown & Miller's invalid lectotype. Brown & Miller wrote that this may be a syntype but were not sure, but I am treating it as a syntype given by Edwards to his brother-in-law Theodore Mead, as happened with Problema byssus (see 106:63) etc.

Hesperia attalus. 103:282, Holland 1931 designated same valid lectotype as Brown & Miller's invalid lectotype.

Hesperia meskei straton. 103:285, Holland 1931 designated same valid lectotype as Brown & Miller's invalid lectotype.

Hesperia comma harpalus. 103:288 & 290. J. Scott (Papilio [New Series] #11, pp. 7-8, 2006) corrected the TL of harpalus & cabelus to the higher Sierra Nevada W of Carson City (far enough west to encounter the syn. "yosemite" phenotype found in the high Sierra). Holland's pl. LII fig. 20 is Polites sabuleti. On 103:291, Brown meant to label as 1) that part of 2nd paragraph reading "Cabelus…1975.", and he meant to label as 2) that part of 2nd paragraph reading "The third…upside down." 103:260, spelled cabelus.

Hesperia comma harpalus=cabelus. 103:291, Holland 1931 designated same valid lectotype as Brown & Miller's invalid lectotype.

Hesperia comma "oregonia" (harpalusXidahoXhulbirti). 103:291-293. J. Scott (Papilio [New Series] #12 p. 69) showed that oregonia is a useless name that evidently applies to an intergrade zone mess like that in Trinity Co. Calif. illustrated by A. Shapiro (J. Res. Lep. 29:35).

Hesperia comma idaho. 103:293, J. Scott (Papilio [New Series] #11 p. 7-8) showed that idaho applies to the lowland ssp. widespread in W U.S., and restricted the TL to the lowlands at Doyle in Lassen Co. Cal. 103:295, Holland 1931 designated same valid lectotype as Brown & Miller's invalid lectotype. Brown & Miller (103:294) wrongly claimed that Barnes & McDunnough (1916, Contrib. Nat. Hist. Lepid. 3 #2:127) designated this specimen earlier as lectotype; B. & McD. actually wrote only that they "would restrict the type"; they did not actually restrict the type; Holland designated the valid lectotype in 1931.

Polites vibex praeceps=brettoides. Spelled vibex not vibe. 106:44-45, lectotype coll. Jacob Boll (not Jacob Doll as O.D. claimed). Brown restricted the TL to Archer Co. Tex., but the bugs do not occur there, thus TL Archer Co. Tex. is an error (Brown made this error on six names in total), as noted above under Chlosyne leanira fulvia, so **I correct TL of all six names including brettoides to Davis Mts. of West Texas**. 106:45, Holland 1931 designated same valid lectotype as Brown & Miller's invalid lectotype.

Polites sonora siris. 106:46, Holland 1931 designated same valid lectotype as Brown & Miller's invalid lectotype.

Polites origenes rhena. 106:47, the rhena TL must be Wet Mts. W of Pueblo, because it does not occur on the plains (where Pueblo occurs). **I hereby restrict the TL to Hardscrabble Canyon drainage S of Greenwood, in the foothills of the Wet Mts., Custer Co. Colo.**, where rhena occurs.

Polites mystic dacotah. 106:52, Georgetown is a little too high altitude for this species, so the **TL is hereby restricted to Georgetown or eastward toward Idaho Springs**, in Clear Creek Canyon W of Denver, Colo.

Polites mardon. 106:53 last line, male fig. Butt. Book pl. 47 fig. 26 not 28. 106:54, Holland 1931 designated a different valid lectotype pl. LIII fig. 12 female than Brown & Miller's invalid lectotype.

Anatrytone logan lagus. 106:61, TL designated as Oak Creek Can., "Custer" Co. Colo. Actually there are two Oak Creek Canyons, in Fremont Co. (one in the foothills of Wet Mts., the other S of Cotopaxi in Arkansas Canyon), of which the former is more likely, while there is no Oak Creek Can. in Custer Co. But I have not found it in S-C Colorado where both canyons occur. Maybe it once occurred there?, as Neumoegen was presumably reliable (Herbert Morrison was totally unreliable on locality data).

Problema byssus byssus. 106:63, Holland fig. the lectotype on pl. 53 fig. 38 (not 28). And Holland 1931 designated same valid lectotype as Brown & Miller's invalid lectotype.

Ochlodes agricola agricola=milo. 106:69, TL was not Tenino Wash., as the species does not occur N of S Ore. Another mislabeled specimen from Herbert Knowles Morrison.

Poanes taxiles taxiles. 106:74, the TL is Oak Creek Canyon in Fremont (not Custer) Co. Colo., as noted above under Anatrytone logan lagus. **I hereby restrict the TL to the Oak Creek Canyon in foothills of Wet Mts. in Fremont Co.**

Euphyes vestris. 106:77, Emmel Emmel & Mattoon (1998) found that the ruricola O.D. does not match vestris, so this ruricola lectotype is evidently invalid.

Euphyes dion dion. 106:80-82. Allyn not Alyn in Fig. 28 legend. Lectotype was fig. on Holland's pl. LIII fig. 36 (not 38 as p. 82 writes).

Euphyes pilatka. 106:83. In 2), Holland's "Ind River" female must have had a label reading Butterfly Book/Pl. 53 fig. 35 (not 36), because fig. 35 shows pilatka while 36 shows dion.

106:85, Hans Herman Behr, not H. H. Berr.

113:30, Tryon (not Tyron) Reakirt. I read that Herman Strecker never returned any loans (that's called theft).

Atrytonopsis python python. 113:32, the male fig. by Holland pl. LIV fig. 4 is the holotype; Brown & Miller mistakenly figured the paratype female (the female on Holland's LIV fig. 5) as the holotype and obviously meant to illustrate the male (read Brown's Holotype paragraph).

Atrytonopsis pittacus. 113:33, Holland 1931 designated same valid lectotype as Brown & Miller's invalid lectotype.

Atrytonopsis hianna deva. 113:37 fig. 6 is neotype not holotype, as noted on p. 38.

Amblyscirtes phylace. 113:40 restricts the TL to foothills of Wet Mts. probably along Hardscrabble Crk., but I did not find it in the Wet Mtn. foothills, and found it only at Pass Creek Huerfano Co., so the **TL should just be left as "So. Colo."** The fig. 8 holotype is female.

Amblyscirtes eos=comus. 113:43, Brown restricted the comus TL to Archer Co. Texas, an error (even though eos occurs there--Brown made this error on six names in total) as noted above under Chlosyne leanira fulvia, so **I correct the TL of all six names including comus to Davis Mts. of West Texas**. The valid TL is the locality of the neotype, but the neotype was labeled only "West Texas", not Archer Co. Texas, thus Archer Co. was NOT the locality of the neotype as Brown wrote. The original comus (lost in the ship sinking) was coll. by Mr. Belfrage rather than Jacob Boll, though the neotype was coll. by Boll.

Amblyscirtes eos=nilus. 113:44-45, holotype coll. Jacob Boll. Brown's restricted the nilus TL to Archer Co. Tex., an error (even though eos occurs there--Brown made this error on six names in total), as noted above under Chlosyne leanira fulvia, so **I correct the TL of all six names including nilus to Davis Mts. of West Texas**.

Amblyscirtes cassus. 113:52, Holland 1931 designated same valid lectotype as Brown & Miller's invalid lectotype.

Notamblyscirtes simius. 113:54, Brown listed the TL as Oak Creek Can. Custer Co. Colo. (Neumoegen), and Pueblo, Pueblo Co. Colo. (Lintner), then mistakenly restricted it to Oak Creek Can. There is no Oak Creek Can. in Custer Co., while there are two in adjacent Fremont Co.; but Brown should have restricted it to Pueblo, Pueblo Co. Colo., because this is a shortgrass prairie species that doubtfully occurs in the mts. in Oak Creek Can., but is common on the shortgrass prairie around Pueblo. So **I hereby correct the TL to Pueblo**. Also, Holland 1931 designated same valid lectotype as Brown & Miller's invalid lectotype.

Panoquina ocola. 113:61, Brown could not find the museum female illus. by Holland pl. LIV fig. 22, probably because it is actually Lerema accius f.

113:67, Part II Section III was published in 1987 on pp. 113:29-69.

113:68, Corbet not Corbert.

Commentary on research on old names and types is needed here. Brown worked hard for 23 years (1964-1987), and must have spent at least $20,000.00-$40,000.00 in NSF government and personal funds, to fix the types of Edwards' butterflies, in a pile of published papers 3" thick. With that time and money he could have done a lot of good biological research, such as finding new hostplants, studying mate-locating behavior, etc. It's too bad that the ICZN Code's obsession with old names (the principle of priority) forces so much waste of time and money. In all other fields of science, old bad work is simply happily forgotten. But in taxonomy, old bad work hangs around forever like a rotten stench, and taxonomists are forced to dive into the old-name sewer and muck around in the murky sludge to dredge up horrid things (toxotaxa), and then sanitize them a little to make them pass minimum standards (see the cartoon at the end of Papilio [New Series] #18). The principle of priority is the diving board into the old-name sewer. If we could somehow get rid of the ICZN Code's obsession with priority and types, we could winch our taxonomists out of the old-name sewer and redirect them into useful biological work, instead of wasting their time on legalistic interpretation of old papers and old names. There are lots of butterflies that need work rearing and photographing eggs larvae pupae, studying the contact areas between dubious species, doing morphology to define genera objectively, etc., work that taxonomists could do if they weren't wasting their time correcting old bad work. We would be better off if the principle of priority were abolished. Without the principle of priority, confusing rotten names such as dumetorum could be instantly ignored and forgotten, as merit & popularity rather than priority would decide our scientific names. A few species might have several different scientific names in use simultaneously (which happens even today!), but this situation would be temporary, and soon the names would stabilize, and the names would be appropriate! Eliminating the principle of priority would carry over onto common names; currently lepidopterists retain horrible inappropriate names (such as Plebejus lupini—now alupini--whose larvae and adults have nothing to do with lupines) merely because they have priority and were in long use; with unshackled correct thinking, these misleading common names could be corrected, finally. If scientific names became unshackled from the principle of priority--free at last—they would greatly improve.

A CATALOGUE OF THE BUTTERFLIES OF THE UNITED STATES AND CANADA, with a complete bibliography of the descriptive and systematic literature. Jonathan P. Pelham. 2008. Journal of Research on the Lepidoptera 40:1-652.

This outstanding book is very useful and welcome for butterfly experts. It updates the names of North American butterflies since the last catalogue/checklist by Lee Miller & F. Martin Brown in 1981, which was partially updated by a list of changes compiled by C. Ferris in 1989. The title is a misnomer, as the book actually is a catalogue of the NAMES, not the butterflies, as the book attempts to update and correct the ICZN status of all the proposed names (the biological status of hundreds of the actual butterfly taxa is arguably wrong, so one cannot really call it a catalogue of the living biological creatures). Thus the book represents a North American update of the Charles Bridges catalogues of worldwide names in 1988. The book is a good value, 652 pages for only $25 (though if I were editor I would have put each name into just one paragraph and used 3 columns in index and two columns in the checklist [Appendix 3] and deleted blank lines in appendices, reducing the book to 400 p.).(The blank spaces can be used to write corrections & additions.) For each name, the book gives literature citation of the original description, type locality, designated types and museum location, and--the best feature of the book--the "original combination" of each name below the genus. Using the original combination, now we can know whether the bug was named as a "form" or "variety" to judge whether it is an infrasubspecific unavailable

name or an available name; and finally we can determine the original spelling and determine whether its ending has been sexually transmogrified by the suffix-changers to conform with ICZN Code requirements for making the sex of genus and species names match. Pelham has spent years of time and lots of $ to examine original descriptions to record all this information. The book lists unavailable names after a double-cross, incl. homonyms after a double-cross symbol as in dos Passos' 1964 checklist, and lists infrasubspecific names in quotes after the same double-cross; I would have preferred a different symbol for infrasubspecific names (such as an odd-font I), but one can examine the original name combination and the other listed info to determine why the names listed after the double-cross are now considered unavailable for use by the ICZN Code. The book lists type locality and types in a separate line for each name; for lectotypes & neotypes the Code requires the TL to be the locality of lectotype or neotype, so it would have been nice for bugs with lectotype/neotype to write at the end of the type locality line "TL now locality of lectotype/neotype," and list the locality. Publications—especially journals--often had wrong dates on their covers, and Pelham has evidently determined corrected publication dates for many or most of these, as noted in the bibliography entries. The book is very thorough. My copy of Miller/Brown has corrections/additions on almost every page, so I compared those to the Catalogue and found that nearly all have been fixed/added. For instance, Miller/Brown mistakenly used the wrong name on six homonyms (arcas, palaemon, sophia, alticola, alaskensis, augustus), and Pelham corrected all of them.

P. VII says that the species-level status of the names was based on Opler & Warren (2002), which is unfortunate, because that obscure work included no subspecies, those two authors disagreed on species concepts, as one of them does not believe in subspecies and has never named any (people with that view inevitably raise all the distinctive ssp. to distinct species status); not a good foundation for the Catalogue. P. IX complains that vol. 12 of Papilio (New Series) lacked peer review (actually it had five times the usual number of reviewers as the regular vanity-press butterfly journals such as J. Lepid. Soc. & J. Res. Lepid., and a review by a non-expert for those journals really results in just editorial improvement and not real improvement of the basic science), yet the Catalogue uses an unpublished thesis for its Hesperiidae higher classification (though it is undoubtedly an improvement). Pelham did not have the time to read Papilio N.S. #12, as noted below where its findings are implemented. The higher classification for Nymphalidae uses the latest research such as new DNA phenograms such as Wahlberg et al. (2005), and seems mostly okay, though rearranged some, but I looked at various phenograms produced by that research that greatly switched positions of Papilionidae and Pieridae and Lycaenidae with small iterations of methods, which does not give one much confidence in the results, so I wonder how long the seemingly-overconfident classification down to tribes and subtribes in this Catalogue will last. Nymphalidae subfamilies are arranged contrary to important gross larval morphology (scoli etc.); Satyrinae and Morphinae should be placed near the base somewhere after Libytheinae & Danainae (see J. Scott & D. Wright 1990, Butterfly Phylogeny & Fossils, chap. 5 pp. 152-208 in Otakar Kudrna's Butterflies of Europe, vol. 2; recent DNA research has evidently proved that Apaturinae apparently lost the body scoli and belong among the Nymphalinae). Riodininae is obviously a subfamily of Lycaenidae, not a family, by characters of adults and immatures, despite some DNA data.

The Catalogue seems to be reluctant to change the status of numerous names of species and subspecies, and usually maintains the 1981 Miller/Brown status without implementing recent revisionary changes of status. Many ssp. that have been proven to be synonyms are still listed here as ssp. Lycaena thoe is the correct name as noted, yet hyllus is still used. Sterope is the correct name, yet acastus is still used. ("Repeating an error doubles it".) Dumetorum is the correct name for C. sheridanii as Warren wrote, yet sheridanii is still used (I like this refusal to use dumetorum [even though the Code states that existing usage must be maintained until the Commission rules on name suppression], because dumetorum has caused enough trouble by whacking viridis and abandoning perplexa and now threatening to overrun sheridanii, and I have petitioned the ICZN to suppress the name dumetorum because it upsets stability and has caused mental-meltdown confusion across W N.A., witness A. Shapiro's 2007 field guide; my petition also protects the name sheridanii). Some well-studied published changes in the literature are ignored, while the book makes some drastic changes with little or no explanation, apparently based on little or no information. There are nearly 300 names that I think are given the wrong status (several hundred synonyms treated as valid subspecies [this is good news for splitters, as no matter how identical is a synonym, someone somewhere will list it as a valid ssp. until the end of eternity], some ssp. are placed in the wrong species, some valid ssp. are treated as synonyms, etc.)(the Burke Museum must not have a very good comprehensive collection of butterflies from throughout North America). And there are many cases in which the ssp. within a species have been arranged in unnatural jumbled sequence (Apodemia "mormo", Celastrina, Boloria, Speyeria, Euphydryas, Lycaena arota, etc.) (p. VIII says they were arranged by latitude/longitude rather than systematic relationship). I mention few of those hundreds of cases of wrong status or placement below, as there are too many of them to be corrected here, but most of them are mentioned in the other book reviews in this Papilio (New Series) #19 issue.

So, we need a new Biological Catalogue of N.A. Butterflies (not names). A Biological Catalogue would classify the wild biological creatures by morphological/behavioral/genetic etc. relationship, and reassign the nomenclature as necessary (as much as allowable in the Code) in order to best fit the real biological units, and would also include non-Code names of those forms that are important in the lives of the butterflies (for instance forms involved in seasonal adaptation, forms such as f. alba that provide Colias females in cold environments with extra nitrogen, forms involved in mimicry, important genetic forms, etc.). Pelham's Catalogue of names merely lists such forms according to how the original name combination

& description was worded, as synonyms or as infrasubspecific unavailable names etc., without mentioning whether the name is of a seasonal form or sexual form or whatever, so there is no way to tell in this Catalogue whether the name is one of those biologically-important forms. Such forms that I used in my 1986 book are listed in the Catalogue without mentioning their biological function, and are called nomina nuda (actually the ICZN Code says that form names are no longer regulated by its rules, so such form names that were proposed after 1960 without types etc. need not have even been listed in this Catalogue).

But for nomenclatural matters, this is an outstanding book.

The book uses original spellings for the endings of species/ssp. names (rather than matching species gender to genus gender), which is commendable in my opinion, but is frequently contrary to the latinization rules forming half the Code. Sometimes a latinized ending is also listed and called "species-genus gender conformation", but I'm sure an expert scholar of latin could concoct a thousand more. A paper by G. Lamas is listed to justify not latinizing the endings. (I don't like changing the endings, and my names were not intended to be latin and were concocted just to sound good, so I am annoyed when people change the endings of my names.)

The worst part of the Catalogue is Pelham's attempt to name five new subspecies. He attempts to name all five by using unavailable names of homonyms or aberrations and raising them to subspecies status. ICZN Code Art. 13 says "To be available, every name published after 1930 must satisfy the provisions of Article 11 and must/ 13.1.1. be accompanied by a description or definition that states in words characters that are purported to differentiate the taxon, or/ 13.1.2. be accompanied by a bibliographic reference to such a published statement…, or/ 13.1.3. be proposed expressly as a new replacement name (nomen novum) for an available name, whether required by any provision of the Code or not." Pelham did not publish a description or definition of any of these five names, so none of the five satisfy 13.1.1. Note that the words "the taxon" in 13.1.1. mean the taxon being named, namely the subspecies in these five cases; and the glossary defines "taxon" as a "population, or group of populations" (a taxon is not an individual such as an aberration—the glossary does define "infrasubspecific taxon", but that means a taxon such as a subspecies that is a whole population or group of populations to which someone wrongly gave an unavailable "form" or "variety" name). Here are the five proposed names:

1) On p. 375 Pelham proposed Chlosyne nycteis pastoron to replace the unavailable homonym obsoleta. Ssp. pastoron is now a valid available ssp. name, because Pelham referenced the original description of obsoleta, which has a description and definition, which satisfies 13.1.2., making the name available.

2) On p. 118-9 Pelham proposed Papilio indra parvindra to replace the unavailable homonym pygmaeus. Ssp. parvindra is now a valid available ssp. name, because he referenced the original description of pygmaeus, which has a description and definition, which satisfies 13.1.2. making the name available. Nomenclaturally-irrelevant note: pygmaeus is a subjective synonym of panamintensis according to Steve Spomer, who has reared and studied all the P. indra ssp., so parvindra is also a subjective synonym.

For the next three names, Pelham attempted to name three new ssp. by raising the status of aberrations to subspecies status. The original description of an aberration does not qualify as the description or definition of the taxon such as a subspecies, because by definition aberrations are abnormal individuals and are thus different from the population and thus the subspecies from which they came, and aberrations are not populations or groups of populations. And the Code requires a description or definition of the taxon being named: the subspecies. Thus the original description of an aberration cannot be used to satisfy the description or definition of a taxon required by 13.1.1., or the bibliographic reference to the description or definition required by 13.1.2. Aberrations are unavailable names, thus cannot fulfill 13.1.3. either. Moreover, article 1.3.2. says "Excluded from the provisions of the Code are names proposed for teratological specimens as such", which indicates that a description of an aberration cannot be used to satisfy the reference requirement of 13.1.2 (thus it is impossible to elevate a name that does not even enter into nomenclature; there is no name to elevate). So, raising an aberration to ssp. status mandates satisfying 13.1.1. or referencing 13.1.2., by requiring Pelham to write or reference a "description or definition that states in words characters that are purported to differentiate the taxon", the taxon being the subspecies being named, not a freak individual within the population. Unfortunately, Pelham fails to write the "description or definition that states in words characters that are purported to differentiate the taxon", and fails to provide a reference to such a published statement, for all three proposed ssp., as follows.

3) On p. 366 Pelham proposes the name Euphydryas colon svilhae as a new ssp., by attempting to raise the aberration "Euphydryas chalcedona race perdiccas tr. f. [transition form is the name Jean Gunder used for the hundreds of aberrations that he named, as Gunder explained in 1924-1928 & 1932 Entom. News, and W. D. Field explained in 1934 Can. Ent. 66:253-257, and C. dos Passos explained in 1938 Amer. Mus. Novitates #999] svilhae" to ssp. status. Unfortunately Pelham does not provide a description or definition, and only states that it is from Olympic Mts. of Wash., and references Guppy & Shepard (2001), which mapped all the bugs from W-C Wash. and Olympic Mts. to SW & W-C BC as ssp. paradoxa. Thus there is no description or definition, as Guppy & Shepard did not distinguish the Olympic Peninsula bugs as different, and merely referred to them as part of the paradoxa range. We do not know how Olympic Mts. svilhae is distinguished from the bugs southward or far northward, as there is no description or definition to differentiate the taxon, thus svilhae does not satisfy 13.1.2. or 13.1.1. (or 13.1.3.), and is an unavailable nomen nudum. [Nomenclaturally-

irrelevant note: I have examined 7m7f of Hurricane Mts. bugs, which look very similar to colon & wallacensis, most like the latter in wing pattern & size; they do not look like a different ssp.]

4) On p. 167-8 Pelham proposes the name Anthocharis sara sulfuris as a new ssp., by attempting to raise the aberration "Anthocharis sara race julia tr. f. sulfuris" to ssp. status. Unfortunately Pelham does not provide a description or definition, and only states that it is from SE BC, E Wash., NE Ore., N Ida. and W Montana, and references A. Warren (2005). But Warren (2005) did not say that this is a separate ssp. or new taxon, he described NE Ore. bugs as near already-named taxa, he just wrote that adults in the Warner Mts. of SE Ore. are phenotypically similar to ssp. stella, and wrote that NE Ore. has individuals resembling ssp. browningi flying with ssp. stella, and wrote that many in Baker & Wallowa Cos. of NE Ore. approach the phenotype of ssp. browningi, and wrote that ssp. stella phenotypes also occur in the Klamath River Can. in S-C Ore., and wrote that high-elevation Cascades populations cannot be assigned to either ssp. near stella or ssp. flora. Warren did not mention BC or Wash. or Ida. or Montana at all. So we do not know what bug Pelham was proposing, so sulfuris does not satisfy 13.1.2. or 13.1.1. (or 13.1.3.), thus is an unavailable nomen nudum.

5) On p. 381-2 Pelham proposes the name Chlosyne palla blackmorei as a new ssp., by attempting to raise the aberration "Melitaea palla a. female blackmorei" to ssp. status. Unfortunately Pelham does not provide a description or definition, and states only that it is from SE BC, E Wash., NE Ore. & W Montana as discussed by Warren (2005). But Warren (2005) did not mention BC, and only mentioned that dark females can be found from central Ore. to W Mont., and mentioned that females in NE Ore. "may be dark, dusky, or pale, and in some populations, dark forms predominate", and he wrote that dark females are common in Calif. eremita and are found in Calif. ssp. palla and in SW & C Ore., and wrote that NE Ore. also has populations in the Columbia Gorge that look similar to sterope and are invariably mixed in with museum series of sterope. Thus we do not know what bug Pelham was proposing, so blackmorei does not satisfy 13.1.2. or 13.1.1. (or 13.1.3.), thus is an unavailable nomen nudum. Additionally, Pelham notes the range of his proposed ssp. blackmorei is SE BC, E Wash., NE Ore. & W Montana, yet the Gunder blackmorei aberration is from outside of that range in SW BC, which would seem to invalidate any use of the aberration in Pelham's attempt to describe/define ssp. blackmorei for 13.1.2. [Nomenclaturally-irrelevant note: Such a subspecies should be named by persons knowledgeable about it, because the SW BC bugs probably are darker than the others.]

Thus, four of the new subspecies names Pelham proposes are worthless, and three are nomina nuda. The editor and peer reviewers of this Catalogue should have found these errors and corrected them; parts of the catalogue evidently escaped quality peer review. It is bad practice to raise aberrations to ssp. or species status, and Art. 13A recommends that a diagnosis should also be provided. I once used the name of an aberration for a new subspecies (Euphydryas chalcedona hennei), but my original description provided a complete description and diagnosis of the ssp., plus the type locality, and designated holotype & a hundred paratypes in museums (contrary to p. 363 which failed to provide that data and wrongly stated that hennei Scott is an aberration raised to ssp. status—these TL & type details are added below). And before someone renames a homonym, it is also accepted taxonomic practice to notify the author (of the name pygmaeus and obsoleta, though the author of the latter is now deceased) and give them a chance to rename the taxa.

Details of the corrections that I have found are are listed below. I cannot find all the errors; decades will be required to find most of them, because people almost never read the details about aberrations and other obscure names. (Many corrections were contributed by N. Kondla, some by C. Guppy and others.) The type localities of many butterflies especially from Colorado have been fixed, to match the historical itineraries of the collectors with the actual distribution of the butterflies, as noted in Brown's Edwards' types corrections above.

P. 16 I think Thessia is just a subgenus at best in Achalarus, as Steinhauser defined it on genitalia (wings are nearly identical to Achalarus albociliatus) and the crude genitalia figs. in Evans of jalapus & other Achalarus aren't any more diverse than are the species within Thorybes.

P. 18 aemilia, Holland 1898 p. 325 designated lectotype of pl. XLVI fig. 39 male.

P. 18 dobra is just an aberration (here's the difference between names and biology again: nomenclaturally it is an available name for a ssp., biologically it is an aberration).

P. 18 subgenera Erynnis & Erynnides are perfectly valid in Erynnis (see Burns 1964 & Papilio [New Series] #14), and the book uses subgenera elsewhere.

P. 24 lena, the lectotype is Holland 1931 pl. L fig. 36 male V.

P. 31 scudderi does not occur in Graham Mts., so **I hereby restrict TL to Huachuca Mts., Ariz.**, where it also occurs.

P. 32 zarucco/funeralis belongs beside the persius-group, see Papilio (N.S.) #12.

P. 33 borealis, delete District of Mackenzie which no longer exists.

P. 34 pallida, spelled Potrero for 4 other names (canescens, celata, nelphe, pithyusa).

P. 38 lagunae holotype was not fig. by Scott (1975).

P. 38 **caespitatis TL is correctly still Marin Co.**, because Emmel et al. had no valid reason for changing it (obviously authors cannot change the TL willy-nilly for no reason, so the first justifiable TL is valid; without this principle people could change the TL every year just for fun [Pelham seems to agree with this principle in text of eremita on p. 381 & fuliginosa on p. 203]; see the corrections of Syst. W N.A. Butt. in this Papilio [N.S.] #19 issue).

P. 38 emend macdunnoughi to mcdunnoughi; a lapsus calami in art. 32.5.1. as it was named for James McDunnough.

P. 39 apertorum is just a spring form not a ssp. (biologically it is form pseudoxanthus Scott).
P. 40 Archer Co. TL is error for philetas (the Archer Co. errors were corrected in Brown's Edwards' types corrections in this Papilio [N.S.] #19 issue). Corrected TL is Davis Mts. in west Texas.
P. 40, Heliopyrgus would seem to be a subgenus of Heliopetes, as the genitalia of Heliopetes purgia is similar.
P. 43 mackenziei, delete District of Mackenzie which no longer exists in Canada.
P. 44 Most of the Megathymini are given the wrong species/ssp. status.
P. 44 polingi, Holland 1931 p. 361 says pl. LI fig. 20 male is paratype.
P. 49 albocincta, holotype fig. Holland 1931 pl. LXXI fig. 17 male.
P. 52 garita, based on Reakirt's itinerary, the **TL is hereby restricted to Mts. W of Denver Colo.**, the only place he collected.
P. 52 edwardsii, **TL hereby restricted to Hardscrabble Can., Wet Mts., Custer Co. Colo.**
P. 58 erna is more of a form than a ssp., its population intermediate toward linda.
P. 58 aenus, **TL hereby clarified to Hardscrabble Can., Wet Mts., Custer Co. Colo.**
P. 59 carolina, Holland 1898 p. 367 designated lectotype of pl. XLVI fig. 36 male.
P. 60 Archer Co. TL is error for comus & nilus. Corrected TL is Davis Mts. in west Texas (see above in Brown's Edwards' types corrections in this Papilio [New Series] #19 paper).
P. 61 I didn't find phylace in Wet Mts. including Hardscrabble Road, so **TL should just be "Southern Colo."**
P. 61 Nastra larvae look almost identical to Atrytone arogos, so why are they placed in different tribes?
P. 67 eunus Kern River bottoms TL is error as it does not occur there. TL restricted above to Victorville (TL of wrightii).
P. 67 muertovalle is a valid paler ssp. from Death Valley to Needles, see Papilio (N.S.) #18.
P. 70 manitoba, TL now Lac la Hache.
P. 70 borealis, Nain is in mainland Labrador, not Nfld., in the province of "Newfoundland and Labrador."
P. 70 colorado, **TL is evidently Kenosha Pass or Guanella Pass, Colo.** Holland 1931 p. 371 says pl. LII figs 1-2 are types, but fig. 2 is not called type on plate and fig. 1 is Hesperia nevada, thus neither are likely to be syntypes.
P. 71 idaho, Brown & Miller 103:294 wrote in error that Barnes & McDunnough 1916 [Contrib. Nat. Hist. Lepid. 3 #2:127] designated the same specimen as lectotype that Holland 1931 & Brown & Miller designated as lectotype, which is from "East Calif."; B. & McD. actually only wrote that they "would restrict the type", leaving the actual restriction to Holland 1931.
P. 71 cabelus, Austin's TL is error as bug is absent in the Central Valley W of the Sierras. Holland 1931 designated lectotype as pl. LII fig. 17 male.
P. 71 harpalus, in Types, delete "18mD (paralectotype)".
P. 74 MacNeill (1964) wrote that the lindseyi type has label "Napa Co. Calif."
P. 76 Archer Co. TL is error for carus. Corrected TL is Davis Mts. in west Texas (see above in Brown's Edwards' types corrections in this Papilio [New Series] #19 paper).
P. 78 mardon, Holland 1898 Butt. Book did not state that the fig. was type, so did not designate a lectotype. However, Holland 1931 Butt. Book wrote on p. 381 that both figs. on pl. XLVII fig. 26 male & pl. LIII fig. 12 female are types, but on plates only LIII fig. 12 female is called type, thus the latter female is a Holland 1931 lectotype designation, and the former male is just a syntype (now paralectotype). Both were mislabeled "Mt. Hood".
P. 80 rhena **TL is Wet Mts. W of Pueblo, Colo.**, see corrections of Brown's Edwards types in this Papilio issue.
P. 80 dacotah TL restricted above to Georgetown or eastward toward Idaho Springs, as Georgetown may be too high.
P. 81 Archer Co. TL is error for brettoides. Corrected TL is Davis Mts. in west Texas (see above in Brown's Edwards' types corrections in this Papilio [New Series] #19 paper).
P. 81 vibex, Miller/Brown wrote TL certainly on the mainland, meaning ?Florida, & they wrote that brettus TL is Georgia (name based on Abbot drawing).
P. 85 byssus, Holland 1931 designated pl. LIII fig. 38 (not 28) male lectotype, and pl. XLVI fig. 20 (not 41) female is paralectotype.
P. 85 kumskaka, Holland 1931 pl. LIII fig. 39 male is Problema bulenta, not kumskaka, so is doubtfully a paratype.
P. 86 spelled monofacies (also on p. 459).
P. 87 aaroni, Gatrelle wrote the lectotype is in CMNH not ANSP.
P. 87 taxiles TL & p. 91 lagus TL are Oak Creek Can. in Fremont Co. not Custer Co., which is dubious for lagus anyway as the bug isn't there now.
P. 88 howardi, Holland 1931 called pl. XLVI fig. 38 male type on p. 391 and nothing on plate, & called pl. LIV fig. 1 female paratype on p. 391 & plate; & called pl. XLVI fig. 14a nothing on p. 391 & plate; thus fig. 38 male is Holland's 1931 valid lectotype designation; Gatrelle wrote that fig. 38 is a syntype, which is now lost (pl. XLVI fig. 38 male Poanes howardi in 1931 book is the same bug as Phycanassa howardi in 1898 book [Gatrelle wrote pl. 46 then wrongly wrote LXVI, it is XLVI]); Gatrelle designated a 2nd lectotype in CMNH with "type 7092 label, which is invalid; Holland's lectotype is valid even though lost.
P. 88 morrisoni, Holland 1931 designated lectotype pl. LII fig. 15 male (pl. XLVI figs. 26-27 are not called types on plate).

P. 89 **pratincola TL is correctly still Broderick, Yolo. Co. Calif.** as Scott defined it, because Emmel et al. changed it for no good reason (see the corrections for Syst. W N.A. Butt in this Papilio issue).
P. 91 snowi, Ute Pass is Teller Co. Colo.
P. 91 Anatrytone was actually resurrected by Scott (1992, Papilio [N.S.] #6) based on numerous larval pupal & adult traits; Burns later repeated this based on a few weak adult traits.
P. 92 simius TL corrected to Pueblo, Pueblo Co. Colo. by Scott in corrections of Edwards types in this Papilio (N.S.) #19 issue. Change 1898 to 1931, as Holland 1931 Butt. Book designated lectotype on p. 369. Pelham Catalogue wrote that Holland 1898 Butt. Book designated lectotype, but he meant to write 1931 as simius is on p. 369 in 1931 book and on p. 341 in 1898 book which was thoroughly revised in 1931. Also, Holland 1898 did not say any specimen was type thus made no lectotype designation.
P. 93 emended to mcguirei, not macguirei.
P. 94 dukesi, Holland 1931 fig. a "paratype" on pl. LIV fig. 26 male.
P. 97 python, Holland's 1931 pl. LIV fig. 4 male is holotype (Brown & Miller mistakenly fig. the female in Holland fig. 5 & called it the holotype, they obviously indicated the male was holotype & intended to illustrate the male).
P. 102 emend altaurus to alturus, a lapsus calami for Lake Alturus.
P. 103 apricatus, Holland 1931 fig. holotype pl. LXXVI fig. 19 male.
P. 103, St. Ilja is Mt. St. Elias according to p. 101.
P. 104 golovinus, Holland 1931 designated lectotype on pl. LXIX fig. 3 male.
P. 105 manitobaensis, Exshaw is the Alta. town, not Exsham.
P. 105 if minusculus is from Colo., move it to sayii.
P. 106 hermodur is a perfectly valid ssp. that is darker and genetically distinct when reared in lab, and requires no reevaluation as it is older than all the remaining sayii synonyms. The **TL is hereby restricted to alpine zone in Sangre de Cristo Mts. or Monarch Pass, in S Colo.**, where the bug is limited in southern Colorado.
P. 108 Troidini was transferred to Parnassiinae by C. Hauser (1993), a view evidently rejected by later authors.
P. 111 floridensis, named by Holland 1898 Butt. Book p. 307, holotype by monotypy, holotype fig. in that book & Holland 1931 on pl. XLIV fig. 2 (not 3) male; named as "Papilio ajax winter form floridensis" thus is infrasubspecific, so change = to double-cross. Delete "cited G. Edwards…Birds I:pl.34" which was not mentioned by Holland, though maybe Pelham is stating only that G. Edwards mentioned this name floridensis.
P. 111 walshii, holotype fig. Holland 1931 pl. XLIV fig. 4 male.
P. 112 aliaska, Pelham claims that Holland 1931 designated lectotype on p. 314 pl. 41 fig. 1 male, which if true would make hudsonianus a syn. of aliaska as Holland's p. 314 says that fig. 1 is hudsonianus from Rupert's House on Hudson Bay. However, Holland also says on p. 314 that he has another type from Scudder's original material from Alaska; thus Holland called 2 specimens types, so neither is a valid lectotype designation. And fig. 1 hudsonianus is not a syntype: Holland's fig. is from Hudson Bay, and Scudder's aliaska syntypes are from Alaska, thus pl. 41 fig. 1 is not an aliaska syntype so cannot be lectotype. We revert to Miller/Brown, who say "TL Nulato Alaska. HT should be in MCZ."
P. 113 umbellatarum Fabricius must be 1738, not 1938.
P. 114 dodi is a syn. of ssp. brucei; both are polymorphic but usually yellow, the black form varying from uncommon in the south (<5% at Glenwood Springs brucei TL) to rare northward in Canada.
P. 114 dodi, Kondla (1981) also defined TL as Dorothy, Alta.
P. 114 hollandii, Roaring Forks is near Carbondale, Garfield Co. Colo.
P. 115 calverleyi, Holland 1931 Butt. Book fig. holotype on same plate XLI fig 6f.
P. 117 rudkini, "Papilio bairdii form rudkini, f. nov." was named as an available subspecific name by Comstock 1935 Bull. So. Cal. Acad. Sci. 34:143-144 by art. 45.6.4., because it was named as a form before 1961 and the original description described a subspecies, and Comstock labeled it a "race" on 34:143 and a "species" on 34:144. The Chermocks did not name rudkini. And even if Comstock's text had described rudkini as infrasubspecific, it would still be a ssp. name by 45.6.4.1. because later authors raised it to subspecific rank (Pelham believes that 45.6.4.1. is valid according to p. 17).
P. 117 comstocki. The original combination was actually "Papilio rudkini form Comstocki f. nov." Form comstocki is an infrasubspecific name because it was described as a form like clarki.
P. 118 phyllisae, spelled Butterbredt Peak
P. 125 arcticus, Holland 1931 designated lectotype on pl. LXXV fig. 6 male as just "type".
P. 127 alexiares is a ssp. of P. glaucus (even though it has wing pattern & genitalia of rutulus) and has mtDNA similar to glaucus (F. Sperling) & was treated as a ssp. of glaucus by J. Scriber (J. Res. Lepid. 27:96-103 & 27:222-232 & Oecologia 71:94-103), & by Tyler, Brown, & Wilson (1994).
P. 134 daira, add these entries: TL: "Virginia"; Types: holotype may be in BMNH (ex van Lennap colln.).
P. 135 eugenia is not in U.S., and solana & maybe pallidula surely belong to sidonia, also not in U.S.
P. 138 is centralis in U.S.?
P. 142-3, why two alba names, is one a white male?

P. 144 eriphyle is limited to the central interior BC according to C. Guppy, so all 5 synonyms do not belong to it though some may be closer to eriphyle than to philodice. TL now called Lac la Hache.
P. 144 kootenai. Because N BC is in the range of ssp. vitabunda, the **TL is the holotype locality of Kaslo, on the Kootenai River, currently on the edge of a reservoir built since the holotype was collected**.
P. 145 has two pallida Cockerell entries on page, both surely the same albino female form.
P. 146-8 sullivani was clearly proved to belong in C. occidentalis in O.D., C. christina also belongs in C. occidentalis, and Papilio (N.S.) #12 placed wasatchia=pseudochristina in C. occidentalis and placed astraea & altiplano into C. edwardsii & placed pseudocolumbiensis into C. columbiensis.
P. 148 edwardsii was named by Behr, not Edwards, as the original description clearly states.
P. 147 alberta, TL is just S Peace River Valley, where eurytheme was absent until the last 10 years.
P. 148 Miller/Brown wrote that pallida is preoccupied by pallida Staudinger, Cat. Lepid. Europe 3 (1860), but it's infrasubspecific anyway.
P. 149 elis, there is no holotype as O.D. did not designate one. N. Kondla states that the type series was almost certainly a mixed series of elis & minisni. Holland 1931 did not designate a lectotype, so there are only syntypes.
P. 150 hela, the Eskimo Point in "NWT" (not the one near Churchill Man.) is now in Nunavut.
P. 150 Scott (1986) Butts. N. A. elevated Colias canadensis to species level.
P. 151 is olga in Alaska? It is a syn. of herzi in Gorbunov book, a syn. of kolosovae in Grieshuber & Lamas 2007 Mitt. Münch. Ent. Ges. 97:163.
P. 152 chione, Holland's 1931 pl. LXVIII fig. 33 male is not syntype as it is from Southampton I., and Holland's p. 299 says chione was originally described from Boothia Felix.
P. 152 C. Ferris Bull. Allyn Mus. #96 said both rossii & gueneei are hybrids nastesXhecla, but rossii is orangish & gueneei not orangish, so rossii is a syn. of boothii.
P. 152 moina, the Eskimo Point in "NWT" (not the one near Churchill Man.) is now in Nunavut
P. 154 gigantea, above Fort York is in Manitoba (now York Factory Manitoba), not Ont.
P. 155 ssp. minisni Bean (1895) Psyche 7:228 TL Laggan Alberta is valid available name & skinneri its synonym, as N. Kondla states that Bean described minisni as a full species with a description (but Cris Guppy disagrees that the words constitute a description) & wrote it is "clearly allied to pelidne"; minisni is not based on elis f; some people consider minisni different from skinneri; Grieshuber & Lamas accepted minisni in their global Colias list.
P. 156 chippewa, add Types: lectotype is same specimen as lectotype of helena.
P. 160 sennae TL is very uncertain and must be fixed by someone.
P. 165 Anthocharini.
P. 170 It's hard to believe that Euchloe ausonides & Pieris protodice are in separate tribes, their larvae are so similar.
P. 171 rosa, Holland's 1931 valid designation of lectotype pl. XXXII fig. 39 male is not the same specimen as Brown's later invalid lectotype, as the wing pattern clearly differs.
P. 172 hyantis, Holland's fig. had no type label & does not match description, thus is doubfully a syntype & Brown's lectotype designation of a different specimen should be considered valid.
P. 175 terlooti is correct not terlooii, this was a simple lapsus calami of Baron Terloot's name, a wrongful substitution of an i for a t.. A lapsus calami must be corrected according to 32.5.1. Pelham has misinterpreted the Code here; every lapsus calami--every misspelling--must be automatically corrected. (The word spelling automatically involves a comparison of the current letters to the known correct usage.)
P. 178 the marginalis ssp. a to f all seem to belong to P. hulda as ssp./synonyms. Passosi is at present a nomen dubium, and C. Guppy will designate lectotype to fix the name.
P. 181 mcdunnoughi is correct emendation for James McDunnough; macdunnoughi was a lapsus calami thus must be corrected (Art. 32.5.1.).
P. 182 hyatti is a synonym.
P. 186 crameri, pl. LXVII fig. 17 male was called holotype by J. Calhoun Holarctic Lepid. 1997.
P. 190 arethusa, author's last name was Wolley Dod, not Dod.
P. 190 the mislabeled cupreus types are identical to lapidicola thus lapidicola is a syn. of cupreus; cupreus TL corrected to Tioga Pass, Tuolumne Co. Calif. (the Lake Co. Ore. TL listed in the Catalogue was based on a comedic chain of four compounding errors); artemisia is a valid ssp.; all by J. Scott in Papilio (N.S.) #12
P. 194 clara, Holland 1931 p. 253 designated lectotype of pl. XXX fig. 26 female.
P. 194 rutila is a homonym of European Lycaena dispar rutila Würneburg 1864 Beitr. Schmett. 1:391, 494.
P. 195 I and others have been using the correct name thoe, and the readers should too. The bad hyllus Cramer painting resembles females of thoe, dispar, hippothoe, alciphron, and thersamon; Kozak thought it was thersamon, and it resembles L. thersamon more in its scalloped hw and the distinctive upf submarginal dots, and especially resembles alciphron in those traits, though the white unh resembles dispar & thoe best, and it does have a large black submedian spot in fw cell CuA_2 (but this spot is painted badly as it is larger than any *Lycaena* I have seen); this uncertainty as well as its TL of Smyrna in Asia Minor (where alciphron occurs) is sufficient reason to render it an unusable nomen dubium.

P. 195 thoe. On Gue'rin-Me'neville's plate 81 the name was listed as thoe Boisduval, so Boisduval 1832 is the author of the name published in the 1832 Gue'rin-Me'neville work.
P. 195 epixanthe, **TL is N.J.** as it doesn't occur at Philadelphia.
P. 196-7 three authors revised L. dorcas/helloides in Papilio (N.S.) #12: Scott, C. Kondla, & C.Guppy showed that L. florus is a distinct species; Scott named michuron; Scott placed arcticus, megaloceras, dospassosi, & "castro" as ssp. of L. florus (Scott has petitioned ICZN to suppress the name castro, see Papilio [N.S.] #18 which fixes TL of castro); hulbirti & sternitzkyi belong to megaloceras.
P. 198 charlottensis, holotype fig. Holland 1931 pl. LXIV fig. 47 male.
P. 199 Miller/Brown say minyas is misspelling of minijas.
P. 204 coolinensis with its mislabeled types is syn. of acadica, see Papilio (N.S.) #12. Papilio (N.S.) #20 restricts coolinensis **TL to "NE North America or Great Plains."**
P. 205 sylvinus, Holland 1931 designated lectotype of Boisduval's female (Oberthür's fig.) on pl. LXXVI fig. 15 female; the later designation of male is invalid.
P. 206 itys, Holland 1898 p. 243 designated lectotype of pl. XXIX fig 17 female, the same specimen as Brown's invalid lectotype.
P. 206 titus, Gatrelle fixed TL on 4(6):9 not 4(6):7.
P. 207 calanus **TL obviously Florida**, the range of the taxon.
P. 207 wittfeldi, the valid lectotype was designated by Holland 1915 The Butterfly Guide, a female on pl. LXXI fig. 2, later fig. by Holland 1931 pl. XXIX fig. 19f, from Georgiana, Indian R., a different specimen from Brown's invalid lectotype.
P. 211 I still place ilavia as a ssp. of favonius, polingi as a distinct sp., because of wing shape, wing pattern, & stigma.
P. 214 perplexa belongs in front of affinis.
P. 215 spelled albipalpus.
P. 215 I have petitioned ICZN to suppress dumetorum and it surely will be, because it is causing monstrous confusion.
P. 216 Papilio (N.S.) #19 designates paradoxa lectotype & fixes TL etc.
P. 218 muiri & thornei are more ssp. of gryneus, even considering A. Shapiro's research.
P. 222 hadros, paratype fig. Holland pl. LXIV fig. 46 male.
P. 232 ines, Holland's 1931 designated lectotype on p. 240 pl. XXIX fig. 35 female, which may now be in USNM or AMNH.
P. 233 clytie, holotype fig. Holland pl. XXX fig. 6 female.
P. 239 the sissoni type and lowland Calif. bugs are a syn. of E. U.S. comyntas, and pacnowe is a valid ssp. from C Ore.-BC (Papilio [N.S.] #12).
P. 240 ssp. immaculata is more valid as a ssp. than several other E. amyntula ssp. listed.
P. 241 Four to six Celastrina ssp. must be reshuffled into their proper species.
P. 241 lucia, there is a holotype by monotypy, because O.D. said "One specimen…"
P. 245 astenidas TL is bad, the name is unusable nomen dubium until TL is fixed.
P. 246 At least 6 Euphilotes ssp. are placed in the wrong species.
P. 246 speciosa, Holland 1931 p. 267 says only that pl. XXXII fig. 2 female is a paratype.
P. 256 incognitus not incognita.
P. 256 Orcus holotype is an unspotted-unh aberration, evidently of ssp. columbia (another example of the difference between valid available ICZN names, and valid taxa; Miller/Brown listed it as an aberration).
P. 256 Cyclargus is surely a syn. of Echinargus.
P. 257 Scott in Papilio (N.S.) #12 revised Plebejus idas/melissa and named one new ssp.: the Ericaceae-feeding P. scudderii includes aster=empetri, nabokovi, alaskensis (but C. Guppy & C. Schmidt independently have since found that alaskensis eats legumes so evidently belongs to the next sp. P. atrapraetextus); P. atrapraetextus includes ferniensis, longinus, sublivens, benwarner, annetta, & fridayi [& alaskensis]; p. 259 Warren did not find benwarner in Ore., and the benwarner gnathos is not as short as that of P. anna (see TL dot 57 on gnathos morphology fig. 4 of C. Nice et al. Molec. Ecol. 14:1749); P. anna includes anna=ricei, lotis, azureus, & vancouverensis; the Tinytown TL of melissa is not an error, as Brown found syntypes from there and Fairplay was just Brown's first guess which he later abandoned for another county, and Warren knows nothing about this situation; the pseudosamuelis Red Mtn. Inn. TL is in Lake Co. not Pitkin Co.
P. 259 lotis is extinct, so needs the cross symbol.
P. 260 fridayi syntypes are in CNC (N. Kondla photos), and Comstock (1927) Butt. Calif. illustrated two evident syntypes from TL Mammoth on pl. 53 figs. 21-22 mentioned in O.D. Evidently collected at high altitude (ivallda & malcolmi are alpine species with same Mammoth TL).
P. 261 Plebejus saepiolus & P. icarioides ssp. were revised by Scott in Papilio (N.S.) #12.
P. 269 Schmidt et al. in Papilio (N.S) #12 assigned aquilo Bdv. 1832 (TL North Cape in Scandinavia, m & f syntypes in USNM) to Europe following Higgins & Riley etc.

P. 270 Steve Kohler's finding of two species of "A. glandon" in W Mont. suggests different species status for glandon & megalo.

P.271 virginiensis. On Gue'rin-Me'neville's plate 81 the name was listed as virginiensis Boisduval, so Boisduval 1832 is the author of the name published in the 1832 Gue'rin-Me'neville work.

P. 271 louisiana, holotype fig. Holland 1931 pl. LXXVI fig. 9D & 9aV male.

P. 272 I examined genitalia etc. of many rawsoni, freeman, & arizonensis to assign them the different status given in the 1986 Butt. N.A. book.

P. 275 mormo & dumeti & mormonia, C. Gillette found A. mormo & Eriogonum hosts absent at supposed TL Davis Creek Park, so **TLs should be just Washoe Co. Nev.**

P. 275 The Apodemia "mormo" taxa are all jumbled, see Papilio (N.S.) #18.

P. 276 add dialeuca Opler & Powell 1962 J. Lepid. Soc. 15:167-8 TL Sierra San Pedro Martir, 5 mi. NE La Encantada, Baja Calif. Norte, holotype CAS, as it does occur in Calif.

P. 277 mejicanus, bug does not occur near Mazatlan, so **TL is Sonora Mex. to S Ariz.**

P. 277 duryi, Holland 1898 Butt. Book p. 230 designated lectotype of pl. 28 fig. 10 female (from 5 mi. E Mesilla…).

P. 277 A. phyciodoides was surely mislabeled from Ariz., as K. Roever told me that the original collectors (the Dorfner? brothers as I vaguely recall) collected often in Sonora where the bug actually occurs.

P. 277 arizona O.D. J. Res. Lepid. 26(1-4):130-2.

P. 278 two of the five Libytheana are given wrong status.

P. 281 Ackery & Vane-Wright 1984 synonymized strigosus to thersippus.

P. 282 one could add after halia the name cleobaea (Godart) HELICONIA, Enc. Meth., 9:222 [1819], TL "Brasil; Antilles", STs may be in MNHN, although p. 437 says it is extralimital, so someone must have restricted its TL?

P. 284 nigerrima, this bug lacks the median white band like sinefascia, and was fig. in Cockerell's Zoology of Colorado.

P. 286 after angustifascia, add syn. sinefascia Barnes & Benjamin Bull. So. Cal. Acad. Sci. 25:15 (1926), TL near Prescott Ariz. restricted by F. M. Brown Trans. Amer. Ent. Soc. 93:371-372 (1967), HT in CM, raising in status of W. H. Edwards' aberration name. The holotype is an aberration of L. weidemeyerii that lacks the central white band (a second similar specimen was found E of Central City, Gilpin Co. Colo. in 2008, and nigerrima is a third).

P. 287 burrisonii (not burrisoni) original description was clearly of a subspecies, resembling rubrofasciata whose range now overlaps that locality [however C. Guppy has not found rubrofasciata at low or higher altitude near Landsdowne=Armstrong but believes it may exist at higher altitude; he currently considers it a local ssp. of lorquini]; the word hybrid was not mentioned in O.D.; it is currently a nomen dubium. Ssp. itelka is different. C. Guppy will designate a neotype to fix burrisonii. (By the way, a name based on hybrids is an available name only if the taxon [population] is a hybrid [in other words, intermediate][Art. 17.2]; Art. 23.8 says name of <u>individual animals</u> of hybrid origin cannot be used for either of the parents, which is logical because there is no way to decide which parent taxon to attach the name to.)

P. 287, eros, Holland 1931 clearly labeled pl. LXXIII fig. 1 male as the type of eros.

P. 288 pseudodorippus, Holland 1898 wrote that he possesses Strecker's type, so Holland's 1931 fig. was surely of this specimen, so Holland 1931 designated it lectotype, except this aberration is surely holotype by monotypy.

P. 289 G. Carpenter & B. Hobby 1944 Trans. Roy. Ent. Soc. London 94:311-346 said the generotype of Limenitis (populi) is close to bredowii in genitalia & venation.

P. 289 hulstii, holotype fig. Holland 1931 pl. VII fig. 5 male (pl. 73 fig. 1 male is lectotype of eros).

P. 290 Agraulis would seem to be a subgenus of Dione.

P. 290 Warren suggested bredowii & eulalia are sympatric thus separate species but his writeup indicates that bredowii & californica could be conspecific.

P. 297, is eunomia younger than aphirape & tomyris as the dates suggest is possible?, was there a first reviser action or ICZN suppression?

P. 297 nichollae TL was defined by Pike in two papers as N end of Wilcox Pass; Mary Nicholl did not define TL as her paper was 20 years before O.D. And specimens from Mt. Assiniboine coll. by Dean Nicholson of Cranbrook BC are ssp. dawsoni according to N. Kondla.

P. 300 pardopsis, holotype is female.

P. 300 saga, bug is not in Nfld. so **TL is mainland Labrador**, in the province of "Newfoundland and Labrador."

P. 301 in laurenti, Brighton is the actual town.

P. 301 lehmanni, holotype fig. Holland 1931 pl. LV fig. 9 male.

P. 304 lapponica is older than freija; was lapponica suppressed by ICZN?

P. 305, boisduvalii, N. Kondla notes that O.D. plainly writes that it was described from countries to the east of Europe, and nothing was said of Labrador or North America. There are no syntypes available, so this is a toxotaxon and boisduvalii should be removed from the North American fauna, as there is no real evidence that it was American. Labrador bugs are ssp. grandis.

P. 306 ranieri is the correct spelling, because Guppy & Kondla showed that ranieri and Mt. Ranier were used many times in the O.D. therefore the sole rainieri spelling in the title is a lapsus calami [probably changed by some editor] that must be corrected to ranieri (Mt. Rainier was once spelled Mt. Ranier); and their choice of ranieri over rainier constitutes first reviser selection of ranieri under art. 24.2.3. anyway; they noted the TL is in Pierce or Lewis Co.

P. 306 sangredecristo is a ssp. in Colo. (TL) where all the females are melanic; the same phenotype is a polymorphic female form in weak ssp. ingens on Beartooth Plateau of NW Wyo. (however N. Kondla notes that in the Beartooth area ingens flies at lower altitudes and sangredecristo-like bugs fly at high altitude, which bears investigation).

P. 309 columbia, Holland 1931 p. 88 designated lectotype pl. XIV fig. 3 male. TL now Lac la Hache & Quesnel Lake [near head of Quesnel River].

P. 310 coerulescens, lectotype fig. by Holland 1931 pl. LV fig. 3 male ups.

P. 310 L. P. Grey informed me that valesinoidesalba belongs to ssp. apacheana.

P. 310, J. Scott 1982 J. Res. Lepid. 20:63 wrote: "The neotype of Speyeria nokomis was caught by Mrs. Cockerell at Beulah, New Mexico, and sold to E. Oslar, based on correspondence from T.D.A. Cockerell to F. Benjamin of the Smithsonian." Maybe Oslar could have coll. nokomis in Ouray Co., but it's doubtful. (By the way, I think the several old specimens of ssp. nokomis from Bent & Mescalero in Sacramento Mts. N.M. (fig. R. Holland J. Lepid. Soc. 62:173)(the Bent ones with no year and mixed-up month and dubious collector source) also are Oslar-mislabeled Mrs. Cockerell Beulah specimens (the Sacramento Mts. evidently has ssp. coerulescens not nokomis, as I have seen and photographed 1m of the 2m coll. by K. Roever in 1973 which is ssp. coerulescens not ssp. nokomis).

P. 312 snyderi, Holland 1931 p. 97 said pl. XVIII fig. 6 male is paratype, which isn't a lectotype designation.

P. 312 halcyone, spelled Hartsel.

P. 312 bremnerii, **TL is** locality of lectotype; Holland's 1931 lectotype was labeled **Vancouver**.

P. 314 platina, Holland 1898 p. 117 designated pl. XVIII fig. 7 male the lectotype. The TL is the locality of this specimen, though if it is vague the locality dos Passos & Grey gave would probably be usable.

P. 314 liliana, Holland 1931 p. 98 says pl. XIII fig. 11 male is "type", a Holland 1931 lectotype designation (presuming the specimen is a syntype); Pelham Catalogue says that this specimen is possibly a fig. of the dos Passos & Grey lectotype, which is in AMNH, but dos Passos & Grey 1947 don't mention that.

P. 316 spelled chilcotinensis (& p. 483).

P. 318 emend macdunnoughi to mcdunnoughi; a lapsus calami in art. 32.5.1.

P. 319 atlantis, valid lectotype was designated by Holland 1915 The Butterfly Guide, a male on his pl. XIV, later fig. by Holland 1931 pl. X fig. 9m, from TL Hunter, Greene Co. NY.

P. 321 dennisi dos Passos & Grey Dec. 12, 1947, Am. Mus. Novit. (1370):20 [Novit. 1247 has no p. 20 & no mention of dennisi] is the valid ssp. name and helena 1957 is the synonym.

P. 322 hydaspe, Holland 1931 figured pl. LXXI fig. 4 female syntype according to his p. 95.

P. 323 rhodope, Caribou TL is correct, L. Grey 1989 J. Lepid. Soc. 43:4-5.; Kondla (2001) noted TL is locality of lectotype, Caribou wagon road, 2500 ft.

P. 323 conquista, Scott 1982 J. Res. Lepid. 20:63 was the first to publish that conquista as well as zerene were caught by A. Klots in Wyo. and mislabeled NM. **TL conquista is hereby designated NW Wyo.**

P. 323 spelled bischoffii.

P. 325 artonis, Holland's 1931 pl. XII fig. 13 male was not a syntype according to Brown 91:326. **TL is Ruby Mts. in Elko Co. Nev.**, not Wells.

P. 327 antonia lectotype fig. Holland 1931 pl. XXIII fig. 12 male (identical to Brown's fig.).

P. 327, valid ssp. montis lectotype fig. Holland 1931 pl. XXIII fig. 11 male (identical to Brown's fig.).

P. 328 flora, the valid lectotype evidently designated by Holland 1915 The Butterfly Guide, a male on pl. L fig. 1, evidently one of the 2m2f syntypes in CM; TL should be determined from its locality in CM. Later invalid lectotype fig. Holland 1931 pl. XXIII fig. 1 male (identical to Brown's fig.).

P. 339 dentigera is dubious in U.S., based on TL of it & zerynthia.

P. 340 orion belongs under dious as both TLs are Surinam.

P. 345 subpallida, spelled Westcliffe.

P. 347 thomsonii is spelling in the O.D.

P. 347 hyperborea, Seitz' figure is of holotype by monotypy.

P. 349, dos Passos had the fine intention of naming the darker northern ssp., but he unfortunately chose a wrong TL for marsyas & created a syn. of satyrus, as Okanogan Co. bugs are closer to TL Colo. satyrus (look at the photo of BC male in BC book p. 249, that's as pale as they get even in Ariz. & Colo.) than to N.B. transcanada, which have the uns dark & reddish in tint (much different), thus transcanada is a distinct ssp. & neomarsyas is a syn. of satyrus as Butt. Cascadia etc. treated it.

P. 349 c-argenteum, Kirby figured the holotype, a holotype by monotypy as text said "A single specimen…" Kirby's c-argenteum holotype is an imprecise painting, whose small black spots caused it to be placed into the synonymy of Polygonia progne, but has some features that might lead some people to consider it to belong to Polygonia faunus rather

than to P. progne (N. Kondla notes especially the shape of the silver mark), which would upset stability of nomenclature if it were considered to be the same species as faunus, as it is older than faunus. However, Art. 23.9.1. says that prevailing usage must be maintained when 23.9.1.1. the senior synonym [c-argenteum] has not been used as a valid name after 1899 (I am not aware of any work that treated it as the valid name for P. progne or P. faunus since 1899, because it has been treated as a synonym of P. progne), and 23.9.1.2. the junior synonym [faunus] has been used as the valid name for the taxon in at least 25 works published by at least 10 authors in the immediately preceding 50 years including a span of not less than 10 years (faunus has been used by more than 100 scientific papers and butterfly books including those books reviewed in this Papilio [N.S.] #19 issue, those uses uniformly spread during that time with accelerated publication rate of popular books containing faunus lately; there are about 30 uses in J. Lepid. Soc. alone during this time, 30+ uses in other journals, 40+ in books, all by more than 50 authors, etc.). Therefore (23.9.2.) the name **faunus is valid as a nomen protectum that has precedence over c-argenteum, and I now take this action to permanently suppress the nomen oblitum c-argenteum for use to name the Polygonia faunus species**.

P. 350 oreas, **TL hereby restricted to Redwood Park, Contra Costa Co. Calif.**, a necessary restriction because ssp. near-silenus occurs in far N Calif.

P. 351 faunus, spelled Greene Co. N.Y.

P. 351 Ssp. cenveray is a valid ssp., larger & paler than arcticus according to Guppy & Shepard (2001; with cenveray being their ssp. rusticus) & photos/specimens of arcticus; and N. Kondla finds that arcticus & cenveray are separated in range by another ssp.

P. 352 K. Brown Lepid. News 1988 #2 p. 39-40 found amathea & fatima intergrading in the field in Darien Panama (relevant better evidence than lab mtDNA that has been proven to be rather useless for the study of phylogeny) and wrote that fatima is a ssp. of A. amathea Linnaeus (1758).

P. 357 gilletti, Holland's fig. is pl. LVI fig. 22 male.

P. 357 the Euphydryas editha ssp. are mostly jumbled in the wrong groupings (see Papilio [N.S.] #12).

P. 359 aurilacus, Holland's 1931 fig. looks different from Gunder's fig. of holotype; one of them is probably holotype, and Holland's is probably paratype.

P. 360 rubicunda, Gunder's 1929 "type" would seem to be lectotype designation.

P. 361 monoensis, Holland 1931 p. 123 says pl. LVII fig. 26 male is holotype (the plate says it is paratype), but it looks a little different from Gunder's true fig. of holotype.

P. 361 gunnisonensis TL Owl Crk. Pass road 2 mi. E of U.S. 550, 3.4 mi. NE Ridgway…

P. 362 beani, Holland's 1931 fig. pl. XVIII fig. 13 male looks different from Gunder's type so isn't Gunder's lectotype; however Holland 1898 p. 141 said pl. XVIII fig. 13 male is Dr. Skinner's original type thus Holland 1898 designated this the valid lectotype and Gunder's is evidently paralectotype.

P. 363 hennei Scott, add TL: Box Can., San Diego Co. Calif.; add Types: holotype in EMEC. My O.D. of hennei contained a full description/definition of adults & genitalia along with TL and a hundred types, it did NOT have the same data as Gunder's aberration hennei.

P. 363 irelandi TL is Boy Scout Camp, Camp Wolfboro, trail near Alta Peak,…

P. 364-5, D. Bauer (1975 Butts. N. Amer. [ed. W. Howe] p. 176-177) wrote that sperryi is a synonym of dwinellei and has the same moist meadow habitat etc.; Bauer should know as he was the last author to have considered chalcedona & colon to be separate sp.; the J. Emmel et al. p. 828 citation was just a checklist listing sperryi in E. colon without explanation, so was evidently wrong.

P. 365 colon, lectotype designated by Holland 1931 p. 117 & fig. pl. XVI fig. 5. **TL** is required to be locality of lectotype which is "**Columbia River**".

P. 368 alena TL was further restricted in Papilio (N.S.) #12 p. 31, to summit Brian Head, Iron Co. Utah.

P. 370 E. bernadetta is a separate species (see Papilio [N.S.] #12) that was found to be sympatric with anicia in Alta.-Mont.-Wyo. by S. Kohler & N. Kondla etc., yet the Catalogue wrongly lumps it into anicia and inexplicably raises colon to species status despite every author since Bauer lumping it into chalcedona (though J. Emmel reports E. colon near wallacensis on Symphoricarpos sympatric with E. chalcedona macglashanii on Castilleja in Pine Creek Can. in Warner Mts., in 2007 Season Summary of News of Lepid. Soc. [details were not supplied]).

P. 370 gilensis, holotype f fig. Holland 1931 pl. LVIII fig. 18 female.

P. 370, ssp. wenatchee is misspelled & is a very distinctive ssp. which is blackish like colon (veazieae is whitish like bernadetta).

P. 371, 3 of the 5 arachne ssp. are misplaced, and all are ssp. of P. minuta (see Papilio [N.S.] #12).

P. 371 gunderiae, Holland 1931 would have designated lectotype fig. pl. LVIII fig. 10 female, however it is an extreme aberration and is a unique specimen that is holotype by monotypy, as the O.D. states "The type is a female.". TL is Beulah, Colo., coll. Herman Nash.

P. 371 In the Edwards types material elsewhere in this Papilio (N.S.) #19 issue I corrected the TL of P. minuta nympha to NW Mexico including Sonora, Mexico, where the lectotype phenotype actually occurs (it does not occur in Graham Co.). Austin did not determine nympha's synonymy, he just named another ssp. For nympha, Holland 1931 p. 128

called pl. XVI fig. 21 male type in text but not on plate, and called pl. LVIII fig. 14 female type on p. 128 & on plate but it cannot be lectotype as Brown wrote it is not a syntype, thus neither is a Holland 1931 lectotype designation; Holland 1898 did not designate any specimen lectotype either.

P. 372 is a surprise, I didn't know I named pardelina! (I didn't--Higgins called it a form before 1961 and clearly described it as a subspecies as he described the entire series of them as equally distinctive all yellower etc., so Art. 45.6.4. clearly means that his name was a subspecies the instant he described it, thus the two Articles 10.2 & 45.5.1 concerning infrasubspecific names do not apply. So replace Scott 1986 by Higgins 1960).

P. 372 Papilio (N.S.) #12 clearly proved that all the fulvia ssp. belong within C. leanira.

P. 373 montana, spelled Popocatépetl.

P. 374 fulvia TL Archer Co. Texas is error as noted in my corrections of F.M. Brown's Edwards types papers in this Papilio (N.S.) #19 issue (6 names have this erroneous TL). Corrected TL is Davis Mts. in west Texas.

P. 374 fulvia, Brown designated the valid lectotype not Holland 1931 (Holland called 2 specimens types on p. 131 & pl. LIX, thus neither is a lectotype designation).

P. 376 gorgone TL=neotype locality=River Road, Burke Co. Ga.

P. 378 hanhami, Holland 1931 p. 127 says only pl. LXXIV fig. 10 female is type, which is a lectotype designation as Pelham writes it is a syntype. The TL is the Manitoba or Minnesota locality of this lectotype, which must be determined from the label on specimen evidently in USNM.

P. 378 spelled inghami.

P. 379 move damoetas & its ssp. windriver & altalus here, all are ssp. of C. whitneyi.

P. 381 perse, the valid lectotype was designated by Holland 1915 The Butterfly Guide, a male on pl. XX fig. 3, which Holland 1931 fig. pl. XVI fig. 19 & Brown later invalidly designated lectotype.

P. 383, Dymasia & Texola should be lumped into Microtia based on DNA (Wahlberg & Zimmerman 2000, Cladistics 16:347-363).

P. 383 dymas, the valid lectotype was designated by Holland 1915 The Butterfly Guide, a female on pl. XX fig. 4, later fig. by Holland 1931 on pl. XVI fig. 18.

P. 384 callina female was designated lectotype by Holland 1931 & figured on his pl. 59 fig. 21, but was called the holotype by Higgins. It is the holotype as it has the X on its label written by Boisduval. The Catalogue is wrong in stating that "the phenotype of the lectotype is typical of central Mexican T. e. elada". I have examined C. elada from across its range in U.S. & Mexico. T. elada ulrica occurs in central Mex. (Michoacan, Jalisco, Queretaro, Mexico, Tamaulipas, Nuevo Leon states) & NE Mex. & Tex., characterized by an evenly-reticulate pattern of black lines over the uniformly orange-brown ups (with smaller upf postmedian tawny spot band) that is totally unlike the callina type. T. elada does not occur in Calif. thus the Sonora label does not refer to Los Angeles Calif. One might think the locality could mean Sonora state in Mexico because ssp. perse from there & Ariz. has a wider ups orange-brown median band that tends toward the callina type (ups rather uniform lighter orange-brown). However specimens from S Mex. (Matatlan & Acatlan in Puebla, & Monte Alban in Oaxaca) are very similar to the callina type with wide postmedian ups band which is frequently whiter on upf, and the Matatlan female is almost exactly like callina holotype. So it seems clear that callina fits the bugs in S Mex., not central Mex. The TL of elada "Mexico" is bad and the callina type label "Sonora" definitely seems to be an error, which could cause misapplication of both names. Therefore to ensure stability and fix this mess it is necessary to fix the TLs of both callina and elada (neotypes cannot be designated because both names already have lectotypes). So, **to fix the identity of elada and callina I hereby declare the TL of both to be** that area of southern Mexico where the callina-type phenotype is common, which with my current knowledge is "**southern Mexico from Matatlan & Acatlan in Puebla to Monte Alban in Oaxaca**".

P. 386 move P. picta next to P. phaon.

P. 387 barnesi, Holland 1898 p. 156 designated pl. XVIII fig. 5 male the lectotype, the same specimen as Brown's invalid lectotype.

P. 388 arizonensis, TL restricted to Ariz. by Scott 1994, Papilio (N.S.) #7.

P. 388 tharos, TL now Van Courtland Park, New York City.

P. 390 Phyciodes diminutor (with incognitus) is a separate species sympatric with P. cocyta (Papilio [N.S.] #13).

P. 391 harperi is an aberration of P. b. saskatchewan, not P. b. batesii.

P. 400 yukonensis, the O.D. designated no holotype, thus Holland 1931 designated pl. LX fig. 21 male as lectotype.

P. 401 sweadneri is a valid ssp. with paler wings.

P. 402 furcae, **TL is S Rim Grand Can.,** as it is absent on N Rim.

P. 402 mackenziei, N. Kondla notes that Davenport explicitly designated a holotype, though he evidently did not illustrate it.

P. 406 the ssp. of C. pegala are mostly given the wrong status, and maritima & carolina are valid ssp., as noted by R. Gatrelle & elsewhere in this Papilio (N.S.) #19.

P. 406, A careful reading of the info in Gatrelle's paper indicates that the correct name is M. eurytris C. Maynard 1891 (Manual N.A. Butt., Boston, De Wolfe, Fisk & Co.) who raised eurytris to ssp. status, and eurytris Fabricius is a

misspelling of the homonym eurytus. Gatrelle treated M. e. eurytris & M. e. viola as a separate species from M. cymela, but I have 4 topotype eurytris from Berkeley Co. S.C. & 2 topotype cymela from Colleton Co. S.C. that Gatrelle sent me, which look the same and are darker on uns than Maryland cymela, so I think more work is needed to show that these are different species.

P. 406-7, status of maritima, alope, carolina, ochracea fixed in Papilio (N.S.) #19

P. 407 incana, lectotype fig. Holland 1931 pl. LXIII fig. 18 male (as boopis).

P. 407 texana, I hereby declare texana a synonym of maritima (**first reviser action**) to make maritima the correct name for those who think they are synonymous (they look similar).

P. 409 meadii, TL is now Bailey, North Fork South Platte River, Park Co. Colo.

P. 409 damei was placed as a ssp. of C. pegala for a long time, and in Catalogue is placed as a ssp. of meadii; it actually belongs to an area of intergradation between C. sthenele & C. meadii, and properly belongs to C. sthenele as a reddish form gotten from intergradation/introgression from meadii. The TL "Grand Canyon Arizona" is rather imprecise, but the *damei* O.D. wrote that upf orangish is limited to rings around the ocelli (sometimes almost obsolete) and unf orange is much reduced compared to meadii and largely replaced by brownish, which fits the bugs flying at Cape Royal near the E end of N Rim of the Grand Canyon and not the variable bugs near W end, so **damei TL is hereby designated as Cape Royal on E end of N Rim of Grand Canyon** (the O.D. paper also described Coenonympha tullia furcae from Grand Canyon, which it is known only from the S Rim & S canyon wall, which might suggest that damei came from S Rim also; however J. Garth's Butt. Grand Can. NP describes S Rim [Desert View] "damei" as having bright red on upf & unf which means that he was describing C. meadii, not damei, so the S Rim probably has only C. meadii). C. sthenele & meadii form a stenchospecies, as they are one species in N Ariz.-S Utah, but are two species in Montana (see Papilio [N.S.] #12). Damei is older than all three C. meadii melania & C. meadii mexicana & C. sthenele masoni, so it would replace one or two of those names no matter which species damei is assigned to. It is doubtful that mexicana is the same as Utah-Ariz.-Colo. pops. of meadii, so mexicana should be restored to ssp. status by those who think mexicana differs from Colo. meadii (mexicana seems to be a syn. of melania, as both have slightly more unh ocelli than ssp. meadii). If damei is transferred to C. sthenele, it is older than masoni and would replace it, and a few reddish-unf females of masoni are known which could be called form damei. But Ken Davenport considers that paulus differs from masoni by having a slight reddish tint (due to introgression from meadii), thus damei should evidently be placed into paulus rather than masoni, and is younger than paulus so won't replace it. Thus to maximally preserve stability, damei should be considered to be just a synonym of paulus, where it would cause no trouble. Or, damei could be considered by some to be an oranger ssp. C. sthenele damei that is distinct from both C. s. paulus & C. s. masoni. I haven't seen the damei types, but according to the O.D. and the later placement of damei into C. pegala, the amount of red is small, so it would be C. sthenele form damei, which fits its placement as a syn. of paulus. (Here's a new strategy for preserving stability. As Pelham placed damei Barnes & Benjamin as a ssp. of C. meadii, I'm surprised he didn't also make a new entry under C. sthenele, as a double-crossed infrasubspecific "C. sthenele paulus form damei Scott 1986, Butts. N.A. p. 241", with the usual Pelham commentary "Proposed as a form with no nomenclatural standing; a nomen nudum." [This damei Scott is of course a homonym of the original damei Barnes & Benjamin, but that is no problem as it is infrasubspecific so homonymy does not apply.] Here I will just propose two more infrasubspecific nomina nuda forms, C. sthenele masoni form damei, and C. meadii form damei, which are infrasubspecific thus can be used within masoni and within meadii melania without replacing masoni and melania. The reader should add those two new infrasubspecific nomina nuda to the Catalogue. Such infrasubspecific nomina nuda represent a whole new strategy of preserving nomenclatural stability. The damei phenotype occurs within C. sthenele paulus, C. sthenele masoni, and presumably C. (sthenele) meadii melania=mexicana, so we need these infrasubspecific nomina nuda to keep the name damei from killing masoni and melania and mexicana. Now, readers can use the name damei in all three taxa, and if anyone questions the priority issue, they can just say that this damei is an infrasubspecific nomen nudum which does not have priority. In this role of stability savior damei is a "schizophrenic taxon"--a split personality--because the same name is used in several different taxa with differing availability status in them. {<<Papilio Bonus: In Papilio [N.S.] #18 I wrote about "pretend type localities" and "jumping subspecies" that are necessary to use in order to properly reduce three or more names to just two for the endpoints of a cline, while still obeying the principle of priority. Now we have "schizophrenic taxa" to preserve stability. Bob Pyle wrote in Butt. Cascadia that the Emperor wyomingo may have no clothes. Bob was mistaken there, but his witty remark definitely applies to a schizophrenic taxon, as we have to leave off the clothes [nomenclatural types etc.] to create a nomen "nudum" infrasubspecific name spelled the same as a ssp. or species, in order to preserve stability. Okay Bob, now let's laugh like hyenas at the pathetic gyrations that are made necessary by the ICZN Code to make words from the old-name sewer properly apply to real biological creatures. And then we can be sad that there's so much time and energy wasted on the effort. Then let's hope that in a generation or two when the existing latin-loving nomenclatural pedants depart, we can have ICZN rules that emphasize biological units first, nomenclature last. A good starting point would be eliminating the principle of priority.>>}) A third [unnecessary] solution to preserve stability, would be to petition the ICZN to suppress the damei.

P. 410 charon, Holland also illus. paralectotypes on pl. XXVI figs. 11 male & 12 female.

P. 410 phocus, TL now Lac la Hache, BC
P. 411, spelled Girocheilus in F. Brown's Edwards types series, & Geirochilus by Edwards; the original spelling was Gyrocheilus?
P. 412 kuskoquima, syntypes fig. Holland 1931 pl. LXI figs. 21 male & 22 female.
P. 413 emend mackinleyensis to mckinleyensis, a lapsus calami (O.D. correctly spelled McKinley Park).
P. 414 brucei is not a ssp., it is an ocelli-less form of E. epipsodea.
P. 414 brucei, Cashier Valley & Cashier & Cashier Mts. & Bullion Mtn. were all at head of Hall Valley, Park Co. Colo., see F. Brown 1964 Trans. Amer. Ent. Soc. 90:396-7.
P. 414, epipsodea O.D. designated no holotype, only 2 syntypes; Ehrlich 1955 designated lectotype by fig. a syntype from BMNH with the word type in fig. legend.
P. 415 alaskensis, Holland's 1931 lectotype pl. LXI fig. 13 male is called type on p. 206 & plate.
P. 416 ethela, Holland 1898 The Butt. Book p. 211 designated lectotype of pl. XXV fig. 18 female, from Trout Crk. in Yellowstone Park.
P. 416 demmia TL defined as Chicago Basin, La Plata Co. Colo., by F. Brown with D. Eff & B. Rotger 1957, Colo. Butts.
P. 416 youngi, Holland 1931 designated lectotype pl. LXI fig. 28 male. Gorbunov 2001 treated lafontainei as a ssp. of E. kozhantshikovi, and discussed Siberian specimens of E. dabanensis with [E. dabanensis] youngi valvae.
P. 419 brucei, Holland's 1931 pl. XXVII fig. 7 male is syntype and Holland validly designated it as lectotype, despite the July 3 date (none of the syntypes were labeled Aug.); (Holland 1898 made no mention of type thus made no lectotype designation); **TL** is locality of lectotype which is **Bullion Mtn., Hall Valley...**
P. 419 balder, Pelham's restriction of TL to Nain, Labrador, is wrong. Boisduval (1834 Icones…; copy obtained by N. Kondla who sent copy to Scott) said balder is from "Cap-Nord, au Groenland et en Islande [=Iceland].", which is his type locality, and merely wrote that he has received some specimens from Nain that do not differ from the balder that he described, so it's not apparent that he considered the Nain bugs to be syntypes of balder. Butler (1868) attributed authorship of the 1832 balder name to Boisduval and not to Gue'rin-Me'neville. Gue'rin-Me'neville (1832) (copy from J. Pelham) figured balder on plate 80 (the male ups looks like it could be European) and the bottom of the 1832 plate 80 clearly labeled it Satyrus balder. Boisd. thus attributed authorship of it to Boisduval; the 1844 text of Gue'rin-Me'neville's work listed the habitat as Cap Nord (and did not mention Nain Labrador either) and cited it as "Satyrus Balder. Boisd. Icones, etc." which seems to be an attribution of authorship to Boisduval. Considering all this, authorship is Boisduval (1832) in the 1832 work by Gue'rin-Me'neville, as Article 12.2.7. suggests that plate 80 made the name balder available by indication by illustrating it with a new name, and according to article 50.1. the authorship of balder is Boisduval as Gue'rin Me'neville stated. It has traditionally been used for European populations as a synonym of jutta. Its TL is Cap Nord on the northern tip of Scandinavia, which is near Scandinavian taiga populations of jutta. So, **I hereby correct the TL of balder to the TL of jutta (Lapland, Norway and Sweden), and any neotype of balder that is designated by someone revising O. jutta in the future should be designated as the specimen that is designated as the name-bearing type of the name jutta** (the original types of both are lost). So cross off the a, because balder is a European bug that appears to be a synonym of jutta. Balder is a toxotaxon nomen dubium, whose types cannot even be compared to Labrador specimens, because there are no specimens, just the painting. It is balderdash! Europeans created this toxotaxon, so the rotten name is properly theirs.
P. 420 balderi is obviously a lapsus calami misspelling of balder so must be emended to balder. The 1837 publication merely has unnamed paintings of male ups and uns, and this text (my translation from German): Eumenis balderi. (Papilio nymphalis, Oreas nubila.) Fig. 981. 982. Male. Smaller than Eumenis aello*, it is the same as the excellent "l.c." figured male example and is on upperside, only through pale ground color and the dark other color, different from the greatly interrupted spot series. The underside of the forewings, except for the surroundings of the eyespots, is almost entirely pale-brown and going toward the hindwing, not like the cited species, is white exposed. Labrador. From Mr. Sommer. *Aello Huebner. Sammlung europaische Schmetterlinge Pap. 519. 520. Male. (end of text) This text has no types, and nothing to indicate that it is a description of a new species. It is just figures and description of a male Oeneis jutta from Labrador that the author identified as balder and then misspelled balderi, a lapsus calami as it was printed just a couple years after balder was named by Boisduval 1832 in Gue'rin-Me'neville. The mathematical odds that balderi is independent of balder is (1/26)**6 (because there are 26 letters in alphabet and 6 letters in the root balder) which is essentially zero. It is not an available name. Neither balder nor balderi nor ssp. jutta applies to the Nearctic fauna. Why are taxonomists so eager to dredge up horrible worthless names and apply them to nicely stable critters?? That is a gross defect of taxonomists (which I have done a few times), and it must stop.
P. 420 leussleri, District of Mackenzie no longer exists.
P. 421 gibsoni, Holland 1931 p. 200 says pl. LXIII fig. 10 male is holotype being named in book, and Miller/Brown say HT in CM; however Pelham Catalogue says O.D. was in 1930 in Ann. Carn. Mus. 20:51, which evidently designated no holotype, which makes the fig. 10 male a Holland 1931 lectotype designation as Pelham states.
P. 421 semplei, Holland 1931 designated lectotype pl. LXIII fig. 1 male.
P. 421 simulans, holotype fig. Holland 1931 pl. LXXV fig. 19 male.

P. 423 hanburyi, Mackenzie District no longer exists.
P. 423 calais, Holland 1931 figured holotype on pl. LXII fig. 7 female; Miller/Brown wrote type may be lost.
P. 423, all the ssp. placed in O. chryxus now belong in O. calais, except O. chryxus which is a separate species (see Papilio [N.S.] #12).
P. 423 the true chryxus type is the male fig. in O.D. which is the valid holotype by monotypy; Shepard's lectotype is invalid and is a female of O. calais altacordillera (Papilio [N.S.] #12).
P. 423, ivallda, Holland 1931 designated lectotype female on pl. LXII fig. 4.
P. 424 Porter & Shapiro proved only that ivallda & stanislaus are conspecific.
P. 424 oslari, **TL hereby defined as South Park between Kenosha Pass & Fairplay, Park Co. Colo.**
P. 424 iduna, lectotype was designated by Holland 1931 pl. LXXII fig. 6 male; TL is required to be locality of lectotype which is "Mendocino" [County].
P. 424 macounii, the valid lectotype was designated by Holland 1915 The Butterfly Guide, a male fig. pl. LXXVI, which may be the same specimen fig. by Holland 1931 pl. XXVII fig. 3, which Brown evidently treated as a syntype.
P. 425 uhleri, **TL is Georgetown or eastward toward Idaho Springs**, as Georgetown may be too high altitude.
P. 425 cairnesi, Holland 1931 figured uns of cairnesi type on LXXIV fig. 20m, & ups of same male on pl. LXXII fig. 6 male.
P. 425 varuna, Holland's paralectotype is pl. LXII fig. 14 (not 11) female.

The 47-page checklist is rather useless as all the info is in the text, though one can better see the higher classification (families to tribes & genera) treatment here without the clutter of the species & ssp. names. P. 451 Celaenorrhinus misspelled. P. 488 New Subtribe.

The bibliography of taxonomic references is long and is bound to be useful. Most of those references were not cited in the Catalogue's main text, and many of the letters after the year of the references that were cited do not correspond to the letters in the bibliography. But those references will be a great source for people researching the literature, especially if you know or suspect that someone worked on a bug but can't find the citation.

Index: P. 611 Anaea/Anaedidi/Anaeini are p. 392. P. 611 anna (Diaethria) is p. 431. P. 613 asteria is p. 431. P. 618 colon is p. 365. P. 621 drusius (Chlosyne) is p. 376. P. 643 rainieri (Boloria) is p. 306.

Overall, this Catalogue is very useful as a compendium of names. Pelham obviously spent years of effort on the task. (Based on Butt. Cascadia and Warren's Butt. Oregon, Pelham has a lot of biological information such as hostplants etc.that he has gathered, which has never been published. Maybe now he will have time to publish it.)

THE BUTTERFLIES OF NORTH AMERICA, A NATURAL HISTORY AND FIELD GUIDE.

James A. Scott. 1986. Stanford University Press, Stanford, Calif. 583 p., 64 color plates.

This is my own book, which took about 7 years to write. Following are additions and corrections. Of course some of the taxonomy is obsolete, as progress marches on, so I don't list most of those changes. A revision would update it all, slim down some parts, add 100+ more ssp., include photos of egg/larva/pupa of nearly all species, drop "field guide" from the title, and redo the plates in taxonomic sequence, using edited photos from nature like the Kaufman book. But I will require more remuneration for such a book than I received from this one, so I doubt that it will happen.

Literature citations for each bit of information from the literature were not included in the book because they would have required hundreds of pages of space and would have made the book impossible. However, the sources of hostplants and most other biological information are listed in my card file; this file consists of about 3000 cards, each full card containing ~1-8 references. The file should be published, but publication would require many months of keyboarding and great expense with no hope of financial return. Unfortunately the ineffective publisher failed to get the book stocked in the chain bookstores, so it did not sell very well, in contrast to low-quality little field guides that are stocked in chain bookstores and sell well.

Plates. In the film negative for each plate is a little image of the Kodak Gray Card (standard 18% reflection), a standard used by professionals to maintain print quality, but the incompetent printer/publisher failed to use that card to calibrate the colors (the lazy morons evidently just scanned the butterflies and ignored the gray card), so the colors on most plates are a little off (often too red). Plate 3, photo of "Feniseca" larva is not that & is mysterious, & looks only partly like actual Feniseca; D. Wright thinks it is a Syrphid fly larva that preys on aphids. Pl. 12, 35c is C. occidentalis sacajawea. Plate 14, 128a is O. calais caryi. Pl. 16, 109d is the new bug which is at least a new ssp. of sthenele from Humboldt Co. with more zigzag unh postmedian line etc. Pl. 18-19, evarete was changed to genoveva, then changed back again! Pl. 27, 230c-d are ssp. camillus. Pl. 36 C. hesseli is on Vaccinium corymbosum flowers. Pl. 38, 405c is Pleb. atrapraetextus fridayi. Pl. 41, 615a-b are Codatractus uvydixa from Nuevo Leon Mex. Pl. 43, 658a-b are Erynnis baptisiae from E Kansas. Pl. 43, 677c is ssp. lena. Pl. 50, 472e is ssp. colorado. Pl. 63 on 634a ups, add male to read 634a male ups. The 394b male letters should be moved leftward, prior to ups. 2002 butterflies are illustrated on the plates (10 photos of eggs, 45 of larvae, 30 of pupae, 1917 of adults). Note: All pinned adults used for photos now have a label that reads "fig. James Scott book". All pinned adults used for photos are in J. Scott collection except for 39 specimens in these collections: USNM (Eurytides celadon 1m1f, Papilio ornythion 1 f ups, P. astyalus 2f ups, Phoebis orbis 1m1f, Diaethria asteria 1m, Anartia lytrea

chrysopelea 1m1f, Epiphile adrasta 1f, Hamadryas atlantis 1m1f, Marpesia eleuchea 1m1f, Libytheana carinenta motya 1m1f, Apodemia multiplaga 1m, Allosmaitia pion 1m, Strymon limenia 1m1f, Choranthus radians 1m1f, C. haitensis 1m, Euphyes berryi 1m1f, Erionota thrax 1m, Bolla brennus 1m1f, Polygonus savigny savigny=manueli 1m); Carnegie Museum (Eurema chamberlaini 1m2f, Chlorostrymon maesites 1m1f); Dale Jenkins (Hamadryas iphthime 1m1f); J. Richard Heitzman (Libytheana carinenta motya 1f); Roy O. Kendall (Apodemia multiplaga 1m).

Part I. P. 1, schmetterling and tagfalter are names in modern German. In old dutch the word botervlieg does exist; boter=butter, vlieg=fly, but botervlieg is not used in modern dutch in which butterfly is now dagvlinder. P. 5 first line, change "wasps" to flies. p. 12. fig 4e should read first-stage larvae of some Lycaeninae. P. 13 4th line from bottom, should read fact fused, making ten visible in males, nine in females, and ten in larvae and pupae. P. 18 2nd parag. line 3, some metalmarks also zigzag erratically. P. 19 par. 4, wing muscles are also attached directly to the wing bases in dragonflies. P. 20 end of line 12, add hyphen on "dur" to read dur-. P. 22 some Lycaenidae also have a transverse dorsal cleavage line on pupal head. P. 27 3rd parag. line 2-3, delete and Asterocampa, 140-142. P. 28 line 2, add coloro after P. polyxenes. P. 29, in all or most species that overwinter as eggs, the first stage larva actually is fully developed within the hibernating egg (David M. Wright, pers. comm.). P. 37 last line change Petersen to Peterson. P. 40 and p. 419, Megathymus streckeri female noises are probably just due to normal wing movements so are nothing unusual. P. 45 Monarchs in S Mex. usually fly northward about 21 March. P. 59 3rd line from bottom should read lay large clusters of eggs... P. 60 2nd parag. line 2, most Colias also oviposit on leaf uppersides, and the Papilio glaucus group oviposits on upperside of leaf tips. 6th parag. line 2 change his Vanessa larvae to her Vanessa larvae. P. 61 Harkenclenus and Lethe eurydice also lay eggs in small clusters. P. 68 parag. 2, sap feeding adults generally land on the tree trunk above the sap then crawl down to it, to avoid being stuck to the sap. Par. 5, only the skippers with a long proboscis--long enough to extend to the end of the abdomen--eject a drop of fluid from the end of the abdomen onto bird dung or salty soil and then suck up the fluid (in other butterflies the proboscis is too short to reach to below the end of the abdomen). P. 73, 337. Heliconiini synthesize cyanogenic glycosides from the amino acids valine and isoleucine (A. Nahrstedt & R. Davis, 1983, Comp. Biochem. Phys. 75B:65-73), so these chemicals are not (or are rarely) obtained from their hostplants. Par. 3, Charles Remington (pers. comm.) states that Papilio machaon-group larvae are perfectly edible to birds. See p. 190 species 29 for recent demonstration of mimicry of millipedes. P. 74 par. 4, tropical spiders reject unpalatable butterflies such as Danainae and Heliconiini by odor rather than wing color (paper in Science magazine about 1987). Par. 6, the Hesperiinae cremaster is typically attached to a silk pad within the leaf nest, so is not available for use as a spear. P. 76, change "perforated cupolas" to "ring glands" four places on page (the proper technical name for these structures is lenticle, the common name is ring gland, and other synonyms are porrenkupeln, ring-pores, etc.). P. 78 par. 2, the black form of P. machaon is recessive in England (see E. Ford, Butterflies) where there are no models, but it has become dominant in N. Amer. where it mimics Battus. P. 81 end of par. 2, add "and Strymon martialis & acis." (tails are longer in 7 Fla. hairstreaks too). The pale silvery blue color of arctic G. lygdamus kournakovi and C. argiolus lucia is also convergent. A. cethura pima and E. (hyantis) guaymasensis (Sonora) are both yellow in the southwest. P. 82 2nd to last line, change populations to animals. P. 86, now that pollution is lessening around London, the moths are becoming paler again. P. 87, crocodiles evolved just prior to dinosaurs, and birds are just one group (Therapoda) of dinosaurs (Robert T. Bakker, The Dinosaur Heresies, 1986, Wm Morrow, N.Y. 481 p.). Hedyloidea should be added to tree just above the 100 mark on trunk. P. 94 parag. 1 end, some Zygaenidae, larvae and adults, are remarkably resistant to cyanide. P. 95 parag. 4, if the moth is far from the bat it flies directly away from the bat. P. 96 3 lines from bottom, a Madagascar Sphingid has a 25 cm proboscis; Charles Darwin predicted its existence even before it was discovered, based on the very long length of the flower it was later found to get nectar from and pollinate. P. 107 Colias hecla and meadii and Neophasia menapia and terlootii also show geographic replacement, but new evidence proves that Colias alexandra and occidentalis do not. P. 112 Trapezitinae occur in New Guinea also. P. 114 parag. 3, trumpets may have heralded the start of Linnaeus' field trips, rather than his return? P. 115 W. Edwards was president of a coal company.

Part II: P. 127 in fig. 49 legend, change "except for species [76] and 343." to "for some species". Libytheana actually lack Va so erase the word Va and the tiny circle next to it on the species 274 drawing of Fig. 49. P. 128-9, V1 is actually absent on prothorax of all first stage Lycaenidae larvae so erase it from bottom of left-hand rectangle of species 276 & 358 drawings. P. 130 parag. 5 line 4, delete "usually" because hardened rings are on all Lycaenidae larvae. P. 131 Hesperiidae also have long setae on prothorax (paragraph 5). P. 132 Apaturinae have secondary setae on A10 (paragraph 28). P. 137 paragraph 28 add usually to read hairs usually very short; in paragraph 31 should read though they are seldom used. P. 139 the Lycaenid cremaster is often attached to a silk pad. P. 144 Erebia pupae are underground in Britain. P. 145 paragraph #55 should cite species 22-24 (not 21-24). P. 148 second to last line should be J. Eliot (not T. Eliot). P. 151 4th line from bottom, Acraeinae is on p. 228 not 338.

Part III: **Subspecies concept.** I would now recognize 100 or more subspecies than I did in this book. I hadn't seen some of the ssp. then. The goal was to include a ssp. in the book only if it is distinguishable from other ssp. by the ordinary person; thus numerous named ssp. listed by Miller and Brown (1981) that are distinguishable only by locality are not included. Some of the weak subspecies may be statistically significantly different from other subspecies, but may not be biologically significant; there is a big difference. With a sufficiently large sample size (such as 50 or 100 or more) almost

every population can be proven to be statistically significantly different from another population. Statistics was developed to detect slight differences in yield of vegetable crops, where a 1% greater yield may translate into thousands of dollars over the whole state or country; but this small difference is of doubtful interest to any Lepidopterist. Therefore, the only criterion for acceptance of a subspecies has to be some criterion of absolute difference (the most universal and least biased being distinguishability by an ordinary person). People complain about names changes because they cling to the names they first learned; they complained about my name changes, and now they're complaining about other people's changes. Changes are inevitable when they involve improvements or corrections, but I lumped too much in many groups (for instance Euphydryas editha rubicunda is very distinctive and should have been included even in the book's superlumped treatment of editha ssp.). So I now consider valid the old ssp. that were missed, and new distinctive ssp. **Form names.** The ICZN ruled that infrasubspecific names no longer have formal status after 1960. Miller & Brown (1981) interpreted this rule to mean that all form names should be ignored completely and listed as synonyms. However, it is hypocrisy to accept as valid numerous very weak subspecies which can hardly be distinguished even by an expert, and yet ignore forms which are far more distinct in appearance and which are involved in important biological phenomena such as seasonal adaptation (such as the spring form of Colias eurytheme whose color and size is vastly different), mimicry (such as the black female form of Papilio glaucus), or genetic polymorphism (such as the white females of Coliadinae). The ICZN ruling, that form names are no longer subject to the rules of nomenclature, is actually a great opportunity to improve the form names. Therefore, in the book a form which has a similar appearance and the same genetic/environmental cause in all the species in which it occurs is given the same name in all. This system is necessary because there are several dozen names for white females of Coliadinae species alone, for instance; all are given the name alba. Subsequent authors have mostly not used form names, but progress is slow and they will use them eventually. **Common names.** Changes of some common names are also inevitable when the former name was misleading. For instance, Eurema nicippe was called the Sleepy Orange, but anyone who has seen this species fly realizes that it flies fast and often quickly changes direction; thus the name is grossly misleading, hence the book name Rambling Orange, which isn't great (maybe Erratic Orange would be better). Plebejus lupini (now alupini) was called the Lupine Blue, but the bug has nothing to do with lupines so the common name was expunged. The name Lupine Blue obviously belongs to Plebejus icarioides, which eats dozens of lupine species and nothing else. I corrected all the misleading & bad common names. Science must be a search for truth, not a repetition of lies. The ignoring of my name fixes by NABA & others is very disappointing; what can we call a writer who deliberately uses a misleading lying name—a moron? The person who repeats an error merely to avoid change is committing a greater wrong than the person who created the error in the first place, because the repeater knew it was an error, whereas the creator thought it was correct. Justifying a fault doubles it.

P. 157, line 7, replace sevata by josephina howarthi P. 163, E. philolaus ranges south to Costa Rica. P. 164, xuthus last seen on Guam in 1968 (Envir. Ent. 22:265). P. 167, the white line on the southern ssp. map (mentioned on 5th line from bottom) is too weak and should run from near Reno Nevada to SW Nebraska. Ssp. oregonia also occurs in N Elko Co. Nev. Peace R. Alta. populations have been named ssp. pikei, which often have rather stubby fw, & eyespots closer to aliaska. 4 lines from bottom, several black form bairdii are now known from SE Alta. P. 168, 5 lines from bottom, should read C and S Alta. P. 169, Umbelliferae hosts in Yukon-Alta. are for hybrid P. machaon X zelicaon. P. 171, joanae is a ssp. of P. machaon. P. zelicaon males probably become habituated to, and thus ignore, the obvious male pheromone; thus females can no doubt distinguish males from females, but males may not be able to distinguish females from males unless a female pheromone in present. W Mont.-NW Wyo. polyxenes records are probably misidentifications of P. zelicaon form nitra. Ssp. asterius is misspelled in book. P. 175 replace nuttallii by graveolens. P. 176. P. andraemon was introduced to Jamaica. P. 177. P. deVries (1986 J. Res. Lepid. 24:292) states that records of Piperaceae for P. cresphontes belong to P. thoas, and that records of Rutaceae for P. thoas refer to P. cresphontes; perhaps deVries is correct, though the photo of P. cresphontes in his "Butterflies of Costa Rica" book looks like a misidentified P. thoas to me (Douglas Mullins states that it looks like P. paeon thrason to him). P. 179 P. androgeus was common in S Fla. from 1976 to 1983, absent since. P. 180, NW Neb. has mostly P. glaucus glaucus evidently. Female pupae from the cross glaucus X canadensis also stay in diapause. Ssp. alexiares also has black females. P. 181 parag. 3 11 ssp. alexiares also lacks the upper spot. P. 183 the Litsea host of P. pilumnus was reported as "laurel", which is probably Litsea but may be another Lauraceae plant locally called laurel. P. 184 P. victorinus is a ssp. of P. menatius. P. 188 replace montanulus by maximus. P. 190 eversmanni is not on Honshu. P. 192 E. albania, mazai, & jethys are all variants of E. melite according to Gerardo Lamas. Parag. 2 Dismorphiinae pupae also have cone on head and enlarged wings. P. 193 C. boothii & thula are ssp. of Colias tyche. P. 194, second alba should not be in boldface. Lupinus arcticus is the only recorded host of Colias canadensis; the other 5 "hecla" hosts belong to C. hecla. P. 195 see Papilio (N.S.) #12 for alexandra/harfordii/occidentalis. P. 198 in second-to-last sentence of C. eurytheme, nondominant traits do not sort out in the hybrids. C. philodice is now native to Bermuda (found in 1986 by David M. Wright). P. 199 line 4 change green to dark green. C. interior Wash. D.C. dot is placed wrong and should be in extreme W Md. Move the C. interior dot from Steens Mtn. in S Ore. to C. pelidne. P. 200 last line, ssp. scudderi is in Utah also. P. 201 C. behrii. The Munz & Keck flora uses Vaccinium nivictum for V. "cespitosum" in Calif. P. 202 the female form of Anteos clorinde resembling the male should be called form alamacho, as in Phoebis philea. P. 204 P. sennae, second to last line, mating should read coupling. P. 206 Phoebis neocypris, not intermedia. Some E. nicippe

hosts are shrubs. P. 209 the name longicauda is older than gundlachia, but form names no longer have formal recognition so the latter could be used because it is better known, however longicauda is more appropriate. E. proterpia strays N to Kans. P. 211 parag. 3, Physaria is almost never eaten by Pierinae. Thlaspi arvense is also introduced from Europe and American Pierinae have not yet adapted to it. P. 216 Pieris rapae is possibly resident in Iceland. P. 217 P. napi occurs on Pribilof Is. Alaska. P. 220-223, species 79-82 should be in genus Pontia (R. Robbins 1986 J. Lepid. Soc. 40:88). Last line p. 220, spots in protodice females are brown or black. P. 221 P. protodice patrols all day. P. 225, 369 Pseudotsuga taxifolia is a synonym of menziesii. P. 226 Catasticta nimbice is now known in Sonora Mex. P. 227 par. 4. Polygonia, Asterocampa (abd. segment 10), and Ithomiinae first stage larvae also have secondary setae. P. 228 line 10 delete "and perhaps Aristolochiaceae". Danainae has 157 species. P. 229 change first word "except" to even. In par. 4, the ancestral hostplant of Danainae-Ithomiinae was probably the plant group Parsonsiae, which contains both cardiac glycosides and lycopsamine. P. 230 Asclepias syriaca was the main hostplant of overwintering Mex. Monarchs. Form alba is due to a recessive gene (J. Stimson & L. Meyers 1984, J. Res. Lepid. 23:153-160). L. Brower has found that there are only two flights Apr.-June in Fla. (where summer temperatures are lethal), 3 flights in Wis. P. 231 first line of D. gilippus, should read upf cells; these white spots are sometimes small, sometimes absent in cell CuA_2. P. 232 D. gilippus adults diapause in the Costa Rica mountains during the dry season. P. 236, Douglas Mullins has raised Aug.-Sep. nabokovi from May-June pyracmon thus proving conspecificity (and he also reared C. nayarit from C. windi!); larvae and pupae are straw-yellow like pertepida. C. pertepida has two flights southward. P. 238-9 N. mitchellii in N.C. is not really a distinct ssp.; it is slightly darker beneath with the unh eyespots often oblique and longer than Mich. mitchellii (probably due to introgression with N. areolata), but the differences are not great enough for ssp. status. Ssp. areolata near the N.C. colony often have shorter than usual eyespots, as do S Dade Co. Fla. adults (the short-spotted areolata are now called Neonympha helicta). N.C. mitchellii has two flights M May-E June and L July-Aug. (ssp. helicta has two slightly later flights there). P. 239, H. hermes adults diapause Nov.-Jan. in N. Fla. (T. Emmel). Ssp. benjamini is a syn. or weak ssp. of inornata. Ssp. mackenziei also occurs NE Alta. P. 240 C. haydeni should read Larva (half grown) yellowish-green, with a supralateral and a subdorsal white stripe, and a white lateral stripe edged by purple-pink, with two purple-pink tails. C. pegala ssp.: R. Gatrelle (1985, So. Lepidopterists Bull. #2) sank abbotti to pegala, and sank alope to pegala because alope is in the blend zone of pegala-carolina. We should use: pegala (coast at least from Ala. to Fla. and N.C.) has large yellow patch with only one upf eyespot on males; carolina (mts. S.C.-N.C.) paler yellow patches & 1-2 ocelli; maritima (=texana)("alope")(most of E U.S.) orangish-yellow fw patch with 1-2 ocelli. P. 242. ssp. charon occurs Ariz. also. P. 243 E. rossii from Que.-Lab. is based on "Cape Mugford Labrador". Ssp. mckinleyensis is the proper name rather than erinnyn. P. 246 E. anyuica=occulta from Yukon only differs slightly in long series from western adults, so is not a valid ssp. P. 249 O. bore is known from S B.C. NW of Jasper Park Alta. P. 251 O. alpina is also in Hudsonian Zone bogs. P. 252 O. polixenes, the S B.C. black spot on map represents a misidentified O. bore (Jon Shepard) so remove from map. O. polixenes is not yet known from Mont. (line 6 of species text). Add O. philipi (C. Alaska-Yukon, taiga bogs, flies in odd years) is usually dark-brown with 2 mm-wide white submedian & postmedian unh bands, whereas alpine pops. are usually paler; it has generally called a distinct species (?, Tom Kral states that normal paler polixenes and philipi fly together everywhere from bogs to tundra and intergrade completely, and he found the two forms in copula). P. 254 A. "troglodyte" aidea looks rather different from Caribbean-Fla. troglodyta ssp., and could still belong to troglodyta (some female aidea have a hooked fw like the others), but it seems best to treat A. troglodyta and A. aidea as separate species. In the Caribbean, the gnathos is more hooked in ssp. troglodyta and minor, but the wing pattern is very similar, and N. Riley combined all Caribbean-Fla. ssp. into troglodyta. P. 255 change alicia to reinthali (peninsular Fla. NE to SW tip S.C.). P. 262 L. weidemeyerii: Rocky Mountain Admiral would be a better common name. Change Salix subcoerulea to Salix drummondiana. P. 263 the yellow-orange L. bredowii larva was a diseased abnormal individual (fig. by R. Pyle Audubon Field Guide to N.A. butterflies). P. 267-8, the cracking sound of adult Hamadryas is made with modified wing veins around the forewing discal cell. P. 275, amathea and fatima are ssp. (K. Brown Lepid. News 1988 #2 p. 39-40). P. 277-80 many places, keep the names evarete & genoveva the way they are. T. Turner & J. Parnell (1985, J. Res. Lepid. 24:142-153) switched the names, then Butt. Venezuela recently switched them back. Turner & Parnell give valid additional differences of valva spine number, testis color, larva and pupa color between the two. P. 280-281, the winter range of Vanessa is somewhat uncertain; thus atalanta may not overwinter so far north. V. cardui overwinters as adults, evidently on the Colo. plains rarely, where one was caught in Jan. in Colo. and migratory movement is rare in Sept.-Oct. P. 286, P. gracilis eggs laid singly, cremaster pad orangish-white. P. 288 P. progne cremaster pad pink; adult flight is slightly weaker than in P. gracilis; ssp. progne perches in gulch bottoms too. P. 289, 284, N. milberti and P. comma also roost with fw far forward & antennae between them. P. 290 N. vau-album larva is not green in Utah. P. 291 N. antiopa migrates out of the Central Valley Calif. in spring and migrates back in the fall (A. Shapiro). hyperborea is merely an aberration. P. 296 ssp. rubicunda is very much larger than nubigena so is a valid ssp. if this size is genetic. P. 300 C. theona hibernates as third-stage larva. P. 301 C. melitaeoides & C. eumeda are distinct sp. P. 302 3rd-4th lines from bottom should read If two recessive genes r are present. P. 304 nycteis hibernates as 4^{th} stage; ssp. reversa is in SW Man not S Man. P. 308 replace callina by arizonensis. P. 309 Phyciodes cocyta=morpheus occurs in Sioux Co. Neb. My 3 papers in Papilio(N.S.) #7,10,13 totally revised Phyciodes. P. 314. P. phaon par. 4, change "native" to "frequent" in Ark.-Mo. P. 316 3rd line from bottom should read size as or larger than the female. P. 318 B. eunomia is

unsilvered in Labrador and Seward Pen. Alaska. P. 319 B. selene courtship should read: The male may hover above the female, and may flutter after landing behind her (sometimes he butts her while he flutters); then his wings are partly spread while hers are closed while they join. P. 319 ssp. grandis & chariclea fly in the same area of taiga bogs just NW Fairbanks Alaska, a sympatry that could be because they are separate species, but further collecting showed that chariclea is rare there most years and chariclea flies mostly earlier than grandis there, so this does not necessarily prove they are separate species (see Butt. Canada). 5 lines from bottom, 1st-stage-larvae also hibernate in Colo. P. 321 B. improba unnamed is ssp. nunatak. P. 322 Siberian B. “alberta” are evidently B. erda kurenzovi. B. astarte unnamed is only slightly if any different so is not a distinct ssp. P. 323 Canadian arctic Baffin I. etc. tarquinius missed, but looks like it is same sp. as natazhati. P. 327 Great Plains S. idalia colonies are still widespread and strong. P. 330 line 9 of S. atlantis, change "reddish" to redder-brown in two places. P. 331 ssp. dorothea is also in Chuska Mts. of NE Ariz.-NW New Mex. P. 334 S. coronis coronis & semiramis intergrade in Sequoia N.P. P. 340 zorcaon is a syn. of H. isabella eva. P. 342 4th line from bottom, add "occasionally", to read "Males occasionally locate female pupae", because in nature most matings involve flying females. P. 343 the elevation of abdomen and extrusion of the abdominal glands is probably a rejection posture even though the repellent chemical may not be available until after mating. P. 348 Apodemia “mormo” is 3-4 sp. (G. Pratt & G. Ballmer J. Lepid. Soc. 45:46-57; Scott Papilio [N.S.] #18). P. 350 A. nais males perch in gulches/depressions from about 12:30-2:30 p.m. The main habitat of A. phyciodoides is oak woodland (M. Smith 1986 J. Lepid. Soc.). P. 351. A. multiplaga ranges south to Costa Rica. P. 353 C. wrighti has three flights Mar., June-July, Sep.-Oct. P. 356 Feniseca hibernates as pupa. P. 359, replace E. minijas by E. toxea. P. 360 titus is in genus Satyrium. P. 362 parag. 6 last sentence should read The orange upf patch is small or absent in most areas (ssp. strigosum) including coastal S.C.-Ga. (unh marginal orange spots larger, ssp. liparops), very large in C Fla. (ssp. floridensis; marginal orange and blue unh spots larger). P. 363 form heathi is frequent in Carbon Co. Wyo. P. 364 S. auretorum occurs in Lake Co. Ore. P. 366 move the end of the S. fuliginosa black streak extending from NE Nev. and ending in C Nev., northward so that it ends in N end of Eureka Co. The C Nev. records of M. leda are all strays. Thereus zebina is properly named Rekoa marius. P. 366, 413, 414, 475. Prosopis juliflora is a synonym of P. glandulosa in most recent floras. P. 370 ssp. margaretae has much longer tails and a slightly-less contrasting unh median band. Cyrilla is error. C. polios lays eggs on or near the base of leaf buds (rarely on flower pedicels). P. 371 change augustus to augustinus two places and in plates and index, delete (=augustinus). C. mossii is not in Neb. P. 373, Sedum texana is a Tex. host of C. xami. C. hesseli angulata occurs in Fla.-N.C. P. 374 lines 2-3, change form smilacis to form arufa. At end of sentence add Ssp. smilacis (coastal S.C.-Ga.) resembles gryneus but unh median line slightly straighter. Change "Cedros I. Mex." to "the similar ssp. cedrosensis on Cedros I. Mex has less white unh postbasal bars". Ssp. gryneus and siva intergrade in Dawson Co. Neb. also. 14 lines from bottom change one green-unh population to ssp. juniperaria. P. 378 ssp. unnamed is pseudodumetorum. P. 379 C. s. paradoxa was inadvertently named by Scott in this book (its appearance in News of Lepid. Soc. several years earlier did not satisfy the Code), see Papilio (New Series) #19. E. heermanni should read heermannii. P. 380-1, Fixsenia belong to Satyrium. P. 383 S. melinus abdomen is orange only on summer males. 4-5 lines from bottom, the desert scrub bug in Big Bend Tex. apparently is a separate species Strymon serapio (uns resembles bebrycia, uph has blue), Mar.-Sep. P. 386 two sp. of Electrostrymon hugon=sangala=endymion & joya=canus have been found in S Tex. P. 387 L. phlaeas hypophlaeas=americana. Near bottom, in Utah Uinta Mts. has near-artemisia & Wasatch Mts. has artemisia. P. 388 change hyllus to thoe. Warner Mts. has L. nivalis warnermontana. P. 389 L. florus (really a species) should be used rather than the older name L. h. castro, because I have appealed to ICZN to suppress castro (see Papilio [N.S.] #12, 18). P. 390 ssp. epixanthe occurs in N.Y., Mass, N.J. southward. P. 391 change ssp. nevadensis to obscuramaculata, and change index nevadensis (Lycaena, sp. 382) to obscuramaculata also. P. 392 L. x. editha from Alta. is based on only one old dubious record. P. 394 L. marina overwinters in S Nev. P. 395 B. exilis arrived in Hawaii 1978. P. 397 ssp. gozora doubtfully occurs in U.S., or may not be distinct from ssp. echo. “Argiolus” is now 6 sp. P. 401-3. E. battoides: Euphilotes bernardino is a separate species and includes ssp.allyni and martini. Euphilotes are totally changed & plunged into chaos since the book. P. 405 E. rita: no Mex. records but probable. P. 406 idas is now 3-4 sp. (see Papilio [N.S.] #18). P. 408 P. melissa males often perch on low spots of trails or gulches to await females, but often do not stay long (P. glandon occasionally does this too). Astragalus mollissimus is a synonym of A. drummondi; Psoralea is not a host. P. 409 see Papilio(N.S.) #12 for ssp. of saepiolus & icarioides. P. 411-2 ssp. acmon is a species, the other “acmon” ssp. are P. alupini ssp., & P. chlorina & P. c. monticola is a separate sp. P. 414 2nd line, should read Greater Antilles. P. 415 Pyrrhopyginae also spread wings at rest. P. 419 the clicking sounds are just incidental products of flight. P. 420 Aegialini last sentence, Aegiale larvae also are in tequila. P. 425-6 Carterocephalus and Piruna are in subfamily Heteropterinae. P. 425 C. palaemon mature larvae hibernate (see M. Brooks & C. Knight, A Complete Guide to British Butterflies, Jonathan Cape, London, which has larva & pupa photos). P. 427 6th line from bottom, should read south to Fla. keys. P. 432 Stipa columbiana is error. P. 433 A. prittwitzi also flies in E Aug. (probably 3 generations or more); females vary from male-like to mostly brown on ups. Hylephila phyleus is a stray in Bermuda. P. 435 Stinga has 1 gen., Sep. is error. P. 436 H. juba eggs stay white (become only very faintly pinkish), larvae hibernate about 1/3 grown. H. comma is mislabeled in W Tex.; ssp. unnamed is mattonorum & has greenish-ochre-brown unh that often lacks spots. Replace Andropogon saccharoides by A.scoparius. P. 438 H. leonardus males also often perch among clusters of flowers to await females. P. 441 H. dacotae males at low density perch mostly on ridgetops or on top of slopes. Only some dacotae sites are

on shorelines of Ice Age lakes. P. 442 H. nevada: C Nev. and extreme S Nev. records are errors (misidentifications). P. 443 3rd line, change Festuca ovina to Festuca idahoensis. The W Grand Mesa P. draco intermediates are actually P. sabuleti. 7 lines from bottom change Eragrostis trichodes to Sporobolus airoides. P. 445 P. mystic males perch in grassy swales and gulches. P. themistocles eggs develop reddish dots. P. 446 replace scoparius by gerardii. P. 447 W. egeremet males perch all day on plants 1-4 m above ground in little forest clearings. P. 449 Problema byssus ssp: upf base blackish-yellow in SE U.S. (ssp. byssus), yellow on Great Plains (ssp. kumskaka). P. 450 P. bulenta has only one flight in Md., June 20-July 14. O. yuma males also patrol slowly among hostplants to seek females. P. 451 replace Blepharoneuron tricho. by Muhlenbergia montana. P. 452 taxiles is distinct sp.; replace Puccinellia airoides by Glyceria striata. P. 455 Euphyes dion ssp. bayensis (Bay St. Louis S Miss. to SE Tex., oranger ups, stigma slightly narrower) was named as a distinct species but intermediates to ssp. dion occur at TL. P. 458 A. hianna deva (stigma absent to present & 3-parted) has only one flight, May-June. P. 459 A. python margarita is a syn. of ssp. python. A. ovinia perches in afternoon as well as morning (K. Roever). P. 460 A. aenus megamacula occurs only in S Ariz. (ssp. aenus in C-N Ariz.). P. 462 A. unnamed is A. elissa, which occurs near Patagonia southward to Atascosa Mts., and in Cochise Co. Ariz. (coll. Biedeman 1903, Ent. News. 15:344) but is not known specifically from the Mule Mts. It is a temporary resident in S Ariz. (absent because of freezes from 1979 to about 1983), and does not fly in May. Celia & belli are distinct sp. P. 463 A. tolteca prenda is apparently only a temporary resident in S Ariz., moving north from Sonora Mex in late summer of some years. P. 464 A. vialis has 2 gen. in Neb. A. phylace flies at low to middle altitudes in the Chiricahua Mts. Ariz. (A. fimbriata at higher altitudes there), and (p. 465) sometimes flies with A. fimbriata. P. 465 parag. 4 capitalize Subtropical. P. 466 C. ethlius is a stray in Bermuda. P. 478 A. pseudocellus last found in Ramsey Can S Ariz. June 28 1936. P. 480 Ssp. mexicana has brown unh. P. 481 Codatractus valeriana= mysie (Ariz.-W. Mex.) has large white fw spots; the plate 41 photos are Codatractus uvydixa from E Mex. with small or absent fw spots. P. 485 S. pulverulenta now known in Baja Calif., Mex. P. 491 E. horatius unh submarginal spots usually paler than E. p. meridianus. P. 492 E. persius occurs in N Man. also. P. 493 Paul Klassen lists E. lucilius records from W-C Man. to Churchill Man., which I treated as misidentified persius; these have been reexamined; there are evidently valid records of E. lucilius from Gillam, Thompson, Mile 349 Churchill RR, Sandilands Man., but not from W-C Man. E. persius Salicaceae hosts were no doubt errors based on E. icelus. P. 494 E. baptisiae flies with lucilius also to Tenn. P. 495 P. albescens (now considered a species?) also occurs in S Nev., but is probably dubious in Kans. P. 499 P. mejicanus pupa is like that of catullus but hairs slightly longer (delete "slightly hairier"). P. 501 P. araxes flies in L July also; adults rest and bask with wings spread laterally; adults sometimes land on open water (!) with wings spread to sip water.

Appendixes: P. 505 for Bermuda, add Vanessa virginiensis* & Colias eurytheme*, delete asterisk after Colias philodice & Calpodes, delete Lethe. Hawaii, add Polites sabuleti. Add Pribilof Is. Alaska Pieris napi (N). P. 506 4th line from bottom, add "or screw clamps" after copper tube. P. 509 a #0 insect pin should be deheaded and backed into match stick. P. 510, to make a holder for feeding adults, cut 8-10 hacksaw blade slits into the edge of 1/4" thick X 1” X 4” plywood, insert a spring-steel forceps holding adult into each slit (this works great!). The plywood can be the edge of a nice feeding trough that holds the honey-water food. P. 511, to mate adults in the lab, a female can be held with forceps and backed toward a caged male; or the female can be anesthetized and placed near the male. Immatures can be overwintered in the refrigerator if sphagnum moss is placed in closed container, or little drops of water are added occasionally to prevent dessication. P. 512 replace "Dupont Duco Cement" with "acetone-based clear cement."

Reference Matter: P. 529, Cotton "Grass" is really a sedge; its name should have been Cotton Sedge. P. 532 in Graminae, change "passim" to "most of". P. 546 in "life zone" entry delete "topography". P. 561 add to index: elissa (Amblyscirtes, sp. 545), 462, pl. 46). P. 566 add to index: instar, 21. P. 578 add to index: simplonia (Euchloe), 214. P. 581 viardi is in genus Itaballia not Itabella.

THE BUTTERFLIES OF NORTH AMERICA. William H. Howe (ed. & painter) & 20 contributors. 1975. Doubleday & Co. Inc., Garden City, New York. 633 p.

This book was a vast improvement on Holland’s 1930 Butterfly Book, which except for the nice plates contained little information. It is now out of print and is somewhat out-of-date, so I just correct the plates. There wasn’t much biology in this book, so I later decided to write my own book.

The ~2000 paintings themselves—by William Howe--are some of the best butterfly paintings ever done. Each plate was painted on a single cardboard, so the individual butterflies could not be rearranged, accounting for the jumbled positioning of some species as individual butterflies were added to later plates as afterthoughts. Following are corrected identifications (some of the minor recent name-changes and lumping of weak ssp. are not updated). Pl. 1#20 is Poladryas minuta near-nympha. Pl. 2#12 may be septentrionalis but looks more like areolata from SE U.S.; #24 is N. ridingsii stretchii. Pl. 3#1-2&16 are C. pegala maritima; 3&5&8-9 C. p. nephele; 15 is C. p. gabbii. Pl. 4#3-4 C. p. nephele; 7&11 C. oetus oetus; the Coenonympha are all C. tullia; 14-15 C. t. ampelos; 18-19 C. t. mono; 22 C. t. pseudobrenda; 28 E. mancinus. Pl. 5#3&6 C. p. nephele; 16 E. stubbendorfii ethela (N.A. has E. stubbendorfii not E. theano); 18-19 C. t. subfusca. Pl. 6#5 O. nevadensis nevadensis. Pl. 7#11 looks like it may be O. philipi; 15-16 O. polixenes luteus. Pl. 8#14 O. calais strigulosa; 16 O. calais caryi. Pl. 9#5-6 O. polixenes subhyalina; 12 O. bore fordi. Pl. 10#1-2 C. pegala pegala; 8

E. mancinus; the Coenonympha C. tullia; 16-18 C. t. inornata. Pl. 11#3 A. troglodyta floridensis; 8 A. clyton flora; 9&23-24 A. celtis reinthali; 21-22 A. celtis jeffermont. Pl. 12#3 L. weid. weidemeyerii; 9-10 A. clyton texana. Pl. 13#2 L. weid. angustifascia; 3-4 L. portlandia portlandia; 6-7 A. celtis montis; 8-9 A. clyton texana; 10 L. anthedon; 13 L. anthedon borealis. Pl. 14#8 L. lorquini itelkae; 10-11 Adelpha eulalia. Pl. 15#1 M. dorcas amymone; 2 M. zerynthia=coresia; 5 Cyclogramma bacchis; 10 P. minuta arachne; 11 D. serina=egaea dyonis. Pl. 16#5&7 P. marg. marginalis; 6 P. faunus rusticus; 16-17 P. oleracea frigida. Pl. 17#11 P. gracilis zephyrus; 15 P. faunus rusticus. Pl. 18#3 P. faunus cenveray; 5 P. oreas near-silenus=threatfuli; 6 P. oreas oreas; 11 Junonia genoveva; 14 J. evarete nigrosuffusa; 15 A. amathea fatima. Pl. 20#3-4 S. aphrodite near-whitehousei; 12-13 S. aphrodite manitoba. Pl. 21#6-8&15 S. zerene platina. Pl. 22#3-4 S. zerene gunderi. Pl. 23#6-8 S. coronis snyderi; 11-12 S. coronis halcyoneXsnyderi; 15 S. coronis semiramis=hennei. Pl. 24#6-7&9-10 S. hesperis dennisi. Pl. 25#11-12 S. zerene picta; 14-15 Castle Lake. Pl. 26#3 S. hesperis dorothea; 4-5 S. hesperis chitone; 6-7 S. atlantis sorocko; 9-10 S. hesperis tetonia; 11-12 S. hesp. hesperis; 13-14 S. hesperis electa=nikias; 15 S. hesperis cottlei=dodgei. Pl. 27#1-2 S. hesperis greyi; 3-4 S. hesperis tetonia=wasatchia; 5-6 S. hesperis viola; 7-8 S. hesperis beani; 9 S. hesperis cottlei=dodgei; 10 S. hesperis irene; 11-12 S. hesperis dennisi; 15 C. sterope vallismortis. Pl. 28#1-2 S. call. callippe=comstocki; 3-4 S. call. calgariana; 5 S. call. semivirida; 9-10 S. call. nevadensis; 11-12 S. call. macaria; 13-14 S. call. rupestris=inornata; 15 S. call. semivirida. Pl. 29#1-2 S. call. calgariana; 3-4 S. call. juba=laura; 9-10 S. call. meadii; 11 S. call. juba=sierra; 12-13 S. call. calgariana. Pl. 30#3-4&14-15 S. hydaspe rhodope; 6 S. hyd. rhodope (from Wyo. not NM); 7-8&13 S. hydaspe minor; 11-12 S. hyd. hydaspe. Pl 31#6-9 S. hesperis beaniXtetonia; 10 S. hesperis schellbachi; 11-12 S. hesperis lurana; 13 S. atlantis pahasapa; 14 S. egleis utahensis; 15 S. hydaspe rhodope (from Wyo., not NM). Pl. 32#1-2 S. aphrodite whitehousei; 3-4 S. hesperis nausicaa; 11-12 S. morm. mormonia; 15&17 S. mormonia eurynome; 16 S. aphrodite manitoba. Pl. 33#1-3&15 replace napaea by alaskensis; 8 B. improba improba aberration youngi; 13-14 B. titania butleri; 16 B. titania arctica. Pl. 34#1 B. eunomia caelestis; 3 B. eunomia triclaris; 7-8 B. freija freija; 9 B. selene myrina. Pl. 35#2 surely Moraine Park; 5-6 B. bellona bellona; 15 B. titania grandis. Pl. 36#4&7 E. chalcedona hennei. Pl. 37#9-10 E. editha quino=augusta; 13-14 E. anicia alena; 15-16 E. anicia maria (C. Ferris in Butt. Rocky Mtn. States p. 332 says the maria & windi IDs were switched, but he was wrong as the windi looks correct to me & Todd Stout finds that maria is blackish); 17 E. anicia eurytion=windi. Pl. 38#1-2 E. anicia wecoeut; 4-5&9&12 E. editha editha; 7-8 E. editha quino; 10-11 E. editha rubicunda; 16 E. bernadetta macyi. Pl. 39#1-2 E. anicia eurytion=windi; 5-6 E. bernadetta rorina; 7-8 E. anicia anicia; 15&18 E. bernadetta veazieae. Pl. 40#1 C. gorgone; 9 C. sterope dorothyi; 10-11 P. minuta arachne; 12 Chl. acastus dorothyi male Durkee, Ore. May 16 1940 LACM; 13 Chl. sterope sterope male John Day River, Gilliam Co. Ore. June 2 1961 DLB; 14 Chl. sterope vallismortis=robusta; 15&18 Chl. whitneyi whitneyi; 16 Chl. sterope sterope. Pl. 41#1-4 C. sterope acastus; 6 C. palla dark ssp.; 7 C. palla palla=eremita; 9-10 C. whitneyi damoetas; 15 C. leanira fulvia; 16 C. leanira alma; 17-18 C. leanira cerrita; 27-28 Microtia (Texola) elada perse; 29 Microtia (Dymasia) dymas chara. Pl. 42#6-7 evidently are correct E. anicia maria=effi; 8 E. colon wallacensis=nevadensis; 11-12 S. mormonia eurynome; 13-14 S. morm. opis=jesmondensis. Pl. 43#3 S. cybele leto; 12 Chl. palla palla=eremita; 13-14 P. minuta arachne. Pl. 44#7 P. phaon jalapeno; 9 P. batesii batesii; 10 P. pulchella owimba; 12 P. pulchella near-owimba; 14 P. texana texana (redder); 18 P. frisia tulcis. Pl. 45#3 S. nokomis apacheanaXnokomis; 4 S. n. near-nokomis; 5-6 C. sterope sabina; 11 E. colon wallacensis=nevadensis; 12-13 C. harrisii harrisii; 14 P. graphica; 17-18 C.hoffmanni segregata. Pl. 46#3 S. hesperis dorothea; 9-10 E. editha edithana; 13 P. minuta minuta; 14 E. bernadetta macyi; 17 E. editha nubigena. Pl. 47#1-2 Libythea carinenta bachmanii; 7&24-25 A. nais chisosensis; 14-15 L. carinenta larvata; 29-30 Cal. rawsoni rawsoni; 41-42 A. palmeri marginalis; 45-46 A. virgulti deserti; 47-48 A. virgulti mejicanus. Pl. 48#2&17-18 A. dialeuca dialeuca; 3 A. virgulti mejicanus; 4&6-7 A. mormo mormo; 5&8&13 A. virgulti virgulti; 9&14 A. virgulti virgulti blacker Baja variety; 15-16 A. cythera tuolumnensis; 19-20 A. cythera cythera; 28-30 Hypostrymon critola; 34-35 Satyrium acadica. Pl. 49#2 Eumaeus toxeus; 4-5 A. halesus halesus; 12 Satyrium semiluna semiluna; 16-17 C. gryneus nelsoni; 18-19 C. gryneus siva; 20-21 C. xami texami; 22-23 C. gryneus loki. Pl. 50#1-2 C. aug. augustinus; 19-20 C. niphon niphon; 22 E. laeta quaderna; 23-24 Satyrium titus titus. Pl. 51#2 C. gryneus sweadneri; 10 Rekoa marius; 13-14 C. cecrops isobeon; 15-16 S. istapa; 17-18 Udara blackburni; 23-24 Ministrymon azia. Pl. 52#3-4 S. melinus melinus; 5-6 S. bebrycia; 23-24 S. Satyrium titus watsoni=winteri=campus. Pl. 53#3-5 replace fotis by mossii; 6 C. gryneus muiri; 11 Satyrium favonius ilavia; 12 Electrostrymon hugon=sangala; 13-14 C. affinis perplexa; 15 C. sheridanii [viridis] comstocki; 16 C. sheridanii [viridis] lemberti; 17-18 C. affinis homoperplexa; 21-22 C. [sheridanii] viridis viridis (the name dumetorum is toxotaxon sewage). Pl. 54#1-2 Satyrium fav. favonius; 3-4 S. favonius ontario; 17 S. sylvinus putnami; 18 S. sylvinus megapallidum; 26 L. cupreus artemisia. Pl. 55#1-2 L. dione; 5-6 L. phlaeas hypophlaeas; 7-8 L. thoe; 11-12 L. florus dospassosi; 18 L. heteronea heteronea (or klotsi); 19-20 L. nivalis browni; 26 L. rubidus ferrisi. Pl. 56#5-6 L. arota virginiensis; 30-31 P. icarioides pembina. Pl. 57#4 Phil. sonorensis extinctis; 7-8 Euphilotes spaldingi pinjuna; 11-12 Cel. lucia lucia; 13-14 Cel. ladon; 15 Cel. neglecta echo; 16 Cel. lucia sidara; 19-20 Cel. neglecta; 25-26 Hem. thomasi bethunebakeri; 27-28 H. isola. Pl. 58#3-4 P. chlorina chlorina; 5-6 P. chlorina monticola; 9-10 G. lygdamus incognitus; 12 G. lygdamus oro; 13-15 G. lygdamus xerces; 19-20 P. podarce; 25-26 Euphilotes bernardino; 27-28 E. glaucon centralis; 29 E. ancilla; 34-35 B. exilis pseudofea. Pl. 59#1-2 P. icarioides incognitus (closer)Xpheres; 7-8 P. saepiolus amica; 10-11 P. aquilo labrador; 15 P. shasta pitkinensis; 16 P. shasta charlestonensis; 24&29 P. scudderi empetri; 27-28 P. melissa melissa; 30-31 P. atrapraetextus near-longinus; 32&37 P. scudderi aster; 33-34 P. atrapraetextus longinus; 35-36 P. atrapraetextus alaskensis;

38-39 P. atra. atrapraetextus. Pl. 60#1-4 P. anna anna; 5-6 P. anna lotis; 7-8 P. atrapraetextus sublivens; 9-10 P. (atrapraetextus?) samuelis; 13 P. saepiolus rufescens; 14 P. saepiolus aehaja; 15-16 P. saepiolus near-gertschi; 17-18 P. icarioides fulla; 19-20 P. icarioides pembina; 29-32 P. acmon. Pl. 61#3-4 E. ancilla columbiae; 15-16 E. glaucon intermedia; 17-18 E. glaucon oregonensis; 19-20 E. glaucon glaucon; 21-22 E. bernardino martini. Pl. 62#1 Pap. troilus male; 3 P. glaucus rutulus; 6 P. glaucus glaucus. Pl. 63#3 P. zelicaon f. nitra; 9-10 P. machaon bairdii; 11 P. polyxenes coloro; 12 P. machaon oregonia. Pl. 64#1-2 P. polyxenes coloro f. clarki; 3 P. machaon brucei; 4 P. p. coloro f. comstocki; 6 P. polyxenes kahli; 7 P. zelicaon. Pl. 65#2 abdomen tip should show space; 5 P. astyalus pallas. Pl. 67#8 P. machaon brucei. Pl. 68#1-2 P. phoebus smintheus; 3-4 P. phoebus hermodur; 5-6 P. phoebus apricatus; 7 P. phoebus pseudorotgeri; 13-16 P. clodius menetriesi. Pl. 69#5 P. phoebus apricatus; 6-7&9-10&13-14 P. phoebus smintheus. Pl. 70#19 P. oleracea; 20 P. hulda pseudobryoniae; 24 P. marginalis venosa. Pl. 71#4-5 K. lyside; 14 A. julia flora; 16 A. julia columbia; 22 E. hyantis lotta; 24-25 E. olympia. Pl. 72#2 E. daira palmira; 5 E. arbela boisduvaliana; 6 E. salome; 21 E. lisa. Pl. 73#3&6 C. scudderii gigantea; 7 C. occidentalis sacajawea; 8 C. tyche thula; 12 male; 13 C. p. minisni? Pl. 74#6&9 C. (tyche?) canadensis; 7-8 C. tyche boothii; 14 C. occid. chrysomelas; 17 C. occidentalis near occid.(Xwasatchia). Pl. 75#9-10 C. philodice; 19 female; 25 male. Pl. 76#13 A. julia flora=alaskensis; 14 A. julia browningi; 18 E. hyantis andrewsi; 21-22 P. sisymbrii sisymbrii. Pl. 77#5-6 A. virgulti duryi; 9-10 P. batesii anasazi; 15&17-18 O. polixenes subhyalina; 16 C. sthenele paulus f. damei. Pl. 78#1-2 C. tullia insulanus; 3-4 C. tullia california; 5 P. pulchella camillus; 11 P. hulda pseudobryoniae; 12 C. tullia kodiak; 13-14 C. tullia mackenziei; 17 P. clodius baldur; 19 C. occidentalis wasatchia; 24 Allosmaitia strophius. Pl. 80 nearly all the ssp. are synonyms. Pl. 81#1 A. remingtoni valverdiensis; 2 A. mariae mariae; 4&7 A. aryxna freemani; 9-10 A. n. neumoegeni; 11-12 A. aryxna baueri. Pl. 82#10 M. cofaqui; 12&15 A. n. neumoegeni. Pl. 83#1-2 A. neum. neumoegeni; #3&6 M. yuccae coloradensis; 17 P. panoquinoides errans. Pl. 84#2 Lerodea arabus dysaules; 5-6 Notamblyscirtes simius; 12-13 A. aenus erna; 14 A. aenus linda; 19 A. tolteca prenda. Pl. 85#3-4 A. hianna deva; 5-6 A. hianna loammi; 16 A. python; 23-24 E. vestris vestris. Pl. 86#5-6 pilatka; 9 Quasimellana eulogius; 13-14 Poanes melane melane. Pl. 87#3-4 Paratrytone snowi; 18-19 Anatrytone logan. Pl. 88#1-2 H. comma harpalus=yosemite; 6 H. comma colorado; 15-16 H. comma near idaho=mojavensis; 17 Polites rhesus; 18 Polites carus; 19-20 H. comma idaho. Pl. 89#30-31 Polites carus; 32-33 Polites rhesus. Pl. 90#1-2 P. peckius surllano; 31-32 H. comma idaho; 38-39 H. leonardus pawnee. Pl. 91#16 not from Colo. (probably Ariz.); 30-31 N. neamathla julia; 36 Monca crispinus=tyrtaeus. Pl. 92#3 mejicanus; 19 P. scriptura; 25 Codatractus valeriana; 32 Piruna penaea; 33-34 P. albescens. Pl. 93#32 E. propertius?; 41-42 E. propertius meridianus. Pl. 94#11-12 T. mexicana; 13 looks like T. mexicana. Pl. 95#13 A. hianna hianna; 15 A. alector hopfferi=gilberti. Pl. 97#1-2 Hesperopsis libya libya; 3 Okoboji; 5 Hesperopsis alpheus oricus; 6 P. scudderi scudderi; 10-11 Hesperopsis alpheus gracielae; 18 L. helloides (Aug. 28 is 2nd gen.); 19 L. phlaeas alpestris; 20-21 C. scudderii harroweri; 22 L. dorcas dorcas (odd with so much orange, but July 24 is dorcas flight; dorcas & helloides both occur at Whiteshell Park); 23 C. occidentalis krauthii; 25 yellow variant; 26 P. savigny savigny=manueli; 27 P. occidentalis nelsoni.

SYSTEMATICS OF WESTERN NORTH AMERICAN BUTTERFLIES.

Thomas C. Emmel, ed. Dec. 18, 1998. Mariposa Press, Gainesville, Florida. 878 p.

This book contains a lot of information concerning western U.S. butterflies, especially the descriptions of numerous new subspecies. Many authors wrote the 73 papers (chapters) in the book, especially John F. Emmel, Thomas C. Emmel, Sterling O. Mattoon, and George T. Austin. The papers vary in quality and content from substantial (esp. discovery of the cassiope & ricei=calneva blues and sthenele=hypoleuca satyrs), to unsubstantial. This review mainly is limited to corrections, and to my opinion of the status of the new subspecies. The ssp. named in this vol. that I think are synonyms are noted below; the other named ssp. not synonymized below I think are valid.

Since this book is mostly concerned with naming new subspecies, a discussion of the ssp. concept is necessary. A valid ssp. must have differences that can be seen by the ordinary person in my opinion, at least after the location of those differences are pointed out. This definition is necessary because butterflies have always been and will always be studied mostly by amateurs (the little flush of money available for university researchers toward the end of the last century will not return, as future money will go to gene jockeys), so a technical definition of ssp. will not work. (Some famous geneticists even deny the existence of ssp., for example among humans, because of so much variation of most traits in the species, but of course using this argument one could deny even the existence of species, as chimpanzees and humans are both variable in most traits and have the same variation in ABO genes and baldness etc., yet are still distinct species even while sharing ~98% of their genes. And according to this argument Neanderthals and ancient humans were not even subspecies, even though most scientists now believe Neanderthals were a separate species.) A really weak ssp. may be different from another one year, but the next year it may look a little different due to random sampling of genes for the next generation and different weather that might affect the phenotype a bit; or maybe the weak ssp. was named because the sample was small and wasn't typical over many years (Hesperia pahaska martini and several Papilio indra ssp. are examples).

A valid ssp. must also have distinctive trait(s) of its own, and cannot be an intermediate between other named ssp. with no distinctive feature of its own, in my opinion; thus a transition area or cline should have only two names (one for each end), and all names for mere intermediate populations are automatically invalid; without this rule, the transition area could end up with three, four, or a dozen silly names based on the % of one or two characters.

The subspecies concept is valid, because evolution is a forking process in which one DNA line forks into several, so if we measure the distance between tines of the fork we get a continuous gradation of distances depending on how close we are to the forking point and how rapidly they have diverged, so a species concept that has the most categories (species, subspecies, infrasubspecies, microsubspecies, etc.) best matches the different degrees of difference found in nature. We only recognize subspecies and not infrasubspecies because the ICZN tells us to without any evolutionary justification, just because of a history of abuse of naming aberrations etc., and because it simplifies the bookkeeping problem (the ICZN Code is a set of laws and latinization rules, obsessed with latin grammar, that has nothing to do with biology and applies only to names). The fact that some "subspecies" are later raised to be species, and some "species" are later demoted to ssp., proves that the ssp. concept is valid for uncertain taxa. Here's a suggestion, used in my paper with N. Kondla & S. Spomer on Speyeria atlantis/hesperis: different degrees of difference can be shown in a checklist by indenting subspecies to the right: the farther they are indented, the less difference they show. Or, more simply, > can be used for one level of indentation, >> for two levels, etc.

My judgement of some of the ssp. may be wrong, because in many cases I have seen few or no actual specimens of them, and it would be necessary to see large series to determine their validity. Some of them may be weak ssp. rather than synonyms. However, the more distinctive a ssp. is, the fewer specimens you must examine to see that it is distinct, so I don't think I have missed too many this way, given my lumpier definition of ssp. And frankly I—and I think most lepidopterists--don't want to recognize ssp. that require a huge series to notice the difference. Obviously all the ssp. were named in this book because the authors thought they were valid, so my saying that one of them is a synonym usually means that my concept of ssp. is not split fine enough to include that one. Some splitting is inevitable as the bugs become better known (my 1986 book lumped a lot of ssp. that I now consider valid, some of which I would have considered valid had I seen specimens; and my lumpiest treatment of ssp.—the 3 "supersubspecies" into which I crammed all the Euphydryas editha ssp.—failed to acknowledge that rubicunda is quite distinctive also and should have been included). And it is true that there has been an inexorable splitting trend from Linnaeus to the present in genera and all other categories. Maybe the U.S. is doomed to repeat the European orgy of splitting that culminated in 200 ssp. of Parnassius apollo. But my goal is to recognize only the ssp. distinguishable by the ordinary person.

The goal is also to avoid bias in determining the status of ssp. and sp. BAD TAXONOMIST'S CREDO: "If I named it, it is a species; if you named it, it is a subspecies; if you named it and I don't like you, it is a synonym". I try to avoid that, but it's definitely easy to dismiss what appears to be mindless splitting when one has not studied the taxa personally. In Colorado maybe I am known as a bit of a splitter, because I have named a new species of Celastrina (which actually may turn out to be a ssp. of the Cherry Gall thing), raised a "form" of one Polygonia into a second species (a ssp. of oreas), split one Speyeria species into two, split a common Oeneis in two, named a Neominois "second brood" which some authors have even considered a separate species, and have published studies splitting both Anthocharis sara & Euphydryas anicia into two species. So if I had lived for decades in those other places, I would have split some of them myself.

The book actually is justified, even though its mission is basically to name new subspecies, because the process of naming new ssp. in the regular journals is too slow and expensive; it would take $50,000. of vanity-press charges (page charges, reprint charges, etc.) from the regular journals, as well as endless aggravation over 20 years, to get this complete coverage of the fauna. Of course, the ideal taxonomic paper naming a ssp. is a complete study of geographic variation of a whole species, listing thousands of specimens examined, but that takes a lot of time and money, which is generally not available. Sure, the piecemeal naming of ssp. and designating neotypes/lectotypes will inevitably result in some errors, but when we notice that about three-quarters of the names in checklists are synonyms anyway, a few more won't sink the ship. A sudden flush of obvious synonyms should actually make it easier to get rid of dubious names from the past that were like vampire zombies that kept coming back after repeated whackings. (Ironically, the naming of hundreds of new ssp. makes it impossible for popular books to include any ssp., and makes it more difficult for conservation agencies to cover any of them.) And the naming of a ssp. automatically activates other lepidopterists, who collect and study the new ssp. and relatives, and they produce progress and correct errors. Basically, a new ssp.—good or bad—activates an army of lepidopterists who eventually do the work a full study would have done. And let's face it: the ideal taxonomic study will work only on ideal bugs, and many of our bugs are the opposite of ideal; they are stenchospecies (bugs that do not fit the biological species concept, bugs that have hybridized or introgressed or converged in a manner that appears random or incomprehensible, rassenkreis, or bugs that are inadequately studied because of haphazard choice of study sites or poor research, etc. Examples of stenchospecies are Papilio machaon/polyxenes/zelicaon, Colias alexandra/occidentalis-christina, Pieris "napi", Cercyonis sthenele/meadii, Euphydryas chalcedona/colon/anicia/bernadetta, Chlosyne palla/[sterope] acastus/neumoegeni, Phyciodes tharos/cocyta/batesii, Limenitis arthemis/lorquini/weidemeyerii, Apodemia "mormo", Callophrys affinis/perplexa/apama, C. sheridanii/viridis "dumetorum", Plebejus anna/atrapraetextus/scudderi/melissa, Plebejus acmon/alupini, Euphilotes battoides, E. enoptes, etc. Another generation of lepidopterists and several more decades will be required to make sense of stenchospecies like battoides/enoptes.

All of the new ssp. are illustrated, mostly b/w. Unfortunately many of the photos in the book were printed poorly (too dark). Some of the few color photos are too red.

Several first-reviser actions are done below (capitalized), for latalinea=subaridum, ricei=calneva, davenporti=pratti, albihalos=austinorum.

Chapter 1 is an introduction to the book.

Chapter 2 fixes Boisduval's types. Later, conclusive proof showed that the labels on the Boisduval specimens in the Smithsonian that contain the wording "a/c Hofer", were written by Foster Hendrickson Benjamin while he was curator of the William Barnes collection (specifically in 1925 for most or all of the labels). And the symbols "a/c" mean "according to". And the person Hofer was Carl Höfer (with the umlaut). Scott explained all this in Papilio (New Series) #13. P. 9, Holland's lectotype (in his 1931 Butterfly Book) is the sylvinus female. P. 10, my saepium specimens from Tehachapi Mts. "fulvescens" and mine from San Diego Co. "chlorophora" don't look different from saepium. Most of the type locality restrictions in the book have logical justification, so are valid. The restriction of Pyrgus ruralis TL to the Feather River Canyon is justified by Lorquin's travels, correcting Scott's 1981 restriction to Tuolumne Co. Calif. However, the change of Scott's caespitatis TL (Marin Co. Calif.) also to Feather R. Can. is invalid, because their change has no justification (the text states that both Coast Range and Sierra Nevada have specimens matching the syntype, and their designation of the Boisduval TLs of heteronea, saepiolus, and agricola to Marin Co. proves that Scott's designation of caespitatis TL to Marin Co. is perfectly justified; therefore **I hereby correct the caespitatis TL to Marin Co.**; authors cannot just change TLs on a whim willy nilly without justification, therefore the first TL restriction that is justified must be accepted as the only valid TL. Their change of the Scott's 1981 TL of pratincola (Broderick, Yolo. Co., just W of Sacramento) to Feather R. Canyon is also unjustifiable and incorrect: they state the specimen could have come from the Central Valley, San Francisco Bay area, or Sierra Nevada, and their designation of the Boisduval TLs of xanthoides to San Francisco and scriptura etc. to Sacramento is consistent with Scott's TL; **I hereby correct the pratincola TL back to Broderick**; prior justifiable work done in a revisionary study as Scott's was, cannot be flippantly overturned for no reason; unjustifiable changes are invalid. P. 22 has several errors: Scott did not think that pratincola was O. agricola, and if Tilden's pratincola were to prove to be a distinct species (it isn't), the name pratincola would be perfectly valid for it. P. 22 and Miller/Brown checklist should have mentioned that Brown, Miller, & Clench (Trans. Amer. Ent. Soc. 106:77, 1980) designated a lectotype of ruricola in the Carnegie Museum (the pale Euphyes vestris in Holland 1931 plate LXXIII fig. 12), which would mean that vestris is a syn. of ruricola; however the O.D. is totally unlike vestris so that lectotype has to be invalid. P. 28 the descriptions of saepiolus & rufescens do not well match the photos; more later on P. saepiolus ssp. P. 30, Paul Opler told me that the Norden phenotype of fuliginosa does match Boisduval's description, thus this new neotype is invalid. P. 31, callina is now resolved, see the corrections on the Pelham Catalogue in this Papilio (New Series) #19. P. 33, the type of irene obviously belongs to S. "atlantis" hesperis (note the cream median unh spots, etc.), and not S. egleis as another lepidopterist has surmised (see the corrections of Butt. Cascadia below).

Chapter 5. Clyde Gillette told me that neither A. mormo nor Eriogonum occur at the designated TL Davis Creek Park, W of Washoe Lake, although p. 89 states that it is a "known locality"; perhaps inaccurate labeling of the "known" specimens? The citation of "Brown, 1965" at end of p. 100 should be "Three letters from Boisduval to Edwards, and the true identity of Melitaea pola Bdv. and Melitaea callina Bdv. J. Lepid. Soc. 19:197-211" in Lit. Cited. P. 102 calchas TL Mono Lake is low-altitude, suggesting it might be minnehaha, but the neotype looks like ssp. shasta, and a series from the mts. off Virginia Lakes Rd. in Mono. Co. looks like shasta, so I will treat calchas as a syn. of shasta. It is spelled calcha on p. 841, calchas p. 834 (apparently not another victim of the sex-trollers who troll the checklists and attempt to assign a sex or do a sex-change on every taxon).

Chapter 7. P. 115 professes a reluctance to redesignate TLs, which should have been applied to caespitatis & pratincola.

Chapter 8, 3rd paragraph describes the uns.

Chapter 11. Tehachapina is a syn. of menapia. Sequoia appears to be a syn. of venosa or very similar, as most venosa females are slightly yellowish also. Mojavensis isn't different enough from pima (and is slightly intermediate cethuraXpima thus an invalid syn. anyway). Desertolimbus is described as intermediate lanceolataXaustralis (nearer australis) thus is invalid even if it isn't identical to australis.

Chapter 12. In the Calif. Coast Range C. palla eremita has females mostly cream, and in lower Sierras (TL of palla) females are supposed to be most often fulvous but are actually often intermediate or cream, then in high Sierra ssp. altasierra has females orange (rarely cream/orange), thus the proportion of cream females in palla is intermediate between eremita and altasierra and there are no other usable characters (except the male ups which may be less dark in foothill and high Sierra), so this is a cline and one of the three names must be synonymized. Nitpickingly it would be altasierra since it is younger than palla and both have most females orange and male ups may be slightly paler; however cream females are frequent in the Sierra foothills so I think it's best to call ssp. palla the whole mess from lowland Sierras to Coast Ranges, realizing that the percentage of orange females varies geographically somewhat; then altasierra is the paler orange high-Sierra thing and from Crater Lake to Mt. Jefferson. Ken Davenport notes that altasierra on E side of Sierra from Bridgeport to Donner Pass looks different from W side. P. 139, silvius is a useful name for the female form with unspotted uns such as fig. 4 (females of all P. faunus ssp. vary from unspotted, to moderately spotted almost as much as males). Sierra Nevada rusticus is not "whitish gray" as stated, it has brownish-gray uns also (it is hylas & cenveray from Rockies that have gray uns). And the fulvescens were nearly all reared, which often distorts butterfly coloration, so it is doubtfully distinct,

evidently a syn. of rusticus. My series of australomontana from Big Pine Mdw. has yellower unh but the orangish ups looks like it has been hybridized with acastus-neumoegeni, as Davenport notes (in his Kern/Tulare Co. paper) also from Kelso Valley region, evidently because of introgression of neumoegeni genes into palla. He has a few from the summit of Nine Mile Can. on Inyo-Tulare Co. line that look like neumoegeni, as do some of mine from Big Pine Mdw. He wonders if the Kennedy Meadows region has a palla australomontana and an acastus that looks similar. Australomontana and neumoegeni are separate species, as in the Kelso Valley region both fly in many of the same places, with no intermediates, neumoegeni flying in washes and patrolling roads in L Mar-Apr., australomontana L Apr-May and occasionally overlapping flights, and they are sympatric on Pinyon Mtn. In the S Sierra ssp. palla and australomontana and neumoegeni (in Kelso V.) all feed on Chrysothamnus, so rearing should be done; maybe J. Emmel has found larval traits that may refer australomontana to palla. So australomontana is evidently heavily introgressed from acastus/neumoegeni, and based on phenotype it is similar to C. acastus vallismortis which also has yellowish unh because acastus vallismortis has evidently gotten genes from palla too (actually the proper name is C. sterope vallismortis since sterope is older than acastus and Jonathan Pelham has shown that sterope belongs to acastus and not to palla). These are stenchospecies (for instance, at Frazier Park the palla sometimes resemble gabbii). Waucoba is a syn. of acastus (evidently hybridized a bit also). Eileenae is a syn. of pugetensis. Obsidiana is basically a syn. of mormonia, maybe the unh is a bit darker on average?, my 6 specimens don't look different enough. Tehama is a syn. of hydaspe, shasta is invalid as it seems to be just an intergrade of rupestris X liliana/elaine, hagemani is a syn. of rupestris, adiasteoides is just the S end of shasta and thus is also invalid as an intergrade, hanseni is a syn. of irene.

Chapter 13. Subaridum is distinctive but is a syn. of latalinea (p. 617, J. Scott **first reviser action**). The photo of caligulosum holotype is bad (solid black), but Davenport & Mike Fisher told me the ssp. is extremely distinct (the uns evidently two-toned like the allotype). Most of the named ssp. of saepium are synonyms (my Pine Valley San Diego Co. chlorophora? series looks like my series of chalcis/fulvescens from Tehachapi Mts. and Colo. provo and S Ore. saepium, and photos of Wash. & BC okanagana are the same); evidently chlorophora if valid is only on "immediate coast" as p. 10 claims? Rubrotenebrosum looks like it might also be a syn. of saepium. Hidakupa looks like a syn. of windi. Marinensis seems to be bayensisXwindi with no distinctive features of its own thus is invalid. The species assignment of the stenchospecies in Callophrys (Callophrys) are controversial as usual. Superperplexa larvae are said to be intermediate between comstocki and perplexa, though the adult spot pattern resembles apama and comstocki, and adults are said to be in a cline with perplexa. Ken Davenport finds pops. with prominent unh spots on W slope from Tulare to Madera Cos. (maybe having superperplexa genes?). Pseudodumetorum was assigned to species C. viridis by Gorelick (J. Lepid. Soc. 25[suppl. 2] table 3, larvae from Del Puerto Can. in Stanislaus Co.), but here it is mistakenly switched to C. perplexa, supposedly on the basis of larvae (which Gorelick placed near viridis), even though adults are similar to viridis "dumetorum" and lemberti, and according to old letters from J. Emmel to Scott, larvae have subdorsal ridges like C. viridis "dumetorum" and lemberti and larvae and pupae resemble lemberti; the leaf-feeding habit and larvae have led recent lepidopterists to suggest that pseudodumetorum (and viridis "dumetorum") belong to the same species as C. sheridanii lemberti (see A. Warren's Butt. Ore.), thus sheridanii becomes a ssp. of C. "dumetorum" (but the name dumetorum should and probably will be suppressed by ICZN plenary powers as I have so petitioned, so dumetorum=viridis will become ssp. of C. sheridanii). (Wash.-Ore. collectors insist that affinis and perplexa are distinct species based on decades of field study, because they occur in close proximity [at different altitudes, at Satus Pass area in Wash.], but close is not sympatry; affinis also occurs in close proximity with homoperplexa in S Utah [affinis in sage hills, homoperplexa in lower gulches] yet Gorelick [J. Lepid. Soc. 59:181-199, 2005] treats them as one species because they intergrade in SE Wyo.-Neb., [though the "intergrade" on fig. 5 looks nearer homoperplexa to Scott]. P. 165 says pseudodumetorum also occurs in close proximity to perplexa, which would suggest they are not conspecific, as Warren's Butt. Ore. noted. And the Univ. Colo. museum has 1f perplexa and 2m pseudodumetorum from Del Puerto Can. Rd. 2 mi. E County line, Stanislaus Co., Apr. 11, 1993, Reed A. Watkins, another sympatry that shows that pseudodumetorum is not conspecific with perplexa. So pseudodumetorum seems to belong to C. sheridanii-viridis rather than C. perplexa (I have petitioned ICZN to protect sheridanii from the older name viridis). Certainly, these are stenchospecies.

Chapter 14. P. 179, insulanus from BC is supposed to have tiny spots, but actually C. Guppy has found that adults from Saratoga Beach in N Vancouver I. are distinct with tiny spots, but the Victoria TL of insulanus has adults that resemble amica type to me, so I think insulanus is a syn. of amica. Sabulosa seems to be a syn. of australis (intermediate to incognitus, uns like australis but more tan, ups female brown like incognitus). Excubita is evidently a syn. of daunia (as are toxeuma & nevada)(someone should be investigating why the well-marked sagittigera flies so close to the washed-out piasus in S Calif., are they separate species?). Gabrielina seems to be a syn. of sagittigera. Aureolus is an extreme of hilda thus a syn. of hilda. Littoralis is evidently a weak ssp. similar to saepiolus. The dedeckera description fits texanus (photos horribly black), so I thought it must be a syn. of texanus, but Ken Davenport suggests dedeckera is very distinct; it "presumably" eats Dedeckera, a little bush with hundreds of tiny yellowish flowers in the Eriogonum family (Polygonaceae); so I'll leave it as a ssp. with texanus for now. Argentata is described as pale-silvery-blue, and Ken Davenport states that it is a syn. of chlorina based on research of J. Emmel, P. Opler, & Davenport (and my series from Big Pine Mdw. on E. umbellatum do look like the shade of blue of presumed chlorina from Lebec, Hungry Valley, & Frazier

Park, though none of these have more than a slight tint of green, whereas the several dozen beauties in Noel LaDue's series from upper Tehachapis had a slight greenish tint; San Bernardino Mts. monticola on E. fasciculatum are bluer. Current thought is chlorina eats E. umbellatum and monticola eats E. fasciculatum and they form a separate species P. chlorina. Alpicola would seem to be a syn. of texanus, as noted by C. Goodpasture. A lot of new ssp. of P. icarioides are named, which former authors such as John Downey and Larry Orsak felt were not worth naming. Scott dealt with these ssp. in Papilio (New Series) #12. Argusmontana is intermediate fulla X albihalos thus is invalid. Panamintina is a valid ssp. with large unh black pupils it seems (I have not seen specimens). Albihalos and austinorum look about the same as panamintina in the photos (pupils fairly large), but in my long series the unh pupils are smaller in austinorum and a little smaller still in albihalos, but these two are similar enough that austinorum should evidently be treated as a syn. of albihalos (since albihalos is farthest from panaminta). Those desert mtn. ssp. all tend to have a weak set of brown spots on uph margin as in ssp. icarioides, sometimes with weak orangish caps, but nothing like the orange margin in ssp. evius females; in the desert ssp. except argusmontana the unf postmedian black spots tend to be large (& wide in cell CuA_1). Inyo is evius X albihalos so is invalid, eosierra is evidently an intergrade of icarioides and fulla and albihalos so is a syn. Santana is a syn. of evius, parapheres is a syn. of pheres (many bad photos here)(note that after 20 years the ups blue changes "fades" toward violety on Plebejus and Glaucopsyche etc. in the Cal. Acad. Sci. etc. collection, so ignore the many published statements about the blue being darker on extinct taxa of blues), atascadero is a syn. of pardalis (sl. intermediate to evius).

Chapter 15, aestivalis is syn. of tecumseh; a little different, but not enough for me. Ken Davenport says that most people who see a full series of joaquina are impressed by how it differs, so let's keep it as a ssp., but I have female libya from San Bernardino & Inyo Cos. Cal. & Lake Co. Ore. that are that cream on unh, so it is evidently weak. Davenport notes that Inyo Co. pop. is much larger, but it and Nev. pops. are not lena. The TL of lena is Montana, and the unh is solid gray-white in males and solid cream in females (both with a central whiter dash) on the lena type and in Colo. (lena range probably Mont.-Wyo.-Colo.-E Utah, and Scott's confertiblanca is evidently a syn. of lena); lena is whiter than "joaquina" and whiter than C Nev. pops., which I assign to ssp. libya.

Chapter 16 on Euphilotes has problems. It was written in 1988! and not revised since. The tables (tables 1-32) are a mess: p. 207 says that vein lengths were measured for Rs and CuA_2 veins on fw and hw, but vein Rs only occurs on the hindwing, and those measurements are not found on the tables. The tables do not contain uph aurora width measurements as p. 207 claims. Evidently every column of the tables refers to uns except the last Border M column. The amount of blue on upf is not on tables as P. 208 claims, which is just as well because the statement "this score is adjusted by adding or subtracting, respectively four times that proportion to or from four" (p. 208) is gobbledygook. And what do those 59.5…54.4 measurements mean on Table 1a??, they are not mm, are they tenths?? The tables are supposed to represent lengths of veins, spot widths, amount of unf blackish suffusion, distance from black dots to wing edge, and (last col. of the –b tables) the uph border width of males and the uph orange width of females and the amount of uph blue on females (these female traits are scored in some kind of indecipherable fashion). Unfortunately a lot of the characters in the almost-indecipherable tables are highly correlated with each other and thus are redundant, and some important characters are not represented on the tables. But it does not matter, as the tables are used little in the text anyway. Details are often disorganized, so one has to round up tidbits of data here and there throughout the paper and move them to their proper place. P. 209 claims without justification that host races or seasonal races are a step above subspecies, but don't some ssp. switch hosts in parts of their range? Most sympatric allochronic host races are claimed to be separate species in the paper, yet E. enoptes cryptorufes (the new ssp. on p. 209 top right) and E. e. dammersi are sympatric on Pyramid Peak. E. bernardino is obviously a distinct species reproductively isolated from E. battoides, but the same can't be said for centralis & ellisii & baueri (baueri flies at the hadrochilus site, but more than a month earlier). I am sure that a computer simulation of interbreeding of two sympatric but slightly allochronic populations eating different hosts would show that despite no inviability or infertility of hybrids (no prezygotic or postzygotic isolation), hybrids would have problems synchronizing with the hostplant they were or even weren't adapted to and so would produce fewer offspring, thus the two host races would persist there, even in the absence of reproductive isolation. In other words, two bugs that eat different Eriogonum species and are synchronized to the flowering period of those Eriogonum, are going to be highly adapted to those species and those flowering times, so hybrids between the butterflies are going to have a lot of difficulty producing offspring because the hybrids may choose a lousier host or emerge at the wrong time, so even if there is no courtship/mating isolation and no embryonic/larval/pupal inviability (thus no reproductive isolation) gene flow between hostplant ecotypes is going to be small, thus hostplant ecotypes may continue to exist sympatrically even if there is no reproductive isolation (and thus are just one species if reproductive isolation is your requirement for separate species). Thus the logic of separate species status for sympatric allochronic taxa is bankrupt, and centralis & ellisii & baueri are probably not even bookkeeping species. (The same problem will occur in the zone where a one-generation-adapted population meets a two–generation-adapted population, as Charles Oliver noted 30 years ago, as the hybrids often have fewer offspring because they are not synchronized as well.) Ken Davenport suggests that a species E. glaucon probably includes both intermedia [which now includes ssp. comstocki] and centralis, in other words most of what was once in E. battoides. Ken Davenport notes that ssp. battoides and ssp. glaucon co-occur at Warren Creek E of Tioga Pass, suggesting they are different sp. (battoides occurs at 11,000' on top of Glass Mtn. E of the Sierra totally surrounded by glaucon, though if they don't overlap altitudinally this is

no test of reproductive isolation). Note that Miller/Brown lists the wrong years of publication of tildeni, bayensis, smithi, columbiae, & martini. P. 210, it would seem that bayensis is a syn. of tildeni, and smithi isn't much different either. Arenacolor is also a syn. of tildeni (a weak ssp., Oakley Shields informed me), and its larvae (3rd paragraph of page) are closer to tildeni/bayensis. P. 211, langstoni is "probably" closer to ssp. enoptes and tildeni than mojave, implying uncertainty (the only real evidence that langstoni and mojave are separate species comes from a 1988 letter from Pratt stating that langstoni flies higher on its host E. nudum than mojave flies on its low-flying host E. pusillum in Jawbone Can. area, where larvae are also distinguishable but may show some gene flow). P. 211 bottom, one wonders if spring females are bluer due to environment, as in P. acmon. P. 226 adds E. plumatella to the dammersi hosts. Cryptorufes is placed in enoptes but p. 213 says it may be a ssp. of mojave; p. 213 says it does not overlap with mojave but p. 211 says it may overlap with it geographically near Pinyon Flat. Mattoni (J. Res. Lep. 27:175) says the female genitalia of mojave differ. P. 213 says that E. ancilla may be an artificial conglomeration, and p. 215 says the wings of the ssp. resemble sympatric battoides more than enoptes-complex taxa. Columbiae could be considered a syn. of ancilla, but A. Warren's Butt. Ore. retains both because of phenotypic differences and different hosts. P. 216, in the battoides group, mazourka & panamintensis fly after spring in mid July. P. 225 lists more hosts for ssp. battoides to add to those of p. 216. P. 217 notes a gap between australoglaucon and typical glaucon, but actually glaucon flies at Lookout Mtn. 8350' filling the gap (specimens sent to me from Derham Giuliani). Mazourka and australoglaucon and panamintensis seem to be synonyms of glaucon. P. 220 intermedia is said to be "sympatric" with battoides (intermedia at lower elevations on E. lobbii & marifolium according to p. 214). P. 221, Pratt (e-mail to Ken Davenport) now suggests that vernalis belongs to E. baueri because it is sympatric & synchronic with battoides in Coso Mts. on E. nudum; though how could those pops. so far apart be the same ssp.?, and Pratt states the vernalis allozymes are closer to glaucon. This paper claims that allyni belongs to E. battoides, then claims that other "dark coastal" populations belong to E. bernardino, based on unpublished allozyme work etc. Pratt (e-mail) states that there is little difference in wing pattern between allyni on E. parvifolium and nearby "near bernardino" pops. on E. cinereum but claims allozyme differences "in sympatry". Allozyme work is cited in many places, but that work has not been published or properly analyzed, and allozymes have proven to be problematic data that mostly are not relevant to the characters distinguishing the wings and bodies of the butterflies or their hostplants or behavior (most are neutral alleles); and allozyme studies are virtually never verified by other authors and thus amount to blind faith; and based on the recent total failure of mtDNA to help in Phyciodes and many other taxa (mtDNA is very variable and overlaps greatly between species, Wahlberg Oliveira & Scott, Syst. Ent. 28:257-273; and a little bit of introgression can result in the mtDNA of one bug completely taking over in the other bug, as has happened in Papilio glaucus appalachiensis [see Butt. W.Va. & their Caterpillars below] & Phyciodes diminutor incognitus & Polygonia progne, etc.), I do not think allozymes should be given much weight. Mattoni published a paper on bernardino (J. Res. Lep. 27:176, 1988) in which he carefully and cogently argues that allyni is part of bernardino, with garthi, based on wing pattern and 4th stage morphology, size & hosts, and on the wing pattern of bernardino 1 km S of Malaga Cove that overlaps wing pattern of allyni. P. 223 emphasizes allyni's fusion of M_{1-2-3} macules with spots bordering orange aurora, but garthi from Cedros I. has these 3 macules nearly always fused & has larger spots. What to make of this disagreement? Mattoni's treatment would seem preferable. P. 222, centralis does not eat E. umbellatum or flavum, which are errors. P. 222, hadrochilus surely belongs to battoides (actually to glaucon, since battoides & glaucon are different sp.) and not to centralis, based on having the same host as mazourka/panamintensis, flight time like mazourka/panamintensis, wing pattern like glaucon, etc. (and look at the map, it is ludicrous to have this one pop. from Westgard Pass belong to a species 400 mi. to the east). Inyomontana is misspelled –us on map (another victim of the sex-trollers?); it seems to be a syn. of bernardino intermediate toward martini, and Oakley Shields suggests it is closer to martini (female ups bluer etc.), thus would seem to be invalid as an intermediate (Ken Davenport notes some difference but says it's hard to place exactly where bernardino & inyomontanus separate because of individual variation within populations—and surely a ssp. isn't worth keeping if the variation isn't much greater than individual variation). P. 226 euromojavensis host in Spring Range is actually spelled heermannii var. sulcatum. P. 226 the W-C Nev. heermannii pop. was named ellisii basinensis on p. 551. P. 227 holotype avawatz evidently coll. Aug. not July; it looks like a syn. of euromojavensis to me but Oakley Shields suggests it is distinct.

The maps of enoptes & battoides are a complicated mess, and benefit from a lot of pencil work. On the enoptes map, the "giulianii" symbol near Lake Tahoe/Carson City must be an error for ssp. enoptes? A tildeni dot can be added for Coso Range. Ancilla occurs in S Alta. and S Sask. The Marina Beach dots are enoptes arenacola. On the battoides map, both symbols from east-central Nev. (the "inyomontana" dot and the "battoides on Eriogonum shockleyi" dot) are actually the same bug, bernardino minuta on Baking Powder Flat, named by Austin on p. 549-50. The Coxey Meadow dot is battoides vernalis, the "centralis" panamintensis is battoides (really glaucon) panam. on p. 219; inyomontana is misspelled. The island pop. W of Baja Calif. is mapped as dark coastal bernardino, but was named garthi by Mattoni, a pop. even more heavily spotted than allyni. P. 813 lists "near garthi" from Pt. Loma San Diego Co.

One disturbing fact: I have two specimens, which have one valva like enoptes, the other like battoides. Does this have devastating implications for the taxonomy of Euphilotes? Is there valval polymorphism due to dominant/recessive genes, such that enoptes & battoides are really the same species, or several species that each are polymorphic in valva form?

Chapter 17. Confusa is intermediate pallescensXelvirae, thus invalid. There are many such intermediate populations. Davenport notes that Mono Co. pops. are extremely variable, some at S end of county may be elvirae while others cannot be placed into ssp. The separation of E. pallescens from E. rita is still dubious. P. 272 states that hostplant is sometimes not a good clue to taxonomic relationship in Euphilotes, as the bugs switched to an annual.

Chapter 18, calneva is a good ssp., however it is intermediate toward the even more extreme ricei on p. 815, therefore calneva is invalid and as a **first reviser action** I declare ricei valid and calneva a syn.

Chapter 19. Purisima I thought might be a syn. of bohartorum which is supposed to have a wide upf border, though Oakley Shields and Ken Davenport say it is quite distinct (smaller spots)(but only half a dozen bohartorum have been caught, so how do we know what it looks like?). There are evidently a number of local odd populations of this tiny hard-to-see bug, including P. speciosa leona in Ore.

Chapter 20. Cassiope is an outstanding find of a new biological creature (eating the odd Cassiope mertensiana, a spreading juniper-leafed bush <30 cm tall with little white bell flowers), with less upf blue near upf apex and unh postbasal discal cell spot vestigial, the uph border wider. Obviously podarce is a distinct species from A. glandon, with its conical unf submarginal spots and different flared-out white larval dashes and pupal abdomen etc. Cassiope would seem to be a ssp. of A. glandon related to megalo, and the larvae and pupae (figs. 1-3) are similar (and variable, comparing 1b with 8); however the recent claim by Steve Kohler that he has found cassiope in western Montana means—if true—that cassiope is a separate species too if it occurs with megalo there. Kelsoni appears to be a weak ssp. with more linear unf submarginal spots (a little more similar to megalo than is cassiope). Cilla unh looks a little darker than podarce on the photos but this trait isn't mentioned in text, only the larger unh spots are noted but these are stated to have "considerable variation", so perhaps cilla is a syn. Klamathensis is very different in Davenport's series so is a ssp. (my one male from Scott Camp Crk. has wide upf border and does not look different).

Chapter 21. Nesiotes is a syn. of amyntula.

Chapter 22. Pseudoxerces from Santa Rosa/Santa Cruz Is. isn't much different from australis, but unh black pupils are a bit smaller thus the white spots are more apparent; it can be left as a ssp. as it isn't an intermediate to xerces (black spots much larger on unf, whereas in xerces black spots are about the same size on unh as unf), and it isn't xerces as several people say, though maybe some of the same genes may be active. P. 309, xerces are darker more violety blue now because of fading of the blue.

Chapter 23. Catalina is intermediate santacruza (closer)Xsylvanoides thus invalid.

Chapter 24. Channelensis is a syn. of sabuleti?, or maybe a little darker (most book photos are dark).

Chapter 25. P. 322, ice-age lowering of sea-level by 300 feet brought biota to Channel Islands that could not move northward as mainland biota did in interglacials (in glacial maxima the Californian biota moved to Baja Cal., in interglacials including the "Recent" the biota moved back north). Hypoleuca is an intermediate sthenele Xbehrii without any different characters of its own, near sthenele but the unh white marks not quite as strong as the San Francisco sthenele fig. in Chapter 2 fig. 115 and in Comstock's Butt. Calif. & Holland's Butt. Book, thus hypoleuca is invalid, and is a syn. of sthenele. Another fantastic discovery!, which can be called near-sthenele.

Chapter 26, figs. show basal upf red streaks, and elegans is a syn. of wrighti.

Chapter 27, p. 333 repeats the folly split of fulvia from leanira, which was superficially based only on adult traits, despite the intermediacy of pariaensis (which has intermediate wing color plus 2 traits of alma & 2 of fulvia), and despite the fact that the ssp. change gradually (step clines) from leanira to the intermediate "cerrita" to alma to fulvia, and the different characters (older larval body color, width of black larval bands, number of white dots in the bands, larval head color, adult color & pattern) change in different places, all explained in Scott 1992 Papilio (New Series) #6 and Scott 2006 Papilio (New Series) #12. Obsoleta is an interesting extinct ssp., correctly a subspecies and not an aberration. P. 344 the ~25 glaciations in the last 2.5 mya surely affected the Colorado Plateau greatly also. Oregonensis & nebularum are syns. of leanira, elegans is a syn. of wrighti, austrima is a weak ssp. with a bit more ups orange than wrighti, basinensis & flavodorsalis are syns. of alma.

Chapter 28. I think C. chinatiensis is still a distinct species, because the "intermediates" shown on figs. may fall in the range of variation of ssp. bolli (which looks intermediate even in NE Mex.)(thus 175-177 can be interpreted as chinatiensis, 169-174 & 178-183 as bolli [though 169 & 170 do look somewhat intermediate], and note that 175-177 are 1988 and 178-183 are 1987 from same site, as if the climate favored one sp. one year, the other the next), and one dot of chinat. is in Durango Mex. right next to a thekla dot, and the Stanford/Opler county record maps show both chinatiensis and theona from all over W Tex. and Eddy Co. NM (plus Hidalgo Co. NM & Cochise Co. Ariz. though, where chinatiensis is dubious), and J. Glassberg (Butt. through Binoculars The West., p. 162) found <u>both</u> theona & chinatiensis in Chisos Basin. More collecting in Tex. is needed. Ezra is prob. a ssp. of theona, and is somewhat intermediate theonaXperlula but not intermed. enough to be invalid; the "lectotype" of ezra would seem to be the holotype. Perlula is prob. a ssp. of theona. Minimus is a syn. of theona.

Chapter 29, ehrlichi is similar to editha but may have more extensive cream bands thus is valid (don't confuse it with augusta [Edw.] which is a syn. of quino), karinae a syn. of editha, bingi a syn. of nubigena (and as transitional to aurilacus is an invalid intermediate), trinitina a syn. of sierra, and variicolor a variable intergrade population thus not a ssp.

Variicolor from TL Sonora Pass was first described by Scott ("1978", J. Res. Lep. 17:245-252), whose 5 specimens from above Sonora Pass had valva prong type frequency of 0,0,0,1,2,2 (short to long), thus the genitalia is closest to anicia as p. 401 admits, so why call it E. chalcedona variicolor?? (the checklist on p. 828 plops it into E. anicia), evidently it actually should be called wheeleri-sierra-macglashanii? (corrections to Scott 1978: the Hallelujah Jct. Pop. should be called macglashanii-wheeleri, the King Can. site macglashanii, the Sonora-Ebbets Pass sites wheeleri-sierra-macglash., the Carson Pass site sierra-macglash., the "quino" sites hennei, the Satus Pass site colon-paradoxa?) and anyway is an intergrade pop. so is invalid as a ssp. The Carson Pass alpine pop. is also very variable from black to orange, yet has very variable prong length frequency (0,16,19,5,1,0, see Scott p. 251), thus is closer to E. chalcedona. These two alpine sites show intermediacy between E. chalcedona and anicia. Why did they name the Sonora Pass pop. and not the Carson Pass pop.??

Chapter 30, koreti is a syn. of lehmani, tahoensis & bingi are syns. of nubigena, monoensis a syn. of edithana (same ovip. on Collinsia parviflora too), owyheensis and mattoonii are syns. of edithana.

Chapter 31. This is a nice paper by Austin & D. Murphy, clearly showing blending between different phenotypes with photos of numerous specimens. (I wish many other chapters of this book had more good mass photos and less text.) P. 420 klotsi is not redder than corralensis & kingstonensis. P. 421 Comstock (1927 pl. 35) figures wheeleri—not olancha--from Mono Lake itself. P. 422 the wings of wallacensis don't look more pointed than veazieae on the photos. The leftmost wheeleri from Pine Valley Mts. in Fig. 7 looks like hermosa. Ssp. klotsi from C Ariz. is like hermosa but darker on ups, the yellow spots more prevalent than red ones. Kingstonensis in wing pattern is a syn. of hermosa (distinguished only by a slightly greater frequency of yellower specimens) yet they have different valva prong so are valid ssp. that have been placed into chalc. and anicia (surely they look similar because of gene flow). Ssp. wheeleri is a little redder than those. Ssp. morandi is variable but has dark basal half of uph, fewer yellow spots than wheeleri, ups often tawnier overall. Ssp. olancha (higher alt. in Mono Co. than the lake) is distinctively white-spotted. Ssp. sierra is the distinctive reddish higher Sierra bug. Ssp. macglashanii is a mostly-whitish mess with some redder ones, and looks like veazieae-macyi in wing pattern, except the valva prong places them in different species (their similar wing pattern surely proves gene flow doesn't it?); Scott's macglashanii-wheeleri series from N Hallelujah Jct. Lassen Co. (J Res. Lep. 17:150) showed a lot of variation with some red adults and some long prongs. Macyi is like veazieae but a bit redder, and one wonders if they are separable over their whole ranges from Nev. to Ore. & Wash. From the photos nevadensis is a syn. of wallacensis. Alena is similar to wheeleri (the photos in fig. 7 show strong contrast between uph central yellow & outer red, but photos in other books [Butt. Colo., Butt. Rocky Mts., Howe] and my specimens do not show this). Maria is evidently distinctive and perhaps has introgressed from colon as its larva is somewhat white-hairy like colon.

Recently Austin et al. (J. Lep. Soc. 57:176-92) changed his mind and split the Nevada bugs into two sp. E. chalcedona and E. anicia, mostly because of a change of species concept to the "phylogenetic species" (a pompous name for bookkeeping species, a portion of a stenchospecies that must be broken off and treated as a separate species after the areas of interbreeding between them are ignored, which allows each taxon to be treated as a separate species where they do not interbreed); E. chalcedona wallacensis and E. anicia veazieae are sympatric without interbreeding (though their flight periods only partially overlap) in NW Nev. (suggesting two species), while in NE Nev. E. chalc. "nevadensis" interbreeds freely with E. anicia wheeleri in the small altitudinal and temporal overlap between them (suggesting one species). (In Papilio (New Series) #12, I discussed the whole stenchospecies in W N.A., and now it appears that E. colon may be a valid bookkeeping species.)

Chapter 32. As noted in Papilio (New Series) #12, carolae is an obvious syn. of eurytion whose TL is identical to the eurytion TL of "probably South Park Colo." (note 521 in Miller/Brown). P. 433 NW not northeastern. Host must be Cast. integra (chromosa only occurs in SW Colo.) if they eat Castilleja there, although S. Spomer found no feeding damage on that plant at TL, and Frank Stermitz reported Besseya plantaginea in S Park also (Besseya alpina is a known host for ssp. brucei in Colo.).

Chapter 33, yolaboli is intermed. to egleis thus invalid, and should be treated as a syn. of oweni. My Warner Mts. series is near-egleis.

Chapter 34 on carolae displays warped logic: if carolae is intermediate thus lower in status than distinct species, why is it raised higher in status to a species??? The holocentric chromosomes in Lepidoptera mean chromosome # does not matter, because even if broken the pieces go to the proper end of the dividing cell. In table, fw shape of female zerene is rounded or square. Fig. of carolae male fw shape resembles malcolmi. Size is larger in coronis & carolae, smaller in zerene. Most traits of carolae in my long series fit zerene, except the first two in table (fw shape male & female) which are weak; the good traits of overscaled unh submarginal band and triangular unh marginal spots and spots outside unh postmedian spots are similar to zerene, thus carolae is actually a ssp. of zerene closest to malcolmi. S. coronis semiramis should have been figured too.

Chapter 35, puntareyes is syn. of myrtleae (photos too light [overexposed]).

Chapter 36, sonomensis is syn. of myrtleae (& photos look darker not lighter).

Chapter 37, giulianii looks like a syn. of lasus slightly intermed. to macswaini on the photos, but Davenport and J. Brock think it is much different (evidently because of "very bright fulvous ups" which isn't apparent on the photos). Mattoonorum is spectacular-looking (but note that only some have tiny unh spots as shown on photos, most in my long TL

series have larger unh spots), so is a ssp. if it isn't just a local intergrade; my only question is, how widespread and stable is this phenotype?, because MacNeill described many odd populations of dodgei, so are there other dodgei pops. this spectacular also? Shapiro (J. Res. Lep. 29:35) showed the variation of H. comma at Asbestos Gulch Trinity Co. (some individuals look like 3 ssp. incl. mattoonorum, though that site is a blend zone near ssp. idaho).

Chapter 38 is not good and has many problems. Ssp. lindseyi is not defined, as the lindseyi TL is not mentioned ["Nellie & Ukiah" in Miller/Brown, Napa Co. Calif. on label on type], the locality of the ssp. lindseyi photos is not given, and the paper does not state how macneilli differs from lindseyi. Using my crystal ball, I deduce that evidently the TL of lindseyi is supposed to be Inner Coast Range, macneilli Outer Coast Range. P. 478 claims septentrionalis is lighter but photos are darker. P. 476 text says lindseyi ups is darker and unh spots less contrasting but photos show the opposite. At any rate, all 3 (macneilli, eldorado, septentrionalis) are syns. of lindseyi. If they were distinctive, MacNeill would have named them in his Hesperia book. Septentrionalis might be a valid weak ssp. with larger unh spots, but the spots on the ssp. lindseyi photos are just as large. K. Davenport notes that S Calif. lindseyi look different from Monterey & Fresno Co. lindseyi, none of which were covered in this incomplete paper, which is so disappointing that I don't want to consider these weak names seriously.

Chapter 39, "harpalus" is now idaho (Scott, Papilio [New Series] # 11). Mojavensis is intermediate idahoXsusanae (its unh spots bigger than susanae but like idaho, unh paler than susanae most often like idaho), thus is invalid and best lumped into the synonymy of idaho. The same phenotype is on N Rim Coconino Plateau in Ariz.

Chapter 40, sierra seems to be a syn. of nevada, with "greenish-olive" unh, the unh spot size on photos is the same size as in Colo. Paper doesn't mention my 1992 paper (Papilio [N.S. #6) noting that Front Range Colo. nevada have sl. browner unh than sl. greener South Park (TL) nevada. "Nr." in fig. 1 legend means NV.

Chapter 41, gentryi has wing pattern like freemani but unh spots weaker, so is a ssp. of A. aryxna. Again, chromosome # does not matter in holocentric chromosomes (baueri's # of 15 is similar to gentryi's 13). Paiute is described as "orange-yellow" but mine are yellowish, so maybe this isn't a valid ssp. Lots of "species" have been described in Agathymus but insufficient attention has been paid to relationships (for instance, valverdiensis & estelleae are obviously same sp. as A. remingtoni when you carefully consider ranges/wings/anatomy/host/ larvae; my 1986 book was **first reviser** in treating the former as syns. of remingtoni.) It's easy to argue that even A. alliae could be considered a ssp. of allopatric aryxna.

Chapter 42. Indistinctus is a syn. of pylades, eureka a syn. of phyleus, flavus a syn. of wrightii (if you accept wrightii as valid--wrightii isn't much different from eunus, just a little paler, so you may want to treat wrightii as a syn. too), obscurus a syn. (a bit darker) of eunus (there are too many names for grades of pallidity in P. eunus; alinea is the only really distinct ssp.). P. 503 right says e. eunus is smaller in spring, but stats show e. "flavus" is bigger in spring--?? G. Austin told me "obscurus" is extinct at TL but still flies near Pyramid L. P. 504 spelled Dechambeau?. Tenebricosus is a syn. of campestris; photos are too dark. P. 505 top, both darker and much yellower? Transmontana is a syn. of coloradensis; Davenport suggests it is consistently larger & lighter than coloradensis, but the photos don't look any different than the gazillions I have caught in Colo. P. 507, # of spots varies in titus. Occidentalis is a syn. of Satyrium titus watsoni. Purpurascens is a syn. of sheltonensis. Clenchi is a syn. of Strymon istapa istapa. Deserticola is a weak ssp., the same as oro but unf spots a bit bigger. Albomontanus is a syn. of gertschi (see Papilio [New Series] #12). Horrible problems in writeup of L. carinenta streckeri, which is actually a syn. of larvata. First, streckeri was named by Field in 1938 (Univ. Kansas Biol. Ser. 39:132) as an infrasubspecific "dimorphic form", therefore the subspecies must take authorship & date of L. car. streckeri Austin & J. Emmel 1998. (Note that Scott & Wright [J. Res. Lep. 30:258 bottom] warned readers about a grossly misleading example at end of 1985 Art. 45[g]. We wrote to inform ICZN that this example was rotten, yet in the 4th ed. 2000 rules the mistake is turned into code as the similar Polinski example at end of 45.6.4.1. shows. Tolerating bad examples; turning errors into rules; promoting instability by changing sexed suffixes; giving half the space to obscure details of latin grammar; allowing the principle of priority to force taxonomists to waste thousands of man-years studying rotten old names and types; that is the unchanging legacy of the anachronistic authors of the ICZN Code. Evidently it will take decades, and the death of the current officers, for the ICZN to become a valued part of biological science.) The whole point here is that the larvata TL is San Antonio, so larvata is whatever <u>population</u> flies at San Antonio, not what the <u>syntypes</u> look like (the pop. may vary somewhat so the consensus is what matters), and I understand that at San Antonio the pop. is more like the Mexican than the E U.S. ssp. (my one San Antonio specimen is like the Nev. specimen figs. 47-48, and San Antonio is in the range of the Mexican thing in Butt. Tex.). The TL of streckeri is Donna in Hidalgo Co. Tex., so it is the Mexican thing like larvata. Figs. 49-50 is actually ssp. bachmannii from Dallas (coll. by Kemner, not Klemner)! They should have shown photo of larvata holotype. They misinterpreted the biology and geographic variation. The N Mexican ssp. larvata=streckeri is not a local phenotype, it is widespread from S Tex. to Ariz. and northern Mex., and these bugs are MIGRATORY so the traits of two syntypes may not matter (migrants into Colo. are mostly larvata but some are bachmanii). The costal white spot is widely fused to the outside-cell spot in bachmanii and offset in larvata, and they fail to note that important character on larvata syntypes (their statement that the spot on costa and that at end of cell and that in cell M_3-CuA_1 are in line on larvata suggests that spot in costa is not fused to that at end of cell as it is in bachmanii, thus the larvata syntypes must be more similar in this critical character to Mex. ones)! The orange on rear of fw is near discal cell in many larvata. (By the way Timothy Friedlander examined numerous U.S. Libythea and published his conclusion that

carinenta and bachmanii are distinct sp. based on genitalia, and then seemingly everyone thought they were two species. I sent him a series from Acatlan, Puebla, in which wing pattern is all larvata yet genitalia varies from bachmanii to carinenta, and then I wondered why suddenly everyone accepted that they were one species, maybe because Friedlander told others?) Grisea is very weak, basically a syn. of coenia. Powelli was named as an infrasubspecific "transition form" by Field in 1936, so the subspecies name takes authorship & date of L. lorq. powelli Austin & J. Emmel 1998 (the description and stated location of holotype and figure all seem to make the name available). P. 515, the posterior fw ocellus is much smaller in all ssp. Paulus isn't a Great Basin endemic as masoni from Colo. looks the same to me (however Davenport & J. Emmel state that E Mojave Desert specimens are closer to masoni than to paulus, and Spring Mts. sthenele look like Colo. masoni; Davenport states that paulus is lighter brown on ups and has more whitish unh scaling, masoni more umber brown on uns; but I am not sure I can see any difference between paulus & masoni in my drawer, so it's not a very good ssp. Davenport notes that fresh masoni often have a strong rusty flush on unf apex, which is introgression from rufous Cerc. meadii which interbreeds with C. sthenele in N Ariz.-S Utah.).

Chapter 43. Profugus is a syn. of huachuca. Apertorum is a syn. of scriptura (fails to note that spring adults have larger white spots, which Scott 1986 called form pseudoxanthus). Flavaventris seems to be a weak ssp. similar to sonora, with slightly yellower uns. Longinqua is a syn. of sonora (intermediate sonoraXflavaventris, thus invalid). Omnigena is a syn. of sylvanoides (K. Davenport notices the difference, but I don't want to recognize a ssp. with this small a difference), and is sylvanoides (very near)Xbonnevilla thus an invalid intermediate anyway. P. 527, napa is a syn. of sylvanoides also. Sacramentorum is a syn. of yuma. Lutea photos look like a syn. to me from the photos, but A. Warren insists it is different, with yellower unh (the shinier unh areas in photos evidently). P. 528, Mt. St. Helena is surely mislabeled.

Chapter 44. Magnamenapia is a syn. of menapia (noticeably larger, but not different enough for me). Pseudothoosa is similar to ssp. sara and ssp. thoosa, closer to sara. It is a little different from both, but in characters and range it is intermediate saraXthoosa thus would seem to be an invalid syn. The paper should have discussed the relationship with ssp. sara. (Anthocharis is discussed in Papilio [New Series] #18.)

Chapter 45. Incana is a syn. of rubidus. P. 540 "olive-gray" is dubious, as it surely is not green (I hate the color "olive", is it a green olive or a brown olive or a black olive???). Rava is a syn. of heteronea. Rutila is a syn. of heteronea plus a homonym of European L. dispar rutila/rutilus. Praetexta is a syn. of browni, lavender on only outer 1/3 of unh like browni (nivalis is lavender on outer ½). Intermedia is a syn. of citima (citima often has larger orange spots, they aren't always small). Obscurafacies is evidently a weak ssp. (uns a bit darker the dots a little larger than californica), & Warren's Butt. Ore. implies it is a syn. Megapallidum lacks tails like dryope, but is larger and uns is whiter so most lepidopterists consider it valid. Obscurofuscum may be a syn. of saepium (the bad photos are too dark; the photos are truly obscurofuscum). Concava is a syn. of augustinus and has nothing to do with iroides (the unh base is dark on augustinus, pale on iroides, and the median unh band averages more of a "concave" nook in augustinus [because the posterior portion of the band has a bit more of an anterior jaunt that forms the rear edge of the nook], a little less of a nook in iroides [because the posterior portion of the band averages straighter]); augustinus and croesioides seem identical also (the only different ssp. in this augustinus group is the new chocolate ssp. in N BC), and iroides and annetteae seem identical. Some people think the polyphagous iroides is a separate sp. from the Arctostaphylos uva-ursi-eating augustinus, but where's the proof? Mojavensis may be a ssp., but why is TL only a couple dozen miles from the designated TL of fotis? My series from Tooele Co. lacks ups orangish. The range would make sense if mojavensis occurred only N and fotis S of Colorado R., but paper states that fotis also occurs N in Virgin Mts. Pallescens is syn. of eryphon. Montanorum looks like Colorado amyntula valeriae, but is evidently distinctive (maybe the postmedian spots are more-distal); it not a syn. of amyntula which occupies the Great Basin. Minuta is evidently a valid ssp., that even looks like allyni in border & some unh spots. Basinensis is a ssp., but it may belong to E. bernardino where Shields placed it, as the wing pattern & flight period fits bernardino not ellisii, and this isolated pop. doesn't fit with the range of ellisii 300 mi. away on the map, though p. 226 says larva is more similar to euromojavensis. Fusimaculata is a syn. of panamintensis and glaucon. Shieldsi is a syn. of purpura (even Oakley Shields agrees). Gilvatunica may be a syn. of ancilla (& the uns spots are large as they are at ancilla TL), but there is controversy about how spotted topotype ancilla are (see Papilio [New Series] #18). Opacapulla is a syn. of dammersi. Aridorum is a syn. of enoptes. Primavera is a syn. of langstoni. Arenamontana is a syn. of pallescens (& uns spots are not smaller than pallescens, see p. 282). Septentrionalis is a syn. of speciosa. Minipunctum is a ssp. or just a var. of deserticola with sl. smaller spots. Alateres is a syn. of melissa. Pallidissima is a syn. of minnehaha (Ferris' [1976] plates don't show any difference either). Goodpasturei is a syn. of alupini. Autumnalis & parva are syns. of mormo.

Chapter 46. Carsonensis is a syn. of apacheana; even 658 types can't make this name valid. Reidi is a syn. of utahensis (as is toiyabe). Expedita is a syn. of arachne. P. 576, monache has much more unh white. Robusta is a syn. of vallismortis (my 2 actually have upf median posterior black patch half the size of that shown for "robusta", and my vallismortis have the large black patch shown, and the ups orangish and unh yellowish doesn't seem to differ either). (The checklist p. 842 lists dorothyi from Nev., which is very dubious.) Arenacolor is actually a valid local ssp. distinguished by large uph postmedian dots, melanic female upf, whiter female unh (but the comparison C Utah sample could be either P. cocyta selenis or P. batesii anasazi). Pullum is a syn. of milberti. Alkalorum is the extreme of--thus a syn. of--pallescens whose TL is nearby, as a cline oetus-pallescens-alkalorum can have only two—not three--names.

Chapter 47 is a nice paper with lots of photos of the variation of Nevada tullia, incl. intergrades elkoXpseudobrenda in NE Nev. and introgression ampelosXpseudobrenda in C Nev. P. 587 the color olive again, the wing is NOT olive-brown! (in Ventimiglia Italy I sampled about 20 kinds of olives at a market, which were all colors from green to brown, all sizes, yet all were so horribly bitter they could pucker a rhino [cheap U.S. olives are green or black]). They show that pseudobrenda is a valid replacement of what everyone wrongly called brenda which is a syn. of california. Mono is a ssp. like ampelos with unh postbasal marks. Elko seems to be a syn. of ampelos (postmedian bands don't seem narrower either). Eryngii is a syn. of california (fewer unh ocelli but intermed. to ampelos in this, thus invalid).

Chapter 48 latalinea is a nice ssp. (subaridum on p. 159-160 & 169 is a syn. of latalinea, J. Scott **first reviser action**).

Chapter 49. It's totally obvious from the photos (and from my series) that interrupta is really lemberti X comstocki, and thus is a syn. as it is intermediate without any different characters of its own, thus is invalid. More intermediates between "interrupta" and comstocki are illustrated, which may have a 2nd gen. like comstocki. P. 622 top mistakenly claims lemberti is limited to high elev.; actually it ranges quite low on the E edge of the Sierras (where Mike Smith found it at Hot Creek, Davenport found it at Martis Creek, R. Wells and O. Shields & I found it at Fredericksburg, etc.--and Ken Davenport found perplexa? resembling lemberti flying under 2000' on W side at Tule River Tulare Co.). And note that Papilio (New Series) #18 discusses intemediates between sheridaniiXcomstocki" paradoxa.

Chapter 50. Based on the types, Scott (1998, Papilio [N.S.] #11) restricted the harpalus TL to "Sierra Nevada Mts., west of Carson City", in other words way west of Carson City, way into the Sierra Nevada where the unspotted ssp. occurs that was formerly called yosemite, not at low altitude in Nevada where the spotted green-unh ssp. idaho occurs. Scott restricted the TL of cabelus to that same way-west locality; they are all synonyms of harpalus (oregonia evidently properly refers to idahoX intergrades from N Calif, despite #11.), while idaho is the lowland Great Basin ssp. (By the way, Scott 1998 used the name H. colorado for these taxa, but I now think that reports of sympatry in Cypress Hills Alta. etc. were bogus, and the N. Amer. entities should be called H. comma again.) Austin is correct in redesignating the TL of cabelus, however he meant to say "western slope of the Sierra Nevada", not "west of the Sierra Nevada" (which would be in the central valley such as Sacramento), so I hereby correct Austin's TL to "western slope of Sierra Nevada". C. Gillette couldn't find mormo at Davis Creek Park.

Chapter 51. This is a bad paper. The table fails to give the unh ground color! even though that is an important character, while numerous tiny-near-worthless characters are given in exhaustive detail (table 1 is humongous, wow!). There is considerable variation in these bugs, and I don't have really long series, but all these names magnus, mandan, mesapano, & skada look poorly-distinguished to me. P. 647 states that mesapano has a "poorly defined distribution", and says skada has "expanded dark and orange patterning" (how can both dark and orange be expanded?). I was informed that Wyo. ones are large like magnus but mine isn't and my largest female is from Alta.; and I was informed that W U.S. pops. are not skada or magnus. The BC book says that magnus ranges north to BC. Cris Guppy states that magnus (forest, unh russet brown) flies together with mandan (prairie parkland, tan unh with a few russet areas) at 3 sites in Peace R. distr. in BC, and finds different DNA, thus he thinks they are different species. Localities are missing on figs.

Chapter 52 has some problems. Its interpretation of the name cupreus and its TL is wrong, as Scott fully explained in Papilio (New Series) #12: the cupreus type is identical to lapidicola, and was collected in the Sierra Nevada, and was not collected in Ore. by Gabb. Thus, lapidicola is a syn. of cupreus, the TL of cupreus is Tioga Pass, and artemisia is a different ssp. Some minor mistakes: lapidicola does not have two gen. as p. 664 surmises is possible, and snowi is brassier colored dorsally.

Alpestris clearly differs from E U.S. hypophlaeas (which replaced the name americana in Chapter 2), and alpestris is similar to arctic feildeni but has a narrower orange band. Bichroma is a ssp. which is usually quite yellow on unh, and the lavender occupies ½ the wing; in browni the uns is often quite yellow, and the lavender only occupies the outer 1/3 of unh, whereas in nivalis the uns is seldom very yellow and the lavender occupies the outer ½ of unh. Actually the unh color varies greatly from bright yellow to yellow-tan in the Cal. Sierras (where I have very bright yellow females) & Colo. & BC, variation that is puzzling; browni females actually vary incredibly from brown to tawny on ups. Note the convergence of larger uns spots on both Warner Mts. warnermontana & jacquelinae. Dorothea looks too much like jacquelinae to me so is a syn. (the male & female fig. by Dornfeld have smaller spots and oranger female upf! & the f is not melanic). Delete last parag. on p. 667, a duplicate from p. 669 right middle. Micropunctata looks like a weak ssp. of gorgon, as SF Bay Area gorgon have uns spots about as small; Davenport notes a blend zone with ssp. gorgon in Kern R. Valley, eastern Greenhorn Mts. and upper Kern Can. Gravenotata TL is spelled Plainview (near Coal Creek, Jeff. Co. CO), not Plain View. The old specimens of heteronea in USNM from Sonoma & Marin Cos. are no doubt violety because of old age (same color change as in old icarioides & xerces). Submaculata is intermediate heteroneaXgravenotata on uns, but the female ups is said to be more tannish-orange so it is evidently a ssp. (and A. Warren notes that it is different). Northi looks like a syn. of klotsi (which is best treated as a syn. of heteronea) on uns (the syntype on p. 66 has blue upf, but p. 671 says some have brown upf!), but is a ssp. if female upf is usually bluer. P. 671 end, Yolla not Yola. P. 672 says that submaculata and klotsi occur only 4 km away in N Calif. and differ in host and larvae (so why are similar Euphilotes raised to species status but these are kept on one species?) Obsolescens looks like a ssp. if most of them are weakly-spotted, though there are a lot of individuals from S Calif. that look like that (even some from Point Richmond near SF). Davenport notes that a pop. in the

Inner Coast Range in Monterey Co. is consistently chalk white below with very tiny spots, which makes obsolescens look obsolete!

This chapter's treatment of Lycaena xanthoides is very bad. Actually, L. dione is a distinct species (differing grossly in unh orange and small solid black round spots etc.) and dione is sympatric & synchronic with vurali, while vurali and editha may yet be ssp. of L. xanthoides (all having the same short narrow unh orange band and pale-centered brown unh spots etc.) that differ only in wingspan and relative size of unh spots. Scott fully discussed this in Papilio (New Series) #14 p.35-36. Pseudonexa is an intermediate between edithaXxanthoides without any distinctive traits of its own, thus is invalid. A published paper (Pratt et al. 1993) that claimed that "pseudonexa" is just L. editha and not intermediates, was highly flawed, and made the ludicrous claim (p. 188) that Scott mis-measured! the unh spots in his original paper on "pseudonexa". Ssp. editha and xanthoides intergrade in the Dunsmuir area to W slope Ball Mtn., at Mather on W side Sierras, & Silver Can. & Sherwin Summit on E side Sierras, & in SW Ore. Pseudonexa is quite similar to nigromaculata.

Chapter 53. P. Opler (pers. comm.) told me his 1970 Norden neotype fits the O.D. better than the new neotype, and the ICZN Code seems to preclude the redesignation of a neotype and requires cases of improper designation of neotype to be referred to the ICZN Commission, so this is evidently another inappropriate redesignation, which is invalid. Tildeni appears to be a syn. of fuliginosa though is said to be darker, and albolineatum appears to have larger unh spots than both but those spots are not mentioned in text and only the "whiter" unh is mentioned, which doesn't look much different on the photos, so maybe it is a syn. too. Maculadistinctum looks distinct by having larger unf spots, and is said to be darker, but my series has smaller spots and looks like semiluna so maybe this isn't distinct either. At any rate, only semiluna is certainly a valid ssp., and Warren's Butt. Ore. gives a much better analysis of ssp.: some tiny-stigma pops. range north along W slope of Sierras nearly to S. Wash.; maybe S. fuliginosa is a different species from S. semiluna.

Chapter 54 is not good. The TL of multicaudata, "Mexique" on syntype, should have been restricted. Grandiosus is a good ssp. from SE Mex.-Guat. with oranger ups, but pusillus TL NE Nev. is a syn. (at best a very weak ssp.) as the variation is described as a cline from S to N, and the male holotype is just an abnormal odd spring form (note that photos in books Butt. BC & Butt. Ore. & Butt. Cascadia are not like holotype). In Colo. I have caught tiny spring adults the size of Argynnis (Speyeria), and giant Aug. females with orangish uph, variation much greater than the supposed geog. variation. Ken Davenport accepts the ssp. because summer forms of it are much smaller than Ariz. mult. But are those still smaller due to environment, and is size alone enough? I don't accept it in Colo.

Chapter 55, shastensis is a syn. of indra; S. Spomer states that most specimens from TL are not as narrow-banded as these photos.

Chapter 56, calcicola is a syn. as it is intermed. martiniXfordi thus invalid. S. Spomer states that reared panamintensis adults do not resemble orig. photos and instead resemble calcicola, thus calcicola is a syn. of panamintensis which is invalid for the same reason. Davenport notes that one of his four males from Westgard Pass looks like panamintensis.

Chapter 57, pygmaeus is another syn. as S. Spomer told me his adults from there look like panamintensis & small size is not consistent (& photos look like martini, thus it is a syn. anyway).

Chapter 58 is very annoying. P. 717 claims alpine Colo. P. phoebus hermodur do not differ from low alt. P. p. smintheus=sayi; actually hermodur is smaller and much darker, and my reared hermodur emerged just as distinctive as in nature (Cris Guppy J. Lep. Soc. 43:148-51 proved that altitudinal melanism is mostly genetic). The dark C Mont. ssp. is nicely corrected to maximus. The separation of phoebus into four sp. (European sacerdos, Asian-Yukon phoebus, Yukon-Colo. smintheus, Cal. behrii) is unsupported splitting. The paper justifies the splitting because of micropyle pattern, but if you use a magnifying glass on fig. 11 smintheus you see that it is actually rather similar to phoebus on fig. 1!, and sacerdos is said to have micropyle like smintheus. P. 718 cites Hesperia micropyle as being a great species-level trait, but Scott (J. Lep. Soc. 29:156-61) showed clinal variation of micropyle between Hesperia comma colorado & H. c. oroplata. P. 719 says phoebus eats Sedum rosea, but in Colo. "smintheus" ssp. pseudorotgeri also eats S. rosea, and flies in mesic habitats typical of phoebus. Yukonensis, magnus, xanthus, & sayii are all syns. of P. phoebus smintheus.

Chapter 59 again relies unfortunately on only one character. Thus the wider tip of a small rod on the valva is supposed to prove that B. titania of Europe is a distinct species from B. "chariclea" grandis, even though multiple characters of wing pattern surely created that remarkable wing pattern similarity, which is extremely-doubtfully due to "convergence" as guessed on p. 728. "Worship the god of genitalia" strikes again (& the fig. of ranieri has a sl. wider rod tip). Many people in America and Europe think that it is the arctic chariclea that is the distinct species from grandis/titania. All the American bugs are B. titania to me. (It's interesting that hypocritical dogma considers B. astarte & distincta conspecific because of similar genitalia when numerous traits of wing shape and pattern differ, yet magdalena and mckinleyensis are usually treated as separate sp. despite being different in only one trait [red fw flush] that is intermediate in Yukon.)

Chapter 60 is a puzzle because of the differences between their ssp. and those of Troubridge & Wood. The 2nd paragraph is a wishful dream of the actual history in which Scott (1986) was the first person to raise natazhati to species rank, based on Troubridge & Philip's research, not Shepard's unknown unpublished work. The O.D. way back in 1920—not Shepard--recognized 2 specimens from Bernard Harbour as natazhati. Bankslandia is a syn. of natazhati (maybe frons & palp differ a bit, but 2 of my 6 have orange—not black—antenna). Why name it Bankslandia when it occurs on Victoria I., NOT Banks I.??, that's very confusing (nobody nowadays cares that people 200 years ago used the word Banksland).

Why are Coppermine adults in my slides like natazhati & paler than Bernard Harbour adults? Finally, surely tarquinius from Canadian arctic (Baffin I. etc., see Butt Canada fig.) is also conspecific with natazhati, not B. freija (this paper's assignment of it to freija based only on "granitic substrate" drags one-character taxonomy to a new low), thus natazhati is a ssp. of B. tarquinius; a thorough study of CNC tarquinius would be gneiss. (By the way Scott's Pleistocene Fritillary is a perfectly fine appropriate name because it occupied Alaska etc. in the Ice Ages, so its replacement by "Beringia Fritillary" in Butt. Canada is very deplorable, esp. because Beringia implies a Siberian distribution that does not exist—and now Brock & Kaufman have muddled it further with their bad name "Cryptic Fritillary".)

Chapter 61 is a useful study of intergradation of P. pulchella. Inornatus resembles pulchella (unf little black, nudum black) but has ups postmedian spots yellow like camillus, the uns is paler orange tending a little toward camillus, and ups of photos looks a little oranger suggesting influx from montana. Inornatus is an intergrade of those ssp. thus would seem to be invalid with my ssp. definition; however, since the intergrading involves three rather than two parent ssp., maybe my intermediate-is-invalid rule does not apply to this case, and inornatus can be considered valid; so maybe? I should compromise here, and say that popular usage should decide: if you like it, use it. Vallis is a syn. of montana, as it looks like the inornatus stuff that has interbred more with montana thus is oranger; yes it is oranger, but when I caught them long ago I called them intergrades; vallis seems to be just montanaXinornatus, thus a simple intermediate thus invalid. Davenport notes orange P. pulchella from E of Carson Pass, Alpine Co., which resembles inornatus, not montanus or vallis as map predicts. Nudum is black in all of Nev., thus all these names are not related to ssp. owimba. C and N Nev. have intergrade populations showing influx from camillus (also, Shapiro found pulchella-montana intergrades in Plumas-Sierra Cos., and Ken Davenport & I find considerable influx of camillus into the pulchella on E side of the S Sierras). Davenport states that "California is a horrible mix of pulchellus, as S Sierra Nevada has a mix of ssp., and ssp. deltarufa appears to be a blend zone between pulchellus and montanus thus invalid" (though I will not sink deltarufa as a syn. at this time because I wonder if the unf discal cell bar blends at all between those, and because my Mather series & Davenport's Yosemite Butt. paper demonstrate that blacker variable pulchella in the low-altitude Sierras separates San Joaquin Valley deltarufa from high-altitude montana).

Chapter 62. More publicity for Ackery & Vane-Wright's thersippus=strigosus.

Chapter 63. Idaho is a syn. of lahontani (unh not pale enough, and anyway intermed. toward archippus thus invalid). Todd Stout notes that Utah bugs are also variable and intermediate between archippus & lahontani. Colors are much too red on most photos incl. fig. 8; actual specimens show that uns of idaho & archippus are very similar.

Chapter 64. Harbisoni is yet another syn. of coloradensis.

Chapter 65. P. 771 Festuca "ovina" is basically a European sp., as its "vars." are now mostly considered to be species (this mistake has caused idiot government workers to seed alien European F. glauca widely in Colo. mts. etc.). Klamathensis is a syn. of mardon.

Chapter 66. Reeseorum & grandiosa are syns. of lasus; some people who have seen lots of these think they are valid, but to me it looks like there are too many names here. Fulvapalla is valid but terraclivosa is intermediate macswainiXfulvapalla thus invalid. Photos are too red.

Chapter 67. Pratti is a syn. of davenporti named in next chapter (**first reviser action**, J. Scott; davenporti has a far greater range so should be used). Nigrescens is a syn. or weak ssp. of virgulti (described as limited to one colony SW of San Bernardino with dark unh margin, but my virgulti from San Diego Co. & S have darker unh margin than virgulti from L.A. to Santa Barbara, so are those San Diego pops. nigrescens that ranges from TL to Baja?, didn't they notice that difference?).

Chapter 68. Davenporti is the same ssp. as pratti (see above **first reviser action**). Dialeucoides is a syn. of dialeuca; it has the same appearance and host and flight period and mountain habitat as dialeuca, so why can't they be monophyletic? Arenaria is a syn. of virgulti (even though allozymes are said to differ). Obviously there is more than one species of A. "mormo", but the group is a mess. Ken Davenport has found deserti sympatric & synchronic with davenporti, so they must be separate species. He has found tuolumnensis flying with his 2-gen. Kern Can.-Greenhorn Mts. bug (#128b in his 2003 Butt. Kern & Tulare Cos. paper) which based on a series he sent I assign to a new ssp. that looks somewhat near deserti with some virgulti influx (128b is the same as 131c-d-e I think, I have a small series of 131c), so evidently belongs to A. virgulti, thus tuolumnensis is a separate sp. from apparent virgulti. Pratt & Ballmer (J. Lep. Soc. 45:46-57) classified the S Cal. taxa biologically thus (names brought up to date by me): type 1) A. virgulti, multivoltine, young larva hibernates, larva may aestivate, egg duration short, larval duration short, this species evidently includes ssp. deserti, virgulti, & now evidently nigrescens, arenaria, mejicanus [extensive orange upf, uph, unh], duryi [same as mejicanus but unh browner], maxima)(deserti & duryi sometimes use Krameria as host, perhaps a clue they are same species); type 2) A. dialeuca, univoltine mostly spring-flying, young-1/2-grown larva hibernates, larval duration much longer, this species now includes davenporti=pratti, mojavelimbus, dialeuca=dialeucoides, evidently peninsularis; type 3) A. mormo, univoltine fall-flying, eggs (or sometimes young larvae) diapause & take longer to hatch, eggs larger than types 1-2, includes langei, pueblo, ssp. mormo=parva=autumnalis =mormonia. Now we add type 4) A. cythera-tuolumnensis, univoltine fall-flying, traits presumably like those of A. mormo, as a separate species because Ken Davenport's 2003 Kern & Tulare Co. paper (Gillette Mus., Colo. State Univ.) reports it sympatric with ssp. mormo along Hwy. 58 in E San Luis Obispo Cos., etc. The Pratt &

Ballmer paper was jumbled and incomplete (data on diapause stage & egg size is very incomplete), but seemed reasonable. But it seems to have been discarded by the new papers. However, the new "1998" papers were probably written in 1988 as was the Euphilotes paper, so are we to believe the J. Lep. Soc. paper?? Those papers left the mormo group (as with Euphilotes) in chaos. There are also problems. A lot of populations are hard to assign to "species" because there aren't enough wing/host characters to distinguish the ssp. and sp. and there is very skimpy reporting of immatures. Butt. Baja Calif. states that occasional specimens from middle altitudes in W Sierra San Pedro Martir are intermediate virgultiXdialeuca (a problem that would disappear if that Baja "virgulti" was misidentified peninsularis and peninsularis is a ssp. of dialeuca, but they describe 2 gen. for their virgulti and say it loses the uph orange southward). Dialeucoides is supposed to have just one spring gen., but I have specimens that look like it from Aug. 16-Sep. 24 (some from the same site where they flew June 4-27—if this is what the end of p. 804 describes, then their "univoltine A. mormo ssp." is just the 2nd gen of dialeucoides). Peninsularis is said to be distinct from virgulti (flying <1 km away with allozymes well-differentiated), and its flight time & host resemble dialeuca, but adults look more like tuolumnensis & virgulti; could it be a link between A. dialeuca & A. mormo?, which are not known to be reprod. isolated, thus A. dialeuca may just be a ssp. of A. mormo (sympatry & allochrony is NOT a test of reproductive isolation so the two can be just one species).

Chapter 69. Maritima & obscura are syns. of polios. Tawnier uph margin isn't common on polios or obscura either; photos don't match some features of description; fringe is checkered on photos. The B.C. book couldn't separate BC material from E polios.

Chapter 70. Ricei is a fantastic new find. Calneva is a syn. of it (**first reviser action** noted above, J. Scott)(uns spots are smaller on calneva photos on p. 281). I have several ricei adults with nearly all uns spots absent.

Chapter 71. P. saepiolus is a nest of worms in identifying ssp., like P. icarioides (for P. saepiolus see also p. 14, 65, 176-179, 197-8). I surveyed this mess and offered my accepted ssp. in Papilio (New Series) #12 (here I correct maculosus). The ranges of aehaja & rufescens are wrong. The photos of gertschi & albomontanus aren't good (male ups isn't green and uns is tan-gray not brownish). Ssp. littoralis (coastal Del Norte Co. to coastal Ore., a few are similar inland in Siskiyou Co.) is a var. of saepiolus (perhaps a weak ssp.) said to have smaller unh spots with white rings. Ssp. maculosus (C-E Nev., TL Snake Range) I thought might be a good ssp. with larger spots as described, but as noted in Papilio (N.S.) #18, in Univ. Colo. museum I found good series from Snake Range and Monitor Range which have ordinary-sized spots (some even smaller in Snake Range), thus *maculosus* is the same as the bug in NW Colo., and evidently isn't significantly different from ssp. *saepiolus* based on my few males of *saepiolus* and A. Shapiro's Field Guide to San Fran. Bay & Sacramento Valley, which shows a female with no blue and says "Sexual dimorphism is extreme in our [Marin/Sonoma/Napa Cos.] populations, but on the far north coast some females have a fair bit of blue above", thus ssp. saepiolus TL Marin Co. evidently has little blue and extends to NW Colo. Albomontanus is a syn. of gertschi which ranges from Cal. to S Colo.

Chapter 72 is checklist of Calif. butt. It repeats the popular error that Nastra neamathla occurs in Cal.-Ariz.-Baja; it actually is limited to SE U.S. (Fla. to SE Tex.), and Butt. Houston & SE Tex. says it intergrades with julia, thus they are ssp. Bairdii is a ssp. of machaon, & hollandii is a form not a ssp. It's Ascia josephina howarthi. C. philodice eriphyle is actually just a local BC ssp. with some orange on ups of many maybe due to historical introgression with currently-allopatric C. eurytheme. Ariane & baroni are syns. of nephele, carsonensis is a syn. of gabbii, & walkerensis is a syn. of nephele (partly intermediate toward gabbii thus invalid). In Calif. I would use P. tharos tharos, P. cocyta selenis (mislabeled from Warner Mts. so is not in Calif. anyway), and P. phaon jalapeno. Spey. hesperis occurs in Cal., not S. atlantis. Xerces is an obvious ssp. of lygdamus. Fridayi is the alpine Sierra bug with wings like lotis but bigger blue spots & gnathos intermediate but nearer melissa, which I assigned to P. atrapraetextus fridayi in Papilio (N.S.) #12. Hesp. libya lena doesn't occur in Calif. or Nev.

Chapter 73 is a checklist of Nev. butt. P. eunus alinea doesn't occur in Nev. does it? Surely acastus dorothyi cannot occur in Nev., just variants like it. More S. hesperis. P. tharos in Nev. might be ssp. riocolorado?, or ssp. tharos.

Index. Brenda, add p. 589. Catalina, Och. sylv., add pp. 313-316. Editha bayensis entry and Euph. ed. bayensis entry, move p. 210-211 to enoptes bayensis. Editha edithana, photo of lectotype p. 126. Flavaventris, p. 525 not 526. Phyciodes hondana, remove 359. Ivallda, change 827 to 828. Karinae, add p. 399. Obscurafacies, add p. 543. Phyciodes hondana, remove 359. Ricei, Euphilotes, move 176 to ricei, Lycaeides. Sineocellata, delete 321, 322. Tehama, change 147 to 146. Thessalia perlulu, change to perlula & remove 359.

FIELD GUIDE TO BUTTERFLIES OF THE SAN FRANCISCO BAY AND SACRAMENTO VALLEY REGIONS. Arthur M. Shapiro, artist Timothy D. Manolis. 2007.

Univ. Calif. Press, Berkeley. 346 p.

At last, a butterfly book full of expert information on hostplants and butterfly biology! Shapiro has studied butterflies in the area for 35 years. Overall, the book text is outstanding in the biological research, and offers numerous interesting insights that can't be found in most books. He gives us summaries of his research, such as interesting accounts of geographic variation in voltinism and hostplant tolerance of Papilio zelicaon across the area. The treatment of local hostplants is excellent, as there is good local info on many species. Shapiro writes about many butterflies that were common 30 years ago on the Calif. lowlands that have now disappeared there (esp. in the Sacramento Valley), such as

Euchloe ausonides & Lycaena helloides & Satyrium sylvinus & Celastrina & Glaucopsyche ecotype at Suisun Marsh & the Phyciodes pulchella deltarufa TL & Limenitis lorquini & Epargyreus & some Pyrgus scriptura sites & Pholisora catullus, some of which would seem to Scott to document global warming, though maybe other factors like introduced parasitoids might have wiped out some species. The color plates are disappointing; they are paintings (Manolis' sole contribution to the book), and the butterflies are often positioned annoyingly with curled wings in spread-winged downbeat position, often with forewings spread way forward in a position that butterflies only achieve on a lepidopterist's spreading board (Nathalis iole are inexplicably in museum-mounted position)(only Superman with his X-ray vision could freeze butterflies in flight to see them this way), and some such as mossii & muiri & mylitta & orseis & juba uns don't look right, the faunus female is too dark, etc.; butterfly photography has exploded, and great photos are available for every species treated. All the illustrated butterflies seem to be identified correctly. In matters of taxonomy, the book isn't great or is often out-of-date, the worst being the Callophrys "dumetorum complex", which gives them numerous names and doesn't bother to choose among them, and gives a perfunctory account of two of them and then misses "pseudodumetorum" which flies in Del Puerto Can. and Trinity Co. Art Shapiro basically does systematics research, but concentrates on environmental causes of seasonal forms, and electrophoresis-then-DNA studies of various populations, transect studies of butterflies and their hosts, etc., while he disdains actually naming any species or subspecies and never completes any taxonomic "revisions" and does not study morphology, thus his work never achieves the kind of robust conclusions that make taxonomically-inclined butterfliers happy. (Though he once did a nice taxonomic study of Poanes viator and named a new ssp.; why not do it again?) But no matter: he gives us nice research on the topics he likes, and we gladly accept his gifts. The description of mate-locating behavior in the book is very annoying, as Shapiro casually uses all the anthropomorphic clichés & deer phrases: some are "territorial", or they "fly a beat", or they "lek", or "lek & mate on the hostplant", they are "highly territorial", they are "very active territorially in late afternoon, perching on the host plant", "lek around the tops of pines" (for Neophasia, which really patrol the tree tops to seek females), "territorial perchers", etc. In describing mate-locating behavior, Shapiro is out of control! (Scott has recently—in Papilio [New Series] #14, and News of Lepid. Soc.--proposed four new words to describe mate-locating behavior, which hopefully will become widely used and will remove anthropomorphism and misapplied deer behavior from the description of bug behavior.) The book uses "puddling", another word I don't like as the only butterfly I know that actually lands on puddles is Apyrrothrix araxes, which lands with wings flat on the water surface! to drink, no other butterflies land on puddles; I used "sip mud" in my book, which is still not great but is better ("suck salty water from moist bare ground" is precise but too long). P. 75 has this gem: "Since subspecies qualify for legal protection, the [Endangered Species] law affords safeguards to things that may not be "real"."

There aren't many mistakes in this book. P. 42 says there aren't any hosts of Nathalis iole in Calif., but its selection of Compositae hosts is pretty wide in Colo., so there are palatable ones in Calif. P. 42 and 127-8 claims that Habrodais grunus adults do not feed and that it has no close relatives in N. Amer., and p. 128 writes that he is mystified at its "odd dance—presumably a lek—around the host deep into the gathering evening gloom". Just read Scott's 1974 paper (Amer. Midl Nat. 91:383-90) on the close relative Hypaurotis crysalus (yes, that is a 2nd N. Amer. Theclini sp.—while "poodiae" will be a separate sp. from grunus when poodles grow wings & fly) and you will learn that they use their equally short proboscis to suck mud and the sap oozing from oak twigs, and you will learn that males patrol about the host canopy (fleeking behavior in Scott's new terminology) in late afternoon-dusk using the violet-ultraviolet wing color to find females and court and mate with them. Shapiro notes that grunus aestivate for 3.5 months+, fascinating! P. 55 says H. grunus perch on the host trees and sally forth to investigate passing insects (raiting behavior in Scott's new terminology, perching behavior in the old), but p. 127 says "they come out in late afternoon to fly around the host plant"; Scott's observations of grunus suggest the latter, they fleek around the host to find females as does Hypaurotis. (While we're on mate-locating behavior, p. 56 says Papilio eurymedon patrols a beat to locate females; yes it does in Colo., but there Scott finds that it patrols only in little clearings among ridge/hilltop trees, back and forth in the small area—flaiting behavior in the new terminology, meaning patrolling in a small area where females fly to mate) P. 52, the world does not appear to butterflies as a mosaic of dots, they have neural network circuits beneath the ommatidia and in the brain which create an interpreted picture of the scene in their brain, just as humans have. P. 56 claims that Erynnis propertius patrols, but I found that it raits (perches) in clearings on the sunny edge of a ridgetop/hilltop (sometimes on gulch banks) to await females. P. 31 bottom, the terminal egg inside the female is often fertile, and I have gotten fertilized eggs by dissecting females many times, as has Richard Heitzman who first told me of this technique. P. 60 middle, males can't mate very often (3-5X at most usually), because their spermatophores are large and greatly deplete their energy reserves. P. 74 says that Pontia occidentalis looks identical to P. callidice calora from Tibet (Scott still calls it P. callidice occidentalis). Interesting that Battus philenor larvae living in full hot sun become redder! Papilio indra males in my experience rait on rocky cliff-like spots just below a hilltop/ridgetop. Colias eurytheme might overwinter poorly in alfalfa because larvae do not diapause so die after mowing (but Jack Harry found they do survive 0°F in Utah). P. 135 the May-June "Inland Bramble Hairstreak" records may refer to pseudodumetorum, which was missed in the book and is conspecific with C. sheridanii-viridis, not perplexa. And viridis & perplexa do co-occur at Marina Beach Dunes near Monterey according to John Emmel's research, and both once flew in San Francisco before perplexa was paved over there (SF perplexa in CIS coll.). The Callophrys name is mistakenly used in parentheses as a subgenus on p. 135-141; the book should have used Mitoura "Callophrys" spinetorum, etc. P. 145 my

Cupido comyntas from Davis Calif. have orange spots & uns just like E U.S. ones. P. 146 Cupido amyntula evidently does not live inside pods in spring; and Ballmer & Pratt (J. Res. Lepid. 27:50&66) write that the larval tubercles are noneversible in some pops. esp. in S. Cal. where larvae live inside Astragalus pods, while the external feeders have eversible tubercles in N Calif.; and in Colo. the main host is Astragalus flexuosus whose pods are only 3-4 mm wide, probably too small for a mature larva to live inside. P. 149 there never was even a bit of evidence that xerces was a distinct species, its hosts and immatures were the same as lygdamus and the distinctively-white-spotted adults were merely polymorphs, and the lavender color of museum specimens is just due to fading of the blue that fades the same way in Plebejus icarioides! P. 155, synonymize tildeni to bayensis!; taxonomy isn't hard, if it's not right, just change it! Echo would seem to be a ssp. of Celastrina neglecta, which evidently goes across Tex. to Ariz. "cinerea" and Calif. with little change; these multivoltine polyphagous bugs look very similar. Missionensis is just an intermediate pheresX pardalis, therefore is invalid, & the San Bruno Mtn. pop. is also intermediate, but is nearer pardalis. Lots of synonyms in the ssp. of Argynnis (Speyeria) zerene, all 3 "myrtleae" ssp. are synonyms of ssp. hippolyta. P. pulchella pulchella occurs at Suisun Marsh, & ssp. deltarufa in the Sacramento Valley. My Papilio (New Series) #13 gave good characters of female uph median band etc. to distinguish P. orseis. All the Phyciodes hibernate as unfed 4th-stage larvae. P. 181 fails to mention the distinctive extinct C. leanira obsoleta in Marin Co. Variable Checkerspot was the name for the lump of E. chalcedona/anicia, but that stenchospecies has been resplit into bookkeeping species chalcedona & anicia. Why didn't Shapiro name the Sierra Nevada chalcedona a new ssp. with vastly different larva?, that's not hard either. The ssp. taxonomy used for Euphydryas editha is decades outmoded: bayensis is now considered a syn. of editha, luestherae is another syn., and baroni is a very distinct ssp. with shockingly-red uns limited to the vicinity of Mendocino. There are seasonal trends in adult forms of Polygonia satyrus, but the individual variation in each season is almost as great. Zephyrus is a ssp. of Polygonia gracilis, while oreas is not a ssp. of P. progne; it's best to use goats just to make their delicious cheese, and rather than sneer and whine about butterfly names, just change them!, it's not hard to do. The story of Nymphalis californica's migration N & E to higher altitude to produce a generation that then flies to the high Sierras to aestivate seems convincing (Shapiro has published on this bug several times before); so why haven't we found it at high altitude in Colo., where it seems to be a non-migratory native limited to the foothills? (no migration because the Colo. host Ceanothus fendleri is edible all summer?). Aglais milberti males rait on cliffs or clearings just below a hilltop (just like Papilio indra), and sometimes rait on gulch banks. If Vanessa cardui fly SE to NW from the U.S./Mexico deserts to get to Davis, and Scott's Colo. cardui fly to NNE all day from the same deserts, why do they not interbreed in winter in NW Mex. and lose their orientation? Our U.S. V. atalanta rubria differs from European atalanta, therefore ours is native. Interesting that after months of adult estivation, Coenonympha tullia california lay eggs and the larvae fast until the grasses grow. Why not use Scott's "Scrub Wood Nymph" name for C. sthenele?; hypoleuca is similar to thus a syn. of ssp. sthenele to Scott. Ralph Wells found O. nevadensis in Eldorado Co. P. 223 the left & right Erynnis valvae work differently during mating, and the species fit in 3 groups: left-handed, right-handed, and ambidextrous (see Papilio [N.S.] #14). Salix records for E. persius in E U.S. are based on E. icelus. Pyrgus "albescens" was mapped NE of Stockton by Burns J. Lepid. Soc. 54:58. Maybe albescens isn't a distinct species: Shapiro notes that higher Sierra Nevada Pyrgus "communis" have the "molecular data" of P. "albescens"; & in Latin Amer. the costal-fold-less "adepta" replaces albescens at higher altitude yet some individuals have the costal fold & valva of the other; & the way albescens is neatly replacing communis in Fla. suggests that a dominant-recessive gene for valva shape is linked to temperature tolerance and they are conspecific and one gene is just replacing another; rearing studies are needed. Maybe Colo. communis differ too, they do not "perch well off the ground, up to waist height" as this book describes in Calif., instead they mostly flait (patrol a small site) in low weedy spots and land low to the ground. Hesperia juba does NOT eat bunchgrasses: in Colo. Scott's more than 100 host records (Papilio [N.S.] #6) show it eats a low mat grass Bouteloua gracilis, plus several winter annual grasses Poa secunda & Bromus tectorum which are green from fall to spring. And juba adults have two gen. & do NOT overwinter, as Scott in Colo. (Papilio [New Series] #6 p. 109, and Lepid. News 1982#1 p. 5) found that Sept. females ovip. on winter annual grasses etc. and the larvae have fast development so they mature in fall and spring in time for a new May generation; and A. Warren (Butt. Ore., p. 36-37) also disproved adult overwintering & actually saw those spring generation adults migrate just above ground level upslope to higher altitude! (Shapiro claimed that adults overwinter because spring adults were found with Chrysothamnus pollen from fall flowers, but that logic is wrong—the entire science of palynology is based on pollen wafting for miles and settling in peat and fossil deposits and serving as good indicators of the age of those deposits, and if pollen can survive for millions of years that way, some surely survives the winter on the bushes and attaches to a spring juba landing thereon). (In general, teeny things like pollen, bacteria, & fungus spores spread everywhere.) P. 240 H. columbia is not greenish. Mysteries remain in H. lindseyi: I found it common at a trashy weedy spot where winter annual grasses looked like the only possible host. Get rid of the name "Dogstar" Skipper!, ycck! Scott has numerous Ochlodes yuma "sacramentorum", which does not differ one iota from ssp. yuma and is a worthless synonym. (Some "conservationist" morons in Kern Co. removed all the Phragmites from one site thinking it was the invasive weed rather than the native strain, and exterminated the yuma pop. there.) The ssp. of Euphyes vestris are very dubious. Amb. vialis eats 5+ sp. of hay (taller wide-leaved) grasses (Scott [N.S.] #6). P. 270 Oeneis & Neominois pupate "underground" in loose soil or litter, and the turf skippers such as Hylephila & Atalopedes & Polites peckius-sonora etc. evidently pupate in the larval nest in loose soil/litter/base of grass clumps. P. 274, Shapiro is

optimistic that amateurs will take over the study of natural history, but Scott sees collectors disappearing, and butterfly watchers failing to provide usable information on hostplants or any other scientific info. It takes a lot of butterfly collecting and endless hours of staring at rigid specimens to develop identification skills and find suitable localities where the bugs are common enough to get results in observing natural history, and it takes a lot of plant collecting and microscope study to learn the plants, in order to do that research, which butterfly watchers just are not able or willing to do. But it won't matter anyway, as our bugs are going to fry with global warming, and when the oil runs out in two decades, we will starve.

BUTTERFLIES OF CANADA, by R. Layberry, P. Hall, and J. Donald Lafontaine. **1998.** University of Toronto Press, Toronto, Ontario. 280 p.

This is a good book, with mostly-accurate text, nice color plates and maps, a gazeteer of localities, a professional discussion of generic controversies, etc.

There are some misidentified photos on the fine color plates: Plate 1 fig. 8 is brizo male, pl. 5f4 is hybridized with canadensis (the unf submarginal band is a stripe instead of spots), 7f24 is the spring form vernalis=ariadne, 8f1-2 are from Colo. not Alta., 10f5-6 are L. rubidus rubidus, 10f13 is L. e. michiganensis, 10f31 S. sylvinus nootka, 10f53-54-55-56 are C. gryneus rosneri, 11f3 ups is same mossii female ups as 2, 13f16 is snyderi, 11f23 evidently Cupido amyntula maritima, 11f24 C. a. amyntula, 11f33-35 Plebejus atrap. atrapraetextus, 11f34 P. atrap. alaskensis, 11f40-41 E. glaucon near glaucon, 12f14 S. callippe chilcotinensis, 13f2 S. zerene picta, 13f6 S. hesperis dennisi, 13f8 S. h. minor, 13f9 S. h. rhodope, 13f13 is S. hesperis dennisi female, 13f14 S. zerene picta, 13f16 S. coronis simaetha, 14f15-16 B. tarquinius natazhati, 15f5 C. whitneyi altalus, 15f11 P. cocyta cocyta, 15f12 P. cocyta selenis, 15f13-14 P. pulchella owimba, 15f23-24 E. a. helvia, 16-8 P. faunus ssp. near female f. silvius, 17f10 L. weid. weidemeyeriiXrubrofasciata (oranger unh), 18f12-13 later named C. sthenele sineocellata, 18f14-15 C. oetus oetus, 18f21 is magdalenaXmckinleyensis, 19f119 was later made holotype of O. alberta ojibwe, 20f8 O. polixenes luteus, 20f9 O. polix. subhyalina, 20f10 O. p. yukonensis, 22f11 may be P. pallida barnesi as it has white patches on top, 28f1 is P. alupini lutzi, 28f5 is newcomeri (neoperplexa isn't in Canada), 29f2 N. menapia tau, 32f7 is B. titania grandis, 32f8 O. polix. luteus.

There are no life zones used in the book. Southampton Is. in Hudson Bay looks like a distribution dot on most maps but isn't. P. 12, Queen Charlotte Is. had 100 m lower sea level during glacial advances and had butterflies. Boloria alberta & B. improba nunatak probably survived on Alta. nunataks also. P. 13, alvar not defined in glossary (=a place with bedrock exposed at surface, often limestone) P. 22, upright egg means that the line from micropyle to middle of egg base is perpendicular to attachment substrate (parallel in flat egg).

Detailed notes (the review for Butt. BC adds other notes): Erynnis pacuvius was reported on Ceanothus cordulatus for ssp. lilius, not in Canada. Yukon-W BC afranius seem dubious. Poplar & willows are errors for E. persius. P. 47, it's actually not hard to find Hesperiinae larval nests in grasses because they bunch the leaves and there is often a "loop" of a grass blade whose tip is silked into the nest but grows faster from the base than the other nest leaves so loops upward next to the nest (Satyrinae larvae are hard to find). Hesperia juba adults do not hibernate. I wrote once that Hesperia colorado and H. comma are different species based on Canada research, but now it seems that Hesperia comma and colorado are conspecific, as Jon Shepard has altitudinal series that intergrade between H. comma idaho=harpalus and high-mountain H. comma manitoba in B.C., N. Kondla says the manitoba and assiniboia are nowhere sympatric in Alta., Paul Klassen says borealis and assiniboia blend at The Pas Man., and the "colorado" and manitoba from Cypress Hills on the Butt. Canada maps are errors and are assiniboia (colorado from Cypress Hills of Sask. on the Butt. Canada map is an obvious misidentification of assiniboia). There are three kinds manitoba assiniboia & colorado, but they are not reprod. isolated (see Papilio [N.S.] #12). H. nevada has just one gen. (even in lab early stages take 100 days). Poa pratensis is an error for Polites sabuleti. Polites draco immatures descr. in Papilio (N.S.) #6. Polites origenes hibernates as 3rd-4th-stage larva. Polites mystic, host is Echinochloa crus-galli not repens. Festuca idahoensis is dubious for Polites sonora. Euphyes vestris: Tridens flavus actually came from A. Shapiro's Butt. of Delaware Valley. Amblyscirtes oslari eats Bouteloua curtipendula (B. gracilis was a "probably" guess error by Opler & Malikul). Norbert Kondla told me the dot from Copper Mtn. in W-C BC on Parnassius clodius and P. icarioides etc. maps is really Copper Mtn. in the Kootenay Mts., so those dots should be in SE B.C. not in WC B.C. Smintheus is a ssp. of P. phoebus (micropyle very similar with magnifying glass, sacerdos has smitheus micropyle, upf submarginal band wide in pseudorotgeri, etc.). P. brevicauda may be a ssp. of P. machaon. Dodi occurs on S prairies & is a syn. of brucei; ssp. bairdii is NOT in Canada or N U.S. (similar specimens must be kahli or nitra). P. 86, all Papilioninae hover while nectaring. Rutulus & canadensis are ssp. of P. glaucus. P. multicaudata does not eat Salix & Populus. The Pontia protodice dots from W Alta.-N BC are dubious according to N. Kondla. Pieris "napi" in Colo. are quite variable, on uns at least, and Adam Porter found that there is very little difference between bryoniae & napi in Europe where people once insisted they were very different species, so I am mystified at the splitting within "napi". Pieris angelika is evidently a ssp. of Pieris hulda. The Yukon line isn't a natural boundary, so the angelika/marginalis dots look artificial there. Geiger & Shapiro's paper was tentative with small sample sizes, one of their angelika pops. was treated as meckyae by Eitschberger, etc. There are Euchloe hyantis/lotta intermediates on the Kern Plateau in Calif. Papilio (N.S.) #18 fixes Anthocharis "sara". Colias eurytheme, the northern dots from BC to Ont. are dubious. The Colias occidentalis/alexandra/christina treatments are an incorrect mess; see Papilio (N.S.) #12; Colias christina/krauthi is the

same species as C. occidentalis; Butt. Alta. has the correct map for alexandra range. Jack Harry has since reared C. meadii johanseni larvae/pupa (in Taxonomic Report, TILS), which are identical to Scott's Colo. meadii. The treatment of Colias tyche is very good. Colias pelidne, the NW BC dot is error (for Colias interior also), and probably all the NW Canada dots are misidentifications. Scott's book had an X for Phoebis philea in N.B., not N.S. P. 122, Lycaena xanthoides has pale-centered unh spots. Canada has L. rubidus rubidus. L. heteronea, move W-C BC dot to Copper Mtn. in SE BC. L. epixanthe is not on pl. 14. The dorcas map is a mixture of L. dorcas & L. florus; L. florus arcticus & L. f. dospassosi are ssp. L. mariposa, Polygonum is error. S acadica "montanensis" from Waterton Lakes are S. sylvinus nootka, which occupies the BC range also. S. californica brashor was later named in BC, not putnami. S. liparops aliparops evidently occurs only in S Alta. Okanaganum is a syn. of Satyrium saepium. Canada evidently has Callophrys sheridanii newcomeri. C. gryneus rosneri/barryi writeups are wrong, the Alexis Crk. & Williams Lake dots are barryi (lots of Juniperus), the Vancouver I. "barryi" dots are misid. rosneri, the plate photos don't look properly identified, and A. Warren's Butt. Ore. corrects barryi TL and says rosneri =barryi =plicataria =byrnei. Call. lanoraieensis is not in Conn. R. Robbins states that C. niphon & eryphon do hybridize. Strymon melinus, only ssp. melinus & atrofasciata are valid. Alce is a syn. of Echinargus isola, which I have never seen migrate. Cupido amyntula maritima evidently occurs in most of Canada, and ssp. amyntula in BC, though there are forms like albrighti (grayer uns) & immaculata in BC according to Kondla. Nigrescens would seem to belong to Celastrina neglecta (with echo), while Celastrina argentata evidently includes the Cherry Gall feeder (now known as serotina) & humulus. E. battoides is evidently E. glaucon near-glaucon assoc. with Eriog. heracleoides based on Warren's Butt. Ore. Glaucopsyche piasus larvae eat only flower buds. Glaucopsyche lyg. kournakovi is the alpine Alta.-Yukon bug with silvery ups, and ssp. afra occurs in the plains with tiny unh dots. Lycaeides idas is a mess of 3 sp. (see Papilio N.S.#12). Samuelis is a separate sp. or ssp. of P. atrapraetextus. Move the W-C BC Copper Mtn. dot of Plebejus icarioides to SE BC. Plebejus alupini lutzi occurs in Canada, with ssp. spangelatus in alpine Alta. Argynnids were lumped into Heliconiini by Scott & David M. Wright 1990 (Chapter 2 Butterfly Phylogeny & Fossils, in Otakar Kudrna's Butt. Europe). Plantago is a dubious host of Euptoieta. W.H. Edwards described Argynnis (Speyeria) hesperis immatures. The Speyeria & Boloria were discussed in the Butt. BC review. Labrador B. eunomia lack silver spots, and Churchill eunomia differ on uns too. Why is B. frigga absent in most of BC, did glaciers scour the willow fens? Early stages are known for B. improba in Colo. & Wyo. Based on appearance & range, natazhati is a ssp. of B. tarquinius. Beringian Fritillary is ridiculous, as it is not in Siberia; Scott's Pleistocene Fritillary should be used. Evidently B. t. natazhati occurs on Mt. Natazhat, Mentasta Mts. Alaska, Montana Mtn. Yukon, Coppermine NWT, & Victoria I. NWT, while B. t. nabokovi irrationally occurs on Sentinel & Stone Ranges BC, White Mts. Yukon, Mackenzie Mts. NWT, & Bernard Harbour NWT. The natazhati is said to ovip. & assoc. with Dryas integrifolia. NE BC B. alberta dots are errors according to N. Kondla. Half-grown larvae of Chlosyne gorgone hibernate. Sterope doesn't occur in BC and is same sp. as acastus. C. palla doesn't eat Castilleja. C. "damoetas" is C. whitneyi altalus. Canada has Phyciodes tharos tharos in S Ont., P. t. orantain in Alta.-Man., two-gen. P. diminutor in S Ont., single gen. P. cocyta cocyta in Nfld.-NS, P. cocyta selenis in most of Canada (which does not have pinkish spines). Canada has P. pulchella (best identified by the orange [no black] subapical costal unf patch) ssp. owimba & ssp. tutchone; camillus stops 300 miles from Canada. P. pallida barnesi has blackish larvae. The Phyciodes mylitta larva photo has white patches near top, which is odd. E. anicia are errors in Man., the "chalcedona" treatment is a mess; E. bernadetta occurs in Cypress Hills along with E. anicia. The Klotassin R. Yukon is surely an error for Polygonia satyrus & oreas. Narrow-banded "oberfoelli" are just individual variants in Limenitis weidemeyerii. P. 214, in contrast, Lethe eurydice fumosus eats the narrow-leaf Carex aquatilis in S Minn. and narrow-leaf C. emoryi in Colo. Nipisiquit is a ssp. of C. tullia (they fly within a few feet, but the nipisiquit flight period is different than immigrant inornata so they can't interbreed, and they look similar enough that hybrids would not be detectable anyway, as in adult appearance it isn't even a valid ssp.), despite distinctive mtDNA (mtDNA fails here again, as it failed in Phyciodes & Polygonia progne/P. oreas & Papilio glaucus appalachiensis, etc.); it has different larval overwintering stage. Move the Cercyonis pegala dot from Copper Mtn. in W-C BC to SE BC; ino & boopis are syns. of nephele. The 3 C. sthenele dots in SE BC are errors. Canada has C. oetus oetus=phocus (silvestris is Calif. ssp. of C. sthenele). Yukon bugs are intermediate Erebia magdalenaXmckinleyensis. I use the names E. stubbendorfii pawloskii, E. s. canadensis, E. dabanensis youngi, & E. kozhantshikovi lafontainei. E. epipsodea has no ssp. Neominois has only 1 gen. Papilio (N.S.) #12 divided O. chryxus into 2 sp. O. uhleri from km154 & mile 80-97 of Dempster Hwy. Yukon are dark brown (nahanni?). SE Man. O. alberta were later named ssp. ojibwe; the E BC dot is error. P. 28 states that Kurentzov's Oeneis names apply in N.A., & I agree that O. alpina is in N.A. as the O.D. illustrates holotype male and valva which is like excubitor. But N. Kondla has photos of both syntypes of rosovi and neither look like O. philipi, and he states that beringianus does not apply in N.A. either. Kondla found major mistakes in the range of yukonensis, and Alta. O. polixenes has males near brucei & females near subhyalina. NE BC Danaus plexippus are errors. P. 258 patrolling is not flying in a specific territory! Bibliography lacks Ferris (1977)(p. 127) & (1987)(p. 142) & K. Johnson (1976)(p. 140).

BUTTERFLIES OF BRITISH COLUMBIA, Crispin S. Guppy & Jon H. Shepard. 2001. University of British Columbia Press, Vancouver, BC. 415 p.

This book is beautiful, with good photos of adults, nice-looking maps, and lots of great photos of eggs larvae and pupae (often borrowed from California or Washington or elsewhere, but still great). It has lots of good information. The authors tried to write a definitive treatise, and named various subspecies to place names on more of the diversity of BC butterflies. This attempt is very commendable, compared to some skimpy Canadian province & U.S. state books that merely provide a picture and a pathetically-starved writeup for each species. The book has lessons about butterfly conservation too. One lesson is that clear-cut logging opens up habitat to benefit various butterflies (idas, icarioides, etc.), land clearing creates grass habitat for others (C. tullia), and a christmas tree farm creates habitat for others (E. editha, which went extinct when the tree farm closed and weeds invaded). These lessons are contrary to the tree-hugging environmental nuts who plague most conservation organizations today and like to scare the public with clear-cutting scares really designed to raise money from ignorant idiots (and reminds us of Ken Davenport's discovery that conservation workers removed all the Phragmites communis at a Kern Co. site thinking it was an introduced weed, resulting in the extermination of that Ochlodes yuma colony). Another case blames pesticide spraying for extirpating Limenitis archippus. Various species (B. bellona, S. atlantis) have odd ranges that miss SE BC, which is interesting, although N. Kondla suggests that B. freija, with a similar range, would have more records there if it flew later into summer collecting season. And C. Guppy notes that the book lumped a lot of S. atlantis records with hesperis, and Guppy can now distinguish them easily and finds that S. atlantis is much more common in C and N BC than the maps indicate. The book wastes a lot of space trying to determine the origin of scientific names (such as the dubious attempt for Limenitis); this etymology annoys me because it is irrelevant to butterfly behavior/ecology/taxonomy etc., and because so many scientific names are grossly inappropriate or misleading.

The book does have a large number of mistakes however, arising from a large fauna with not enough lepidopterists or time to study them. Too often, the subspecies are listed and mapped but no distinguishing features are described (for those species written by Jon Shepard), leading readers to question their validity or believe that they were determined by locality rather than actual characteristics. Hostplant information is quite weak, with hundreds of hosts missed that were published by Scott in particular (in Papilio [New Series] #6).

Below are detailed comments and corrections I have noticed, with numerous others added by Norbert Kondla. P. 13, the records of V. atalanta from Queen Charlotte Is. and Atlin are in both the Canada book and the BC book, so are correct according to Guppy (pers. comm.), who states that it is a migrant to BC, far northward in some years.

P. 89 the right Erynnis valva is also useful for identification, nearly all BC Erynnis can be identified from wing pattern alone; and the tibial tuft character is useful (missing on some species such as pacuvius). P. 92 E. afranius records are surprising, the two specimens from New Aiyansh were part of a local collection acquired by Shepard, so should be from that locale. Mislabeling does occur (A. B. Klots' collection of S. zerene and S. hydaspe in N New Mex. was mislabeled for instance, the latter even named "conquista"), and misidentifications of the valva occur. However C. Guppy notes that those "afranius" records were definitely collected from that site, but is doubtful they are really afranius and may be an undescribed sp. in the afranius-lucilius group (I note that there are strange records of genitalic "lucilius" from N Man. & "afranius" from Yukon etc., and a report of afranius-genitalia bug from Pink Mtn. BC, hinting at a boreal Canadian creature now unnamed?). E. persius records for Salix & Populus are errors for E. icelus. Scott 1992 Papilio #6 found that Colo. persius eat several legume genera. The white uph base spots described on P. centaureae are actually missing on this species and on the photos. P. ruralis is easily identified on upf. Carterocephalus is in subfamily Heteropterinae; most of the ssp. of palaemon are dubious to me because individual variation is great, although N. Kondla suggests that the the boreal forest/aspen parkland mandan has a tan unh with a few russet areas, and the cordilleran magnus has a russet-brown unh as in photo. The ups of O. garita is not greenish, and Scott in Papilio #6 gave half-grown larva as overwintering stage. H. juba adults do not overwinter: Scott Pap. #6 proved that H. juba has two generations, fall females lay eggs that hatch and larvae feed and grow very fast compared to other Hesperia (allowing two generations), no adults occur in March-M May when real overwintering adult butterflies fly, and obviously Shapiro's May adult sat on an inflorescence that survived the winter and picked up stray pollen (and A. Warren recently observed juba migrate to higher altitude). The female "juba" photo is H. comma idaho. The live male photo of H. comma "oregonia" is hulbirti as the book defines and maps it. Oregonia is an intergrade of idahoXhulbirtiXetc. in N Calif., so hulbirti is the correct name for oregonia in BC, and idaho is the correct name for BC "harpalus". H. nevada adults are easy to identify (though Guppy says some BC H. comma are similar), and eggs do not turn pale green. P. peckius half-grown larvae hibernate (Papilio #6). In P. sabuleti, Eragrostis trichodes is a misidentification error (see Papilio #6). Papilio #6 gave many hosts for P. draco. The photos of P. mystic do not look like an undescribed ssp. Atalopedes unh is not tweedy green. Pap. #6 described immatures and numerous hosts of O. sylvanoides, and the "phenotypic response" theory of ssp. is wrong. Papilio #6 gave numerous hosts for E. vestris (Cyperus is lab only) and A. vialis.

The P. clodius ssp. are worthless to me, though Guppy says he can distinguish them; the gray chevrons are present on claudianus photos, and all the pops. from W N.A. in Scott's coll. have weak chevrons except a Stevens Pass pop. E of Seattle with strong chevrons, which this book labels as claudianus characterized by weak chevrons! P. phoebus smintheus seldom oviposits on the host (Shepard observed phoebus in Yukon ovip. on the host, but this may be only occasional; Scott

found that they are laid about 10 cm away on average). Smintheus belongs to P. phoebus (Shepard & Manley's 1998 fig. 11 smintheus micropyle looks a lot like phoebus micropyle when you use a magnifying glass!, and other characters used to justify the split such as the moist habitat and Sedum rosea host of phoebus also occur in SW Colo. pseudorotgeri; and Evgeny Zakharov has shown that bremeri in Asia has the same mtDNA as phoebus and intergrades with it, and is therefore another ssp. of phoebus, along with sternitzkyi and behrii. (Also, the number of micropyle spines differ in Colo. H. comma colorado, but intergrades clinally to H. c. oroplata, J. Lep. Soc. 29:156-161). About its ssp., yukonensis females have large red spots approaching those of phoebus; and magnus & olympiannus are surely syn. of smintheus. The male phoebus photo has rather small spots, contrary to text. Bairdii is a ssp. of P. machaon as shown by F. Sperling, and dodi is a syn. of brucei as it has no distinguishing differences; actually hudsonianus hybridizes with zelicaon only in some areas, and pikei is intermediate between hudsonianus and oregonia (the eyespots like hudsonianus). P. zelicaon form nitra should have been mentioned, although Guppy states that nitra does not occur in BC; zelicaon could have two gen. near the coast but seldom three (Guppy told me a third gen. is partial and overlaps with late 2nd-gen. adults). P. indra larvae take much longer than 18 days in nature. P. glaucus is conspecific with canadensis, rutulus, and alexiares, recent splitting here violates the biological species concept. P. g. canadensis intergrades with rutulus in SE BC (Scott & Shepard Pan-Pac. Ent. 52:23-28) where numerous intermediates abound, and the map shows intermediates. P. g. alexiares wings and valva look like rutulus, yet females are often black like glaucus, its hybrids with glaucus had high fertility and 1:1 sex ratios (Scriber & Lederhouse JRL 27:222-232), and its mitochondria are very similar to glaucus. Also, arcticus is a rutulus-like form in Alaska etc., & canadensis intergrades with glaucus. Pusillus is a syn. of multicaudata. P. eurymedon males flait (patrol a small area among trees on ridgetops to await females), in Colorado also.

Tau is a good ssp. near the TL that has a larger black fw patch (not a less-red unh); most of the map has ssp. menapia. Beckerii surely has only 2 or possibly 3 gen. in BC, not 4, though Guppy assures me that a few adults are the 4th gen. Some P. sisymbrii elivata females are yellow, so I wonder if flavitincta is a weak ssp. Hybridization expts. with Siberian P. callidice (rather than with the one or two European adults as Shapiro did), which resemble nelsoni, would probably show compatibility with occidentalis. The Pieris napi group needs lots more work, as everyone agrees. It seems to me to be highly muddled in the book, so I offer some possibilities below, while admitting that these possibilities are speculative as I have little knowledge of these bugs: Guppy and Kondla claim to find marginalis and oleracea sympatric in numerous locations. But based on the maps, P. oleracea and marginalis could be the same species (see the isolated central BC cluster of oleracea that fits nicely into the missing area of the marginalis map), and the book's marginalis species looks phony to me because guppyi and tremblayi are surely the same species as angelika based on very similar wing pattern (the photos all have narrowed unh veins near margin, etc.), and the graph beside map shows that guppy/tremblayi have only one generation (Guppy told me that he has collected 2nd gen. but it is obscured because of its late season when few collectors are about and by the wide altitude gradient). But the 4 photos of "angelika" are tremblayi according to N. Kondla, and C. Guppy notes that angelika is closer to oleracea than to hulda, so maybe angelika is a ssp. of P. marginalis. The wing pattern melanism sequence is: unspotted summer forms> oleracea> marginalis> reicheli> tremblayi> guppyi. P. oleracea may have recently dispersed along Alcan Hwy. to Yukon just as P. rapae did (though Guppy told me that oleracea W of Rockies are an unnamed ssp. hence cannot have dispersed recently). The graph shows mostly one gen. (sometimes two) for oleracea, whereas angelika has one gen., so angelika might occur at higher altitude than oleracea?, but Guppy told me they occur at the same altitudes. The immature traits seem weak, for instance tremblayi larva has spiracles in cream band & magnifier shows cream around spiracles (Guppy told me that cream is absent around spiracles and that the "cream band" is not pigmentation, it is shiny reflection from hairs, as noted in text for reicheli larvae; though I doubt that hairs aimed toward the camera would reflect at all--the pale lateral line next to black spiracles of tremblayi larva photo surely is not tracheae?). P. angelika is said to have lower pupa projections, but that was perhaps based on pupae that hatched into tremblayi? The adult traits are so variable as to be questionable also, and the phenotype changes drastically in seasonal forms. At any rate, I have no answers here, just these speculations, but the scheme presented here and by Eitschberger etc. seems to have many questions so a lot more work is needed. Chew & Watt (Biol. J. Linn. Soc. 88:413-35) did mtDNA of a few arctic specimens, but one wonders about their identifications, particularly the Racing River specimen in NE BC. (More: the Alaskan passosi according to Guppy is a mixture of shapiroi & oleracea syntypes thus is currently useless; the pseudobryoniae TL was stated to be Finnmark Scandinavia in Miller/Brown while Pelham's Catalogue lists it as Nulato Alaska.) Looks like Pieris rapae spread along the Alaska hwy. Anthocharinae is not a valid subfamily (Scott & Wright, vol. 2 Butterflies of Europe, etc.). (American ausonides looks rather like European E. simplonia, which until recently was called ausonia, because both names have been transposed in Europe). Pavel Gorbunov's new Russia book suggests that E. naina is a ssp. of E. ausonia. If ogilvia really has darker uns, perhaps it is conspecific with naina, as Gorbunov reports great variation in Siberia in E. ausonia naina; ogilvia and naina are sympatric in Yukon, where they may be separate species, or forms? (a few adults identical to naina occur in high-altitude Colo. ausonides). E. naina photos do not show rounded fw. E. hyantis lotta is suggested by intermediates reported from Kern Plateau Calif. The book distinguishes "A. sara" from "A. stella" well, though the book states that females become yellower inland, and the bar of stella becomes like sara westward, implying that they are the same species. Guppy told me that "stella and sara both fly on the west side of the Coast Range, near Vancouver. They maintain separate phenotypes, and in the Skagit valley apparently use different habitats." The real

ssp. stella has yellow-tinted males and is limited to the Sierra Nevada of Calif., so the "stella" of this book is a related ssp. columbia. The black marginal spots and yellow veins described do not match the Anthocharis photos. More work needed. (See Papilio [New Series] #18 for some clarification of Anthocharis.) C. philodice is very often paler yellow on ups, though the photos look too pale (Guppy states that many eriphyle are this pale); Astragalus "carodurpus" is misspelled (for caryocarpus??) as is leucanthus. Note that eriphyle (based on photos sent by Guppy) is a good ssp. limited to BC which has a lot of orangish-tinted adults, which I think must be due to introgression with eurytheme in some past eon such as the altithermal period. Colo. C. eurytheme adults survive fall frosts quite well, and I have never seen real migrating eurytheme adults, so I assume it is native in Colo. as J. Harry finds in Utah. C. eurytheme surely overwinter and do not migrate in BC (though Guppy did see a migration in BC), as is true of eurytheme and philodice in Colo. Guppy states that it cannot be native in BC because the phenology histogram shows very few spring records, but could the few records be caused merely by its scarcity in the province ("their populations never get large")? (Colo. eurytheme and philodice are not common in spring). S. Ae (1958) did write that his larvae on the Yale roof did not diapause in fall and died in the winter while philodice diapaused 3rd stage (maybe because the diapause inducing mechanism was not yet adapted to that latitude?). But why don't I see migrating adults in Colo.?? C. alexandra could still have been named after Princess Alexandra, as a princess is not exactly obscure; and W. H. Edwards lived in West Virginia so he may have liked the south. Queen Alexandra's Sulfur was first used in 1956 Colorado Butterflies. But true C. alexandra actually does not occur in B.C. Papilio (New Series) #12 updates the treatments of Colias "alexandra" & C. christina. Recent collections in Grant Co. Oregon, by C. Ferris and A. Warren etc., and the MS thesis of Clyde Gillette that concluded wasatchia was a ssp. of occidentalis, have shown that C. occidentalis occidentalis intergrades with C. occidentalis wasatchia=pseudochristina, so are one species; "astraea" [now called sacajawea] and christina and krauthi are obviously the same species as wasatchia, so all these are ssp. of occidentalis. The holotype pseudocolumbiensis photo in book is oranger than the actual specimen which has only a slight orangish flush. The female pseudocolumbiensis in the book is Colias edwardsii according to N. Kondla, who currently considers them to both occur in S BC. The book maps the range of pseudochristina as a ssp. of occidentalis (and misses the Ida. range of pseudochristina), which is correct, but was not correct for the limited concept of occidentalis that the book espoused, because pseudochristina was named from Utah and is related to christina. The ssp. status of kluanensis is doubtful (is it a syn. of christina at the TL?), because series from west of the TL in Yukon are distinct with grayer unh than krauthi and christina, but specimens from north of TL have unh yellower-green like christina and krauthi (though the uph at both sites has a little less orange than krauthi), and Butterflies of Canada states that there is a cline in S Yukon from kluanensis to christina. Ssp. occidentalis does not occur in NWT, this page should mention that C. Ferris Bull. Allyn Mus. 116:17 designated male as lectotype from Gulf of Georgia=Strait of Georgia beside Vanvouver I., while the females from "Fort Simpson on Mackenzie R." are other species such as C. p. vitabunda, which the book does state. C. meadii white females are very rare in Colo. and Wyo., where meadii flies in both subalpine and alpine. (By the way the Colo. meadii larva is identical to C. meadii johanseni.) C. hecla females are usually orange, and C. canadensis females usually white, though some are yellow; Scott 1986 first separated them as distinct species (Ferris described it as a ssp. of hecla). No dots are shown for canadensis along the Haines Hwy. where text claims sympatry. C. nastes varies from almost blackish to pale yellow, with considerable individual variation, so some of the N.A. names are not valid ssp., but the two ssp. in BC evidently differ and have different fw shape, though they don't look much different on the photos (Guppy notes that he has since coll. streckeri in SE Yukon). Gorbunov's book does not list chippewa from Russia, and Tuzov's findings do not show sympatry of palaeno and chippewa so may have limited relevance. C. interior has a satellite spot (sometimes a small smudge, note photos), and N. Kondla states that the unh in N BC (Pink Mtn.) is more greenish (and Yukon area records of "pelidne" are not that; C. interior needs more study). Skinneri is a syn. of C. pelidne minisni. Alaska gigantea adults are actually quite large, so mayi is distinguished by very slightly less blackish on uph base and slightly less unh green. Eurema doubtfully comes from the word heurema, and iole is very doubtfully from the word iov, as there is never any purple flush on N. iole (the unh may be dark green). N. iole is not delicate and is somewhat migratory. E. nicippe photos should be orange, and N. iole should be yellower, as the yellows and oranges of Coliadinae did not reproduce well (their colors are bad in Scott's book too).

E U.S. phlaeas americana is native, not introduced from Europe (where non-arctic pops. have brownish uns and tails, unlike americana); phlaeas also occurs in S Utah and Wind River Mts. Wyo. L. phlaeas larvae hibernate half-grown. Ssp. henryae is a syn. of snowi, which does have a bipartite range, separated by ssp. artemisia in the sagebrush zone in Wyo.-Mont.-Utah; the larva photo is Calif. ssp. cupreus=lapidicola; the unh is gray on photo. L. thoe is the proper name, as the figure of hyllus type is a female L. thersamon (A. Kočak 1983 Priamus 3:3-5, 1984 Priamus 3:95) or alciphron etc. L. dispar is not the sister species of L. dione. L. dione is a distinct species which is sympatric with editha in Laramie Mts. Wyo. without interbreeding; but editha (p. 358) is a ssp. of L. xanthoides and intergrades with it in N Calif. and the lower Sierra Nevada. L. dione is rare at lakes in Colo., where thoe and helloides fly by the million at the Polygonum coccineum zone around lakes and dione is absent, evidently because its eggs cannot withstand submergence (David Wright found that dione egg cells are quite wide and shallow compared to subgenus Epidemia eggs, evidently suggesting that dione eggs cannot sustain underwater plastron respiration for a long period); so BC folks should look in weedy meadows and along

creeks for dione, not around lakes (2008 update: N. Kondla has found dione in quite a few weedy sites & roadside ditches assoc. with Rumex within a limited range in SE BC). "Historically correct" does not apply to common names such as Dione Copper, because priority does not and should not apply to them; common names should be appropriate. Guppy told me that Polygonum amphibium is an error for dione as a host in BC or is rare. L. rubidus glue their eggs on just like other Lycaena. The larva photo of L. heteronea is ssp. clara, and the pupa is Calif. "submaculata" (=heteronea X gravenotata). L. dorcas and helloides are a close group, and L. florus is now considered distinct (see Papilio [N.S.] #12 & #18). Real dorcas is sympatric with real helloides on the flatlands of Alta. & NE BC; Yukon material is L. florus arcticus & L. dorcas; L. florus no doubt occupies much of BC (the single-generation populations), while real multi-generation helloides near-helloides occurs in S BC. C. Guppy has found real L. dorcas at Quesnel BC, assoc. with Potentilla palustris in a wet bog/fen. Fig. 64b looks more like helloides or L. florus (not dorcas) based on unh band and fw shape and spots etc., the live photo of "helloides" on p. 187 looks like helloides or florus. The photo of male "dorcas" from Valemont BC cranberry bog looks like L. florus or helloides, & the cranberry bog assoc. suggests L. florus to me (though Guppy insists they are not florus or helloides & are dorcas, possibly a new ssp.), and the female "dorcas" from Yukon looks like L. florus arcticus (florus is very variable, ranging from adults that are very dark to adults that are oranger). The "helloides" photos look like L. florus, not ssp. helloides, but they are from a two-gen. pop. in Vancouver I., so evidently they are an unnamed darker S B.C. ssp. of helloides. True L. dorcas is very different from all these pictures (darker, less orange, stubbier fw, black dots relatively closer to base, small). L. nivalis has all the unh spots of other Lycaena; the larva is ssp. warnermontana. Only very young L. mariposa males have a slight purplish tint (common to most very young male Lycaena, where they reflect ultraviolet even when older). Charlottensis actually differs by having a dark median unh band, not by yellow color; penrosae is a syn. of mariposa.

Benjamin & Ziegler provided the modern definition of Satyrium, prior to Clench. Ssp. immaculosus has smaller unh dots in most of BC, ssp. titus has larger spots but occurs only in SE U.S., so the ssp. in Peace River is evidently immaculosusXwatsoni (the titus uns photo is very dark, surely an aberrant specimen, unlike Butt. Alta. photos). S. b. columbia looks identical to behrii so is a syn. S. fuliginosa does overwinter as eggs; the larva/pupa photos are "maculadistinctum", a syn. of semiluna; the Waterton Lake dot is missing from map. Wash.-BC S. californica have less ups orange, later named ssp. brashor Kondla & Scott; the Waterton Lakes record is missing from map. The blue spot has orange cap in californica (but very reduced in many BC specimens according to Guppy), none in sylvinus. The map of S. acadica on p. 358 shows no dots in Idaho, meaning that the book treats coolinensis (TL Coolin, N Ida.) as S. sylvinus, implying that nootka is a syn. of coolinensis, because the name coolinensis is older; if Coolin adults are sylvinus and not acadica, then coolinensis is the proper name for nootka. However the coolinensis types are definitely ordinary S. acadica, and thus were mislabeled from Coolin. Ssp. liparops males rait (perch) on gulch trees to locate mates, perhaps explaining their presence on Amelanchier, though it could be a host. The "affinis" photo unh has many white spots unlike most affinis (Guppy says BC adults are variable for this trait, with at least a trace of white usually present, uns is lighter green than sheridanii); real affinis males rait=perch on hilltops to await females, which Guppy states is frequently true in BC. In nature the sheridanii pupae survive freezes and there is no prolonged emergence (Hiruma's 200 days were a lab artifact). P. 210, C. johnsoni can be orange on ups. Barryi and rosneri are ssp. of C. gryneus, and the maps interdigitate nicely as ssp. should, and the photos do not show the diagnostic traits claimed (the rosneri photos do not show less contrast, the photo of mounted barryi is not pink, the live photo of rosneri is pink), there are no areas of sympatry (they interdigitate in S interior BC but are in different habitats because hosts occur in different habitats according to Guppy), and identification problems are severe (I thought most identifications for the maps have probably been made based on the presumed hostplant trees, not the butterflies, though Guppy insists he can separate them by wing phenotype). Warren's Butt. Ore. recently corrected the barryi TL & suggested that barryi & plicataria & byrnei are all syns. of rosneri. The augustinus and iroides pops. are not closely adjacent on maps., and are surely one species. The "augustinus" photos are oddly dark chocolate on uns (Colo.-Ont. Calif. adults are reddish-brown on uns, not chocolate), so this is a new undescribed ssp., but is not ssp. augustinus; N. Kondla and now C. Guppy both think that these "augustinus" photos are really iroides (by the way, the only difference I can see between real augustinus and iroides is the unh base averages less dark--oranger--in the latter), and Guppy now thinks augustinus occurs in BC in western foothills of the Rockies. Distinguishing features of C. mossii are not listed; actually ssp. mossii from Vancouver I. is distinguished mainly by longer russet marginal unh spots, and the amount of white differs little, as ssp. mossi may have slightly less whitish overscaling on unh beyond white line (although the live ssp. mossii photo from Victoria I. has a lot of white like schryveri) and E Ore. "schryveri" and the Creston BC "schryveri" photo is intermediate between schryveri and mossi in the amount of unh white, thus BC lacks pure schryveri. Callophrys polios ssp. are rather worthless. The unf cell bars are rather worthless for separating niphon from eryphon. C. eryphon sheltonensis has a more purple uns; though N. Kondla has found that purplish adults are found occasionally elsewhere in BC. S. melinus atrofasciatus may be a valid darker ssp. with less red on unh postmedian line, with setonia a syn. of it. The mounted atrofasciata photos are dark because they are the spring (April) form; the other photos of atrofasciata and setonia are paler because they are the summer (July) form.

E. comyntas from Ore.-BC are later-named ssp. pacnowe Scott & Kondla with blacker rounder unf postmedian spots (and with slightly smaller orange spots on average). If E. comyntas was brought in by "nursery stock", they must use

herbaceous legumes as nursery stock there (actually E. comyntas pacnowe is native from Ore. to BC). The female D and female V are given separate localities on 372 despite obviously (note antenna position etc.) being the same specimen. BC amyntula could be ssp. amyntula but the photos look like ssp. albrighti, and N. Kondla notes ~3 varieties in BC. Scott actually published that the Jamesia feeder is a darker-uns critter more like BC ladon (the whitish Colo. taxon is C. humulus), Scott did not mention BC, and Scott would use C. neglecta echo and C. lucia for several BC species. The map dots are almost entirely allopatric though, suggesting that the two species have been confused in BC and a more careful assessment of uns color and unh patch and ups color and voltinism (lucia has much more silvery ups blue, at least in Yukon & Edmonton) would greatly change the maps (and C. Guppy informed me that he now knows of 6 locations where lucia and echo are sympatric in BC, and they are easily separated by phenotype). Guppy now suggests that there may be three species in BC, C. echo, C. nigrescens (bluer ups, in SE BC), and C. lucia. Because the "echo" has only one gen. in BC (except for the one female), it might be thought that there is just one sp. in BC, but Guppy and Kondla assure me that there are several species, showing sympatry. In E U.S. the southernmost C. lucia has darker bluer ups, so maybe nigrescens is the darker-blue ssp. of C. lucia. Kondla now suggests that at Genelle BC 95% of adults can be separated into "bakeri" earlier , and "nigrescens", which overlap in flight. The larva of E. battoides is "ssp." glaucon, while the pupa from Riverside Co. is surely E. bernardino, a separate species, as Riverside Co. is south of the known range of E. battoides. The larva of G. piasus is ssp. sagittigera. The G. lygdamus larva is described as light green but the photo is pink. The female G. lygdamus "couperi" photo is columbia according to N. Kondla. Ssp. couperi is evidently limited to eastern Canada (where lowland Kananaskis Alta.-Man.-Ont.-N.B. males have darker-blue ups), because the Yukon-NW BC-Alta. mts. males are a distinct ssp. with very pale silvery ups that Kondla states is the Siberian ssp. kurnakovi (both "couperi" figs.). Scott (Papilio [N.S.] #12) improved the Plebeius idas mess. BC evidently has 1) Plebejus atrapraetextus which eats legumes (Astragalus, Lupinus in Colo. etc.)(Guppy [whose larva was amazingly multicolored] & C. Schmidt found that alaskensis eats Lupinus in Yukon, so is evidently P. atra. alaskensis), 2) P. scudderi in C BC to eastern Canada etc. which eats Ericaceae, and 3) the whitish-uns P. anna (with ssp. vancouverensis) in S BC. The book states on p. 234 & maps that P. idas is allopatric to anna in BC, but the ranges actually overlap (see Papilio [N.S.] #12). Scott prefers Anna Blue and Melissa Blue to the possessive case (these butterflies were never owned by those people). The melissa larva is Calif. ssp. paradoxa. Kondla notes that melissa in BC is evidently an undescribed darker ssp., which does not eat alfalfa. P. 238, the saepiolus uns wing base is never green, and Kondla finds that some BC males are a bit green on ups. I think insulanus from the TL is a syn. of amica, but Saratoga Beach adults from N Victoria I. have smaller spots, an undescribed distinct ssp. The larva photo is S Cal. ssp. hilda. No characters are listed to distinguish pembina from montis, the blue colors are bad on the photos (note the background colors), and these are no doubt synonyms, though blackmorei is distinct. P. acmon lutzi is actually P. alupini lutzi; real P. acmon ranges north to Chelan Wash. Ssp. spangelatus also occurs in the alpine zone in Alta. (& a similar ssp. cotundra in Colo.). Peace R. glandon is NOT lacustris, which is very different & heavily spotted beneath (TL woods north of Lake Winnipeg, not prairie); prairie pops. are an undescribed ssp. somewhat intermediate rusticaXmegalo based on the photos of prairie adults in this BC book & my specimens (Chris Schmidt will describe it). The "mormo" photo on p. 246 is A. virgulti deserti female.

P. satyrus uns varies from golden tan to dark brown; syn. marsyas is misspelled; the larva rests on the bottom of the leaf which is curled downward around it. The weakly-spotted-female-uns form of P. faunus is form silvius. Ssp. rusticus is the browner-uns Calif. ssp. (Scott, J. Res. Lepid. 23:209) which I doubt extends northward, though Butt. Cascadia suggests it occurs northward so Ore.-Wash. adults should be compared to real Calif. rusticus; BC adults are the grayer-uns recent ssp. cenveray from Ida.-Mont. There is no valid reason for separating zephyrus from gracilis (the male ups zephyrus looks more typical of gracilis with darker uph margin but the uns shows it is zephyrus, whereas both "gracilis" photos are actually zephyrus); zephyrus is distinguished by less-contrasting uns base-median vs. postmedian. Perhaps Sugden's willow host of gracilis was P. faunus, although if it eats alder it may eat willow also (faunus hylas eats both willow and Ribes, so perhaps P. gracilis can also). The p. 254 photo of threatfuli male holotype may be female. P. oreas threatfuli is basically an intermediate between silenus & oreas, which I (in Papilio [N.S.] #12) considered an invalid intermediate. Further study may show threatfuli grading to silenus toward the coast; the rarity of specimens makes this difficult to study. Concerning Roddia, Polygonia have middorsal scoli on larvae also; Polygonia and Roddia have silver spots on pupa, absent on Nymphalis; the larval horns are small on Roddia; Roddia pupal shape is like Nymphalis; and Roddia evidently lays more eggs than Polygonia but less than Nymphalis. Thus Roddia seems valid. N. Wahlberg & Soren Nylin later plopped it back into Nymphalis, but I call it Roddia. Someone should look into the Denis & Schiffermueller names, if there are many and overturning them would cause much instability, then they do need to be retained (ICZN is considering them according to their website). N. californica is rare in Colo. too, where it is evidently a native. The idea that herri is due to "maturation in mountain environment" is doubtful, because altitudinal "forms" have proven to be genetically distinct when reared, and herri does not really differ from californica (the book does not give distinguishing characters). A. Shapiro evidently would say that the Apr.-June hill in the histogram are bugs migrating N into BC, and their offspring are the July-Sept. peak, which then migrate S. In N. antiopa, weeping willow is S. babylonica. Aglais milberti larvae are creamy on bottom half; only adults hibernate; willow and Helianthella are erroneous hosts without actual published data. V. cardui is orange, not pink, though Guppy states that fresh adults have pink tones that fade; at any rate the common name is frivolous nonsense like

most butterfly names. Overwintering of Vanessa seems difficult to study. It might be thought that V. carye=annabella does overwinter in BC as the graph shows two generations including many in spring and the map shows many dots, however there is only one record before mid May and adult hibernators first appear 4-6 weeks earlier than that. V. atalanta hibernates as adults, and actually any Vanessa could emerge in Feb. in Wash. and fly into BC the next day, but this must be rare or there would be more early-spring records; larvae fold the leaf upward and live on top of the leaf (the opposite of P. satyrus).

P. 271, most Argynnis (Speyeria) males have concave fw margin. E. claudia surely attempts to breed in BC and surely succeeds at times; there is no OFF-SEX-EGGS button pushed by customs at the border; it is rare so rarely breeds in BC. S. cybele pseudocarpenteri is dimorphic, just less so; S BC populations are nearer pugetensis than leto according to N. Kondla; cybele occurs in many habitats. Kondla (News Lep. Soc. 43:100) showed that whitehousei was named for A. C. Whitehouse, a Forest Service worker stationed in Jaffray. The tan circle trait on unh (between CuA_1 and CuA_2, not beside M_3) of aphrodite is an interesting character, which does work most of the time, but often does not work (only 14 of 33 Elko specimens have the halo according to Kondla), and occurs occasionally on some other Speyeria (cybele hesperis zerene callippe egleis etc.); a better trait for aphrodite is the pale color along unh Rs vein across the disc, visible on all three photos. No distinguishing features are cited for columbia and whitehousei; columbia is a little darker on ups bases, while ethne is a syn. of whitehousei. S. zerene sitka seems to be similar to hippolyta (the unh submarginal band is not wide on photos as text states), which ranges along the coast from N of San Francisco to the Ore.-Wash. coast and the NNE Olympic Mts. (see Butt. Cascadia) and Alaska panhandle. S. zerene garretti is a syn. of picta; the female garretti photos are the picta phenotype, and the male picta photos are garretti phenotype, according to N. Kondla; who states that zerene does not retreat to high altitude in dry summers, though Guppy states this occurs (maybe the low ones died from drought). S. zerene larvae are not gregarious when young as eggs are laid singly; the larva/pupa photos are unfortunately too dark; the bremneri TL is Vancouver BC. (the locality on Holland's lectotype). The S. callippe semivirida disc varies from green to light brown. The chilcotinensis holotype is stated to be female, but the photo is male; the authors corrected this in News Lepid. Soc. 44: 51 by stating that the holotype of chilcotinensis on p. 277 is the female photo, not the male. The photos of S. "atlantis" are actually S. hesperis brico, and the confusion is amplified by P. Hammond's mixup in the text. N. Kondla (Boreus 22:17-24) suggested that the C BC S. a. hollandi dots are S. hesperis brico, but Guppy has found that those dots are correct, as S. atlantis is quite common in C BC in Black Spruce bogs and very wet open White Spruce forests, while S. hesperis is common in drier sites; they are almost always easy to distinguish. S. hesperis helena is a syn. of dennisi (dennisi is older, a mistake in the paper by Scott Kondla & Spomer, Papilio [N.S.] # 8); the helena female photos are male; beani larvae do have narrow yellowish heart-lines; brico is a perfectly valid ssp. which the book confuses with S. atlantis; "Northwestern Frit." name was coined by Hooper 1973; at Atlin they are not limited to the warm springs. N. Kondla has published (Taxonomic Report 3[1], 2001) that S. hydaspe minor (whose author is McDunnough) is on the coast, and S. h. rhodope=sakuntala is inland; they occur in any kind of forest. Mapping S. m. eurynome in Alta. and opis in BC would seem doubtful as bugs don't often respect artificial political boundaries, but Guppy states that they are easily distinguished, evidently by the browner disc & darker ups in opis (though those traits aren't apparent in my few specimens, which have a rather pale disc & are mostly unsilvered), & N. Kondla finds that eurynome occurs in Flathead Valley of extreme SE BC; erinna is usually silvered, and one wonders if erinna really has the odd range shown and occurs in BC, (evidently it does); mormonia males do not hilltop in a mate-locating sense; the TL of washingtonia is Mt. Rainier, and it is a distinctive ssp. (not a syn. of opis) with dark ups and dark-green disc. N. Kondla states that ssp. bischoffi is often silvered (almost 1/3 of specimens according to Guppy), and its TL was restricted to Anchorage AK by L. Grey J. Lep. Soc. 43:7; Guppy now notes that the lowland Yukon bugs incl. Kluane Lake are just opis, and bischoffi occurs in NW BC along the Tatshenshini River, and likely in the St. Elias Mts. in Yukon. Polygonum is the host of B. napaea in N.A.; Vaccinium mostly grows in woods (though V. cespitosum grows in meadows etc., and B. napaea occurs in meadows contrary to the name napaea), Polygonum in meadows (nearly all Scott's numerous and carefully-demonstrated Boloria hosts were ignored by this book). Gorbunov's book states that B. napaea and B. alaskensis are sympatric in the Ural Mts., so according to him N.A. has B. alaskensis, not napaea. Flight periods of B. eunomia reflect biology and overwintering stage, not the desire to avoid mating interference; numerous Scott hostplants of the truly polyphagous eunomia are missing. B. eunomia also has silver unh spots (p. 285). B. bellona scoli on T1 differ in length from those of B. selene; both jenistorum & toddi are synonyms of bellona, no distinguishing features are given; the disjunct range is very odd but evidently real. Youngi is an obvious syn. of improba (the youngi type was just a yellow aberration, see Holland 1931 pl. LV fig. 28); the E-C B.C. ssp. is nunatak Scott; N BC pops (Pink Mtn.) have some adults showing a suggestion of the traits of nunatak, but this pop. is ssp. improba also. B. alberta is surely the Alberta Fritillary, not Albert's; Edwards would have named it alberti if he had named it after Prince Albert, and alberta has a feminine suffix if named for a person. The "wide white area" on B. polaris unh is the row of white lunules like on freija and astarte. Gorbunov treated kurentzovi-erda as ssp. of B. polaris, based on study of genitalia, habitat etc. Scott's 1986 book first invented a common name for natazhati, the Pleistocene Fritillary, which is perfectly appropriate; "Beringian Fritillary" invented later in Butt. Canada is misleading nonsense as it is not found in Siberia, so this inappropriate name must never be used again. There are lots of data showing that astarte flies every year at many Alta. sites such as Plateau Mtn. (records of Scott & Shepard, Butt. Alta.) etc. The difference between astarte and distincta is

vastly greater than the difference between magdalena and mckinleyensis, though a slight hint of distincta can be found in Pink Mtn. astarte. Chariclea belongs to B. titania (the wing pattern of grandis and European titania is very similar in numerous characters; we cannot set up species based on single weak characters, ignoring many others that point differently). (A lot of hypocrisy here: distincta is lumped with astarte despite large wing pattern/shape differences, and myrina etc. from NA is lumped with European selene which looks quite different, while chariclea is split from titania despite identical appearance in some ssp. & very minor valva rod difference, and elsewhere mckinleyensis is split from magdalena despite the only difference being the amount of red which is intermediate in Yukon.) The ranieri uns photo looks like helena. The butleri male photos are actually grandis (from Atlin BC, a range extension or mislabeled); Guppy has since found grandis along Top of the World Hwy. W of Dawson Yukon, with butleri in the alpine (many people consider that there are two species in N.A. B. chariclea butleri in the alpine and B. titania grandis lower down, except they hybridize considerably in some areas; that treatment is better than treating all American ssp. as B. chariclea, which is wrong as grandis is nearly identical to European titania). Scott proved that titania helena is polyphagous, though based on many dozen records the main host is various Vaccinium. BC Phyciodes "tharos" is actually P. cocyta; it has mostly one generation based on the graph, with very few records in May or after mid Aug. (note that P. pulchella has the same type graph). Porter & Mueller actually misidentified some cocyta as tharos (see Papilio [N.S.] #13), and thus only proved that Mich. and Ohio bugs are similar species. P. cocyta occurs on the plains of Alta. also (along river woods), sympatric with tharos; pascoensis is evidently a synonym until proven otherwise. The P. batesii crescent is usually paler than ground color, and there is no purple on any Phyciodes larva; young larvae rest on top of a web, not in it. Alta.-BC has P. batesii saskatchewan, named later (Papilio [N.S.] #13). All Phyciodes hibernate as 4th-stage larvae. Scott (Papilio [N.S.] #7, #10, #13) showed in nauseating detail that P. pulchella was the correct name, not pratensis, and Kondla & Guppy J. Lepid. Soc. 56:171 showed the same thing. BC has ssp. tutchone in NW BC and owimba in S BC (N. Kondla), both of which have orange antenna nudum, versus black in Calif. pulchella. Ssp. owimba is just as valid as most of the ssp. in this book, and a continuous distribution does not invalidate a ssp.; the book did not bother to investigate where the small neat-rowed tutchone changed into owimba. To demand here that valid ssp. require a distribution break would invalidate most of this book's ssp. (most of the ssp. in this book are mapped as if they have continuous distributions into the next ssp., including threatfuli etc., although Guppy notes that there are abrupt topographic changes such as parallel mountain ranges & valleys that provide barriers between some of the book ssp. that don't show as a gap on the map dots). P. 303 meant to say that there are no P. mylitta records from the Lower Mainland Coast of BC (the map region shown on p. 10) before 1902, whereas it presumably was present all along in the Southern Interior map region (P. mylitta eats all thistles of several genera, so was probably native to the southern interior of S BC before Canada Thistle invaded, happily eating the same native thistles as does P. pallida). C. whitneyi altalus occurs in BC, and has pointier fw and brighter coloration than true Colo. damoetas; populations also occur below timberline where rockslides extend downward into the forest; Scott (Papilio [N.S.] #6) described damoetas early stages and Scott (1986) has photo of pupa. The book fails to state how C. hoffmanni manchada differs from segregata (it doesn't). The book badly mixes up Euphydryas chalcedona & anicia. Actually the easiest way to see the valva prong is to merely brush the scales away from a specimen as Scott did; there is no need to remove the abdomen or dissect or mount or preserve it in a vial or slide at all, and Scott's genitalia examinations did not mangle the valva using any of those procedures. (This accusation reminds me of Gordon Pratt's ridiculous accusation [J. Res. Lepid. 30:175] that I mismeasured the unh spots of N Calif. Lycaena xanthoides editha X xanthoides populations, and later Pratt published photos of specimens identical to Scott's and named those intergrades a ludicrous "subspecies" pseudonexa.) The BC book photos on p. 307 are stated to be "paradoxa" but all are the blackish coastal colon ("perdiccas"), they are NOT the redder paradoxa which should have been illustrated; paradoxa is a redder (look at Gunder's original type photos) variable ssp. of chalcedona that originated from intergrading with anicia. Ssp. colon or near-colon occurs on Vancouver I and Olympic Pen. E. anicia isn't completely reprod. isolated from E. chalcedona, as proved by Scott morphologically (and proved using electrophoresis by Peter Brussard and others)(see Papilio [N.S.] #12 for recent info), and p. 308 last sentence admits that true paradoxa can be distinguished from ssp. hopfingeri only by the valva. The chalcedona map missed the presence of wallacensis in NW Mont. (Missoula etc.). Page 309 "Biology" admits that blacker adults near the paradoxa range resemble wallacensis (which resembles colon but has a slightly longer valva prong). The unf postdiscal band character is rather worthless. The photo of "dark colour form" of anicia is actually an aberrant specimen (of course aberrations can be called forms, but I prefer to use the word "form" for commoner variations). The anicia map shows bakeri in SW Mont., where bernadetta occurs too. P. 310, the dorsal arm of other Euphydras has small spinules too (see Figs 71a & b). The valva of E. gillettii is similar to E. editha, and DNA study by Niklas Wahlberg plops it phylogenetically into the middle of various Eurasian Euphydryas. The chart shows L. arthemis has only one gen. in BC, except for rare records. L. archippus may never have eaten apple as a usual host (it has failed to colonize Denver despite common apples and superabundant crabapples, yet is found along Denver creeks and all over W N.A. on Salix exigua); Salix was probably the most common host. L. archippus idaho is a syn. of archippus, it's much less distinctive than lahontani, and is intermediate and close to archippus thus a syn. The name burrisonii was clearly named as a ssp. in the O.D. which did not mention the word hybrid, and is now a nomen dubium; C. Guppy suggests that burrisonii and itelka

differ and will designate a neotype. Scott would have preferred names for the two L. lorquini ssp. that are relevant to the butterfly, rather than using middle names of obscure people.

The separation of C. tullia into two species based on one weak character is rather dubious (for instance Fig. 73 shows a 2X ratio for both, despite claims of 1.5 and 2.5 in the text), and even if the drawings are poor and this genitalic difference is statistically valid (later photos by N. Kondla showed little difference), the difference does not mean they are separate species. Demorest Davenport published a revision of American tullia decades ago, and recent attempts to hypersplit the species have been debunked by G. Austin and others (by the way C. tullia nipisiquit never meets inornata either since they are separated by different flight periods and habitats). My series from Seward Pen. of "viluiensis" seem synonymous with kodiak from Brooks Range-Denali Hwy. (so the Siberian viluiensis does not occur in Alaska or is a syn.), and yukonensis does not seem distinct either. W Mont. pops. are generally considered to be sweadneri, which is a little paler than inornata (and Kondla finds sweadneri in SE BC, which flies in cooler moister higher areas than surrounding ampelos); insulanus and columbiana are syns. of ampelos; benjamini is paler than inornata though lumped by some. (In these Coenonympha and Cercyonis etc. some people like to split much more finely than I do.) Evidently all BC C. pegala are ssp. nephele; and the Alberta book showed no paler outer uns band. The sthenele text blames others' misidentifications, and then misidentifies the male C. oetus "phocus" photos, which are really sthenele paulus (and phocus is a syn. of oetus; photos in Butt. Alta. are ssp. oetus also); Butt. Canada has a sthenele dot from ~Chapmans in SW BC. C. oetus unf lacks a brown line, not a light band; Scott's C. oetus hosts are just as valid as all the other literature "hostplants" for Satyrinae (studying hosts of Satyrinae is difficult, because larvae are hard to find in nature, females often oviposit rather haphazardly, and larvae will eat numerous plants, etc.). The eyespots are not in line on the photos of E. mancinus, the text evidently meant "approximately" in line; one wonders whether the adults flying together on Dempster Hwy. were just picked out of a series based on one variable character without confirmation from other characters, however Butt. Canada mentions genitalic differences. E. magdalena and mckinleyensis are no doubt biennial; females oviposit on the edge of boulders near vegetation (grasses, sedges, rushes, etc.); saxicola is a synonym of magdalena unless you want to be a hairsplitter and peer minutely at a few body hairs that can't be seen on photos; Yukon pops. are intermediate between magdalena and mckinleyensis in amount of fw orange, which proves that they are conspecific, since that is how they differ. Little sign of a bipartite range appears on the E. discoidalis map, though C. Guppy suggests there could be a gap in N BC. Gorbunov's book suggests to me that pawlowskii is a ssp. of E. stubbendorfii; and E. theano is limited to the Altai as the Russians treat it. The valva tip of one Siberian specimen (type of tschuktscha) resembles youngi, which with the slight difference and considerable variation in the four photos of dabanensis valva in B.C.S. Warren's Erebia book, suggests to Scott that it is a variant of E. dabanensis, of which youngi is a ssp. The male photos of "youngi" actually seem to be E. kozhantshikovi lafontainei (note the spikes at outer edge of unh median band in mid cells, & paler uns); the unh has more of a slight reddish than pinkish tint. Some E. epipsodea larvae are green due only to food, and they surely have 5 rather than 3 stripes; the great variation in eyespot number is noted, yet the book persists in recognizing ssp., even though remingtoni is surely a synonym of epipsodea, and sineocellata no doubt is a syn. of epipsodea also; the Alberta book and Manitoba book photos resemble ssp. epipsodea also, and the Alberta book assigned prairie & Peace R. pops. to ssp. freemani =sineocellata and said there was little difference from ssp. epipsodea, and mentioned that the BC ssp. was hopfingeri (which BC book synonymizes with epipsodea)! It's time to throw these ssp. names into the epipsodea dumpster, there are no ssp. within epipsodea! Scott (Papilio [N.S.] #6) showed Poa pratensis to be a hostplant of epipsodea in nature, among others. O. chryxus is an open-forest species in the Front Range of Colo. Still no discussion of the possibility that macounii is a ssp. of O. nevadensis, despite its allopatry and close geographical replacement and similarity in nearly all physical and behavioral traits (macounii lack the male stigma, have slightly darker upf veins, and on average the unh mesial band looks more distinct and unh striations are less, though the unh traits vary considerably in both); would a nevadensis female care if her mate had androconial scales? (obviously macounii females do not care, since their males lack the patch)? Why are their ranges barely allopatric, if they aren't ssp.? (Guppy suggests the habitat changes). Papilio (N.S.) #12 divided "chryxus" into two species which both occupy most of BC, O. chryxus, and O. calais altacordillera & O. c. caryi. Phalaris arundinacea is doubtfully a host for O. chryxus, since this grass is 2 m tall and occurs in wet spots. The unh median band of O. uhleri is weak, not pale; uhleri never has two generations per year despite ancient ridiculous reports of two (C. Guppy told me he has seen two near Plateau Mtn. Alta., and I suggest that the late individuals were misguided oddities who got out of sync, as rarely happens in various butterflies); and Scott has never seen males hover and spy downslope (they merely perch in hillside swales near the host to await females, hovering and spying would require an enormous waste of energy); Scott proved that Poa etc. are larval hosts (oviposition, association, lab feeding, what else is needed?). The same ludicrous two-generation nonsense is repeated for O. alberta, will that ancient garbage never die? (two gen. was reported in error in the 1800s for Colo. alberta, where dozens of recent collectors have never found a 2nd); Oeneis are very slow larval feeders, and there is zero possibility of ever producing two generations, though a mixed-up individual may emerge in a wrong month. The photos of O. "alberta" from Peace River look like many O. calais near altacordillera to me, at least on ups, and the unf postmedian line doesn't have as long a jog as most O. alberta; this bug flies early on dry low-altitude grasslands like other O. alberta in Canada, but are evidently oranger so are at least a new ssp., and should be investigated further. Holland's (Sandberg's) description of O. bore larva stripes was very poor, and larvae may vary somewhat like O. uhleri; there is a two-year cycle in Colo. also; the

unh of my edwardsi specimens is not darker and less contrasting. The live photo of "mckinleyensis" looks like Oeneis philipi. O. jutta always has a two-year life cycle; ssp. reducta is oranger and is not in BC or Alta., the "reducta" and "ridingiana" photos are chermocki, and chermocki is a syn. of alaskensis (European jutta is similar but usually? has a tawny spot near upf tornus in cell CuA_2); the photos show whitish inner margin of unh median band. Nights in the alpine/arctic zone are usually too cold for O. melissa larvae to feed at night. Is ssp. atlinensis different from ssp. melissa? Many more dots exist in S Alta. for O. polixenes than shown on map; the photos of yukonensis are too overexposed white; yukonensis is similar to Colo. brucei, while Scott's Alta. males are similar to Colo. brucei while most females are browner; luteus is yellower, and also occurs at Churchill Man. Gorbunov treats philipi as a syn. of O. norna oeno; his drawings of norna and polixenes genitalia suggest a resolution of philipi's status, but Scott's examination of philipi and brucei valvae indicate that they vary greatly (and average midway between Gorbunov's pictures of both taxa, the average valva tip more square), with philipi valva tip perhaps averaging wider like norna but one individual is quite narrow only 25% of basal width; the valvae of these taxa and O. melissa are too variable to draw confident conclusions). N. Kondla suggests that the female "rosovi" is O. polixenes, and his photos of all the rosovi types (2 syntypes) show that neither resembles O. philipi (one is yellowish with weak unh band!). Why should the Kootenays have eastern N.A. monarchs??

Appendix 3 provides data for photos, a useful feature. Delete "A. c. campestris" on p. 357. P. 359, replace dumetorum with perplexa. Two L. lorquini ilgae live adults are listed, so which data go with which photo? Shus?ap is misspelled in M. rosneri. P. oreas threatfuli holotype is male. S. behrii is from Sherwin Summit. S. liparops larva has no locale (none available).

THE BUTTERFLIES OF CASCADIA. **Robert Michael Pyle. 2002.**

Seattle Audubon Society, Seattle, Washington. 420 p.

Most butterfly folks will like this book. The photos are nice, and the text has interesting digressions about the fauna. It covers "Cascadia", an artificial area including Washington and Oregon, though the maps include some surrounding area. The book includes for each species something about identification, variation (subspecies), hostplants and number of generations, habitat and range, plus a little blotch map. This review mainly lists the things in the book I think need correction.

For easy identification, the text of a species and its photos should be on the same page, but in many cases photos of related species appear on a species' page, which is quite confusing. Many of the photographs in this book are misidentified, especially in the tough groups such as Argynnis (Speyeria) and Phyciodes. To identify butterflies requires staring at them for a long time in order to develop an ability to recognize their subtleties, which is as difficult as identifying human faces (thus people can identify and name only a few people, those they have stared at the longest), and I think this requires a large personal collection that one can stare at interminably, so butterfly watchers have a disadvantage here. Another disappointing feature of the book is the wholesale inclusion of numerous recently-named subspecies, especially those creeping into the fauna from California and Nevada, which appear to be synonyms or are very weak. I now recognize many more subspecies than are in my 1986 Butterflies of North America book, but I still think many recent ssp. names are not distinctive enough. The map on p. 20 should have included the names of the counties to show the reader where they are. The book sometimes uses strange nonstandard english that inhibits communication, including "afforesting" on p. 46, "flickering" (fluctuating??) on p. 361, "cumbrous" p. 75, "oystery" on p. 60, "individuating" on p. 181, etc. This book, like the BC book, I think wastes a lot of space on the etymology of the scientific names, an academic exercise having nothing to do with the butterflies since the butterflies exist in nature just fine without names. Some people seem to like this exercise, but many scientific names are inappropriate, misleading, meaningless, frivolous, or stupid, so deducing their origin involves a plunge into idiocy. Contrary to p. 35, there were three strong efforts to organize common names of N.A. butterflies, the first being Scott 1986, who—most importantly--also corrected all the inappropriate misleading names (such as correcting "Early" Hairstreak E. laeta, which flies in July, to Turquoise Hairstreak, correcting the Lupine Blue to icarioides not P. alupini, etc.). It is quite disappointing to see so many folks (such as the untrained amateurs in the North American Butterfly Association) ignore appropriate names and return to bad misleading inappropriate names, especially when there is no Code that requires the use of older bad names. And it is disappointing to see so many lepidopterists still using priority, or counts of the frequency of use of bad names by trashy books, to choose between common names (such as the Red Admirable in this book). The name Lupine Blue should not be used for Plebejus alupini, when the butterfly has absolutely nothing to do with lupines (larvae do not eat lupines and adults do not nectar on lupines), and the name is totally perfect for another species P. icarioides which is totally restricted to lupines. (As a humorous aside, maybe we could transport these common name transgressors to the international border S of Osoyoos, where local politicos cannot agree on whether their river and jurisdiction is the Okanagan or Okanogan, and we must, using the handle of a stout butterfly net, nag on their noggins until they confess their sins and agree to fix those names.) As I stated in my critique of one conpendium of common names (J. Lepid. Soc. 47:170-1), "The study of butterflies is young compared to the study of birds (because there are fifty times more ornithologists working on half the number of species), so there is no need to rush into mandating particular common names when so many of them are bad. The lesson…is this: common names should be appropriate descriptive names for the

common person; they should not be the most common error.". It is nice that the book does have the courage to reject some of the inappropriate common names used by NABA.

The lists of hostplants found by Pelham here and there in the book, are unfortunately not documented (ovipositions?, larvae found?, association?) and are not published elsewhere; Pelham told me that most are based on larvae found or ovipositions, but at present we have to wonder if they are all valid.

Detailed comments: Foreward: Lepid. Society is losing members, thanks to harassment of lepidopterists by the U.S. Government. P. 24, the worst conservation problems in the west are overgrown pest trees (Lodgepole Pine, Engelmann Spruce, etc.) choking out butterfly habitats due to 100 years of misguided fire suppression by the federal government etc., weeds such as Bromus tectorum (cheatgrass), B. inermis, Centaurea diffusa & repens etc. overgrowing whole landscapes (B. tectorum dries in June and later often catches fire and burns up native sagebrush etc.), and development and water diversion ruining lowland riparian sites (probably 50% of Speyeria nokomis sites were wiped out by 1900 by water diversion). P. 28 Norbert Kondla has a bigger collection than other private NW collectors, and has published much more than any other area lepidopterist. P. 45, A. vialis photo is a male. P. 49 what does "sub-cell" mean? P. 50 spelled aemilia (L. Miller J. Lep. Soc. 39:51); all butterflies flap their wings below and above the body; mexicana raits on hilltops. P. 51 icelus does not eat locust. P. 53 pacuvius is rather readily identified by the strong upf mottling; at high density pacuvius males usually patrol their hillside hostplants. P. 55 fredericki (a syn.); upper photo looks like a female. P. 56, centaureae ssp. are weak and the top photo has a very whitish uns because photo is overexposed. It occurs in both subalpine and alpine zones, and subalpine is below timberline. P. 57, P. scriptura also flies L Apr.-May. P. 58, Kondla finds that Pend Oreille communis pop. has one gen. M June-M July in shrubby open woods, and Pelham notes that there are numerous univoltine foothills pops. P. 59, albescens/communis may be a dominant/recessive polymorphism (A. Warren says that Mex. P. communis adepta [which mostly lacks costal fold]/albescens relationship is complex, as some males which lack costal folds have albescens genitalia, and some males with costal folds [albescens] have adepta genitalia, which I think implies that costal folds and genitalia are polymorphic and may be just a dominant/recessive situation, which would explain why albescens can take over Florida and displace communis (what usually happens when one species invades another's range is one bug moves in, while the other bug remains at least for a while). Rearing studies are needed (raising whole families from a number of wild-caught females, cage matings). P. 60, the waxy bloom on Hesperiid pupae is best called "glaucous", it is not blue. P. 62, pupa may have glaucous waxy bloom but is not purplish. P. 63 both photos are of course ssp. libya; and true ssp. lena has a solid cream unh and occurs in Colo.-Mont. and obviously does not occur in Nev. P. 65 the oregonia m f are near-idaho. P. 66 the ssp. are weak and difficult to assign in C. palaemon (Pelham). Kondla says tan-unh mandan occurs in boreal forest/aspen parkland in N Alta.-NE BC, russet-unh magnus in cordillera mts.; C. Guppy has new research on these. The Tilden & Mattoon paper did not even report unh color in their giant table! I do not have confidence in any palaemon ssp. now as adults vary a lot and everyone who looks at them comes up with a different scheme because the differences are overwhelmed by the variation. P. 70 eureka is a synonym; muertovalle is limited to Death Valley-Needles CA. P. 72 both photos of course are ssp. uncas (Warren reports terraclivosa in Ore., which looks like fulvapallaXmacswaini thus is invalid & has darker unh like macswaini thus is a syn. of macswaini, but based on Pyle's description of white veins, ssp. lasus occurs in Ore., not macswaini). P. 73 juba adults do NOT overwinter, explaining the total lack of any specimens collected between the two Sept. and May gen. H. juba is not much bigger, and Scott proved (Papilio [N.S.] #6) that Bromus tectorum (a winter-annual grass) is a very common host in Colo. of the winter generation, and this bug has 2 generations; its larvae grow much faster than other Hesperia, permitting a 2nd gen.; the Oct-April larvae feed on winter-green grasses at lower temperatures, the May-Sept. larvae feed on a few green and maybe not-so-green grasses at higher temperatures; Shapiro's work was quite incomplete, and his 1st-gen. males must have picked up stray pollen in May when the new adults emerged from larvae (pollen falls to the ground and lasts thousands of years in soils, so it surely can overwinter on an old flower head that a spring male rests on while doing raiting=perching behavior for mate location in some gulch). P. 74, manitoba TL is LaHache [Lac la Hache] BC; harpalus is not a syn. of idaho, it is the ssp. in Cal. Sierra Nevada (TL far west of Carson City in the Sierra Nevada of Calif. where unh spots are reduced and yellower); oregonia is a useless name. P. 65 J. Pelham told me that plate 2, 3rd row left and middle, and p. 75 left two photos, are all the isolated Puget Trough H. comma [near idaho] with unh spots flat white or even tan, pearly in some females. P. 75 right middle photo, Pelham and others think this represents montane forms of H. comma idaho, which occur in montane areas within the range of lowland idaho, and evolve independently. This is controversial, since all "altitudinal forms" that have been reared have proven to be genetically different, and darker manitoba genes in the ice age probably just moved upward in altitude and interbred with idaho moving northward in the lowlands, so the "habitat convergence" producing the similar appearance of such high-altitude bugs is probably mostly due to shared genetic ancestry. Scott believes that H. colorado belongs to H. comma after all and the purported cases of sympatry in Canada do not exist. Since oregonia is a useless intergrade name, H. c. hulbirti might be used for W Ore. bugs with greenish-yellow unh and yellowish spots also. Pl. 3, juba male is female. P. 80 sierra is a syn. of nevada (and the Front Range Colo. pop. has a slightly more tan unh than greener South Park pops.). P. 82 tenebricosus is a syn. P. 83 it was common in S Minn. in 2002 also. P. 85 Scott repeated the old stuff that peckius larvae and pupae both hibernate but I don't believe it, larvae probably hibernate. P. 86 alkaliensis is basically a syn. of sabuleti, my series from Lake Co. Ore. is definitely ssp. sabuleti, and aestivalis is a syn. of tecumseh.

P. 87, there are usually lots of Sept. flowers. P. 88, waxy pupa is glaucous again; and klamathensis is basically a syn. of mardon. The lower right photo looks like O. sylvanoides orecoasta f. P. 90 draco is in NW BC too and Yukon. P. 92, themistocles seemed absent or scarce on Colo. Poa pratensis lawns for a long time, but in the last few years became common again (did it suffer from parasitoids brought in by the invading P. peckius, then adapt later to immunologically encapsulate most of the parasitoids??). P. 96 flavaventris is described as similar to sonora but uns a bit yellower perhaps, so is a weak ssp. at best, and doubtfully occurs in Ore. P. 98 nemorum isn't very valid either. P. 99 omnigena is intermediate between sylvanoides and bonnevilla, near sylvanoides, and lacks characters of its own, so is invalid. Pelham suggests that most NW sylvanoides are somewhat intermediate, but my Yakima Co. bugs are ssp. sylvanoides, and I have seen near-bonnevilla from Grant Co. to Kennewick. P. 101 upper left photo is female. P. 102 lutea is a syn. of yuma. P. 104 kiowah is a syn. of vestris. P. 106 vialis hosts are hay grasses, not Poa or the lab hosts (Papilio [N.S.] #6 has these and tons more hosts). P. 110 I think virtually all those clodius ssp. are useless synonyms; BC book got them wrong I feel. Pelham suggests that most lepidopterists have difficulty with these clodius ssp. names, and thinks the Snake River pops. are derived from uphill pops. in Blue Mts. Pelham suggests that the cryptic larval morph may better define some ssp. P.111, lower left photo is male, upper right female. P. 112 all are synonyms of smintheus, except olympianna (smaller, a little darker esp. females, due to altitude evidently), Mont. maximus (much darker females), and Calif. sternitzkyi (misspelled). P. 113, I think smintheus is still a ssp. of phoebus, look at Shepard & Manley's 1998 fig. 11 micropyle with magnifier and notice it looks quite like phoebus (at least intermediate), and their phoebus characters of Sedum rosea and moist habitat occur in SW Colo. ssp. pseudorotgeri as well as phoebus (and Evgeni Zakharov finds that a Siberian taxon bremeri that Shepard ignored actually belongs to phoebus also and intergrades with it). P. 114 C. Hauser (Nota lepid. 16:34-43) wrote that Parnassiinae/Troidini are the same subfamily, because Troidini branched off its base first, then Cressida-Euryades, then Hypermnestra, then Parnassiini; the other subfamily Papilioninae includes Papilionini and Graphiini. P. 116 there is no evidence suggesting oregonia is a distinct species; even the text says everyone agrees it is the same species as bairdii; the only experts who wrote about this assigned it to P. machaon, and Keith Brown's recent Papilionid book placed it into machaon. Yes it is large and beautiful, but that isn't sufficient grounds for distinct species. P. 117 dodi TL is Dorothy Alta., allotype Red Deer R. near Nevis, 100 km NW Drumheller (Kondla 1981 Blue Jay 39:144, & Kondla Alta Natur. 26:39). Pikei is intermediate to machaon hudsonianus, wing pattern more similar to oregonia, and host Artemisia dracunculus; it differs by having eyespot tending to machaon, fw stubbier than oregonia, tegulae less yellow, not by the worthless traits listed. P. 120 shastensis is a syn. of indra; the types of several new supposed ssp. of indra (including this and pygmaeus) do not match specimens later collected at the type locality, according to Steve Spomer. P. 121 canadensis is a ssp. of P glaucus (and rutulus), the page struggles with this. Layberry's map isn't as good as Guppy & Shepard's; the book didn't mention Scott & Shepard's paper (Pan-Pac. Ent. 52:23-28) demonstrating intergradation in wing pattern & male & female genitalia in SE BC. By the way alexiares wings and valva look like rutulus, yet its hybrids with glaucus had high fertility and 1:1 sex ratios (J. Scriber & R. Lederhouse J. Res. Lepid. 27:222-232), females are often black like glaucus, and its mitochondria are very similar to glaucus, and it is accepted as a ssp. of P. glaucus, so canadensis & rutulus should be given the same chance to be included. Perhaps mating is sometimes less than random?, but they sure do produce lots of intermediates in nature. (By the way, Donovan & Scriber J Lep. Soc. 57:25-35 just published data on glaucus & canadensis in Mich. that show that they lack prezygotic reproductive isolation in the field and mate freely [Deering & Scriber 2002, J. Ethology 20:25-33] and the genes from mixing have spread 200 miles from the mixture zone, there are big step-clines in the genetic traits that distinguish them such as ability to eat Liriodendron, they proved they hybridize in nature using numerous allozyme/rearing tests, hybrid larvae survive just as well as parents in the lab [Table 2], hybrid morphotypes are frequent in Wis. [Luebke et al. 1988]; thus they have clearly shown that glaucus & canadensis are one species, unless their species concept is one of those 23 different species concepts nowadays that has nothing to do with reproductive isolation.) P. 124 pusillus is a synonym or very weak ssp., as book photos from BC and Wash. books and Butt. Pacific Northwest resemble Colo.-Mex. adults more than the pusillus holotype, and the holotype looks like an unusually pale odd spring form (allotype looks more normal), and in Colo. May adults are small and paler, late summer adults are large (sometimes huge) and darker and females sometimes have orangish inside the black borders. So the only valid ssp. seems to be the oranger grandiosus from Guatemala-Chiapas (not SW Mex.) (incidentally the multicaudata TL is only "Mexique" the loc. on syntype, the TL should have been restricted). Pp. 130-131 N. menapia, top male photo is ssp. menapia, and middle and lower photos are of ssp.tau; middle photo is typical of tau (Pelham told me it is typical of predominant form in Puget Trough) which is characterized by wider upf black (not by unh red of females which is similar to ssp. menapia) and is limited to Puget Trough, not quite as melanic as melanica from Outer Coast Range of N Calif. (an odd bipartite range of melanism); Scott has normal ssp. menapia from Lane Co. Ore.- Lewis Co. Wash.-Mt. Rainier-Mont. P. 133 brain not retina, the brain interprets what we see, often wrongly in the case of those magazine brain-fooler drawings; 30 years ago it was found that the butterfly retina takes info from many ommatidia and combines it into an image before it even gets to the brain, so insects don't see those ludicrous 100-image pictures that Hollywood erroneously projects. Science Jan. 24, 2003 has an article about Sphingid night vision concluding they combine color info from numerous ommatidia to get better color night vision than humans have. P. 134 flavitincta is distinguished by dusky ups bases acccording to Pelham; most females of other ssp. are yellow or yellowish also; elivata is a syn. of sisymbrii with no

distinguishing features. P. 135 should mention size of posterior black postmedian spot on protodice male upf, etc. P. 136 Shapiro's little cross was done with very few individuals. (The study of Phyciodes mtDNA by Wahlberg Oliveira & Scott, Syst. Ent. 28:257-273, showed that of 140 adults studied, there were 99 different sequences of DNA, and tharos cocyta batesii pulchella were highly polymorphic and overlapping. It seems that studies that just use one or a few individuals to analyze electrophoretic alleles or DNA, get results that erratically depend on which individuals are randomly tested, thus the results are quite likely to be randomly misleading.) Tuzov's book reports nelsoni from E Siberia, but Gorbunov's book suggests ssp. callidice ranges from Europe to E Siberia and maps a continuous range from the Urals to E Siberia. P. 138 Kondla notes that marginalis is a forest species, it is people who are edge species. There are many unfinished problems in napi group in BC book, such as guppyi/tremblayi surely belongs to angelika, and the hole in map of marginalis is nicely filled by oleracea implying it's a ssp. in an unfinished classification, etc. And Pelham suggests angelika might be a syn. of pseudobryoniae. P. 139, upper left is male, lower left female. P. 142 eggs are not blue; insulanus not insulana; mayi and transmontana are obvious synonyms of coloradensis, which isn't very distinct from ausonides. N.A. ausonides has been treated as a ssp. of European E. ausonia, but Euchloe taxonomy is a mess (see Gorbunov's book etc.). Europeans have switched the usage of the names simplonia & ausonia recently (ausonia Hübner was named for Mt. Ausoni in central Italy, and simplonia Freyer was a Boisduval nomen nudum that Freyer properly named but incorrectly listed from Croatia but Bernardi corrected its locale to Simplon Pass, and now it's applied to pops. in the Alps & Pyrenees), so N.A. ausonides looks more like what Europeans now call simplonia (but the upf cell bar touches costa in simplonia, not in ausonides). Complicating this mess, our Yukon naina is said by Gorbunov's book to be a ssp. of E. ausonia (and rare high-altitude individuals from Colorado resemble naina), and andrewsi from San Bern. Mts. looks like ssp. E. ausonides, not hyantis/lotta which ranges very close to andrewsi, leading one to think that someone mixed up their andrewsi larvae with ausonides to claim larvae are like hyantis. So a lot more study will have to be done before we can assign Palearctic Euchloe names to American taxa with confidence. P. 144 bottom states that hyantis and lotta are allopatric and allochronic, but p. 146 left bottom suggests they are separate species because of lack of interbreeding. Actually, hyantis has not been proven to be a separate species from lotta, and the book's maps clearly show no range overlap between hyantis and lotta in S Ore., so "lack of interbreeding" has never been tested, and I was informed that they intergrade on Kern Plateau Calif. P. 148 the book is correct about flora, and correct that stella is limited to Sierras and has slightly yellowish males. P. 151 Pelham says male C. occidentalis photo is correct but photo is too pale. The male & female pseudocolumbiensis and the female occidentalis are evidently C. edwardsii, which ranges into BC according to N. Kondla (ssp. alexandra does not occur in Wash. as p. 160 claims). P. 152 keys should not be used, because they involve a sequence of decisions, any one of which if made wrong will result in a totally wrong identification, so the total likelihood of success is small; tables should be used instead, because one can compare every character for the specimen in question, and narrow it down quickly and get a great idea of what it is and how it varies from normal, one can quickly find the most unusual trait in the table and see if your specimen has that feature, and the likelihood of failure is small because a missing character or odd character state will not totally derail the process, plus it's a lot easier to expand a table than a key, variation can be included in a table but not in a key, and a table simultaneously acts as a description. Nobody should ever use or make keys; use TABLES of taxa versus characters. P. 154 I have not noticed any range expansion of philodice in Colorado, but Pelham told me that in Wash. it prevails in June from 3000-5000' then evidently expands its range in E Wash. and Puget trough through the summer. P. 156, likewise I am puzzled at how much eurytheme migrates. Pelham has seen eurytheme migrating through Seattle in Aug., and thinks it expands higher in altitude during the season, and Crispin Guppy saw a migration of thousands in July in Flathead River drainage 6000', and Orley Taylor wrote that it migrates northward during the season. So why have I never seen C. eurytheme migrate in Colorado?; in Colo. it doesn't act like a migratory species, and I often find it after strong fall freezes as adults survive freezes just fine unlike the regular migrant butterflies. The theory that adults and larvae die overwinter and it migrates north each spring to repopulate is wrong according to Jack Harry, who caged N Utah alfalfa & found that they survive fine overwinter at 0°F mostly as 2nd-3rd-stage larvae. P. 155 top right is male C. occidentalis according to Kondla and myself; Orley Taylor & Robert Silberglied originally studied uv of philodice/eurytheme, and its polymorphism is just a single-gene trait that may or may not be associated with reproductive isolation (in C. occidentalis christina/sacajawea, some males are orange and some are yellow with the associated uv difference, yet they are one species). P. 160 columbiensis females are nearly always white, occasionally yellow; ssp. alexandra is not in Wash.-Ore. P. 161 lower photo is pseudocolumbiensis based on locale, not C. o. occidentalis, though N. Kondla thinks it is edwardsii which actually extends into BC. P. 158-61 are confused about C. occidentalis and C. alexandra. Papilio (N. S.) #12 clarified the situation somewhat. The BC book lists a number of occidentalis dots from W Wash. and BC. P. 159 cites Scott's book in error, Scott merely lumped all occidentalis and alexandra into alexandra, following Ferris (as for the "ever the iconoclast" bit, "one who attacks established beliefs or persons", Scott often defies convention merely because progress marches on and so much of the old dogma proves to be wrong; people who do the most research disprove the most dogma; after I published my book, I found that a lot of people were annoyed at my name changes, but they rushed out and did research that solved some problems, so stirring the pot does work to speed research. Now we have 23 species concepts and so many name changes made by nearly everyone that there is total chaos in the taxonomy of many butterfly groups, and many people are disconcerted, but progress continues). P. 163 there is actually no SE BC gigantea record. P. 167 iole has

to migrate across divides to get to the watercourses. P. 169 Gossamer seems too frivolous and misleading to me. P. 170 should mention whether SW Ore. adults are whiter on the uns thus are ssp. arota (probable) or not, the unh of the photo female does have dark unh esp. tornus like ssp. virginiensis=schellbachi; size is not meaningful as it doesn't vary much that I've seen. P. 171 alpestris is not darker-gray beneath. The egg/1st stage overwintering stage is an error according to the info I have; half-grown phlaeas larvae were proved to overwinter by Gordon Pratt, and in general subgenus Lycaena species overwinter half-grown, subgenus Tharsalea as egg; however alpine Alta. phlaeas would probably be biennial also, so maybe egg and half-grown larva would hibernate, after all phlaeas is the latest-flying arctic butterfly so would not have enough time to grow to half-grown larva. My little note (J. Lep. Soc. 47:253-4) disproved the idea that ssp. americana was introduced from Europe, because European phlaeas have browner unh and tails, while the Scandinavian polaris has grayer unh and no tails but is said to have brassier ups (see plate in Higgins & Riley) and larger unh spots; I have adults from S Sweden that don't look like americana either. P. 172 henryi is a syn. of snowi; BC book's argument that it is valid because ssp. artemisia divides its Alta.-Colo. range is wrong, especially when that book [wrongly] lumps C. whitneyi altalus with C. w. damoetas, which have the same ranges as the cupreus ssp. The Ida. dot is surely ssp. artemisia, which is a valid ssp. that is roughly intermediate between cupreus and snowi if you add up all characters but is an odd mixture of character traits, the ups color most like cupreus in males but females are yellower, the ups spots are larger than either, the unh is grayer more like snowi, female uph darker than cupreus, habitat is upper sagebrush zone more like cupreus. Ssp. artemisia supposedly occurs in Lake Co. P. 173 L. thoe has two generations. P. 174 L. dione is correctly a separate species from L. xanthoides, because dione is sympatric with L. xanthoides montana in LaBonte Can. in Laramie Mts. Wyo., and is much different from the others distinguished by long orange unh band and solid black unh spots. But L. xanthoides editha is a ssp. of xanthoides, which have short scalloped orange band and tan-centered unh dots and differ basically only in size. L. x. "editha" "pseudonexa" is actually the intermediate populations between xanthoides and L. x. editha in N Calif. (note also that Emmel Emmel & Mattoon's L. xanthoides nigromaculata photos are rather similar to pseudonexa photos), but pseudonexa has to be treated as a synonym in my subspecies concept since it has no different characters of its own and is just intermediate xanthoides X editha (the factor analysis paper of Pratt et al. [J. Res. Lep. 30:175-195] wrongly lumped these intermediates into editha; that paper was a useless black box with no usable extractable data, and proved that they can't even distinguish the larvae of rubidus from xanthoides/editha; that paper pathetically accused me of mismeasuring the spots). Shapiro's papers on N Calif. butterflies clearly labeled these as intermediate and showed that the intermediates occupy a large range in the Siskiyou Co. area in N Calif., and Warren's Butt. Ore. showed the intermediates in SW Ore. also; they are not just a local thing (obviously the opinions of local lepidopterists should be carefully considered, as Pelham emphasizes). P. 175 middle right photo is dione female, lower right is dione male. P. 176 xanthoides does not remain separate where it comes near editha, intermediate pops. also occur at Mather near Yosemite (and also on E slope of Sierra according to that factor analysis paper). L. x. montana was declared a homonym of a Eurasian bug by Kocak 1984 (Priamus 3:95), who renamed it vurali, TL Broadwater Co. Mont., HT USNM. P. 177 misspelled jacquelinae a good ssp. with larger uns spots, but dorothea is a syn. of jacquelinae (note that Dornfeld's female dorothea topotype is not melanic, and his book describes females as having extensive yellow). P. 178 those duofacies & perkinsorum ssp. are rather worthless, evidently synonyms, and Pelham also questions them; Johnson & Balogh's original paper was not convincing, sirius and duofacies were described as having both brown & orange females, rubidus and monachensis were described as having brown females but the illustrated females were orange, and maybe only perkinsorum has brown females usually; in Colo. sirius is the brown female more common at high altitude while at low altitude the females are mostly orange; better to just call the brown female form sirius. P. 180 klotsi, submaculata, and rava are all syns. of klotsi, which also can be considered a syn. of heteronea, since there are no populations totally lacking unh spots. And gravenotata is a good enough name for the Siskiyou thing; the primitive "plesiomorphic" state was surely the spotted unh of all other Lycaena, and then the spots decreased in the Great Basin sagebrush where bugs get whiter, so Colo. and Cal. gravenotata could share the same name due to presumed shared ancestry. Emmel & Pratt wrote that gravenotata is in SW Ore., not submaculata, and actually they wrote that submaculata is limited to W Sierras N to Shasta Co., and submaculata is intermediate between heteronea and gravenotata thus is a synonym because it lacks any different characters of its own and is just an intergrade; they wrote that ssp. heteronea types were darker blue, but that's just because the specimens are old, those 50-year old San Francisco icarioides pheres and lygdamus xerces in Cal. Acad. Sci. are also darker blue on ups merely because of an unexplained darkening of the blue due to age (blues just seem to get darker blue after 40 years or so in museums). P. 182 the violet tint isn't refraction, it is the violet-wave-length tail of the uv reflection (or diffraction maybe, but not refraction, which is light bending due to its speed slowing when going through a denser substance like water). P. 183, top right & bottom right from Kittitas Co. look like L. florus. Pelham informed me that dark forms (like those found in florus) occur all over the Wash. steppe to montane habitats and Puget Trough, without any geographic consistency, although dark forms increase in montane univoltine pops. but not to the exclusion of normal females. So, because florus is characterized by a gamut of forms from quite melanic to oranger helloides-like and a single gen., and ssp. helloides is characterized by fewer dark forms (there are dark forms even in Calif.) and several gen., Wash. surely has L. florus in montane univoltine pops., and has L. helloides (maybe darker N ssp.) elsewhere that vary somewhat (perhaps some lowland pops. along Columbia R. may be L. h. near helloides?). (True L. dorcas ranges south to Quesnel BC. and C Alta.) P. 184 bichroma is a syn. of nivalis; actually

browni=praetexta differs by having lilac occupying only the outer 1/3 of unh, vs. outer ½ in nivalis=bichroma, the average color of yellow is actually the same, and I have ssp. nivalis females from Loon Lake in higher Sierra for instance that are deep yellow on unh also; and Pelham notes Blue Mts. pops. with significant numbers of individuals with the mostly unicolorous creamy unh, in among the yellower ones; evidently there is widespread polymorphism for yellow/cream unh color; praetexta is a syn. of browni; the photo of "browni" has unh half lilac so would seem to be ssp. nivalis, so Wash. may have ssp. nivalis, not browni; eggs are not blue, they are maybe sl. bluish-green when laid but rapidly turn white like other Lycaena. P. 186 penroseae (note spelling) is a syn. of mariposa, and charlottensis differs by having a dark median unh band; Pelham notes a distinctive segregate in the N tier of counties, E of the Okanogan R. in Wash.; uliginosum misspelled. P. 189 estesi is a syn. of halesus, and dolichos=juanita occurs in Ga.-Fla. (see Papilio [N. S.] #18). Perpetuating an error such as Great "Purple" Hairstreak is worse than creating it in the first place. P. 190 lorquini is syn. of grunus (and a Baja ssp. "poodiae" I will recognize as a valid species when poodles grow wings & fly). P. 192 occidentalis is a syn. of watsoni; Rosa woodsii is an amazing new hostplant, which Pelham told me is based on ovipositions and larvae he found in Wash. steppe habitats, where Rosa is often the only woody plant present with titus other than Artemisia. P. 193 columbia is at best a weak ssp. resembling behrii, as my 8 columbia from N of Chelan Wash. resemble behrii closely although they maybe average a bit larger unh spots; crossii is the only distinctive ssp. (much larger, darker uns, different host). P. 194 tildeni is a syn. of fuliginosa, maculadistinctum a syn. of semiluna; as the photos from Kittitas Co. show, these things are quite variable; ssp. albolineatum from Lake Co. Ore. was missed, it looks valid to me with a row of black unh dots. P. 195 P. sabuleti sabuleti and P. s. ministigma are the same species and the latter has a smaller stigma (Mex. norae with no stigma is a ssp. of sabuleti too). (By the way, I often wonder whether Oeneis macounii is a separate species from nevadensis, they are amazingly identical except for the male stigma, if macouni females don't require the stigma, maybe nevadensis females don't either.) The low-altitude fuliginosa may need its stigma to distinguish itself from S. californica etc., whereas the high-altitude one without stigma presumably lives with no other Satyrium, as other species are absent at high altitude. P. 196 obscurafacies and cygnus are synonyms; "red-capped" should be in bold, not the other stuff. P. 197 note this whole page refers to S. sylvinus, not californica as I first thought! P. 198 the Salix exigua bug has been spreading in Colo. (from W Colo. to Arkansas River N to Castle Rock), maybe its overwintering eggs on small Salix exigua shoots are being mowed and spread in hay bales, much like Thymelicus lineola, but the future of an egg in a hay bale would appear to be grim. I have a few adults from N Ida. that seem to be nootka but some have more orange unh lunules, so I thought that coolinensis is really nootka so the latter is a synonym of coolinensis, but Mike Fisher & N. Kondla have looked at the coolinensis types and they were acadica, which must have been mislabeled "Coolin Ida." The pale-uns things with tail can be called ssp. sylvinus everywhere, as typical lowland Cal. sylvinus has a whitish uns (more whitish than grayish); in NW Colo. I found a slightly-paler uns critter in a sage area (the rest of Colo. has darker putnami). P. 200 okanagana probably a synonym; picture in BC book doesn't look much different. It's not "rough-housing", it's just investigative mate-locating behavior. P. 201 lower right is S. tetra female, note kinky unh line, and gray scales like Glassberg's tetra photo beyond postmedian line. P. 204, the photo is the real C. [sheridanii] viridis "dumetorum" from San Mateo Calif., but the taxon as described is surely a variety of C. sheridanii [viridis] lemberti or newcomeriXlemberti perhaps intergrading toward newcomeri, and Pelham says probably so. P. 205, oregonensis is an intergrade between perplexa and affinis so is technically not a valid ssp., and Pelham states that oregonensis is a Lotus-feeding syn. of perplexa and is similar to the Mason Co. Wash. perplexa; these have the unf less orange than Calif. perplexa so are distinctive, though they are intermediate perplexa X affinis. Scott treats perplexa as a ssp. of affinis, because affinis intergrades with homoperplexa (which is very similar to perplexa) in S Wyo.-Neb. ("intergrades [of affinis] with C. apama common" C. Ferris, 3 mi. E Laramie, Wyo., 1997 Lepid. News #2 p.34; & G. Gorelick J. Lepid. Soc. 59:181-199)(yet interdigitates altitudinally in S Utah as washingtonia and oregonensis do in S Wash.), and there isn't real evidence (just nearby distributions) that apama/perplexa and affinis are distinct species in Utah or Wash.-Ore. Scott and Justice (J. Res. Lep. 20:81-85) tabulated seven characters of colors and spots of these northwestern critters and showed that the Blue Mts. and Okanogan Co. washingtonia actually are somewhat intermediate between affinis and oregonensis, some characters being closer to one and other characters closer to the other; Pelham directed John Justice to most of the localities; Pelham states that Ft. Simcoe has only sheridanii and affinis but not oregonensis, so Scott & Justice's one female "oregonensis" from Ft. Simcoe must have been misidentified, but that doesn't change the results of the paper since 40 other oregonensis were analyzed. P. 207 newcomeri isn't much different from neoperplexa, and the "neoperplexa" photo fits description of newcomeri; neoperplexa has always been described as lacking [actually reduced] a black edging of unh white stripe, and my 6 newcomeri from Okanogan Co. and 2 from Yakima Co. actually have some black edging esp. posteriorly, so these two names do not seem to differ much. C. sheridanii males perch on the ground or on low plants because they perch in teeny little swales (most often on hillsides, even near a ridgetop); in contrast male affinis perch mostly on hilltops, thus mostly on sage bushes since it tends to be everywhere in their habitat; Pelham notes the same perching behavior of these two in Wash., where affinis will choose a prominent bush or even fencepost on a ridge; homoperplexa perches in gulch bottoms and on hillside trail bottoms, generally on low plants. P. 210 one could say that johnsoni is rare so has been missed from earlier-succession forests, but Pelham states that all johnsoni colonies were in old growth/virgin forest, and has seen no evidence that it colonizes adjacent earlier-succession forests (but of course all old trees eventually die, so johnsoni must colonize new trees at least locally). P. 211 ninus is a

syn., and pupae probably overwinter under loose tree bark as Atlides do in Calif. (perhaps old trees are better for johnsoni in providing more loose tree bark for pupae?, and older trees may have more mistletoe?, but the same factors should apply for C. spinetorum). P. 212 barryi is evidently a diverse wastebasket name for the juniper-feeders, if the uns varies from yellowish-brown to violet and purple, but the latter two colors no doubt refer to the overtone or sheen; as an exercise, the wing pattern variation should be mapped separately from the hostplant variation, and then we could see if there is concordance. (Warren's Butt. Ore. has corrected the barryi mess; barryi is a syn. of rosneri.) P. 213 Kondla says the ICZN code states regarding rosnerae/i that inadvertent errors must be corrected but incorrect latinization is not an inadvertent error, so rosneri must be preserved; but elsewhere the code states that endings must be properly latinized, and patronyms must be given a latinized suffix according to its gender; how do we reconcile these contradictory and rotten articles in the new code? (maybe we change the endings or not, however we wish?!). P. 214 concava is a syn. of augustinus as it has dark unh base, and the only difference between iroides and augustinus in my series is the unh base is pale in iroides & dark in augustinus. P. 215 that chocolate-brown thing in BC book is not augustinus, it's a ssp., because eastern N.A. augustinus are reddish-brown like iroides (C. Guppy Jan. 2003 told me it is a new unnamed ssp. of iroides). P. 216 my series of Vancouver I. mossii are distinguished by having unh red wider and postmedian area less whitish; windi has unh white line weak. Males rait in gulch bottoms. P. 217 obscura and maritima are both synonyms, my Colo. females have just as much slight rufous on uph as the E N.A. ones. Evidently Bob did not inadvertently name "teninoensis" in this book, since there is no description/diagnosis (in general, manuscript names should not be mentioned in print because of the possibility of inadvertent valid publication under ICZN rules); kinnikinnick misspelled often. P. 218 sheltonensis is a good ssp. but purpurascens is a syn. P. 221 atrofasciata photo is paler than setonia photo (the April atro. photo in BC book was darker than July photos of both ssp. because of spring date); setonia is a syn. of atrofasciata and both are evidently characterized by less black on unh line; Pelham agrees that atrofasciata and setonia refer to spring & summer gen. and only one name is needed; abdomen is orange only on summer males, spring males have no abd. orange. P. 225 isola has dozens of legume hosts and does not favor Melilotis (Papilio [N.S.] #6). P. 226 hw rubbing evolved once I believe, as Eumaeini and Polyommatini are sister taxa (I haven't read Eliot's latest classification). P. 226 the amyntula ssp. are a mess. Albrighti may be a valid local form or ssp. in Mont. and a form in BC, but maritima probably occurs over most of Canada. P. 228 top photo could be E. comyntas perhaps, but lack of orange spot fits E. amyntula better; at that site near Douglas Ariz., comyntas occurs in lowlands and amyntula in mts. P. 230 Wash. evidently has several species of Celastrina including C. (neglecta?) echo, and C. lucia with all the unh patch forms, and maybe nigrescens too (which may be a ssp. of C. lucia). Pelham says Celastrina lucia occurs in Wash. The BC book didn't make a good case for two species because the sky-blue lucia and the darker-blue echo are essentially allopatric there, but Kondla claims that echo and nigrescens are different species sympatric in SW Alta. and NW of Vernon BC. Kondla says bakeri & nigrescens are not synonyms of echo, and states that bakeri has a violacea or marginata uns and flies earlier, while nigrescens flies a little later (overlapping a bit) and has a more maculated lucimargina uns (I think these two are probably uns forms of one sp.). A. Warren's Butt Ore. claims to find echo & nigrescens sympatric in Ore. Pelham states that echo always has at least a partial 2nd gen. in Wash., but echo has just one gen. in BC as Kondla says the "summer form echo" female photo in BC book is the only known summer female of small 2nd brood of echo in southern interior BC., and the BC phenogram shows mostly one gen. Chris Guppy now suspects there are 3 species in BC, lucia, echo, and nigrescens, which all fly in the N Okanogan Valley, nigrescens occurs in the E half of S BC, and he has found a new ssp. of nigrescens in the C interior of BC. So, I conclude that there are surely two species in BC and evidently southward, and there are lots of opinions, but someone must start observing ovipositions and rearing larvae to determine how many real species there are. P. 231 Warren's Butt. Ore. says the photo is C. nigrescens ovip. on Holodiscus. Surely the ability to express the unh patch of form lucia is genetic, even if the patch is induced by photoperiod/temp., so there's not much difference in the theories. In Colo. Front Range the lucia-patch form of C. lucia sidara is rare but occurs and the patch is small, while in W Colo. in seemingly identical temperature regimes and not much more moisture, the lucia patch form of C. lucia lumarco is common and the patch is twice the size, so surely this difference is genetic as photoperiod is the same and temperature similar. David Wright informed me that Cherry Gall Azure and Hops Azure and argentata may be same species, eating mostly Deervilla in the north (Maine to Minn. etc.); if that species got to Colo. it perhaps ranges to BC and even Ore. as nigrescens?? (what does nigrescens eat?). P. 231 Paul Ehrlich told me years ago that "Sooty Azure" was a bad name because Cel. nigra has no blue; he was right so I named it Spring Sooty in my book. P. 235 top right photo maybe is E. enoptes? but is from N Wash., one would have to get series and find hosts to determine this. Concerning the "probable and presumptuous" comment, too bad this characterizes most of the Eriogonum feeders, including Euphilotes, Plebejus acmon/alupini, and Apodemia mormo. P. 236 leona is obviously a ssp. of P. speciosa, and possibly a syn. of bohartorum. P. 238 Alaska-Yukon-Alta. mts. has ssp. kurnakovi, not couperi; xerces blues are obviously a ssp. of G. lygdamus (half of them [form "antiacis" etc.] had unh black dots like pardalis rather than white blobs, the ups is darker blue on dead museum specimens due to darkening of the blue, hosts were identical, etc. etc.). P. 239 toxeuma a syn. of daunia; isn't a "lunker" a fish?. Plate 240 icarioides (lowland) painting is ssp. fulla, not ssp. icarioides which has distinct black unh postmedian dots, and lower right saepiolus is female not male. P. 241 spangelatus misspelled. P. 242-3 I think ricei is a syn. of anna, as the amount of orange varies from little to much even in Calif., and Pelham finds the same great variation in Wash. Scott (Papilio [N.S.] #12) revised this group and documented sympatries

between species, and for the bugs in Cascadia used the names Pleb. anna (ssp. anna & vancouverensis), Pleb. atrapraetextus (ssp. atra., near-longinus, & benwarner) & P. melissa melissa. Pelham states that melissa and idas atrapraetextus are sympatric in Wash. & Ore. at least later in the season, and "ricei" has near sympatry with atrapraetextus in Ochoco Mts. Glycyrrhiza lepidota is shunned by melissa in Colo. Fridayi is a ssp. of Pleb. atrapraetextus that occurs only in higher Sierra Nevada of Calif. P. 246 P. saepiolus is a complicated mess that Scott corrected in Papilio [N.S.] #12 & #18. Ssp. aehaja does not occur in "Cascadia". Ssp. rufescens evidently isn't in it either. Ssp. saepiolus probably occurs over most of it, as I doubt that Marin Co. females are much bluer as noted above (in Syst. WNA Butt. review, which shows that maculosus from E Nevada has ordinary uns spots and resembles saepiolus). Littoralis is evidently a weak ssp. or form of saepiolus, distinguished by white rings around unh spots, but I have some like that from Siskiyou Co. (Scott Camp Crk. and S of Copper Ore.) where that phenotype is a form. Ssp. kodiak & insulanus (a syn. of amica) aren't in Cascadia (amica may be in NE Wash.). P. 247 lower right photo is male not female. I fixed P. icarioides in #12 also. P. 248 I thought montis & pembina were synonymous, but montis is higher-altitude montane and pembina lower steppe-semi-steppe according to Pelham; but Pyle's book states upf border of montis is narrower, but it is wider in BC book photos; is it valid? Ssp. icarioides has whitish uns so rings disappear and uns looks like saepiolus. Helios is a syn. of icarioides (see Dornfeld's Klamath Co. photo with unh rings not visible). Ssp. fenderi is identical to ssp. icarioides but a bit darker below. P. 250 icarioides is the Lupine Blue obviously, and preoccupation refers to homonymy in ICZN code, NOT to common names, please. To repeat an error is twice as bad as making it in the first place; after all the original creator of the error thought it was correct, whereas the repeater knows it is wrong yet repeats the error, making two wrongs (printing an error, and failing to correct it). P. 250 lower right photo is male P. melissa, note narrow ups border and pointy fw. P. 251 pallidissima is a syn. of minnehaha. P. 252 lower photo is P. alupini ("acmon" in this book) lutzi, not ssp. alupini. P. 253 Scott's "true acmon" from Chelan Wash were collected July-Aug., and Pyle reversed Pelham's findings; Pelham finds that all along E slope of Cascades exists a zone where some colonies are univoltine and others bivoltine at least partially (in Columbia Basin there is only one gen.), and the second gen. is smaller and more "acmon"-like than the spring brood, so these populations look like "alupini" in the spring and acmon in summer and fall. In Calif. pure acmon, early spring adults also look more alupini-like (darker-inner edging to uph orange band), so all of these E slope Cascades multivoltines are most likely true P. acmon and not P. alupini lutzi. And Warren's Butt. Ore. finds true acmon over much of Ore. Scott's published note actually contained lots of data, considering that it used all of Goodpasture's results plus more. Scott's 1986 book published no map of anything in Willapa Hills, his dot was in Olympic Mts. P. 253 the *E. ovalifolium* host of Olympic Mts. *spangelatus* was discovered by Paul Opler and printed in Butt. Cascadia without mentioning him. P. 262 mating pair from Lincoln, Mont. (same pair uns on p. 275) is obviously not brico, and seems to be S. zerene picta, note the reddish uns & pale unh submarginal band & lenticular silver submarginal spots & wide dorsal black bars etc. that suggest zerene.. P. 262, Steve Spomer and Sterling Mattoon and I are just as qualified as national Speyeria authorities as Paul Hammond. (And S. edwardsii is definitely not directly evolved from S. callippe semivirida, contrary to Hammond J. Res. Lep. 29:63). P. 263 pl. 9, coronis photo is definitely coronis according to Pelham & Scott & Spomer (though N. Kondla thinks it is zerene; the unh submarginal silver spots have pointed caps like zerene, and I have specimens of zerene like this, though my zerene have narrower median black upf spots and oranger ups than this photo). Pl. 9 middle row right zerene has uns photo that is identical to 4th row left uns photo, and is picta=garretti, not bremnerii which has more solid russet all over unh. The right photo in 4th row is most like picta, and Pelham agrees it is picta, so unfortunately there is no uns photo of bremneri. 4th row middle "picta" specimen is a picta in Burke Museum according to Pelham, but is a pale variant that resembles ssp. gunderi. 5th row left is S. hesperis beani. 5th row middle photo from Tiger Mdws. Pend Oreille Co. looks darker somewhat like S. atlantis hollandi to me and Kondla (and Kondla told me he caught both hollandi and S. hesperis near-beani in forest beside Tiger Mdws., then found only hollandi at sedge fen/grassy marsh W of Ione). Also, Steve Kohler has found both in NW Montana. However, this specimen is probably S. hesperis near brico, because S. Spomer told me he reared specimens from Tiger Meadows in 2002 (livestock sent by Hammond) and although some were very dark like hollandi, they all had the wing shape and size of beani, and larvae were typical dull-black like ssp. hesperis, not even "intermediate" like the beani from BC Spomer has reared before; Spomer's reared adults from there have the disc reddish-brown but some are dark-brown like hollandi, the ups border are oranger like brico, the unh submarginal band mostly rather narrow like brico (not quite as narrow as hollandi), and the unh disc is usually connected to silver spot at tornus like brico, although the unf tornus spots are strong and black like hollandi. Thus this photo is evidently S. hesperis near brico. Spomer thinks the one "atlantis" phenotype Hammond reared from a hesperis female from N of Missoula Mont. that produced a gamut of phenotypes, was just a dark beani (or maybe a galloping larva got returned to the wrong box), as these bugs vary. More rearings should be done here, as the larva color evidently is an important key to identity in this region as only S. hesperis has the blacker larva (S. atlantis hollandi has a paler larva than the black hesperis-type larva of near-brico here). Thus this confusion of S. atlantis & S. hesperis in BC and N Wash.-NW Mont. is an identification problem, not a species problem, as there are clearly two species S. atlantis and S. hesperis (many individuals in Speyeria, Phyciodes, Colias, Euphilotes, Pieris, etc. cannot be identified, even when the species are valid). P. 263 5th row right is S. hesperis dodgei. P. 264 eileenae is a syn. of pugetensis, which is a valid ssp. my book should have included. Ssp. leto is linked with cybele through the sequence cybele>carpenteri>charlotti>leto. Rod Davis once reared cybele from Bear Paw Mts. Mont.

which apparently showed a nice cline between cybele and leto, and Moeck mentions intergrades from there and in Alta. P. 265 lower right photo is male. P. 266 bottom photo is S. hesperis hesperis from Jefferson Co. Colo., one of the occasional variants that is 2/3 silvered. Ethne is a syn.of whitehousei, while Spomer & I now think that columbia is a distinct ssp. that is small with dark disc and darker ups bases (Scott only has 5 columbia, which have ordinary disc, and a bit darker ups bases, and have paler ups; it isn't strikingly distinct). P. 267 upper left callippe is male not female, bottom photo is female. P. 268 ssp. hippolyta evidently occurs all the way from Olympic Mts. to Wash. coast and Ore. coast and Point Reyes Cal. (as myrtleae). P. 269 top right picta "male" is female, middle right picta "female" is male (and S. Spomer says this could be zerene or hydaspe). P. 270 Pelham says photo is S. coronis simaetha, so that must be what it is, it's greener than the small numbers I've seen. P. 271 top left Pelham says is S. zerene, I think that's correct; bottom left I and Pelham and Kondla agree is zerene also; right is male not female. P. 273 top left is female not male, top right maybe is male; bottom right Pelham and Spomer say is S. hydaspe and I think that's correct, the uph submarginal crescents are M-shaped which is frequent in hydaspe. P. 274 viola and dodgei are vars. of irene. Hammond's theory that the irene type is S. egleis is interesting, so I looked at Emmel Emmel Mattoon's photos of type figs. 252-3, and find that they are actually S. hesperis, not S. egleis (note especially the clear pale median spots in unh disc of their female fig. 253, the clear pale spot at base of unh cell CuA_1 is characteristic of all irene [and is clear on male dodgei on Pyle's p. 275], but is absent on all egleis in which that area is the color of the disc or the whole area is paler; and the unh submarginal pale band is not suffused with a little brownish as is egleis, although the posterior part of this pale band has an infusion of disc color in my irene more than the photo; the upf black bars are a little darker like irene rather than the weaker bars of egleis; the unf of females of both irene and egleis is darker redder on basal area than is this photo, but the photo is horribly bad too pale and too yellow; also L. P. Grey surely examined this specimen and called it atlantis, and was surely aware of the egleis possibility because of the words egleis and irene on the label, so obviously Grey identified it as atlantis also. So I reject this argument, cottlei is an irene bug (those unh median spots are very clear and obvious identifiers). The book is rather confused about brico because the brico photos on p. 275 & 271 are misidentified: p. 275 top right is female S. hesperis beani, not brico; bottom right same mating pair as p. 262 is S. zerene picta. P. 275 bottom, as noted above Hammond surely had females of S. hesperis and his reared "chocolate…atlantis" proved to be dark "hutchinsi" by larval color; and from the book statement, the two females could have been separate species; anyway his statement that they "intergrade" is just difficulty of identification. Scott, Kondla, & Spomer wrote the 1998 paper, and Ron Hooper invented the name Northwestern Fritillary. (Note: in the Speyeria paper by Scott Kondla & Spomer, Papilio [N.S.] #8, dennisi is older than helena so is the correct name for that ssp.) P. 276 S. hydaspe, Kondla has since written his paper showing minor is the proper name for coastal small often-silvered ssp., and rhodope is the correct name for what was called sakuntala. The unh in N Cal. still looks darker to me making purpurascens valid, but I haven't examined hundreds. P. 279 washingtonia generally has a darker-green disc than those shown. Some S. mormonia adults esp. females descend to low alt. in late summer. P. 278 top is S. coronis male, not mormonia, note fw shape and ups color and black spot size and little marginal black. P. 283, diapause is 4th stage; sierra is a syn. of chermocki. P. 285 astarte has fw more pointed (not squared) than distincta and unh median band is narrowed posteriorly. P. 286 ranieri is a syn. as it is similar to grandis (looks nothing like arctic chariclea to me), while Mont. "ingens" is a syn. similar to helena (and an intergrade anyway thus not a valid ssp.). And grandis is very similar in wing pattern to European titania in many characters, which overpower the one character of slightly-wider little valva rod, making N.A. bugs B. titania contrary to Shepard. Vaccinium is the most common of many titania hosts in Colo. (Papilio [N.S.] #6 again). P. 289 oregonensis is a syn. of leanira; both photos are C. l. daviesi from Cal. Sierras; basinensis is a syn. of alma. P. 290 carlota a syn. of gorgone. P. 291 manchada a syn. of segregata, note the male ups photo on p. 296 is identical to Dornfeld's Butt. Ore. male ups of segregata. P. 292 photos are Colo. ssp. damoetas (note convex fw etc.), whereas ssp. altalus with concave fw etc. occurs in B.C., contrary to Shepard; habitat is alpine AND SUBALPINE talus in Colo. and Alta. and Wyo. and Calif. P. 293 female dorothyi are dark, males often dark on ups too, and dorothyi is very variable though no females are quite as light as acastus; Kondla reads ICZN details to suggest dorothyi is correct even though ending was wrong sex; I personally refuse to change sex of endings as that rule is bad (for example the original author may have not intended the names to be latin, and non-latin names should not be latinized—all my names were not latinized because I do not know latin and I spelled the names to make them sound pleasing, and thus any changes of my names are contrary to the code because the names were originally not latin), and the rule causes endless instability and will be changed sooner or later. P. 293-4, evidently sterope actually is a ssp. of acastus, not palla, and dorothyi links the two, according to info from Pelham, as explained in A. Warren's Butt. Ore. C. acastus dorothyi is extremely variable, and is closer to acastus though no females are as light as acastus; dorothyi TL is from an area where paler acastus-like and creamy sterope-like females are mixed together, and not far southward the predominant female form is acastus. Sterope has 100% creamy "eremita" females, and males can be much more heavily marked as well. The ventral bands are slightly yellowish but some can be whiter or rarely even pearly. Sterope occurs in steppe desert of Columbia Basin, barely penetrating the forest-steppe ecotype, habitats like acastus. The hostplants of dorothyi and sterope are the same (Chrys. viscidiflorus), and behavior [mate-locating] in steppe-desert draws is the same. The creamier females and creamier uns spots may have entered sterope/dorothyi from C. palla, just as introgression evidently introduced the yellower unh spots into C. acastus vallismortis. Sterope is marginally sympatric but largely allochronic with palla in the Simcoe Mts. of S-C Wash. and Blue

Mts. of Wash.-Ore. [the sterope records in 7 cos. in N-C Ore. in John Hinchliff's checklist belong to palla?, and the Columbia Co. Ore. record is an error evidently]. C. palla does not extend up the E slope of the Cascades, where it is replaced by sterope. Creamy females are absent in C. palla in NE Wash., and some are creamy in S Wash. but nowhere do they predominate. Sterope females are never reddish. Thus from Pelham's info and the situation in Calif., it seems that C. palla and C. acastus are just barely distinct species and introgression has been frequent, overlapping evidently only very narrowly in the S Sierra (where C. palla australomontana—which is very similar to C. acastus vallismortis—and C. acastus neumoegeni barely overlap), (acastus and palla flavula overlap in W Colorado, at Basalt Eagle Co., S of Glenwood Springs in Garfield Co., and Minturn in Eagle Co.). The larval scoli on sterope should be examined and compared to palla and acastus, as they may differ in length in Calif. Norbert Kondla has found specimens in BC that may be C. acastus sterope. P. 294 in Calif. the Coast Range C. palla eremita has females mostly cream, and in lower Sierras (TL of palla) females are supposed to be most often fulvous but are often intermediate or cream, then in high Sierra ssp. altasierra has females orange (rarely cream/orange), thus the proportion of cream females in palla is intermediate between eremita and altasierra and there are no other usable characters (except the male ups which may be less dark in foothill and high Sierra), so one of the three names must be synonymized. Nitpickingly it would be altasierra since it is younger than palla and both have most females orange and male ups may be slightly paler; however cream females are frequent in the Sierra foothills so perhaps we should call ssp. palla the whole mess from lowland Sierras and Coast Ranges to S-C and SE Wash. as Pyle's book lists, realizing that the percentage of orange females varies geographically somewhat; then altasierra is the paler orange high-altitude bug from Sierras & Crater Lake to Mt. Jefferson, and calydon in the Rockies has male ups margins darker. The hosts are doubtfully sufficient to put altasierra into acastus, because acastus eats Chrysothamnus often, yet I found it in Colo. and Wyo. on Aster glaucodes, and palla eats Erigeron in Colo. and Aster, Chrysothamnus, Solidago, Senecio, elsewhere, so neither species is very specific. P. 297 left middle is P. mylitta from "Madeira" (Madera Co. evidently) Calif. Jack A. Levy, not orseis herlani, and note in particular it has only a couple dark postmedian dots (herlani has a whole row of those dots and a whole different unh); middle right is P. pulchella female also from "Madeira", evidently ssp. pulchella from the bit of dark upf showing but Madera Co. goes from San Joaquin Valley to alpine so this could be deltarufa or montana maybe. P. 298 pascoensis is probably not a valid ssp., and the brown patch is large on p. 299 photo. P. 298, Erigeron philadelphicus should not be considered to be a host, as the larva probably wandered onto it, especially considering it pupated the next day and all larvae wander just before pupation. P. 299 I examined all the specimens that Porter & Mueller (J. Lepid. Soc. 52:182-205) used for electrophoresis in their paper (from Mich. and N Ohio), and found them all to be P. cocyta-group (see Papilio [N.S.] #13, and this was discussed briefly in a paper analyzing mtDNA of Phyciodes [Wahlberg, Oliviera, & Scott, Syst. Ent. 28:257-273], thus they proved only that P. cocyta selenis has mtDNA similar to P. diminutor). P. 300 all Phyciodes diapause in 4th stage. P. 301 both photos, again from "Madeira" (high altitude Madera Co. Cal. evidently, not Glenbrook Nev. as text implies with "TL Glenbrook…shown in the photographs") Jack N. Levy, are female (not male) P. pulchella montana; note that montana females usually have uph median band orange but yellower at rear like these two photos; real P. orseis herlani females have this band all tawny (seldom all yellower like a few montana), & ups & uph is more uniformly orange with black lines (the "herlani" in Opler's field guide is evidently montana also). P. mylitta is commoner because it is a weedy multivoltine species. P. orseis's preference for riparian banks is only the raiting (perching) site for mate-locating males; the hosts are way up on hillsides etc. The uns of ssp. herlani is tawny with a network of fine lines; mylitta unh is mottled with brown areas more like ssp. orseis. P. 302 lower photo evidently male. Variation last line should read SE individuals. Melitiine should be Melitaeine. Adult barnesi don't differ from pallida; the larvae are darker; larvae wander away before pupation so pupa would almost never be on host. P. 303 top photo is female not male; is there any data for Centaurea diffusa & solstitialis?, Shapiro's solstitialis record was merely "suspected"; Pelham told me that he gathered larvae on two occasions on Centaurea but believes they wandered from Cirsium, and he has never seep ovip. nor found eggs on Centaurea. (By the way, I caught the beautiful Melitaea phoebe in Spain, and read that its hostplants are 7 sp. of Centaurea, so we certainly must introduce it into Colo.-Mont.-Wash. etc. to help control Centaurea diffusa a bad Eurasian weed; Mongolian phoebe might have the right climatic adaptation for our area.) P. 304 pupa is evidently E. chalcedona chalcedona as it is from Josephine Co. Ore. P. 306 anicia TL not Banff; howlandi is a syn. of anicia; veazieae=macyi is a ssp. of E. bernadetta. Pelham notes that bakeri is a member of a guild with hopfingeri to N and effi to E (hopfingeri & bakeri are riparian and use more herbaceous Penstemon), and is assoc. with Snake R. & Columbia R. riparian habitats, as opposed to sandy habitats of macyi and lithosol habitats of veazieae. (But the adults and larvae and host of effi seem to place it as a synonym of E. anicia maria.) (Many ssp. in Euphydryas have geographic differences in host usage, and if the ssp. of E. editha were assigned by host use as found by the Ehrlich group, the ssp. would be totally different.) N. Kondla & S. Kohler in Papilio [N.S.] #12 showed that E. bernadetta is a distinct species (which includes veazieae and macyi), while Pelham has found that in hostplant use etc. bakeri seems to belong to E. anicia. P. 307 top right veazieae specimen looks aberrant with enlarged white spots, because none of my series of veazieae nor any book photo (or photos Robert E. Hardwick sent from Kittitas Co. and Klickitat Co. Wash.) looks like that photo; p. 401 states the photo is Harney Co. Ore., where such a specimen would be an aberration. Something interesting to consider: Dennis Murphy hybridized chalcedona and anicia for several generations and the results were similar to veazieae; maybe that says something as to its origin? The bottom sentences on p. 307 are false, Austin & Murphy 1998 actually described

and illustrated clear and obvious intergradation between chalcedona & anicia in Nev. and fully stated that it involved intergradation, and they treated chalcedona and anicia as one species (in NE Nevada, they are barely sympatric, but are mostly allochronic and occupy mostly different altitudes, yet in the few places and times where and when they do meet Murphy found that they interbreed more than randomly, thus there is no reproductive isolation at all)(later Austin changed his mind based on NW Nev.). Scott rehashed the chalcedona-colon-anicia intergradation vs. sympatry mess in Papilio(N.S.) #12. Note that Brussard et al. found colon more similar to anicia in its isozymes. P. 308 chalcedona wings are not more rounded. Pelham says Shepard was premature and perdiccas TL may be Vancouver I. Ssp. wallacensis from Missoula Mont. is same as colon except valva prong is intermediate to anicia. P. 309 rassenkreis & wallacensis misspelled. P. 310 edithana should be boldface. P. 311 the "baroni" pictures in Dornfeld's book do look like rubicunda as Pyle says they must be (true baroni is a very distinctive local Mendocino Co. critter with much more red uns and the distal blue "editha line" often absent and ups often a bit darker)(by the way the blue "editha line" is not one line it is the "editha area"). Ssp. mattooni (not mattoonorum which is a Hesperia comma) and owyheensis are syns. of edithana. My series from Deschutes Co. Ore. appears identical to Calif. nubigena, thus remingtoni seems to be a syn. of nubigena. P. 312 Scot's Broom is really Scotch Broom? Pl. 11 paradoxa female is male. P. 316 neomarsyas is syn. of satyrus. P. 317 ssp. fulvescens is a syn. of rusticus, as the Sierra uns is just as fulvous as Coast Range uns. True ssp. rusticus from Calif. has a lighter browner uns than hylas and the light-brown color is especially obvious in unf cell (Comstock's uns from Plumas Co. is grayer than any other Cal. specimen I've seen), as brown as eastern ssp. faunus though the uns green spots are paler; the northern extent of rusticus is questionable, as Dornfeld wrote that Ore. adults have gray uns (maybe his desc. wasn't accurate enough for this purpose?), though the p. 315 Clallam Co. male has brownish uns and Pelham states that NW males are fairly brownish (but has he seen Calif. rusticus?) and he is satisfied that NW pops. are rusticus, so maybe near-rusticus does extend north through Wash., but BC and Ida. have the gray-uns bug which I named cenveray in Papilio (N.S.) #12; someone should compare these with Calif. ones, and determine the limits of the browner rusticus (my 3 BC adults and the BC book photo are gray on uns like cenveray). Female faunus uns varies from unmarked (form silvius=orpheus) all the way to mottled almost as strongly as males, and the mottled ones are often mistaken for males. P. 318, I have never seen intermediates between gracilis & progne. P. g. gracilis is in E N.A., not in Wash., though some specimens may look like it. We judge species by actual characters as our only estimate of "true genetic compatibility"; in this case there is no difference between gracilis and zephyrus except the contrast between uns base and distal area, and this contrast does intergrade on specimens we look at. True splitters take a nearly perfect cline like leanira-cerrita-alma-pariaensis-fulvia, and divide it by cutting the cline right down the middle in an orgy of pigeonholing that violates all fairness. P. 319 P. oreas and P. progne are separate species because no intermediates have been found (see #12 again). I haven't seen Okanogan/Pend Oreille adults, but NW Mont. adults are the threatfuli type; threatfuli seems good in BC-NW Mont. (not quite a uniform entity), but when you add the SC Mont. bugs that are a little paler on uns (and this book says Blue/Wallowa/Ochoco adults are darker on uns), I think these are just degrees of intermediacy between silenus and oreas, so threatfuli is an intermediate therefore a synonym. I wonder how fast silenus really is, as nigrozephyrus isn't fast. P. 320 Aglais seems a valid genus for milberti & urticae based on various characters and cladistic reasoning. Roddia seems to be the proper genus for l-album=vaualbum: in egg cluster size, Roddia has 18+ eggs, Polygonia 1-several, Nymphalis very large clusters; in larval horns Roddia's are small (large Polygonia, absent Nymphalis); in pupal shape, Roddia is like Nymphalis; pupa of Roddia has silver spots in saddle like Polygonia, not Nymphalis; in genitalia, Roddia resembles Nymphalis polychloros but valva prong is a bit more pointed; in mtDNA Roddia is closer to Polygonia (work of Soren Nylin's group in Sweden, Zool. J. Linn. Soc. 132:441-468); Roddia unh has a silver comma like Polygonia, not Nymphalis; Roddia are sexually dimorphic like Polygonia, not Nymphalis; wing shape of Roddia is like Nymphalis, not Polygonia; so the total score is 5 traits closer to Polygonia, 3 to Nymphalis, if you ignore the intermediate egg count and put the horn size into the Polygonia score, so I think we can conclude that vau-album is not a Nymphalis, so I call it Roddia (the alternative would be to lump Polygonia and Roddia into Nymphalis, the sister genus to Aglais). But now Wahlberg et al. have lumped it back into Nymphalis for unknown reasons; I call it Roddia. P. 321 watsoni is a syn. of j-album; j-album has larger uph submarginal yellowish spots than Eurasian l-album. P. 323 Red Admiral is used, but Admirable is used elsewhere in book. P. 324 hyperborea is a syn., as hinted. Eggs may be in double layer too. P. 326 furcillata & subpallida are syns. P. 327 the book missed "the Nut", while quoting my original note in Lepid. News; the proper quote was: "And who was Milbert of Nymphalis fame, was he the brother of Filbert the Nut?"; we can't leave out the Nut! P. 328 range is wrong, they must occupy the intervening white areas if they shift over the landscape as the book says. P. 329 is an unusual dark virginiensis larva, back east they are paler with rings around body. P. 330 annabella differs from carye by only a teeny tit on the valva, like titania/grandis, I caught them in Colombia and can't tell the adults apart, so I lump them. P. 332 Australia has ssp. kershawi. Absent in most of S Amer. R. R. Baker found evidence of a little overwintering in Britain, and surely a little overwintering occurs in Colo. as T. Cockerell found one in Jan. P. 334 I don't like the name Admirable; it's a couple pages from Limenitis Admirals which have wide stripes. (Atalanta has raiting=perching mate-locating behavior which the ignorami call aggressive, so Redneck would be just as good.) P. 336 grisea is a syn., and its unh is tan to russet. P. 338 if Weidemeyer was German, it is pronounced Vye-day-my-air. P. 338 fridayi are real intergrades due to introgression: N Nev. has weidemeyerii and fridayi and no lorquini, Mono Lake & W Nev. has fridayi as weid. & lorquini almost interbreed randomly, & Dornfeld and this

book note fridayi in SE Ore. in the weidemeyerii pop.; only in Mont. does S. Kohler find reproductive isolation. P. 339 arthemis may have red spots on unh submargin, or a wider red band—this is a weak character. The bit about arthemis and astyanax being separate species was thoroughly disproved by Austin Platt, who in numerous quality papers amply demonstrated astyanax and arthemis are one species that intergrade fully in three genes that even change in different latitudes. Hybridization with lorquini in BC would logically favor more lumping, not more splitting. L. arthemis (with astyanax)-weidemeyeri-lorquini is a stenchospecies. Suture zones of Remington were discredited in bird papers etc. 30 years ago. Pelham notes that there are a lot of hybrids of archippus X lorquini along the Snake River, and suggests that if one used hybridization to define species, there would be only one N.A. Limenitis. Looking at the big picture, archippus is quite distinct and I have never found a hybrid, whereas arthemis/astyanax broadly intergrade and have been thoroughly proven to be one species, and they are mostly allopatric to weidemeyerii and lorquini, except weidemeyerii overlaps arthemis arizonensis in Ariz.-N.M. (weidemeyerii X arthemis hybridize at Police Coulee in Alta. and in Sweetgrass Hills of N Mont., but not in 4 N.D. cos. where they are sympatric) so we can evidently treat weidemeyerii as a bookkeeping species. BC book says there are many hybrid arthemis rubrofasciata X lorquini, but are there enough to make them one species?, not according to the map dots, so we can treat lorquini as a mostly separate bookkeeping species from arthemis. P. 341 top two photos look like ilgae on unh, but locale says Pierce Co. Wash. well within range of itelkae, so are these ssp. weak? The the burrisonii-like hybrid in BC book looks like female not male. P. 342 intermediates without different characters of their own should not be named, so we should just call idaho lahontani X archippus intergrades if they tend toward lahontani a little, & idaho is a syn. of archippus. P. 343 how often does archippus eat apples?, not often, they haven't colonized Denver with its common apple trees and superabundant crabapple trees. Pelham states he has never observed archippus eating apple either, and archippus are not in apple orchards in S Okanogan Valley now. P. 346 eryngii is not really distinct from california, columbiana looks like a synonym of ampelos to me, the coastal insulanus is only a bit darker than ampelos on ups but unh is much darker than ampelos (Pelham notes ampelos is somewhat variable and occupies the steppe & semi-steppe), sweadneri from NW Mont. is ochre-cream; yontocket is usually ochre above though it varies (and is mostly intermediate between insulanus and california, suggesting it cannot be a valid ssp.?, but series of yontocket seem to show an influx from eunomia also, plus some odd redder-unf adults, so yontocket can be kept for now since it is not quite intermediate). P. 347 Scot's Broom misspelled Scotch broom here. Most are not ochre so Ochre Ringlet is misleading; what's wrong with just simple Ringlet? It was Demorest Davenport—not Thomas Emmel--who showed that they all belong to C. tullia. P. 348 boopis TL Point Richmond Cal. is a good ssp. limited to Calif. as book says, it has only 0-1 unh ocelli, whereas Ottawa-Colo. nephele has the full set of unh ocelli; a bunch from Ochoco Mts. have lots of ocelli so look like nephele, but many others in my coll. from Ida.-Wash.-Mont. have varying numbers of ocelli from few to many and perhaps could be called near nephele maybe; ariane and incana are near nephele; paucilineatus is basically a syn. of gabbii. A huge statistical study of geographic variation would be useful. Lots of hosts in Papilio [N.S.] #6 never made it into this book. P. 350 Great Basin Wood Nymph isn't a good name because it occurs in Calif. P. 351, phocus (TL Lac la Hache BC) is a syn. of oetus; in BC book it is said to have the pattern of oetus but the unh smoothly dark-brown, but what are the odds of their ranges changing exactly all along the BC-Wash. border as the BC book map shows?, zero!, so it would seem that they cannot be distinguished by actual characters and are synonyms. But Pelham suggests that some boreal pops. in N Cascades have suppressed unh markings and smooth ground color, if phocus applies to those; however he notes oetus is extremely variable. P. 352 lower photo of "incana" is same photo of "ariane" on p. 249. P. 353 photo looks like C. palla more than hoffmanni, and maps of Chlosyne and epipsodea show it more likely to be palla than sterope or hoffmanni. P. 354 TL Rock Lake, Alta., N. Kondla 1996 Alta. Natur. 26:40. Bean did not send the types to Edwards because the bug was named 20 years before Bean collected; Kondla is looking into this. Hopfingeri is syn. of epipsodea. P. 356 larva is 3rd or 4th-stage O. calais valerata. P. 356 O. uhleri uhleri probably is annual in Colo. foothills, as I haven't noticed differences between years (it's possible that two cohorts would produce a population every year, but uhleri larvae grow on grasses on open S-facing slopes that are warm, versus sedges in the shade of trees for Front Range Colo. O. chryxus). P. 357 the bit about the king's new clothes is amusing. Actually wyomingo in E edge Rocky Mtn. Nat. Park occurs there alone without any ridingsii flying earlier in the summer, so can't be just the second generation. Scott & Fisher show (Papilio [N.S.] #18) that wyomingo is a late-flying ssp. that has color of ridingsii & pattern lines of stretchi & raits in swales. (In Spring Mts. Nev., there are two cohorts of Euphilotes ancilla purpura that are sometimes sympatric but always allochronic by a month, that do not differ by mating site or diapause stage, and feed on different varieties of E. umbellatum [Austin et al. 2008 {J. Lepid. Soc. 62:148-60} named it a new ssp. cryptica but it's a syn. of purpura to me], and a certain lepidopterist told me that they must be two separate species because he insists sympatric allochronic entities have to be separate species; in that case Pyle might say that there are not only no clothes, but no emperor)(actually I feel naked without my net, and the butterfly watchers trade their net and any possibility of certain identification for binoculars, so I think they are the ones running around naked). Wyomingo hibernates as young larva. P. 357 only 2 sites in text, 3 counties on map, so one site is on county line? P. 358 Vancouver I. missed on map. P. 359 top is confusing as it is O. nevadensis, and isn't labeled Great Arctic like bottom photo is; they do not overlap at all & may be ssp. P. 360 beani is blacker than other ssp. P. 361 valerata is very variable and a ssp. of O. calais, and the Mt. Hull stuff might be O. calais altacordillera (see Papilio [N.S.] #12). P. 365 Bt corn has proven to be not an important threat. Since the monarchs mate randomly by male capturing female in S

Mexico in Feb.-March, the SW-fall-flying ones out of E U.S. would interbreed with the SE-fall-flying ones out of Wash., canceling out their adaptation, wouldn't they? P. 396, JAL is JNL=Jack N. Levy. P. 397, 72:bottom no data.

THE BUTTERFLIES OF THE PACIFIC NORTHWEST. James R. Christensen. 1981. University Press of Idaho. 116 p.

This book is old and insignificant, but many misidentified photos should be noted: Pl. 2, 13, 2nd not 1st brood, 19 E. h. lotta. Pl. 9, 65 & 64 are P. gracilis zephyrus. Pl. 11, 70 S. coronis simaetha, 72 S. hydaspe purpurascens, 70 elaine. Pl. 13, 90 P. cocyta. Pl. 14 & 15, 97 C. acastus I think, 96 E. editha both plates. Pl. 16, 109 L. c. snowi, 110 L. p. arethusa, 112 could be xanthoides X editha. Pl 17, 112 could be xanthoides X editha, 119 cupreus. Pl. 18, 117 male-female switched. Pl. 19, 117 idas anna, 130 E. amyntula. Pl. 21, columns reversed. Pl. 27, #28 & #30 switched. Pl. 30, 16 & 17 switched. Pl. 43, 90 P. cocyta. Pl. 44, 109 cupreus. Pl. 45, 112, xanthoides X editha. Pl. 47, 129 S. sylvinus, 147 mossii. Pl. 48, 164 centaureae, 181 H. comma idaho.

WATCHING WASHINGTON BUTTERFLIES. R. M. Pyle. 1974.

Seattle Audubon Society, Seattle, Washington. 109 p.

Misidentified Photos: Fig. 7, Euchloe hyantis lotta, 12 Colias philodice, 15 Satyrium sylvinus nootka, 30-31 Cupido amyntula, 40-41 Polygonia faunus, 64 Erynnis persius (more likely than pacuvius or propertius).

BUTTERFLIES OF OREGON. THEIR TAXONOMY, DISTRIBUTION, AND BIOLOGY. Andrew D. Warren. 2005. Contributions Gillette Museum of Arthropod Diversity, Colorado State University, Fort Collins, Colorado. 408 p.

This is a good contribution to the taxonomy of Oregon butterflies, aimed at scientist-lepidopterists. It is mostly concerned with studying the geographic variation and distribution of the various species and subspecies. Warren notes that there have been numerous misidentifications of Ore. butterflies, so he mostly rejects other people's identifications and uses mostly his own identifications. There are no illustrations of the butterflies, so it is not possible to check his identification ability here, but it is quite good (though I disagree with the sex or species of eight of his corrections of identifications of photos in Bob Pyle's Butt. Cascadia book, as noted above). The book also has a useful massive compilation of citations of the biological studies conducted on Oregon butterflies anywhere in or near Oregon, no doubt assisted by the Pelham Catalogue bibliography. In contrast to the rejection of others' identifications, Warren accepts a lot of hostplant data & studies from Jonathan Pelham, even though none of that data has been published thus cannot be verified. The altitudes and flight times are combined & summarized for the whole state, which isn't too useful when there is such great variation between the climate of rainy coast, desert, and alpine. The use of the terms "guarding perches", "defending perches", "dueling", etc. for mate-locating behavior are rather annoying anthropomorphisms to me. P. 106 claims that Lycaena heteronea "frantically patrol between flower heads of their Eriogonum foodplants, and defend perches on Eriogonum flowers.", which is self-contradictory in mate-locating terminology (the bug fleeks over the hosts in Colo.). (Raiting & fleeking are now used for perching & patrolling mate-locating behavior, see Papilio [N. S.] #14.) Scott (1992, Papilio [N. S.] #6) reported life histories of many species that were not cited in the book (Pyrgus communis, Pholisora catullus, Papilio zelicaon, Pontia beckerii, protodice, Pieris "napi", Lycaena helloides, Plebejus melissa, etc.), maybe because they were far from Ore. Warren does not like subspecies, yet still uses them throughout in discussing geographic variation. Many of the ssp. discussed I think are synonyms, as discussed in the review of Syst. W N.A. Butt. above, so I have not repeated all of those here.

An Ore. curiosity is Elmer Griepentrog, who evidently singlehandedly mislabeled a thousand specimens, resulting in dozens of erroneous records noted in the book. One would think that someone with that name was invented by mischievous Entomology I students at Oregon State, but Michael Fisher told me that Elmer was a real collector who lived in Seaside, Ore., and exchanged butterflies with him in the late 1960s, and that material was identified correctly to species. Evidently something later happened with Elmer.

Details: Male E. propertius rait on gulch banks and just off the top of hilltops. Ricara isn't a very good ssp. of Pyrgus ruralis. Scott's paper on Hesperia (uncas, comma colorado, comma ochracea) immatures was missed (J. Lepid. Soc. 29:163-7, 1975). Warren documents migration of Hesperia juba and refutes adult overwintering, which Scott also refuted in Papilio (N.S.) #6 & in Lepid. News 1982#1 p. 5. H. comma oregonia is a variable worthless ssp. name. Pyle's Butt. Cascadia p. 81 lower left peckius actually is a male. Alkaliensis is a syn. of Polites s. sabuleti, my series from Lake Co. Ore. is clearly ssp. sabuleti, and Austin (1987 also mapped ssp. sabuleti from NW & N-C Nevada (near Ore.). The Polites "mardon" in Butt. Cascadia p. 89 lower right, Warren says is actually a female, while I think it is O. sylvanoides orecoasta female. Lutea may be a good ssp. of O. yuma with slightly yellower unh. Male yuma in N.M. that have strayed from the Phragmites patch also rait near the ground on river banks. Osceola & kiowa are syns. of Euphyes vestris. Cynodon & Poa pratensis are errors for Amblyscirtes vialis.

The ssp. in Parnassius clodius are mostly useless. Magnus & xanthus are syns. of Parnassius phoebus smintheus. May to Aug. is several generations of Papilio multicaudatus. Neominois menapia tau from Wash. actually is a good ssp. with darker apical black upf marks, similar but not as black as N. m. melanica from coastal Calif.; red unh markings are variable and haven't been shown to have much geographic variation thus far. Elivata is a syn. of sisymbrii. Transmontana & mayi are syns. of coloradensis, which isn't much different from Euchloe ausonides. Ken Davenport has evidently found intermediates between Euchloe hyantis & E. h. lotta on the Kern Plateau. The black upf bar and uph black dots should have been mentioned in the treatment of Anthocharis "sara". Ssp. stella has yellowish males, so the Ore. bugs aren't typical stella. Colias philodice eriphyle is limited to BC pops. with some orangish-laved adults. If Colias eurytheme is migratory, why have I never seen migrants in Colo.? The treatment of Colias occidentalis & christina is good, except that they are obviously conspecific. The P. sennae female in Butt. Cascadia looks too yellow to be philea to me.

The ssp. of Lycaena arota are defined wrongly here and will have to be restudied: ssp. arota actually has whiter unh & the male unf is just ochre-tan with no orangish; virginiensis=schellbachi has brown unh & postmedian-submarginal orange on male unf; the male upf margins don't differ. The Lycaena cupreus ssp. are messed up also, as Scott (Papilio [N. S.] #12 wrote: SE Ore. evidently has ssp. artemisia, while SW Ore. evidently has near-cupreus. Warren notes intermediates between L. xanthoides xanthoides and L. x. editha in Ore.; Pratt et al. 1993 actually could not even distinguish L. rubidus larvae from xanthoides-editha; Scott in Papilio [N.S.] #14 p. 35-36 discusses xanthoides-editha further. The heavily-spotted unh Lycaena heteronea from N Cal. & S Ore. are gravenotata, as they look the same and there are no other differences; excuses such as "most likely does not indicate close genetic similarity" are just hot air in the absence of data, as we have to go on known facts to decide, not speculations, and the facts say they are gravenotata; and the primitive condition throughout Lycaena is a fully-dotted unh, so it's the spotless Great Basin types that are genetically different; above I dealt with lousy names submaculata & rava etc. Penrosae is a syn. of L. mariposa. Habrodais grunus males don't "guard perches", they fleek (patrol to seek females) late in afternoon as the previous sentence on p. 113 says.

P. 115, a mile away is NOT sympatry (close but no cigar, folks), and perplexa is a ssp. of C. affinis (and the perplexa-clone homoperplexa from Colo. intergrades with affinis in S Wyo. & Neb. says G. Gorelick). P. 116, Scott's 1986 book reported that viridis is a syn. of "dumetorum" but the latter will no doubt be banished by ICZN under its plenary powers. P. 117, only one of Scott's specimens from near Satus Pass was was misidentified for certain; and Warren discusses the problems of distinguishing sheridanii from perplexa & affinis in Ore., so one supposes that many specimens were misidentified in Warren's study samples also. Glenn Gorelick wrote that pseudodumetorum (from Stanislaus Co.; my series from there fits the O.D. description of specimens from Trinity Co. TL) is related to viridis, and Warren seems to show that it belongs to C. viridis (as sheridanii) (near lemberti) (Ken Hansen found that it is sympatric with perplexa in Trinity Co., and Univ. Colo. museum specimens show perplexa sympatric with pseudodumetorum in Del Puerto Can. in Stanislaus Co., so can't belong to that), and so it seems that viridis is conspecific with C. sheridanii (dumetorum is older than sheridanii, but I have petitioned ICZN to suppress it and protect sheridanii from viridis). My reared topotype newcomeri and nearby specimens are small with a thin white unh line, so I have difficulty believing that populations in Polk & Josephine Cos. in W Ore. that are nearly immaculate can be intermediate newcomeriXviridis as middle of p. 121 & top of p. 122 says (Warren notes that true newcomeri are often large, females are often tawny, and uns is somewhat bluish-green, but do they have few white spots?), maybe the W Ore. bugs are better called newcomeriXlemberti, as lemberti averages fewer spots (the next sentence on p. 121 calls them near-viridis, which is even more dubious). P. 123 claims that interrupta is similar to neoperplexa, which is also dubious, as the unh line is variable and sparse in the former, complete in the latter. P. 124 then claims that pseudodumetorum could be treated as a syn. of newcomeri, which is quite wrong, and the same paragraph claims that lemberti is broadly similar to neoperplexa, which is again wrong. We need more study of larvae of these bugs, which show good differences (Ballmer & Pratt in J. Res. Lepid. 27:40 says that comstocki, viridis "dumetorum", & lemberti have saw-tooth-profile big ridges on most older larvae, whereas perplexa is more rounded), and less study of adults which in Ore. can often not even be identified. Anyway, viridis "dumetorum" and pseudodumetorum are not newcomeri, and this book's Callophrys section suffers from sloppy writing. But it does seem that Warren has shown that viridis "dumetorum" and sheridanii (and lemberti & interrupta) are likely all one species, so we do need the ICZN to suppress the name dumetorum, as dumetorum has the awful history of stomping on viridis and causing vast confusion of viridis vs. dumetorum and dumetorum vs. perplexa, and now causing even more confusion of dumetorum vs. sheridanii; the disgusting name dumetorum must be banished forever! And sheridanii must be given priority over viridis.

The treatment of Callophrys gryneus in this book is excellent, as Warren corrects a lot of errors, and finds that the type of barryi was mislabeled and was from a Thuja pop. near Portland, so he synonymizes it to plicataria, & finds that plicataria & barryi & byrnei are all syns. of rosneri, and synonymizes acuminata to nelsoni, & redemonstrates my 1986 book finding that the gryneus ssp. (incl. siva, nelsoni, loki, etc.) can switch hosts in nature and they all eat each other's hosts in lab, and Warren shows that my book's lumping of all these into one sp. gryneus was correct. Ninus is a syn. of C. spinetorum. The book missed my note that Callophrys johnsoni flies down-gulch to find moisture (Scott 1973b, J. Lepid. Soc. 27:283-7). I have 3 Callophrys mossii from Morrow Co. that are mossiiXschryveri. Obscurus is a syn. of polios, and maritima doesn't look different either. My 1986 book described C. polios larva & pupa. Purpurascens is a syn. of sheltonensis, a good ssp. with darker purple uns. The book separates Satyrium fuliginosa & S. semiluna as distinct species, but does not give

supporting information, as they are not sympatric, supposed differences in structure and wing shape are not presented, and high-Cascades pops. are not on ridges & have vestigial stigma intermediate between the species (& the book claims that Dornfeld's 1980 p. 196 #4c-d female is S. semiluna but it looks exactly like S. fulig. tildeni and nothing like semiluna to me). Maculadistinctum is a syn. of semiluna. Columbia is a syn. of Satyrium behrii. Occidentalis doesn't seem much different from Satyrium titus watsoni=winteri. Obscurafacies is basically a syn. of Sat. californica, as is cygnus. Scott 1992 showed that S. californica is polyphagous on many shrubs, so maybe Dyar's 1894 Yosemite rearing on Salix was californica. Pyle's Butt. Cascadia p.197 upper right photo actually is a female. Okanogana is a syn. of Satyrium saepium. Setonia is a syn. of atrofasciata, pudica a syn. of Strymon melinus, whose males have orange abdomens after spring, and which doubtfully immigrates.

Cupido comyntas in Ore. are not sissona, which was explained in Papilio (New Series) #12 with the description of C. c. pacnowe. Wright (1885) reared C. amyntula from inside Astragalus pods in Calif. The treatment of Celastrina echo also suggests there is a 2nd species Cel. nigrescens over much of Ore. (nigrescens with small, shorter wings [vs. larger, longer wings in echo], hazy dusky blue ups. [vs. darker clear purplish-blue in echo], unh variable but most have larger darker spots [vs. poorly-maculated clear-white, often bluish unh], fringes strongly checkered [vs. white]). But I do not understand the difference between them, as nigrescens has violety ups in BC also. Rearing from natural hosts is needed (but beware, my adults of Cel. neglecta reared from Prunus virginiana leaf galls in Minn. were much more silvery than wild adults). Echo is supposedly assoc. with Ceanothus velutinus, nigrescens with Holodiscus, but I wonder if those are real main hosts, or just possible occasional hosts? (Celastrina taxa such as sidara & ladon & neglecta may have main hosts and lots of secondary hosts). Much more work needed here; based on maculation & fringe is nigrescens the S ssp. of Cel. lucia? Toxeuma is a syn. of Glaucop. piasus daunia. Leona is obviously a ssp. of Philotiella speciosa, and maybe a syn. of bohartorum; septentrionalis is a syn. of speciosa. The Euphilotes on Eriog. marifolium (fig. on front book cover) is E. battoides ssp. near battoides (which also eats E. marifolium). Warren raises E. glaucon on Eriog. umbellatum (with oregonensis & intermedia) to bookkeeping species status, within stenchospecies E. battoides. He treats the similar bug on E. heracleoides as a separate species having paler uns & later flight, but it seems to be a new ssp. of E. glaucon, which has a couple apparent relatives that are "sympatric or narrowly parapatric [apparently the latter, as proof is not given of the former]". Euphilotes "baueri" seems to be an unnatural catchall mess. Evidently E. columbiae should be called E. ancilla columbiae? Plebejus "idas" in Ore. I treated as Pleb. atrapraetextus in Papilio (N.S.) #12; the Ochocos to Wallowas pops. are P. atrap. atrap.Xlonginus, and I named the Warner Mts. bug P. atrap. benwarner. In Colo., male P. atrap. sublivens and P. melissa often rait (perch to await females) on little trail-like depressions in valley bottoms. The BC book statement that idas feed only on Vaccinium was an error. Ricei is a syn. of P. anna anna; the amount of uns and female ups orange varies greatly in these. Both of Shapiro's records of host Astragalus whitneyi var. siskiyouensis on p. 189 top (for P. anna) & also p. 190 top (for P. melissa) were for the same Ball Mtn. bug that later proved to be P. atrap. benwarner, not P. anna or P. melissa (see Papilio [N.S.] #12). Real P. melissa in Colo. was NOT the high-altitude bug with reduced orange (an error by F. M. Brown, which I fixed in #12). Glycyrrhiza lepidota is a dubious host for P. melissa; it is ignored in Colo. Austin's (1998i) conclusions on Plebejus saepiolus aehaja & rufescens were wrong, and insulanus is a syn. of amica, as I explained in Papilio (New Series) #12; evidently Oregon has ssp. saepiolus over most of the state, and weak ssp. littoralis (which actually has smaller uns spots with white rings) on the SW coast. Colo. Front Range P. s. near-gertschi eat Astragalus (Scott 1992). P. 193, fenderi does not resemble pardalis. Montis is a syn. of Pleb. icarioides pembina. Pyle's Butt. Cascadia p. 250 photo actually looks most like a male Pleb. melissa. Calchas is a syn. of Plebejus shasta, & pallidissima is a syn. of minnehaha. P. 200 top, Pelham's bivoltine P. alupini in Wash. may refer to what he now considers to be P. acmon, which is bivoltine there (at the Chelan site Scott 1998b referred to, etc.). P. 201 middle, real lutzi doesn't have large uns spots. P. alupini spangelatus also occurs in Alta. (Papilio [N.S.] #12), so may occur in high Wallowa mts. too. The Plebejus on Eriog. pyrolifolium in the high Cascades from Mt. Shasta to Mt. Adams is evidently a nice distinctive unnamed ssp. of P. alupini, which is sympatric with P. acmon but not with other P. alupini varieties.

Scott (1986) book had photos of Euptoieta immatures. P. 207, Pyle's pugetensis photo was on p. 265, not 256. Speyeria zerene hippolyta differ from bremneri on ups median band & unh disc & submargin. Scott's 1986 book lumped S. z. garretti into picta, following Grey & Moeck 1962. NE Ore. pops. are evidently S. egleis linda. Pyle's p. 273 lower right photo is a male S. hydaspe, not zerene. Dodgei is a syn. of S. hesperis cottlei (in turn a weak variety of irene). Speyeria atlantis was a mess until Scott et al. (1998) fixed it & divided it into two sp. & named 3 ssp. Study of the types clearly indicates that irene is NOT a syn. of egleis, as noted in Butt. Cascadia review. Pyle's p. 278 upper left fig. is S. coronis I think. All those Boloria selene ssp. except atrocostalis are very weak. The B. bellona ssp. are very dubious; Scott 1992 showed a partial 2nd gen. in Colo. Uslui & borealis are syns. of B. epithore chermocki. Oregonensis is evidently a syn. of Chlosyne leanira, & basinensis a syn. of alma. Scott 1992 found "basinensis" on Castilleja chromosa. Chlosyne palla ssp. eremita-palla-sierra is a cline, and only 2 names can be used for a cline, so eremita has to be considered a syn. of palla. The treatment of Chlosyne palla & acastus is good, with J. Pelham's finding that sterope belongs to C. acastus (which becomes C. sterope acastus). P. 231, Ferris 1981b dorsal female at far right is on p. 324. Manchada is a syn. of C. hoffmanni segregata. Hoffmanni's "patrol territories" evidently means flaiting behavior? I add two more misidentifications of Phyciodes orseis in Pyle's Butt. Cascadia: the middle left male on p. 297 is P. mylitta, and BOTH females on Pyle's p. 301

are P. pulchella montana. P. 238, Aster "Eurybia" glaucodes is the host of Phyc. batesii anasazi, which is not conspecific with P. cocyta as this page claims (see Papilio [N.S.] #13). P. 241, owimba & inornatus are not synonymous, the antenna is orange in former & black in latter, & latter is an invalid intergrade anyway (see Papilio [N.S.] #13). Jack Harry gave lots of hosts of Euphydryas gillettii in Scott's 1986 book. P. 244 notes apparent intermediates between E. anicia bakeri and what is now considered a separate sp. E. bernadetta veazieae along Snake River in Baker Co. Scott 1981a found no difference between colon & chalcedona valvae. SE Jackson, S Klamath & S Lake Cos. seem to have E. chalcedona colon with mixture of macglashanii; Austin & Murphy showed macglashanii is extra-creamy on ups, with little extra red. Pyle's Butt. Cascadia p. 312 upper right photo looks like a male to me. E. editha baroni is a local Mendocino Co. Calif. bug with extreme red uns. Polygonia faunus rusticus has a brownish uns, and evidently does not extend northward into Ore., while fulvescens is doubtfully much different from rusticus in nature (most known specimens are reared). The zephyrus fig. by Guppy & Shepard p.252 looks like a female in wing colors & shape to me. P. oreas and P. progne are closest relatives in uns color, hosts, larvae, rarity, weak flight, & gnathos (see Papilio [N.S.] #12), despite mtDNA (progne evidently stole its mtDNA from P. interrogationis/P. comma) which has been proven recently to be rather useless for the study of phylogeny. SW Ore. pops. are P. oreas near-silenus, based on my Siskiyou Co. series. Threatfuli is not intermediate silenusXnigrozephyrus, they are intermediate silenusXoreas, nearer silenus. Nymphalis milberti migrates altitudinally. Pre-hibernation Sept. Nymphalis antiopa frequently feed on Chrysothamnus flowers in Colo. Vanessa cardui kershawi is geographic variation. Scott (J. Res. Lepid.) showed that spring cardui migrants into Colo. fly to NNE all day long, so how does cardui get to Ore.? Scott's 1986 book figured the Vanessa virginiensis larva. Idaho is basically a syn. of Limenitis archippus. Warren indicates that Adelpha eulalia is a distinct species, but provides no evidence that californica is a separate sp. from A. bredowii, so it's A. bredowi californica perhaps.

Only half of my Coen. tullia ampelos have one ocelli (on rear of unh). Eryngii is a syn. of C. t. california (a slight intergrade thus invalid). Yontocket isn't similar to insulanus (which is like ampelos), it looks like californiaXampelos then adding strong uns markings. Ariane & incana are synonyms of nephele, paucilineatus is a syn. of gabbii. Scott 1992 reported that Cerc. pegala do NOT drop their eggs in flight, they always land and extrude an egg, and half the time the egg falls parabolically into the litter and sticks to the first thing it hits (the other half the egg sticks to the plant the abdomen touches). Erebia epipsodea has no valid ssp. Neominois mating period is early-to-mid morning, so the afternoon patrollers must have been flying for another reason such as predator avoidance.

The references are 99 pages!, and with their info cited in text make the book useful. (There is a space between entries and the type is large, so with hanging paragraphs and smaller type they could have been put into 50 p. to save $) P. 292, it's J. V. Z. Brower. P. 296, move Chermock & Frechin to p. 297. P. 299 spelled Cockerell. P. 358, add Scott, J. A. 1975. Early stages of seven Colorado Hesperia. J. Lepid. Soc. 29:163-7.

THE BUTTERFLIES OF OREGON. Ernst J. Dornfeld. 1980.

Timber Press, Forest Grove, Oregon. 276 p.

Warren (above) corrected this book, so I won't repeat most of that, and won't repeat the ssp. corrections already noted. It was a good book for its time, but is somewhat out of date as Warren notes.

P. 40 oregonia is obviously P. machaon oregonia, & has 2-3 gen. Maple is dubious for Papilio glaucus rutulus. Parnassius hibernate as eggs. Neophasia men. menapia occurs in Ore. Limenitis lorquini doesn't occur in Wyo. or Alta. Polygonia oreas don't eat azalea & rhododendrons. Castilleja is an error for Chlosyne palla. C. palla & C. sterope & Callophrys etc. were updated by Warren. Euph. editha baroni is limited to Mendocino Co. Calif. Adult Call. eryphon--not larvae--were on willow catkins. Polygonum is an error for Lycaena mariposa. Lycaena helloides hibernates as eggs. The gnathos illustrated for Plebejus melissa looks like "idas", and the treatment includes Pleb. atrapraetextus (maybe some photos too). Avena is a lab food only of Amblyscirtes vialis. Symphoricarpus & Ambosia are errors for Pholisora catullus, Amaranthus an error for Heliopetes ericetorum, Sidalcea an error for Pyrgus ruralis, Sitanion an error for Thorybes mexicana. Th. diversus does not occur in Colo. or Wyo.

I list some of the misidentified photos here (the major corrections--very many ssp. names have to be updated due to progress, & the sex is wrong on a dozen as Warren notes). Pl. 4#1a-c are N. m. menapia. Pl. 6#4b-c-5a-c are Col. occidentalis occidentalisXwasatchia females. Pl. 10#4a-c are Cerc. pegala nephele. Pl. 17#4c is probably Polyg. faunus. Pl. 18#1a-d Phyc. cocyta selenis. Pl. 19#5a-c is Chl. sterope sterope. Pl. 22#2a-c are evidently E. editha rubicunda. Pl. 34#4a-b is Sat. (fuliginosa?) semiluna. Pl. 36#8a-d Call. [viridis] sheridanii newcomeri. Pl. 39#2a-d Lyc. nivalis browni. Pl. 40#2a-d Pleb. anna anna. Pl. 41#5a-d Cupido comyntas pacnowe. Pl. 43#4a-d Och. sylvanoides orecoasta. Pl. 46#3a-d are Hesperopsis libya near-libya. Pl. 48#2a-c are Th. mexicana aemilia.

The maps need correcting in recently-revised groups such as Colias occidentalis/edwardsii, Chlosyne palla/sterope/acastus, Plebejus acmon/alupini, Euphilotes, Callophrys [viridis] sheridanii/perplexa, C. gryneus, etc.

ALBERTA BUTTERFLIES. C. Bird, G. Hilchie, N. Kondla, E. Pike, & F. Sperling. 1995. Provincial Museum of Alberta. Edmonton, Alberta. 349 p.

This book has a nice appearance, with glossy pages and pretty maps and photos (the little North American maps were taken from my book). Unfortunately, the book has many errors. The text appears to have been written a decade prior and poorly updated since. Evidently the book was written mostly by Charles Bird, a long-retired botanist rather than a lepidopterist; p. 2 suggests that Albert Finnamore helped mix up some of the photographs. Gross misidentifications abound in the photos. Dozens of photos are misidentified as to sex, including many not corrected in the errata. Surprisingly little new biological information such as hostplants is presented, and numerous hostplant errors from the literature are repeated. Species are arranged alphabetically rather than by taxonomic similarity. Many good common names are ignored and bad ones used. The little maps showing the North American range are lifted directly from Scott's (1986) Butterflies of North America, frequently without adjusting for changed species concepts. The dot maps seem fine, but the purple mountainous area is too small on all dot maps so a quarter of the dots for alpine species are mistakenly outside the purple area.

Detailed comments on each species: Bouteloua curtipendula occurs N to Mont. at least, and is probably the host of Amblyscirtes oslari in Alta. Amblyscirtes vialis doubtfully eats Poa since its hosts are hay-type-grasses, my larvae died eating it, and Avena is a lab food only. Ancyloxypha numitor doesn't eat Poa for the same reason; Minn. females fly right over Poa lawns to oviposit on hay grasses beyond. Scott (1992, Papilio New Series #6) paper clearly showed that logan belongs in Anatrytone, whereas Atrytone arogos is vastly different. Schizachyrium is an error for A. logan, as the original host record merely stated "Andropogon" and only A. scoparius is Schizachyrium. The photo of male Hesperia comma manitoba is rather pale on uns & looks like assiniboia. The TL of Hesperia comma manitoba is Lac la Hache B.C., not Man. as the inappropriate name implies. There is no proof that H. comma contains more than one species in Alta.; in Colo. we have proof that the manitoba-like colorado is the same ssp. as the lowland ochracea that looks like assiniboia. The photo of Hesperia nevada female is H. comma female. Oarisma garita males fleek, they do not perch or defend territories. Poa is dubious for Poanes hobomok; photo of female is Polites peckius. The Polites rhesus male photo is female. The Carterocephalus palaemon photo is ssp. magnus, not mandan, according to N. Kondla; Poa is a lab host only, palaemon would probably eat Bromus inermis but doubtfully Bromus tectorum which is not a suitable hay grass. Presumably Erynnis afranius occurs in Alta. Thermopsis rhombifolia was just a "likely" host of afranius in N.D., not a confirmed host. Erynnis persius fredericki was named after R. C. Frederick not R. C. Fredericki, and this ssp. is doubtfully distinguishable from borealis or persius. Malva is the same old error for Pholisora catullus. The text says Pyrgus centaureae freija is darker than loki, but the photos look the same. Scott never observed oviposition on Potentilla diversifolia in Colo., only on Vaccinium near it, and Scott's recent research shows that lab larvae eat Vaccinium, as well as Potentilla and Fragaria etc.--another example of Scott's law that all bog butterflies are polyphagous. Pyrgus communis has only 2 gen. on the Colo. plains, so has two in Alta. The Pyrgus scriptura photos have black streaks extending to edge of the hindwing fringe, and the unh is darker (both traits like Pyrgus xanthus), so are oddly atypical—why? Thorybes pylades pupae do not overwinter. Several populations of Parnassius phoebus occur in Colo. on hills at the plains edge; and males fly only 1/4 m above ground. Shepard's claim that Parnassius phoebus and smintheus are separate species lacks proof, as the primitive egg of smintheus matches the European egg, and several of Shepard's "Alaskan" traits also occur in SW Colo. pseudorotgeri (occurrence in moist swales on Sedum rosea, dark submarginal band on fw), and the micropyle photos are rather similar with a magnifying glass. Papilio machaon dodi is a syn. of brucei. Two of my maps for machaon are mislabeled. Oakley Shields (J. Res. Lepid. 6:69) reported lots of mating behavior of Papilio zelicaon. The book separates Papilio glaucus and canadensis and rutulus wrongly, as Hagen et al.'s reasons for separating glaucus from canadensis are very weak, they intergrade over a broad zone of a hundred miles or more, and canadensis and rutulus intergrade broadly in SE B.C. and Mont. (J. Scott and J. Shepard, Pan-Pacific Ent. 52:23-28, and the Black Hills (L. Brower, Evolution 13:40-63); even in Colo., glaucus/rutulus intergrades are found along with a few stray glaucus; there is little or no reproductive isolation within the glaucus-group, whereas P. eurymedon and P. multicaudata show total reproductive isolation). The domestic crabapple record for P. eurymedon is an error as previous records mentioned only apple. Species alnifolia is an error for P. multicaudata, as previous records mentioned only Amelanchier. The Pieris "marginalis male" photos on p. 117 are obviously female & same photo wrongly put on p. 119. Text states that marginalis may intergrade with Pieris oleracea along Bow River, so why are they split? (They state that Geiger & Shapiro also claim that Anthocharis sara and stella are differentiated at the species level, yet inconsistently do not split them). Pieris rapae occurs in some wild areas in Colo., up to 11,800'. Pontia callidice occidentalis does have a spring form, but the book fails to mention that Pontia protodice is just a temporary immigrant in Alta. late in the season, thus is summer form. The upf markings of Pontia sisymbrii photos are wide. Alta. bugs evidently are Anthocharis julia columbia. The second Colias canadensis photo is male ventral. Migration of Colias eurytheme is rare. Colias gigantea is surely a ssp. of scudderi; biological differences between them are dubious, scudderi is semipolyphagous on Salix & Vaccinium & Polygonum, so gigantea will probably prove to be also. Colias nastes larvae lack pink stripes in Alta. according to Clyde Gillette; the pink description comes from European larvae, which recent research suggests is a different species Colias tyche that includes thula & boothii. Spring Colias philodice also generally have submarginal unh dots; pupae do not overwinter. The Colias pelidne male photos are Colias philodice male spring form; the female pelidne photo is a female C. occidentalis christina. The "niphon" photo on the key on p. 152 is eryphon. The photos of Lycaena "dorcas" florus male look like L. helloides male. Photos of female L. "dorcas" florus are L. d. dorcas (the authors missed the opportunity to contribute anything regarding the relationship between L. helloides, L. florus,

and L. dorcas). Papilio (N.S.) #12 shows only Potentilla palustris is used by L. d. dorcas, and L. florus is a separate sp. Two hostplant errors published by Lembert (Gayophytum and Oxytheca) are repeated; helloides overwinters as egg not pupa. The N.A. maps for both dorcas and helloides were taken from Scott (1986) without adjusting for the book's species concepts. Lycaena mariposa eats Vaccinium not Polygonum douglasii (an error corrected long ago). The Lycaena nivalis female is male. Ivesia & Horkelia are errors for Lycaena xanthoides editha hosts. P. 163 misquotes Wright & Ballmer who actually found gene flow between xanthoides and editha even on the E side of the Sierras; and A. Warren's Butt. Ore. now adds xanthoidesXeditha intergrades in Ore. I still use the name Lycaena thoe instead of L. hyllus, as the hyllus figure was evidently L. thersamon. The book fails to list any distinguishing features of Lycaena cupreus henryae. L. phlaeas doesn't occur in Colo., and overwinters as larvae not pupae. Both photos of Callophrys [viridis] sheridanii uns seem to be ssp. newcomeri not sheridanii. The photos of Satyrium=Harkenclenus titus are evidently ssp. watsoni, not immaculosus, though Alta. evidently has an intergrade between them. Callophrys polios doesn't always oviposit on dorsal leaf surfaces. The upper right "Callophrys niphon" photo is C. eryphon; upper left clarki is female. Do they intergrade in Alta?, the text mentions intergradation, 2 photos are misidentified as noted above, a key couplet is wrong, and Rob Robbins told me that eryphon and niphon intergrade. C. niphon doubtfully patrol to find females. Callophrys gryneus and siva intergrade S of Gothenburg Neb., and in the Sacramento Mts. N.M. and W Tex. Satyrium acadica has no valid ssp., and N. Kondla found that the 3 dots in SW Alta. are actually Ted Pike specimens of S. sylvinus nootka, which belong on p. 184, where the photo looks like nootka. S Alta. evidently does have Satyrium liparops aliparops if only some specimens have an orange upf patch (some have orange in Colo.). Cercocarpus is an error for Satyrium saepium. Strymon melinus eats fruits, not leaves; photo is male (abd. is orangish on summer males). Poison ivy is an error for Celastrina, as the published record was Rhus typhina. Trifolium and Thermopsis are errors for Everes amyntula, which oviposits mostly on pedicels; albrighti is maybe a valid form in Mont. & BC with grayer uns, and maybe ssp. maritima occurs in Alta. (ssp. are weak and difficult in this sp.). The top photos of Glaucopsyche lygdamus couperi are of an aberration, middle photos are ssp. oro, bottom female looks like ssp. afra. Plebejus "idas" is evidently two sp. in Alta. (see Papilio [N.S.] #12): P. scudderi which eats Ericaceae (Ledum groenlandicum is not a confirmed host as it was reported as only "probable" in Man.), & P. atrapraetextus which eats legumes. Plebejus melissa eggs--not larvae—overwinter; the male may be P. atrapraetextus. Lotus corniculatus is an error for Plebejus acmon, a lab food only. P. alupini lutzi occurs in Alta., not P. acmon, and P. alupini spangelatus occurs in the alpine zone at two known Alta. sites. P. icarioides pembina & P. shasta minnehaha occur in Alta. P. 212 3a is Chlosyne palla not damoetas. Helianthus and Salix and Ulmus are old bad errors for Nymphalis milberti. The book fails to mention that Onobrychis viciaefolia (not viciifolia) was published as a "fortuitous" host of N. antiopa. Nymphalis californica and N. vau-album have no ssp. The keys to Polygonia zephyrus/oreas/faunus are misleading. Polygonia faunus rusticus only occurs in Calif.; Alta. specimens should evidently be called ssp. cenveray, & arcticus is evidently similar to cenveray as the Yukon photo of "arcticus" female (not male) looks like that. Polygonia gracilis and P. zephyrus are both treated even though they say they cannot be distinguished in Alta. (actually they can, zephyrus has less-two-toned uns), and they repeat the same dot map and the same Scott N. Amer. blotch map of gracilis for both species! The Alta. Polygonia interrogationis was obviously a vagrant. Polygonia progne progne does not occur in Alaska & is rare stray in Colo. Alta. has P. oreas near-silenus. Ulmus is an error for P. gracilis zephyrus. Lupinus is dubious for Vanessa carye annabella. Vanessa atalanta overwinter as adults not pupae. Most of Scott's (Papilio [N.S.] #6) hostplant data for butterflies such as Boloria never made it into this book, even though that paper was cited in Bibliography. The Boloria alberta "male" is a female; male alberta do not hilltop, they patrol the hillside Dryas mats, and B. alberta does not occur on "barren" ridges except as singletons rapidly trying to find their proper Dryas mat habitat. Boloria bellona jenistae is a syn. of bellona. Alta. has B. titania grandis (not chariclea); Salix herbacea may be an error for B. titania chariclea. Alta. has B. epithore chermocki=uslui. Thalictrum is an oviposition error for Boloria eunomia; larvae lack blue dots. The photo is too pale to be B. e. dawsoni. Boloria improba aberration youngi is a syn. of improba; the Alta. ssp. is ssp. nunatak, which flies on lush tundra, not barren land. The Wyo. range of Boloria alaskensis "napaea" is missed on map; Polygonum viviparum=Bistorta vivipara. B. selene must have 2 gen. occasionally. In Euptoieta claudia, Portulaca oleracea is questionable (listed in a Brazil paper). Alta. has S. atlantis hollandi (upper photo)(N. Kondla notes it also from SW Alta. corner & Cypress Hills), S. hesperis beani (middle photo), & S. hesperis dennisi=lais (bottom photo). P. 252 photo looks like S. coronis snyderi. The Speyeria egleis photos look like ssp. mcdunnoughi, not ssp. albrighti the ssp. that would occur in Alta. P. 257 maybe they missed the small Viola labradorica on Horn Ridge. Speyeria zerene doesn't hilltop in Scott's experience. Paul Grey's map has so many "garretti-picta"'s that garretti should be considered a syn. of the older picta. The genus Charidryas was used by Miller/Brown for no good reason. C. acastus has two gen. in Alta. according to N. Kondla. The photos of Chlosyne damoetus are C. palla. Alta. C. damoetas are actually C. whitneyi altalus, with brighter ups & concave fw margin. Aster is an error for C. gorgone, which has no ssp. Cypress Hills Alta. has E. anicia near-anicia and E. bernadetta. Euphydryas editha overwinters half-grown, not in final stage. E. gillettii 2nd photo is uns. The Alta. ssp. was later named P. batesii saskatchewan; young larvae live on, rarely under, a silk web. All Phyciodes overwinter as unfed 4th--not 3rd--stage larvae. Phyciodes cocyta was never known as pratensis. Pupae of Phyciodes pulchella are notably less-bumpy. Alta. has P. pulchella owimba & P. tharos orantain, both with orange antenna clubs. Alta. has L. lorquini itelkae. The Limenitis weidemeyerii illustrated has wide bands, not the narrow ones supposedly characteristic of oberfoelli. Lethe

anthedon overwinters as 3rd and 4th stage larvae. Cercyonis silvestris is misspelled, and is a ssp. of C. sthenele not oetus; ssp. phocus was characterized by grayer unh, charon by darker unh. Ino is a syn. of C. pegala nephele. Coenonympha tullia likes flowers; it's silly to claim that C. ochracea jumps from the S Rockies to N.W.T. with C. inornata in between, and there is no evidence that there is more than one species tullia in N.A. The N.A. map of C. inornata was unaltered from Scott without the necessary change to fit their species concept. W. Krivda wrote that Erebia discoidalis pupae overwinter. A large paragraph is devoted to apologizing why they can't decide their ssp. of Erebia epipsodea; the answer is simple, there aren't any valid ssp., but there is much individual variation, including a Colo. form brucei that lacks ocelli. E. magdalena saxicola is a dubious ssp. based only on a few paler body hairs; E. magdalena lays eggs on boulders, not under rocks, courtship occurs all day, and females occur near the males (males flait [patrol and sometimes perch] in rockslides nooks, while females occur on more vegetated areas nearby); the book fails to note that Yukon pops. are intermediate in red flush between magdalena and mckinleyensis. If the Erebia stubbendorfii theano record from Alta. is an error, then why is it on the N.A. map? (because those maps were taken from Scott's book unchanged); Salix was only an oviposition site, not a host. Oeneis alberta females are active in morning too; I haven't noticed any hilltopping. Later research in Papilio (N.S.) #12 shows that Alta. has O. chryxus chryxus (the photos) in mts. (chryxus oviposits on fallen or still-attached twigs above Carex mats under pine [usually] trees in Colo.), O. calais caryi in N Alta., & O. calais altacordillera in mts. It is doubtful if any butterfly eats Juncaceae in nature, even Oeneis jutta. Oeneis melissa overwinter as larvae, not pupae. Oeneis polixenes larvae cannot possibly mature the first year; the mts. have males near-brucei but females nearer subhyalina; but what ssp. occurs in extreme N Alta? The life history of Oeneis taygete is known at Churchill; I still lump it into O. bore. Female Oeneis uhleri are active in warm mornings also. Neominois actively mate-locate in early morning. Why so few dots for Danaus plexippus?, it must be a rare migrant to Alta. Acerates and Apocynum are dubious plexippus hosts. P. 313, Viceroys are also semi-unpalatable.

BUTTERFLIES OF THE ROCKY MOUNTAIN STATES. C. Ferris & F. Brown, eds. 1981. 8 authors. University of Oklahoma Press, Norman, Oklahoma. 442 p.

I already published full corrections/review of this book in J. Res. Lepid. 20:58-64, though that review is somewhat dated. So this is brief, and corrects some errors in that review, and includes all the photo corrections. P. xiii, Cockerell lived in Las Vegas New Mex. P. 16, Oeneis melissa & Papilio zelicaon are rare in alpine meadows. Neophasia menapia tau is a local NW Wash. ssp. with more upf apical black. The first Pontia sisymbrii photo is female. P. 161 “astraea” f is christina f. P. 176 pseudorotgeri photo is smintheus m (pseudorotgeri is only in San Juan Mts.). Apodemia mormo pueblo occurs in SE Colo. Celastrina lucia sidara occurs on E slope of the Colo. mts., C. l. lumarco on W slope, C. (argentata?) humulus in Front Range foothills, Cel. neglecta on E plains, & Cel. neglecta cinerea in southern Sangre de Cristo Mts. R. Bailowitz later published in J. Lepid. Soc. that herri is a S Ariz. ssp. of Cupido=Everes amyntula. The area has multivoltine Lycaena helloides, & single-gen. L. florus (castro) in mts. incl. L. florus megaloceras in Bighorn Mts. & L. f. near-megaloceras in C Mont. (see Papilio [N.S.] #18). The area has Satyrium titus watsoni E of continental divide, and S. t. immaculosus W of it & in the NW Great Plains. The book should have figured Callophrys [viridis] sheridanii neoperplexa, as nobody seems to know what it is or how it is distinguished from newcomeri. The first Cyllopsis pyracmon henshawi photo is female. P. 277 damei are Cercy. pegala nephele. P. 285 upper left male is Oeneis uhleri. P. 310 upper left male & female are S. atlantis sorocko. P. 319 photos are P. batesii near batesii from Syracuse, Onondaga Co. N.Y. P. 324 right female is C. palla calydon female. P. 331 alena is the later-named E. anicia wecoeut. P. 332 the maria & windi paintings in Howe (1975) are correct, as Todd Stout finds that maria is mostly black, and the orange windi would seem to be a syn. of E. anicia eurytion (or eurytionXanicia thus invalid) which this book claims ranges N at moderate elevations into Wyo. & Montana. P. 340 brown female is the later-named P. oreas nigrozephyrus female. Some migrants of both Libythea carinenta larvata & L. carinenta bachmanii are known in Colo.

FLORISSANT BUTTERFLIES. T. C. Emmel, M. C. Minno, B. Drummond. 1992. Stanford University Press, Stanford, California. 290 p.

Florissant is a relatively flat wooded area of the Colo. mts. that has a rather dull fauna for Colorado, except it has a lake-bed shale deposit with lots of fossil tree stumps & fossil plants & bugs. The butterfly fossils are illustrated (some are spectacular, some are vague wrecks). The best feature of the book is the many b/w photos of larvae & a few pupae, most by M. Minno. The book has 8 color plates of adults. The text is rather skimpy for each species, and there are a lot of errors.

Color plates: Pl.I#4a-c are E. persius, probably coll. by me. Pl.I#7b is Pyrgus ruralis. Pl.II#23a-b are P. zelicaon; 23c-d are P. zel. form nitra. Pl.IV#42a&c are Lycaena florus near-sangremar. Pl.V Oeneis chryxus live adult is O. calais altacordillera. Pl.VI#82a-c are Chlosyne palla flavula. Pl.VI#83b-c are Chlosyne leanira alma. Pl.VI#77a-c are Phyciodes cocyta selenis. Pl.VII#75c is Spey. hesperis hesperis. Pl.VII#75d is Spey. coronis halcyone. Pl.IX#80a[same specimen as fig. 47]-b are Phyc. cocyta selenis from Big Spring Ranch.

Detailed comments: P. 2, the first Lepidoptera probably ate detritus, as Micropterygidae do today. P. 13 Colo. has more butterfly species than Calif. P. 32 photo is Rumex crispus. P. 33 Megathymus yuccae occurs at a similar elevation at Tarryall River in Park Co. Erynnis afranius surely does not occur in the area, and the plate figs. are E. persius. Pyrgus xanthus is a mtn. species, but not alpine. Mature larvae of Pyrgus scriptura probably hibernate. Stinga eggs hatch quickly, & mature larvae hibernate. Hesperia comma ochracea most often ovip. on turflike sedges. Polites sonora eggs are laid without glue and fall into the litter. Paratrytone snowi host is only Muhlenbergia montana (Blepharoneuron was Scott's error). Parnassius phoebus adults often feed; eggs hibernate. Nitra is just the black form of P. zelicaon. Papilio glaucus rutulus ovip. on ups of leaves. Neophasia lay a row of eggs on the pine leaf. Eriphyle is limited to S BC. P. 56, maybe the record of Rumex triangulivalvis is an error, as fig. 23 is not that but is R. crispus. The Lycaena "helloides" in the area have just one gen. in July so are surely Lycaena florus, the mtn. sp. with one gen. (L. helloides has 2-3 gen. and lives at lower alt. on the plains & ovip. on detritus below the hosts). Satyrium californica ovip. on stems. Callophrys affinis homoperplexa surely eats Ceanothus fendleri often in the area. Strymon melinus abdomen is orange only on summer males. Trifolium is an error for Cupido "Everes" amyntula. Celastrina lucia sidara (not cinerea) occurs in the area (main host Jamesia). Plebejus melissa ovip. on lower stems of host, & eggs hibernate. Plebejus saepiolus has just one gen. L June-M Aug., & in the Front Range of Colo. Astragalus agrestis & A. alpinus are preferred over Trifolium (Papilio [N.S.] #6). Plebejus (Agriades) glandon eats Androsace in Europe. Apodemia mormo pueblo was later named from the area. Polygonia faunus rusticus is a Calif. bug. Polygonia oreas nigrozephyrus surely occurs in the area as it occurs all around it. Vanessa virginiensis adults hibernate. The return migration of Vanessa cardui is usually weak. Speyeria "atlantis" has been split into two sp. (Papilio [New Series] #8), and text doesn't say whether the local bugs are unsilvered; but I have seen specimens of Spey. hesperis hesperis & Spey. atlantis sorocko (not "electa") in Teller Co.; hesperis occurs in aspeny wooded areas, sorocko in wet meadow/heavily forested areas averaging higher in altitude (75d on pl. VII is Spey. coronis). P. cocyta selenis is the proper name for "tharos pascoensis", and P. pulchella camillus for P. campestris. Phyc. pallida does not occur in the area, though it evidently occurs northward along the South Platte River into Park Co.; the fig. 47 and Pl. IX#80a-b photos are all P. cocyta selenis. The Euphydryas treatment is confused; they describe the early bug as like E. anicia "capella" (probably just eurytion), and the later bug as yellower (evidently eurytion)(doubtfully Euph. bernadetta which has recently been separated as a distinct sp., Papilio [N.S.] #12). They say the hostplant isn't known, but say that larva & pupa were found on Big Spring Ranch, and below the Pl. I legend are 2 photos of a near-"capella" female from near Florissant and a white "capella" larva on Castilleja, which is probably the larva from Big Spring Ranch which is 4 mi. SW Florissant, as Emmel's (1963) description is like this photo; based on the habitat & altitude & known range of eurytion, eurytion occurs here, not capella; E. anicia eurytion=carolae occurs in NW South Park, see Papilio [N.S.] #12). Cyllopsis pertepida larva has two long head horns. Coen. tullia ochracea often feeds on flowers. Erebia epipsodea males surely can mate within a day or so after mating, and their flight is rather even compared to other Satyrinae. Neominois ridingsii sometimes visit flowers, and males are active in early morning ~7:50-11:00. Oeneis "chryxus" in Colo. is really two species, O. chryxus which flies in even-numbered years and oviposits on tree twigs above turflike sedges under conifer trees, and O. calais altacordillera which occurs in even- and sometimes in odd-numbered years and oviposits on grasses (see Papilio [N.S.] #12). Florissant has true O. chryxus (which does not ovip. on grasses as book claims), while O. calais occurs at the S end of Rampart Range NE of Woodland Park, and surely occurs on Pikes Peak (Pl. V live adult is altacordillera from Mosquito Range). The larva photo p. 87 doesn't show the heart-band enough (the heart-band is generally solid brown in O. chryxus, solid to just a row of dashes in O. calais).

THE BUTTERFLIES OF MANITOBA. **P. Klassen, A. Westwood, W. Preston, W. McKillop. 1989.** Manitoba Museum of Man & Nature, Winnipeg, Manitoba. 290 p.

This book is surprisingly good and professional, considering that only Klassen was a well-known lepidopterist. There are almost no misidentifications! The treatment of difficult bugs such as Polygonia & Phyciodes & Argynnis (Speyeria) "atlantis" is very good. The color plates are nice, the text has nice dot maps, detailed records are listed, many references are given, and a conversion table of common to scientific hostplant names is given.

On the plates I note mostly just taxonomic progress: Pl. 3 fig. 32, Chaffee; Pl. 5f4 is P. polyxenes kahli (connected eyespot); 8f1-3 are P. glaucus canadensis; 10f11-15 Col. occidentalis christina; 12f16 is odd for dorcas as it looks like florus; 14f11-12&17 Cel. lucia; 14f16&18 Cel. arg. argentata; 14f19-22 Pleb. scud. scudderi; 14f35-37 Plebejus glandon suttoni; 17f1-2&4 Spey. atlantis near hollandi; 17f3&5-6 S. hesperis dennisi; 19f7 ssp. harrisi; 19f8-10 ssp. hanhami; 19f15-18 P. cocyta selenis; 19f19-22 P. batesii saskatchewan; 19f25-26 E. anicia helvia; 23f11-14 C. tullia benjamini; 23f15-17 C. t. inornata; 25f4-6 O. calais calais; 25f11-12&14 O. alberta ojibwe; 26f10-12 O. polixenes luteus.

Epargyreus clarus pupae hibernate. Hesperia comma assiniboia does not occur in N.M. (ssp. ochracea in Colo. is similar). Klassen wrote to me that H. comma from Thompson & Gillam are somewhat intermediate manitobaXlaurentina. I doubt that Polites peckius=coras hibernates as pupa. Klassen told me that Anatrytone l. logan occurs in Man., but Culross has intemediates to ssp. lagus. Poa is a lab host for Amblyscirtes vialis. Kahli is a ssp. of Pap. polyxenes mostly limited to Riding & Duck Mts. Euchloe ausonides eats flower buds. Man. has Colias occidentalis christina, not C. alex. chr. Eurema lisa record at Sandilands, p. 255. Lycaena helloides hibernates as egg. Man. evidently has Satyrium titus watsoni=winteri

in SE (but pl. fig. 27 has tiny dots), intergrades watsoniXimmaculosus in SW. P. 94 photo is Satyrium calanus. Callophrys polios ovips. at bases of leaf buds. Man. evidently has Celastrina lucia all over Man. (pl. 14 figs. 11,12,17) and Cel. argentata in S Man. (pl. 14 figs. 16, 18, evidently same sp. as serotina & humulus)(maybe the two gen. stated in S Man. is a combination of the two sp., or ?maybe Cel. neglecta creeps into S Man.). G. lygdamus afra is in Riding Mts. & has smaller unh spots. Plebejus melissa eggs hibernate. Churchill evidently has P. glandon suttoni. Man. has Speyeria hesperis dennisi, not electa. Boloria eunomia from Churchill is a new ssp. with unh silver spots small & submarginal pale rectangles redder. Boloria frigga hibernates as 4th-stage larva. P. 139 boisduvali. Lysimachia is an error for Chlosyne gorgone. Phyciodes hibernate as unfed 4th-stage larvae. Man. has P. cocyta selenis=morpheus; the two-gen. bugs in S Man. may be P. diminutor. P. batesii saskatchewan occurs in SW Man. at least, maybe P. b. lakota in SE Man. (I have not seen those). E. anicia is an error for Man. (J. May also mislabeled Mellicta athalia from BC). Polygonia faunus lay many eggs/day. P. 218 Vernonia. V. cardui kershawi occurs in Australia. Coen. tullia from The Pas show more unh postbasal bars, maybe an influence from another ssp. Erebia rossii dot from The Pas is dubious according to P. Klassen letter. Erebia mancinus is in Man. Erebia epipsodea has no ssp. Neominois males actively mate-locate in early morning. Man. has Oeneis calais calais; larvae hibernate twice, as young and old larvae in two winters. O. uhleri hibernate as 2, 3, 4, 5th stage (young & old) larvae. The O. alberta E of Red River were later named O. alberta ojibwe. P. 249 misandra. P. 253 Lintner. P. 261 Leslie 1980 missing (cited p. 72).

BUTTERFLIES OF SASKATCHEWAN. Ronald R. Hooper. 1973.

Museum Natural History, Regina, Saskatchewan. 216 p.

A good little book that is quite likeable, despite being out of date. Nice b/w photos, good mostly-accurate though skimpy text (not much was known about Sask. butterflies), not too many errors. Hesperia dacotae was later found in SE Sask. Longleyi is a syn. of Ancyloxypha numitor. P. 61 kahli is a ssp. of P. polyxenes. P. 63 dodi is a syn. of P. machaon "bairdii" brucei; the photo is maybe an odd P. zelicaon. The Badlands Old World Swt. photos are P. m. brucei=dodi. P. 67 the bairdii from N.D. must be P. polyxenes. P. 68 bottom looks like Colias philodice male. Pontia protodice & P. callidice occidentalis are wrongly lumped; the photos are occidentalis; the text gives the range of both. The book wrongly lumps Colias eurytheme & C. philodice, and the text does not distinguish them. Christina is a ssp. of C. occidentalis. The book lumps Euchloe ausonides & creusa (Butt. Canada lists 5 creusa dots across C Sask.). Apodemia mormo has been found SE of Killdeer. Callophrys niphon is not in Cypress Hills. Sheltonensis is a C. eryphon ssp. in NW Wash., not Sask. Sask. Satyrium titus uns dots are rather tiny in N.D.-Sask.-Alta. so evidently they are watsoniXimmaculosus. The stray Sask. Lycaena phlaeas was surely hyopophlaeas from E U.S. P. 111 scudderi. Sask. has Plebejus alupini lutzi. Albrighti has gray uns, so Sask. evidently has Cupido amyntula maritima. Sask. has Celastrina lucia all over, Cel. neglecta in the S half (see Butt. Canada), and probably also C. argentata in S Sask.? Zephyrus is a ssp. of Polygonia gracilis, and the gracilis figures look like gracilisXzephyrus. The Woodland Pearl Crescent is Phyciodes cocyta selenis, & the Prairie Pearl Crescent is P. tharos orantain; Hooper was one of the first people to publish this distinction. P. "campestris camillus" does not occur in Sask., the photos are Alta. P. pulchella owimba, and the Sask. records are P. batesii saskatchewan which is the only batesii ssp. in Sask. Photos & text are Chlosyne sterope acastus (which does not eat paintbrush), not C. palla. Euphydryas bernadetta & E. anicia near-anicia fly together in Cypress Hills, bernadetta averaging a little earlier. Sask. has Boloria freija freija, not natazhati. Sask. has Speyeria zerene picta. S. mormonia has one gen. S. atlantis hollandii and S. hesperis dennisi=helena do not interbreed (the cross-bred specimens on p. 171 were misidentified according to N. Kondla); dennisi also is at Duck Mtn.; the Cypress Hills evidently has S. hesperis near-beani. Mayae is a syn. of S. aphrodite manitoba. Ino is a syn. of Cercyonis pegala nephele. Sask. has Oeneis calais caryi. O. uhleri has one gen.

BUTTERFLIES OF NORTH DAKOTA. AN ATLAS AND GUIDE. Ronald Alan Royer. 2003. Minot State University Science Monograph #2. Minot, North Dakota. 192 p.

This is a nice little book. The color photos of each butterfly are at the top of each text page, and the map is at the bottom, so everything can be seen at once, rather than flipping through a book for photos and maps as in most books. And only 3 photos are misidentified. It is not out of print, despite internet $ gouging caused by its pleasing appearance (send $40+$5-in-U.S. shipping to Minot State Univ. Bookstore, 500 Univ. Ave. W, Minot, ND 58707). Notes: Epargyreus clarus males rait (perch to await females) only in morning, and rest in the shade in the afternoon. Erynnis icelus in SD is only in the Black Hills, so icelus is no doubt absent in SC & SE N.D. P. 19, the hw fringe is not white-tipped on the afranius photos. For Erynnis persius, "aspens and willows" are errors based on icelus. Scott knows of no evidence for Pyrgus communis immigration. Pholisora catullus usually eats Amaranthus. Ancyloxypha numitor eats various hay grasses. Hesperia comma hibernates only as eggs. Hesperia ottoe "flourishes only in ungrazed native prairies" and Polites origenes occurs in "undisturbed native prairies" and Atrytone arogos is in "undisturbed native prairie" (Butt. S.D. also notes this for arogos) because larvae of all three are aerial on the plants—unlike all other Hesperia and Polites which make nests in plant base/soil litter—so cows can eat them (see J. Scott, Papilio [New Series] #6, who found Andropogon gerardii the main and only host for the three). Poa is dubious for Hesperia leonardus pawnee, and larvae hibernate in 1st stage. Polites

peckius in ND is ssp. peckius, as photos and text indicate a larger unh patch than farther south. For Polites mystic, Agropyron & Phleum are H. Tietz errors, based on Polites themistocles. The female Wallengrenia egeremet photos are really Polites origenes (egeremet females seem to lack any upf orange, whereas the photo has orange on the costa; themistocles females always have orange, and origines females rarely have a little; egeremet females have the unh spots more elongate basodistally, and the spot in cell M_2 is positioned more basally; themistocles usually have a more ochrey unh with no spots though there are often a few anteriorly or occasionally small traces; origenes origenes females do often have the tiny row of pale spots on darker unh as on the photo). Poa is rather dubious for Poanes hobomok as the bug is expected to be a hay-grass feeder like Poanes taxiles. Cyperus esculentus is a lab host only for Euphyes vestris, the native hosts are turflike dryland sedges in Colo. Bouteloua curtipendula is the main host for Amblyscirtes oslari in Colo. Poa is an error for Amb. vialis as Scott's larvae died eating it. Leussleri is a syn. of Megathymus streckeri texana or a weak ssp. Kahli is evidently a ssp. of P. polyxenes as it has a definite geographic range, though many individuals resemble asterias so maybe the ssp. is weak. ND has Papilio machaon brucei=dodi, as the predominantly-black ssp. bairdii stops in C Colo. P. zelicaon f. nitra is produced by a dominant gene; its frequency should have been stated (it is ~5% in Front Range Colo., but up to 30-50% in W Neb.). Obviously glaucus and rutulus are ssp. of Papilio glaucus, and ssp. glaucus occupies SE N.D., and the "canadensis" in W N.D. are glaucusXrutulus intergrades, just as they are in the Black Hills of S.D., while ssp. rutulus does not occur in N.D. The male Pontia protodice photo is actually P. occidentalis. P. protodice also hilltops, and the spring form also has darker tan-green unh. Early spring Colias eurytheme have much less ups orange (sometimes none) like the hybrids with C. philodice. C. alexandra altamont occurs in N.D. Longi is a syn. of Lycaena rubidus rubidus in Scott's opinion. Satyrium acadica males rait only in late afternoon-sunset. S. titus have tiny uns dots in N.D. so are near ssp. immaculosus; oaks is an error. For Satyrium edwardsii, Q. macrocarpa is Bur Oak. Satyrium liparops aliparops has weak uns white lines (a photo from Minneapolis also has weak lines) and little to considerable ups orange flush, while ssp. fletcheri seems to have weak uns lines and much orange flush, while ssp. strigosa has stronger unh lines and no flush, so Royer seems to be correct in the ssp. The photo of Callophrys gryneus siva female from Slope Co. has an offset unh line, so has intergraded with ssp. gryneus some. Obscurus is a syn. of Callophrys polios in Scott's opinion, and franki=humuli are syns. of Strymon melinus. N.D. Cupido amyntula are evidently a ssp. (different from ssp. amyntula) with whiter uns ranging to Man. & even Mich., which evidently should be called ssp. maritima, as the N. Kondla's photo of lectotype of maritima is whitish on uns and spotted like the photos. Ssp. albrighti is evidently a ssp. in Little Belt Mts. of C Mont. (and a ssp. or form in BC, where some have whiter rings around the black spots); Steve Kohler notes that uns spot size is quite variable in both albrighti & amyntula, but albrighti has uns more gray (whitish-gray in ssp. amyntula), is smaller, with male ups more purplish-blue (vs. lighter blue in amyntula), and female ups darker gray-black with little blue. There is lots of variation and current confusion among C. amyntula ssp., but N.D. does not have albrighti, and maritima seems the best name now. The photos of Glaucopsyche lygdamus are definitely not oro, they fit afra (TL Brandon Man. due S of Riding Mts., the neotype female designated by F.M. Brown has tiny unh dots) which seems to be a valid ssp. in Scott's series from Riding Mts. S Man. & Nipigon Ont., which has tiny unh dots & larger unf dots. Glycyrrhiza is a recorded host of Plebejus melissa but is not a host in Colo. N.D. evidently has Plebejus saepiolus amica? N.D. has Plebejus icarioides near lycea, which Steve Kohler finds in SE Mont. Plebejus alupini lutzi is evidently the correct name for N.D. "acmon", as the upf border is narrow on the photos here and in Sask. (though there are two gen. as in ssp. texanus farther S); Astragalus & Lupinus are errors, & apply to true Calif. P. acmon. Chris Schmidt finds that Canada Plebejus "glandon" "rusticus" is a new ssp. related to megalo. N.D. evidently has Apodemia mormo mormo. Desmodium is a dubious C. Abbot host for Euptoieta claudia. N. D. evidently has Argynnis (Speyeria) aphrodite manitoba based on p. 121 photos (not ssp. aphrodite), but the p. 125 female is like whitehousei=ethne, so if the darker ones have been misid. as S. atlantis, then N.D. has ssp. manitobaXwhitehousei. Speyeria aphrodite & edwardsii females also aestivate. The female Speyeria atlantis photo is really S. aphrodite whitehousei. N N.D. evidently has S. atlantis hollandii, while the two SW N.D. counties evidently have ?S. hesperis luranaXdennisi? Speyeria mormonia eurynome evidently is the N.D. ssp. The ssp. of Boloria selene are very weak (only atrocostalis is distinctive), so ssp. sabulocollis would supposedly occur in SW N.D., myrina in the remainder. Aster is not known to be a Chlosyne gorgone host to Scott, while Rudbeckia hirta has one Colo. host record. Evidently Chlosyne nycteis reversa occurs in Bottineau Co., ssp. nycteis elsewhere. N.D. has Phyciodes tharos orantain, though SE N.D. might have ssp. tharos with black & white antenna club. P. cocyta selenis occurs in N.D., though as noted SW records may be tharos. P. batesii lakota occurs in N.D., and the unh brown marginal patch is still present and conspicuous. The first Polygonia comma and P. progne photo is of course spring form, the others summer form. The band of Nymphalis californica records across E N. Amer. does not fit migration, it is more like the Polygonia satyrus distribution in the east. Nymphalis antiopa is bivoltine in Colo. Vanessa hibernation isn't well known, but V. atalanta hibernates as adults regularly, and V. virginiensis and V. carye annabella hibernate much farther north than V. cardui. Limenitis archippus is somewhat unpalatable too. Oberfoelli is a syn. of Limenitis weid. weidemeyerii. N.D. seems to have Asterocampa celtis celtis, and Asterocampa are natives, not strong migrants. Lethe anthedon hibernates as 3rd-4th stage larva. N.D. has Cercyonis pegala nephele. Neominois ridingsii rait early in the morning, when they are very active. Varuna isn't a good ssp. of Oeneis uhleri, being merely a bit smaller.

FIELD GUIDE TO BUTTERFLIES OF SOUTH DAKOTA. Gary M. Marrone. 2002.
South Dakota Department of Game, Fish, & Parks. Pierre, South Dakota. 478 p.

This is a useful book. It has nice color photos of each species, though many require flipping a page to be viewed. Few photos are misidentified. The map is with the text, which is nice. Sometimes the text seems skimpy, but it is much larger than the Michigan & Missouri books. My only major complaint is that many hostplants are given obscure common names that cannot be found in any major flora, as noted below; there should have been an appendix to convert these names to scientific names, but G. Marrone sent me a list deciphering the questionable hosts, as noted below with the asterisk*. Nearly all of these hostplants are from the literature, and few are from S.D. Detailed comments: For Parnassius phoebus smintheus (sayi is a syn. of smintheus) p. 26 spearleaf stonecrop is Sedum lanceolatum*. S. D. has Papilio machaon brucei=dodi, not ssp. bairdii which is predominantly black and stops in C Colo.; males flait and rait on hilltops to seek females. The male photo of brucei may be P. zelicaon, as the abdomen uns is black and the tegulae aren't very yellow. The female f. "hollandii" is really Papilio polyxenes f. pseudoamericus, as the unh base is yellow making it a yellow form (hollandii is a black form with yellower abdomen), and the many orange spots on unh postmedian band are more than most machaon and are typical of pseudoamericus, and tegulae are blacker evidently (broken off?), and Marshall Co. is out of range for P. machaon which only occurs in W S.D. Nitra is the black form of P. zelicaon, not a ssp., and its frequency should have been more precisely stated; gothica is a syn. of zelicaon. For P. zelicaon p. 42, wild parsley is Lomatium foeniculaceum*, and heartleaf alexanders is Zizia aptera*. Obviously P. glaucus glaucus occurs in most of S.D., and SW S.D. has glaucus glaucusXglaucus rutulus intergrades (not canadensis), and rutulus is just a rare form in SW S.D. The male glaucus photo has a solid unf submarginal band, so is the spring form evidently. The male on p. 60 has little unh orange, as it is an intergrade. Note that L. Brower proved intergradation from glaucus to rutulus in Black Hills due to input of genes from the latter (Evolution 13:40-63). For Papilio eurymedon p. 66, snowbrush Ceanothus is Ceanothus velutinus* (C. herbaceus, C. fendleri, & C. velutinus all occur in Black Hills). Magnolia is an error in past literature for Papilio troilus. Nordini is a syn. of Pontia s. sisymbrii. The female photo of Pontia protodice is actually P. callidice occidentalis. For P. protodice p. 78, common pepperweed is Lepidium densiflorum*. Pieris "marginalis" and Anthocharis "stella" are known only from single records coll. by Edwin M. Perkins in Allyn Mus. Entomology (G. Marrone e-mail Oct. 10, 2007); according to S. Spomer, Kilian Roever coll. an Anthocharis in the Black Hills in nearby Wyo., so the S.D. Black Hills sara is probably valid, but could the S.D. "marginalis" be mislabeled? The photo of Manitoba marginalis is Pieris oleracea according to dogma and the maps in Guppy/Shepard BC book, and anyway Scott is not certain that pseudonapi=mcdunnoughi belongs to P. marginalis, though S Bowden's lab crosses determined that it could be. The male female "oleracea" photos from Colo. are P. marginalis pseudonapi=mcdunnoughi according to the usual dogma. Palaeoreios is a syn. of Euchloe aus. coloradensis. For Euchloe olympia p. 93, blue mustard is Chorispora tenella, a new host (*Marrone observed ovip. in Black Hills). Anthocharis julia julia is the bug in S.D. The male photo is A. j. julia; the female photo looks like the new ssp. Anth. sara colorado from SW Colo. Colias philodice & C. eurytheme hibernate as 3rd (sometimes 2nd-4th)-stage larva. Colias occidentalis does not occur in Baja Cal., that is C. harfordii. For Col. occidentalis krauthii p. 103, alpine sweetvetch is Hedysarum alpinum*. For krauthi and "alexandra", northern sweetvetch is Hedysarum boreale*. The Colias "alexandra" is now known as C. edwardsi altiplano. For Zerene cesonia p. 107, false indigo means Amorpha fruticosa*, but that common name shouldn't be used because in floras it also means Baptisia. Americana is now considered a syn. of Lycaena phlaeas hypophlaeas, which did not immigrate from Eurasia (Scott J. Lepid. Soc. 47:253-4, & S. Kohler Taxon. Rept. 7[1]) because Eurasian bugs differ and have more uniform unh, more diffuse unh red line, and European phlaeas have longer tails and browner unh & little notches on basal edge of uph orange band; hypophlaeas evidently arrived from Siberia or evolved from L. p. feildeni long ago. For Lycaena thoe=hyllus p. 131 & helloides p. 135, marsh smartweed is Polygonum amphibium=coccineum*. For helloides p. 135, prostrate knotweed is Polygonum aviculare. Longi is a syn. of Lycaena r. rubidus. Polygonum douglasii is an occasional host of Lycaena florus, which is now considered a separate sp. from L. helloides. Satyrium titus ssp. are mostly weak (Gatrelle's sample sizes in Taxonomic Report 4[6] were deplorably minuscule), but evidently the ssp. in SD is watsoni (TL Kerrville Tex., one paratype has small red spots but O.D. only claimed uns was paler)(=winteri Gatrelle TL Sherborn Mass.)(=campus Gatrelle TL Shelby Co. Iowa) which occupies most of E U.S. and has larger black dots and redder spots (=occidentalis Austin & Emmel TL Pershing Co. Nev.), while ssp. titus=mopsus (both TL Screven Co. Ga.) from the coastal plain of Fla.-Ga. has whiter edging to unh marks, immaculosus (TL Provo Utah) has tiny or absent uns dots and occurs W of the continental divide and in N.D., while the E-slope Colo. bug has small black dots and oranger spots evidently watsoniXimmaculosus. Satyrium liparops aliparops in S.D. surely has some adults with orangish ups flush? C. gryneus gryneus has the postmedian unh line kinkier than C. g. siva. Obscura is a syn. of Callophrys p. polios. Franki is a syn. of Strymon m. melinus. Everes amyntula valeriae also occurs in E slope Colo. For Cupido (Everes) amyntula p. 166, Glaucopsyche lygdamus p. 177, & Thorybes pylades p. 350, cream-colored vetchling is Astragalus ochroleucus* (also in Britton/Brown flora). Celastrina lucia sidara also has f. lucimargina with dark margin & patch; how frequent is the patch? H. Pavulaan states that Black Hills have intergrades sidaraXnigrescens etc. For Celastrina neglecta p. 170 & Erynnis martialis p. 362, inland ceanothus is Ceanothus herbaceus* (p. 362 says it's the same as New Jersey Tea, but both Ceanothus americanus & C. herbaceus are N.J. Tea in Great Plains Flora)(Marrone states that C. herbaceus [ssp. pubescens] is common in Black Hills & C. fendleri is

uncommon in W Black Hills). Glaucopsyche lygdamus afra evidently occurs in NE S.D. as the bugs there have smaller unh dots like afra. For Plebejus melissa p. 179 white crazyweed is Oxytropis sericea*. S.D. evidently has Plebejus saepiolus saepiolus, not the small-dotted amica. S.D. has Plebejus icarioides lycea (not pembina), which also occurs in Bighorn Mts. & SE Mont. For Plebejus shasta P. 185 tufted milkvetch is Astragalus spatulatus*. S.D. evidently has Plebejus alupini near-texanus, as there are two gen. and the upf border is wide on the photo. Plebejus glandon rustica hibernates as 2nd-stage larva. Apodemia mormo female photo from Colo. has some uph orange, so could be a very dark ssp. pueblo from SE Colo, but is probably a variant ssp. mormo from W Colo. Most of S.D. evidently has Argynnis (Speyeria) aphrodite near-whitehousei=ethne instead of manitoba, though the male looks a little paler (& a female from Spearfish Can. Lawrence Co. I examined was whitehousei). For Speyeria edwardsii p. 214, S. zerene p. 221, S. hesperis p. 229, S. mormonia p. 231, longspur violet is Viola adunca* (adunca is called "hook-spurred violet" in Great Plains Flora). The Speyeria "edwardsii" nectaring on p. 215 is really S. aphrodite. The female coronis photo is Speyeria coronis halcyone, but some snyderi-like adults occur in Wyo. and the 5m4f I have examined from Black Hills had red-brown discs except 1m had green disc & 1f had green-over-brown disc like snyderi, so the S.D. ssp. is near-halcyone. S.D. evidently has the pale-brown-disc Speyeria zerene platina or near-platina, not ssp. sinope; platina also occurs in Wind River and Bighorn Mts. Wyo. (though some dark-brown disc variants like ssp. picta occur in Bighorns), while the greenish-brown-disc sinope occurs only in S Wyo.-Colo. Maybe S.D. has ssp. harmonia, but it is basically a syn. of Speyeria callippe calgariana anyway. E Alaska, C Calif, & Ariz. have only Speyeria hesperis, not atlantis. For S. atlantis p. 227 meadow violet is Viola papilionacea* in Britton/Brown. Bighorn Mts. S. hesperis may perhaps best be called luranaXdennisi, as the unh submarginal band is wider than lurana and unh disc has more pale tan areas and the black bars are narrower. The Black Hills have a new ssp. S. mormonia kimimela described by Marrone, Spomer, & Scott. The ssp. of Boloria selene are very weak, although elsewhere nebraskensis is larger, & atrocostalis has darker ups borders. Carlota is a syn. of Chlosyne gorgone. For C.nycteis p. 240 cutleaf coneflower is Rudbeckia laciniata*. The female Chlosyne nycteis photo is a male. For Chlosyne acastus p. 242 showy aster is Aster conspicuus*, but is an error for acastus according to Marrone (it is a known host of Chl. hoffmanni), and rubber rabbitbrush on p. 215 & 242 is Chrysothamnus nauseosus* (p. 215 shows the white tomentose carpet on the twigs)(Marrone wrote me that this is merely a likely host due to association); readers should note the odd two generations in S.D.-N.D.-Alta. For Phyciodes tharos p. 246 & P. pulchella camillus p. 252 heath aster is Rose Heath Aster=Aster ericoides*. W S.D. surely has Phyciodes tharos orantain with orange nudum, and ssp. tharos evidently occurs in the far E with black nudum. Phyciodes cocyta selenis larvae don't have pinkish spines as Charles Oliver wrote. Phyciodes batesii lakota has a definite brown unh marginal patch (the unmarked unh describes ssp. batesii); P. batesii also occurs W to NWT and Ariz.; the female photo is a male. All Phyciodes hibernate as unfed 4th-stage larvae. For Phyciodes pulchella (not pratensis) camillus p. 252 marsh aster is Aster hesperius*. Phyciodes pallida pallida (not barnesi) evidently occurs in S.D., as the photos resemble that (the larva description fits pallida, as barnesi larva is blacker, though the desc. is no doubt from Colo.). For Euphydryas bernadetta bernadetta p. 256 clustered broomrape is Orobanche fasciculata*, and beeplant is an error. Polygonia interrogationis and P. comma have winter and summer forms, which surely indicates that they must overwinter northward. Ssp. cenveray may occur in SD, as the book describes 2 rows of green unh spots. The Polygonia "faunus" photos are Polygonia progne winter form. For Polygonia gracilis zephyrus p. 268 swamp currant is Ribes lacustre*. Vanessa atalanta is claimed in both Dakotas books to be just an immigrant, but I wonder if it (as well as Vanessa virginiensis and V. carye annabella) often overwinters? Oberfoelli is a syn. of Limenitis weid. weidemeyerii. The Mountain Emperor is the new ssp. Asterocampa celtis jeffermont from Front Range of Colo. named by Scott & M. Fisher. Lethe eurydice fumosus surely occurs in most of the state (it occurs in S-C Minn.) except maybe the NE, and the photos are fumosus. In Cercyonis pegala, Porcupine grass Stipa spartea is a dubious H. Tietz host. In Colo., Cerc. meadii eats turflike sedges, while C. oetus uses Poa pratensis/agassizensis etc. Neominois ridingsii males are very active in early morning when they mate-locate by raiting on ridgetops. Ssp. uhleri (not varuna) occurs in S.D. evidently (Neb. has large ssp. uhleri). For Erynnis afranius p. 364, American deervetch is Astragalus americanus* & should be called American vetch. For Erynnis afranius p. 364 & E. persius p. 366, goldenpea is Thermopsis rhombifolia*. Fredericki is a syn. of Erynnis persius. For Pyrgus scriptura p. 368 & P. communis p. 370, scarlet globemallow is Sphaeralcea coccinea*. Amaranthus is preferred by Pholisora catullus, and Chenopodium berlandieri is greatly preferred over C. album, if the latter is eaten at all. Ancyloxypha numitor eats hay grasses, so Poa is an error; Spartina is a known host, but pectinata was not known to me, and prairie cordgrass is S. pectinata, and S.D. has two sp. of Spartina, so is this a valid record or just data creep? Stipa is a known host of Oarisma garita, but Stipa columbiana=Columbia needlegrass is a literature error. Ssp. phyleus and ssp. uncas occur in S.D. The photos of Hesperia comma assiniboia look like H. comma idaho instead, leading one to believe that assiniboia doesn't occur in S.D., but I have a long series of typical H. comma assiniboia (unh tawnier & spots yellow) from Slim Buttes in Harding Co. Aug. 23 1970 (and 4 from Day Co. ½ mi. W Bitter Lake Aug. 25, 1971), so ssp. idaho doesn't occur in county unless it sneaks into the S part (maybe global warming is shifting idaho north and replacing assiniboia in Harding Co.??). The sheep fescue=Festuca ovina host for Hesperia nevada is really Festuca idahoensis. Polites rhesus hibernates as older larva. S.D. has Polites peckius surllano, with a small unh patch as shown on the photo. For P. mystic, Quackgrass=Agropyron repens, timothy=Phleum pratense, & Echinochloa crusgalli are all errors by H. Tietz based on Polites themistocles. Ssp. logan evidently occurs in E S.D., as Scott's specimens from Logan Co. in

NE Colo. are lagus, from Lincoln & Dawson Cos. in SW Neb. & Davis Mts. Tex. are lagusXlogan, and from Lincoln Co. on the W edge of Minn. are typical logan, while the male & female photos in this book look like lagus and near-lagus, so W S.D. evidently has lagus or near-lagus, while E S.D. surely has ssp. logan, just like N.D. Napa is a syn. of Ochlodes s. sylvanoides, and it eats hay grasses, so the literature host Cynodon dactylon is dubious; 1st-stage larvae hibernate. Poanes hobomok probably is a hay-grass feeder like P. taxiles, thus Poa is a dubious host, and is an error for Poanes taxiles. P. taxiles males rait in gulches. Ssp. viator occurs in S.D. The ssp. of Euphyes vestris are pathetically weak and worthless; metacomet may be a weak ssp. by having a slightly stronger unh lighter band, and would be the only ssp. in S.D. For Euphyes vestris p. 437, sun sedge is Carex heliophila*. Notamblyscirtes simius immatures were desc. by Scott in Papilio (New Series) #6, unfed 1st-stage larvae hibernate, and males rait on hilltops in early morning. Bouteloua curtipendula is the main host of Amblyscirtes oslari. All the Amblyscirtes are basically hay-grass feeders. Poa pratensis is an error for Amb. vialis as my larvae died eating it, and Cynodon dactylon is an old lab-record error. Leussleri is a syn. of Meg. streckeri texana (though S. Spomer notes that Nick Grishin's Kerrville texana topotypes have sl. smaller spots and sl.thinner uph marginal band).

BUTTERFLIES EAST OF THE GREAT PLAINS. An Illustrated Natural History.

Paul A. Opler, George Krizek. 1984. Johns Hopkins Press, Baltimore, Maryland. 294 p.

This book is welcome, because it emphasizes natural history. It has more info on natural history than the outdated Klots Field Guide. It is a nice book, though there are some errors. It has 54 p. of 324 nice large color photos of living butterflies, but most of the less-common species have no photo, so identification will be difficult just using this book. The text has shaded distribution maps for each species, which are mostly accurate. Contrary to the title, it covers only E U.S., and not E Canada.

There is at least one misidentified photo. Photo 156 is P. comma not interrogationis; 166 is odd-looking and looks like P. faunus on ups but the margins are straighter than faunus so it evidently is satyrus; 174 is Junonia genoveva (the name was genoveva in my book, later switched to evarete, now switched back again); the postmedian unh lines of 204 are atypical of Lethe appalachia though the photo is correctly identified; 209 is evidently N. helicta septentrionalis; 272 looks like P. themistocles; 273 is probably Polites themistocles as P. origenes females usually have little upf costal orange.

Some published info on hibernation stage (J. Res. Lepid. 18:171-200) was not included. Based on Paul Opler's experience with Eurema daira etc. in Costa Rica, it is hypothesized that many southern U.S. species overwinter as diapausing adults, which deserves further research. Such species as Zerene cesonia, Eurema nicippe, E. lisa, Phoebis sennae, Libythea, & Vanessa cardui are often reported to overwinter as adults, yet they are also reported to overwinter as pupae (see J. Res. Lepid. 18:171-200); maybe their development is just slowed in winter in warm southern regions when they can be found in any stage. The exact northern extent of adult winter diapause is still not well studied in many Vanessa & Nymphalis etc.

Detailed comments: There are lots of distribution improvements and recent taxonomic changes that I won't mention. Times are given for mating and oviposition, as if these are genetic preferences, when mostly it just represents small sampling size of only part of the daily activity period. p. 12 female butterflies are larger partly because they have to emerge a few days later than males in order to synchronize virgin females with the maximum population of males (J. Scott 1977, J. Animal Ecol. 46:909-924). P. 14, S Fla. is subtropical, not tropical. P. 25 perching species visit mud too. P. 31 adults need more nectar in summer because it is hotter. Eurytides marcellus is a stray in Wis., where Asimina is absent. P. 50 "balanced polymorphism" of Papilio glaucus black females was disproved (Science 156:3774; Ann. Ent. Soc.Amer. 65:1267; J. Lepid. Soc. 26:109; Evolution 27:257), and the best theory is that black females benefit from mimicry, while frequency-dependent selection (birds learn to eat the black form if it becomes common), immigration of yellow females, and perhaps survival differences, cause the polymorphism. Magnolia is not eaten by Papilio palamedes larvae (J. Brooks 1962, J. Lepid. Soc. 16:198). F. Chew found that Pieris oleracea & P. rapae don't really compete much, so rapae did not displace oleracea. Pieris virginiensis doesn't occur in Ala. Colias philodice hibernates as 3rd-stage larvae. C. interior does not blend with C. pelidne in Man. Phoebis sennae: p. 70 Chamaecrista is a genus, a syn. of Cassia. Phoebis agarithe is identified by the straight unf line; Pithecellobium guadalupense is a syn. of P. keyense in Long & Lakela flora; P. unguiscati is an error of H. Tietz (based on H. Dyar's [Proc. Ent. Soc. Wash. 4:448] P. guadeloupense, which is a syn. of P. keyense). Cassia bicapsularis is a lab-only plant eaten by Eurema nicippe, based on R. Kendall (J. Lepid. Soc. 17:22). "Wild currant" is an error published before Feniseca's carnivory was known. Lycaena phlaeas was not introduced from Europe; half-grown larvae hibernate (J. Res. Lepid. 18:171). Lycaena dione & thoe mate-locate all day. For L. thoe, change the error Rumex orbiculatus to R. verticillatus (orbiculatus actually derives from Shapiro's Butt. Delaware Valley "Water Dock", in Gray Flora Water Dock is R. verticillatus & is just the 2nd name for R. orbiculatus, & Shapiro Butt. N.Y. uses only R. verticillatus). E Iowa is an error for Lycaena epixanthe. P. 88 summer Strymon melinus males have orange abdomens. Aronia was only suspected for Satyrium titus (by A. Shapiro, Butt. N.Y.). I think Satyrium acadica mate only late afternoon-dusk, and the few mating pairs I found in early morning I think just mated through the night. Lysiloma was just a lab host of Ministrymon azia (R. Boscoe), and is an assoc. record in Mex. (S. Roman). Oaks are dubious for Calycopis cecrops, & lack documentation. Pinus clausa was an assoc. host only for Callophrys niphon (based on C. Zeiger,

1980 Lepid. News #2 p.22, Fla.). Fixsenia favonius ontario is a ssp., which often lacks the orange ups patches esp. northward. Move the W Wis. dot for Erora to E Wis. Suriana maritima may be an error for Strymon istapa=columella, that has been copied often since (Frank Fee [pers. comm.] did validly record S. martialis on it from Big Pine Key). Hemiargus hanno antibubastus: Pithecellobium guadalupense is a syn. of P. keyense in Long & Lakela flora; P. unguiscati is an error of H. Tietz (based on H. Dyar's [Proc. Ent. Soc. Wash. 4:448] P. guadeloupense, which is a syn. of P. keyense), and the record is based on H. thomasi (reported as ammon, from Lake Worth, Palm Beach Co. Fla.) so should be transferred to H. thomasi. Cupido "Everes" comyntas, change Medicago sativa to M. lupulina (Shapiro reported lupulina in Butt. N.Y., & Butt Rocky Mtn. States wrongly changed it to "alfalfa", which led to M. sativa). Thermopsis for Cupido amyntula maritima (not valeriae) was just an assoc. record from same book. Celastrina proved later to be 4 sp.: Cel. lucia, C. ladon (the 1st brood hosts listed in N Va.), C. serotina, C. neglecta (the 2nd brood listed in N Va.). Cimicifuga is the host of C. neglectamajor & sometimes C. neglecta. Glaucopsyche, spelled Vicia caroliniana in Gray flora. Plebejus scudderii nabokovi is all over N Wis. & N. Mich. I found Libythea mating pairs in daytime. Shapiro Butt. N.Y. wrote that Viola septentrionalis was only assoc. with Speyeria atlantis. Salix herbacea was assoc. only (S. Scudder, Butt. New England), and Polygonum viviparum only speculation, for Boloria titania. Lysimachia is an error for Chlosyne gorgone. Phyciodes tharos oviposits all day. Phyciodes batesii hibernates as unfed 4th-stage larvae, larvae are not pink, a partial gen. is rare if it exists anywhere, and several S Wis. records are errors (11 more errors in print from Iowa, Ill, Ind., Ohio). Lonicera japonica was a lab-only food of Euph. phaeton (A. Clark Proc. USNM 71 #2683; W. Saunders' Butterflies of Allegheny Park). The Polygonia comma black form occurs only in summer. Vanessa cardui usually pupates many meters from its host nest. V. atalanta ovip. all day, & hibernate as adults. P. 163 spelled Ruellia nudiflora. P. 167 Quercus velutina (Shapiro Butt. N.Y.) refers to ssp. arthemis, & Vaccinium stamineum is a dubious record of Abbot & Smith. Austin Platt (pers. comm.) told me Lim. archippus larvae are not colored differently on willow & cottonwood. Apaturinae is an older name than Charaxinae (the book combines them). P. 173 TL of alicia is New Orleans. W. Edwards described N. areolata immatures. P. 184 spelled Carex alopecoidea. If the two gen. for Megisto cymela are allochronic then they cannot interbreed and wouldn't be separate species anyway; M. "cymela" is still an uncertain mess, even though R. Gatrelle declared that two sp. M.cymela & M. eurytris Maynard 1891 occur in S.C.; my specimens say that viola is a good ssp. with wider brown uns lines (J. Calhoun found that viola intergrades to cymela in Fla. panhandle); but I can't separate anything else despite my topotypes of eurytris & cymela caught by Gatrelle, thus eurytris still looks like it is probably a syn. of cymela. Clark & Clark Butt. Va. wrote that male Cercyonis pegala fly L June-L Aug. and females fly E July-L Sep., while in Colo. males live to at least Sep. 7 & females to Sep. 13 though sex ratio after Aug. 15 is about 1:4; and Marc Epstein got Colo. females to oviposit in L July. C. pegala often visits flowers. Erebia disa just likes shade, and truly crepuscular butterflies are extremely rare or absent. Strigulosa is a ssp. of O. calais; leaning of adults is thermoregulation in Hipparchia (R. Findlay etc. Ecol. Ent. 8:145-153). Bigelow's sedge C. rigida is a syn. of C. bigelowii in Gray & Britton/Brown floras. P. 195 spelled Asclepias exaltata, & Acerates is a syn. of Asclepias. Epargyreus clarus usually ovip. on the host; males roost under leaves every afternoon after their mate-locating period; pupae hibernate. Cogia outis is native in Ark.-Mo. Robinia pseudoacacia is correct for Erynnis icelus (J. Burns' rearings reported in Butt. Ga. & Univ. Calif. Pub. Ent. v. 37). Erynnis zarucco: Sesbania longifolia is error, correct name is Daubentonia longifolia (from Mather & Mather J. Lepid. Soc. 13:72). Salix & Populus are errors for E. persius. Althaea rosea, Abutilon, & Malva are errors for Pyrgus oileus (they are based on H. Tietz' "syrichtus", strictly a syn. of oileus, but the name syrichtus was mistakenly used for P. communis when these hosts were first published, thus they really belong to P. communis). Origanum & Marrubium are errors for Pholisora catullus (& my larvae refused Marrubium); mating occurs all day. Nastra neamathla occurs from Fla. to C Tex. & julia from Tex. to Calif., and are ssp. according to Butt. Houston. P. 223 spelled chicory. Hesperia uncas is resident in Sherburne Co. Minn. near Minneapolis. Hesperia comma larvae are brown; eggs hibernate. Hesperia leonardus pawnee occurs in SW Minn. & W Iowa in typical form, and intergrades to leonardus are in E Minn. & W Wis. & NW Iowa; Ala. is error. Hesperia metea: glomeratus is A. virginicus var. abbreviatus, not a var. of scoparius. H. sassacus: Festuca rubra seems to refer to Shapiro's Butt. N.Y. host F. nutans, a syn. of F. obtusa in Gray flora. Polites themistocles eats many grasses. Polites mystic mates all day long. Polites vibex: Stenotaphrum was eaten in lab only (J. Lepid. Soc. 19:3). Wallengrenia egeremet mate-locates all day. Atrytone arogos once flew commonly in July in Fla. Problema bulenta antenna clubs are like byssus. Mich. Euphyes dukesi flies in July. Cyperus was lab food only for Heitzman's Euphyes vestris. Linda is a ssp. of A. aenus. The Ohio Amb. aesculapius dot is error. Amb. reversa has the same seasonality as A. carolina. Amb. nysa: Echinochloa crusgalli is error, J. R. Heitzman published Ech. pungens (J. Res. Lepid. 3:154), a syn. of E. muricata in Mo. flora, however Gray flora uses E. pungens=muricata. Avena (S. Scudder) & Cynodon (J. Lepid. Soc. 19:31) were eaten only in lab by Amb. vialis. Calpodes ethlius: Thalia geniculata may be an error, C. Zeiger (1964 Lepid. News #4) reported T. dealbata from "Fla."; T. dealbata occurs in N. Fla., and T. geniculata is a different introduced sp. in S Fla. The Panoquina panoquinoides early stages desc. is from Calif. P. pan. errans. The immatures desc. for P. ocola perhaps refer to P. lucas=sylvicola.

BUTTERFLIES AND MOTHS OF MISSOURI. J. Richard Heitzman & Joan Heitzman. 1987. Missouri Department of Conservation. Jefferson City, Missouri. 385 p.

Almost no misidentifications of the butterflies! For what this book aims to do, it is a very good book. It covers all the butterflies, and some of the more beautiful, common, or pestiferous moths. Each has color photos, and comments about distribution status, hostplants, larva description, and misc. comments. Ssp. are given only if they are not the nomenotypical. There are 7 color pages of larvae/pupae photos. My main gripe is that the text is skimpy for most species. Richard Heitzman is a skilled experienced lepidopterist, who has lots of interesting information, which I wish had been included.

Detailed comments: P. 34 the "lucilius" photos are Sask. E. afranius. P. 48, Mo. has the later-named P. peckius surllano. P. 68 linda is ssp. of A. aenus. P. 85 joanae is a ssp. of P. machaon, being a bairdii-bug that has introgressed with P. polyxenes a lot, leading some to consider it a syn. of polyxenes, but it is evidently valid, with eyespot & mtDNA of bairdii. P. 366-7 has photos of joanae larvae, which (S. Spomer & Heitzman pers. comm.) have unicolorous light-green or bluish-green forms (polyx. larvae are paler ventrally) with paler/absent spots (polyx. spots oranger) & young larvae with a light-yellow saddle (polyx. whiter). P. 96 menapia must have been an unnatural truck/plane import. P. 122 mopsus is a syn. of titus and Mo. has Satyrium titus watsoni=campus. P. 135 Phaseolus misspelled. P. 138 H. thomasi was surely misidentified. P. 141 Mo. has Cel. ladon (spring), C. neglecta several generations later in year, & C. neglectamajor in Ozarks. P. 164 photos show later-named P. phaon jalapeno. P. 169 progne photo is summer form female. P. 174 Cirsium. P. 175 atalanta adults hibernate. P. 183 A. troglodyta floridalis is very dubious (misidentified?). P. 192 hermes is just a stray if it only occurs July-Sept. SW Mo. has C. pegala texana if you think it differs from C. pegala maritima "alope"; why doesn't the text explain the creamy Salem Uplift form which looks like cream C. p. carolina from the Carolina Mts.?, much too skimpy. P. 198 Cynanchum is error (it is a host of D. gilippus).

THE BUTTERFLIES OF IOWA. Dennis W. Schlicht, John C. Downey, Jeffrey C. Nekola. 2007. University of Iowa Press, Iowa City, Iowa. 233 p.

This book has some interesting features. Schlicht & Nekola are mostly interested in butterfly conservation, and have scoured Iowa to find what is left of the fauna, an admirable and arduous task because most of Iowa has been scraped bare to plant soybeans and corn. They have found 170 fens in NE Iowa for instance (160 remain, p. 100), and state that 90% of Iowa's fens have been drained (p. 98). A good lesson for lepidopterists and land managers is repeated often here, as they write that the new practice of burning small prairie tracts (to prevent shrub and tree succession) has burned up colonies of Hesperia dacotae, Oarisma poweshiek, Atrytone arogos, & Coenonympha tullia, & fire is stated to reduce Speyeria idalia pops. Also, Hesperia ottoe was "exterminated by management practices", and Plebejus melissa declined on managed reserves. Obviously, to remove shrubs/small trees land managers should **MOW** these small prairies in the fall instead of burning them, as I wrote in my 1986 book for Hesperia dacotae (& grazing is said to help S. idalia). P. 22 notes that 50000 of A. F. Porter's butterflies were eaten evidently by dermestids (the fate of the Stallings & Turner megathymid collection--lepidopterists, give your collections only to large museums with guaranteed endowments!).

The main trouble with the book is that the authors did not consult experts or research the literature enough. In particular, my two hostplant papers (in Papilio [New Series] # 6 in 1992 & #13 in 2006) gave many hostplants and life histories that I found in about 20 yearly visits to my sister's farm near Albert Lea, Freeborn Co. Minnesota, only a few mi. N of Iowa. Many of the questions that they ask in this book were already answered in those two papers. (At the end of each species account, they ask Questions, which is rather annoying—in a book I want answers, not questions.) When I first got the book I turned to the Phyciodes with grim expectation, and there it was: Phyciodes diminutor Scott 1998 was missing, even though its TL (in Papilio [N.S.] #10) was 10 mi. N of Iowa, and I caught it at the Minnesota Welcome Center on I-35 just a stone's throw N of Iowa, and then I turned to the Phyciodes plate p. 167, where I saw that the upper two photos are actually a male Phyciodes diminutor, which p. 213 writes is from Rowley Fen, Buchanan Co. Iowa June 15 1985 D. Schlicht; that male is obviously diminutor as the antenna nudum is orange, size is large, there is a large uph space without line, and unh has large russet marginal patch. Obviously P. diminutor occurs all over NE Iowa, where it must eat mostly Aster simplex; true P. tharos occurs all over the state.

The book skimps on taxonomy, as the ssp. names of many sp. are not given. The nomenotypical ssp. occurs in Iowa in Epargyreus clarus, Thorybes pylades, Erynnis brizo, juvenalis, Hylephila phyleus, Polites origenes, Poanes hobomok, massasoit, viator, Euphyes dion, Atrytonopsis hianna, Battus philenor, Papilio glaucus, troilus, Pontia protodice, Colias philodice, Zerene cesonia, Callophrys gryneus, henrici, Strymon melinus, Danaus plexippus, Speyeria cybele, Boloria bellona, Chlosyne nycteis, Phyciodes tharos, Vanessa cardui, Limenitis archippus, Asterocampa celtis, clyton, Hesperia metea, Eurema mexicana. Other missing ssp. are added below.

There is a list converting plant common names to scientific names, but wild beans p. 45 isn't on the list. J. Burns' histograms seem to show just two gen. of Erynnis martialis (Apr.-M June being the 1st). E. baptisiae has three gen. in Neb. according to Steve Spomer, not four, and Burns lists Sept. records for Ill. & Ohio where there must be 3. Mint is an error host of Pholisora catullus. Ancy. numitor eats 5 sp. of hay grasses in S Minn., and bluegrass is an error. Polites peckius surllano is the ssp. in Iowa, as the photos show; I think turfgrasses such as Poa pratensis are the main hosts, as the eggs are laid without glue. Scott gave several hosts for Polites themistocles, and he showed that Andropogon gerardii is the main host for P. origenes. The types of A. arogos iowa—not the genus--were from Iowa. Anatrytone logan larvae overwinter

half-grown. Problems byssus kumskaka occurs in Iowa. Bluegrass is dubious as a host of Poanes hobomok, which probably eats hay grasses as does P. taxiles. P. zabulon surely has 2 gen. at most. It's very interesting that Poanes massasoit has a disjunct NW range. Scott found Poanes viator & Euphyes dion larvae on the same parts of Carex lacustris just N of Iowa. Buchholzi is a syn. of E. conspicua, based on my Neb. & Minn. series. E. bimacula illinois occurs in Iowa. Euphyes vestris has two gen., and Scott found it eating dryland Carex pensylvanica which occurs in Iowa. Kentucky bluegrass is dubious for Amb. hegon, which surely eats hay-grasses like all other Amblyscirtes. Amb. vialis overwinters as larvae, which eat various hay grasses. Pontia protodice is rare in S Minn., and it evidently strays N in spring. Phoebis sennae marcellina occurs in Iowa. Based on wing pattern & DNA, Lycaena phlaeas hypophlaeas is native in E U.S. and evolved from arctic or Siberian ancestors; it was not introduced. The 3rd L. helloides gen. is probably Sept., and it is Sept. in Neb. also according to Spomer. Evidently Satyrium titus watsoni=winteri=campus occurs in Iowa. S. calanus falacer & S. liparops strigosa occur in Iowa. Scott reported other hosts of Cupido comyntas comyntas in Iowa. The photo looks like Glaucopsyche lygdamus afra rather than ssp. couperi. Libytheana carinenta bachmanii occurs in Iowa. Speyeria cybele alcestis (a ssp.) & aphrodite & idalia (the weak ssp. occidentalis) surely just have one gen., with females aestivating until later in summer. Boloria selene nebraskensis occurs in Iowa. Both Phyciodes overwinter as unfed 4th-stage larva. Polygonia progne 2nd gen. is probably L July overwintering to E May. Vanessa atalanta rubria occurs in Iowa. Iowa arthemis is just a rare polymorph in the Lim. arth. astyanax population. Lethe eurydice fumosus is widespread from Iowa to Colo., and also occurs in wet roadside ditches in S Minn., where its host is Carex aquatilis. Coenonympha tullia benjamini occurs in Iowa. Cercyonis pegala nephele occurs in Iowa, and probably has just one gen. Six of the species listed in "Occasional Strays & Old Records" are uncommon strays but validly recorded. Leptotes marina surely overwinters much farther north than coastal Texas (probably in Colo.). Danaus gilippus thersippus occurs in Iowa. Dione vanillae incarnata occurs in Iowa.

The maps are nice, and old and new records are distinguished by symbols to help document the disappearance of some species. A map of county names would have been useful.

The color plates are nice, and only one was misidentified (the Phyc. diminutor)!, although Hesperia leonardus pawnee & leonardus photos are transposed. The 2nd Erynnis lucilius & Oarisma poweshiek & Euphydryas ph. phaeton are also males. The female Ancy. numitor is above the male. Both Call. gryneus are females. The lower left Sat. acadica is male, lower right female. The Polygonia interrogationis photos are summer, then winter form; P. comma are winter, then summer f; P. progne all summer f.

BUTTERFLIES OF WISCONSIN. James A. Ebner. 1970.

Milwaukee Public Museum, Popular Science Handbook #12. Milwaukee, Wisconsin. 205 p.

This book is somewhat out of date, so I won't make many comments. There are not many distribution records, there are no maps and just a few counties are mentioned in text for most species. The book has good b/w photos, and there are almost no misidentifications. P. 58 the Euchloe olympia name anniha is a nomen nudum that was never published. The photo of "male Satyrium calanus falacer" is a female S. caryaevorus. Plebejus scudderii nabokovi occurs in Wis. (the photos of scudderii) fom Oconto, Marinette, Brown, Waupaca Cos. etc., and P. samuelis occurs in Wis. in Burnett & Wood Cos. etc. (see Papilio [N.S.] #12). The photos look like Celastrina neglecta, & Wis. also has Cel. ladon, and perhaps also C. (argentata) serotina. P. 108 Junonia coenia doesn't eat Sedum. Polygonia satyrus occurs in Vilas & Sawyer Cos. etc. The upper Phyciodes "tharos" male is P. cocyta selenis, while the female looks like P. tharos; both occur in Wis., and P. diminutor surely occurs in S Wis. P. 134 Argynnis (Speyeria) aphrodite female uns is ssp. alcestis, which is mentioned on next p. from S Wis. Dione vanillae incarnata probably strays to Wis. rather than ssp. nigrior. Lethe appalachia is also in Wis. Wis. has Coen. tullia inornata, & O. calais strigulosa, & O. jutta alaskensis=ascerta (not ridingiana). Wallengrenia egeremet & Polites peckius peckius occur in Wis. Mature larvae of Pyrgus communis hibernate. P. 190 Erynnis persius does not eat Salix or Populus (errors based on E. icelus).

MICHIGAN BUTTERFLIES AND SKIPPERS. A Field Guide and Reference.

Mogens C. Nielsen. 1999. Michigan State University Extension, East Lansing, Mich. 248 p.

This is a good book. It has little color photos of adults and shaded-county distribution maps with each species, and the text covers the usual information that most people want. It has some caterpillar photos too. The hostplants are quite accurate, though the common name>scientific name translation on p. 242-8 gives a few more hostplant species than are found in text. There are almost no misidentifications! I would have liked more added comments and local expertise. Many of the adult photos are too orangish.

Detailed comments: Battus philenor is not threatened, it is just a rare stray. (Many of the so-called threatened species are really just corner weeds: very common in their whole range, but entering just a little corner of your artificial political unit, thus very limited in your phony biogeographic jurisdiction. Michigan is a totally artificial state, as the "northern peninsula" and "southern peninsula" aren't even connected, and Isle Royale is way off.) P. polyx. polyxenes is from Cuba (where it may have never existed as a ssp.!). The distribution maps of P. glaucus & P. canadensis show near-total allopatry,

which is silly as they really intergrade and forms resembling the other are found widely within each other's distribution (even W of Denver in Colo. we have a few stray glaucus and some glaucusXrutulus intergrades). I wonder if the two Pontia occidentalis were just misidentified? The Colias philodice & Phoebis sennae & Eurema lisa photos are too orange. Lycaena phlaeas was not introduced from Europe. Satyrium titus watsoni=winteri evidently is the ssp. in Mich. The Celastrina seem to be correctly sorted into three sp. C. ladon, C. lucia, & C. neglecta, though the mating pair of C. ladon looks like it might be C. lucia; a fourth sp. Cel. (argentata) serotina probably occurs in N Mich. also, eating Diervilla probably. Podophyllum=may-apple & Portulaca=purslane are errors for Euptoieta claudia. Argynnis (Speyeria) cybele oviposits near violets, not on them. Boloria eunomia flies more than 2 weeks, and I haven't seen "dogfights". Bol. freija doubtfully hibernates as pupa. Most Phyciodes "tharos" photos are P. cocyta selenis (selenis has large uph orange space & orange nudum on elliptical club, & large paler unh marginal patch); only the live male photo and p. 127 bottom left female look like tharos (and the latter lacks abd. tips), so P. tharos & P. cocyta were evidently confused in this book, thus the geographical replacement of them on the maps is surely wrong. Also, P. diminutor seems to occur in S Mich. & N Ohio (see Papilio [N.S.] #13); it is similar to P. cocyta but has two gen. June to Sept. P. tharos has 3 gen. in S Minn. and probably in Mich. too. The P. cocyta selenis photos are correct. P. batesii lakota occurs in Mich.; it has one gen., the larva is not pinkish, & antenna club is almost always blackish. The broods of Polygonia & Nymphalis aren't stated well, as the 1st gen. overwinters from the previous Sept. The lowest P. faunus photo is f. silvius. Seasonal forms of P. progne should have been mentioned (ups photo is winter form). Vanessa atalanta adults hibernate. P. 149 wild snapdragon does not exist, as Antirrhinum major & A. orontium are from Europe. Lethe creola was an error in Mich. Mich. has Oeneis calais strigulosa. The male Thorybes "bathyllus" photo looks like pylades. Which 2 sp. of Baptisia does E. baptisiae ovip. on? Mint=Mentha is an error for Pyrgus communis. Ancyloxypha numitor ovip. on various hay grasses. Oarisma poweshiek doubtfully eats Eleocharis=spike-rush. Mich. has the large-patch P. peckius peckius. Redtop grass for Pompeius verna means Agrostis gigantea on p. 246 (even though Gray flora says Redtop is A. alba). Anatrytone logan & Poanes hobomok doubtfully eat Poa. Poanes viator & Euphyes dion larvae are known and feed on Carex lacustris in Minn. Cyperus was just a lab host for Euphyes vestris. Poa pratensis is dubious for Amblyscirtes hegon & A. vialis, as Amblyscirtes eat hay-grasses. Some hosts were missed on p. 242-8: Aspen is Populus tremuloides, Broccoli & Cauliflower are Brassica oleracea var. botrytis, Brussels Sprouts is Brassica oleracea var. gemmifera, cabbage is Brassica oleracea var. capitata, Kale is Brassica oler. var. acephala, cherries are Prunus spp., Clovers Trifolium spp., common mallow=Malva neglecta, Dock=Rumex, Dogwood=Cornus, hard pines=Pinus spp., Holly is misalphabetized, Indian Grass=Sorghastrum nutans, lawn grasses are Poa pratensis etc., Pansy is Viola tricolor var. hortensis, Pennsylvania sedge is Carex pensylvanica, Redtop grass is Agrostis, Sumac is Rhus spp., sunflower is Helianthus spp., Wild pepper-grass is Lepidium, wild senna is Cassia.

THE BUTTERFLIES OF INDIANA. Ernest M. Shull. 1987.

Indiana University Press, Bloomington, Indiana. 262 p.

This is a good book. The color photos are nice. The county-dot maps are very good. Interestingly, it reports numerous times of observations of mating pairs (all EST), which provides conclusive evidence of mating time (406 copulating pairs of Pieris rapae from 9:30-6:30 for instance!), whereas most authors try to ignore mate-locating and mating behavior; his data for Phyciodes tharos matings clearly show the genetic ability to mate all day and the temperature-dependent increase in frequency in warm parts of the day.

Detailed comments: Epargyreus has two gen. if it flies May-Sept. P. 29 Vernonia. Lespedeza tExana was lab-only for Achalarus lyciades. For Thorybes bathyllus, the hosts are Strophostyles, Rhynchosia tomentosa, Rhynchosia virginiana, & Tephrosia ambigua. Pl. II all 4 E. "horatius" are E. juvenalis. T. pylades evidently has one gen. Wild indigo, witch hazel, & oaks are errors for Erynnis icelus. P. 41 Geoffroea. Pl. III both E. lucilius are E. juvenalis. Pyrgus communis evidently is somewhat migratory. The lherminier are females. Salix & Populus are errors for Erynnis persius. Digitaria is an error for Hesperia sassacus. P. 71 Agrostis not Agretis. P. 75 Oryza not Orza. Colias eurytheme hibernates strongly in Utah, mostly as 2nd-3rd-stage larvae. Trifolium was used only in lab by Phoebis sennae & Eurema lisa. Ind. evidently has Satyrium titus watsoni=winteri. Ind. has Lycaena dorcas michuron. Galium is an error for L. helloides. Pl. XXIX 2nd row 3rd is S. calanus falacer. P. 148 Quercus ilicifolia does not occur in Ind. P. 150 Rhus copallina. Callophrys niphon niphon occurs in Ind. Pl. XXX 2nd row 4th is S. melinus female. Crataegus is an error for Satyrium favonius ontario. Pl. XXXI all Celastrina are C. neglecta. Indiana has C. neglecta all over, C. neglectamajor in SE Ind., & C. nigra. P. 164 Irwin Leeuw. All the hosts of Plebejus samuelis are for P. melissa except for Lup. perennis. Adult Libythea carinenta bachmanii evidently hibernate. Pl. XXXV last specimen is S. aphrodite alcestis, which is evidently just a form in Ind. Pl. XXXVI last bug is male. Aster is not a host of Chlosyne nycteis, which has two gen. Phyciodes tharos larvae are not green; the photos are P. tharos, but Phyciodes diminutor probably occurs in N Ind. The photo of P. batesii is P. batesii lakota, but the 4 dots in text are surely tharos. Wisteria is an error for Euphydryas phaeton (Clark wrote that lab larvae refuse it). P. 195 Ulmus. Pl. XLI 5th row left is P. progne, so delete zephyrus from the book & Ind. P. 200 & 209 Boehmeria. Salix is error for Aglais milberti. Ludvigia & Sedum are errors for Junonia coenia. Lethe creole is surely an error in N Ind. Cynodon dactylon is lab food only of Cyllopsis gemma. Evidently Cercyonis pegala maritima occurs in Ind. (R. Gatrelle found that topotypical alope is a syn. of ssp. pegala [in the blend zone pegalaXcarolina], thus maritima replaces the usual usage of

alope (maritima is older than ochracea which is an infrasubspecific pegalaXcarolina intergrade & carolina is a cream-patch ssp.) thus maritima =”alope”; abbotti is a syn. of pegala). However, C. p. maritima intergrades toward uncommon forms like C. p. nephele in N Ind. (=olympus). Danaus plexippus androconia do not attract females (the male grabs her with his legs for mating).

BUTTERFLIES AND SKIPPERS OF OHIO. David C. Iftner, John A. Shuey, John V. Calhoun. 1992. Ohio State University, Columbus, Ohio. 215 p.

I caught some of my first butterflies in Ohio, near my grandparents' houses near Cleveland and near Green Springs. I caught a Giant Swallowtail on the fragrant soil of a cow pen, and put it into a jar stuffed with grass because I didn't know how to dispatch and preserve it; it's still in my collection. Later I found Argynnis (Speyeria) idalia near Cleveland. This book is good. It has a lot about Ohio's habitats and glaciation. Despite the tiny counties in Ohio, there are a lot of records, from 35-97 species records per county, and the maps show fairly complete coverage of potential ranges. A flight period histogram is given for each species, based on >25,000 records. The usual hostplants are listed plus some new ones, along with an impressive list of nectar plants used by each species. A lot of work was done on sedge-meadow & other wetland species. The book mentioned how Lycaena epixanthe might have been widespread before the cranberry bogs were all drained. It must be frustrating living in Ohio: lots of common widespread species, but many species are scarce or nearly-extinct & impossible to find. The book usually uses the annoying “territorial” word to refer to what I used to call perching behavior to await females, which I now term raiting behavior.

Detailed comments: P. 11 says the Xerothermic was 8000-4000 years ago, p. 12 says it ended 5000, and I understood it was even earlier. Oaks are dubious for Erynnis icelus. P. 43 Findlay. Polites mystic host is usually Poa pratensis, though sedges could be eaten also; hosts have to be turflike on non-watery soil as the eggs are laid without glue and drop into the litter. Huron is a syn. of Atalopedes campestris. Carex is dubious for Anatrytone logan also (sedge meadows usually have Poa pratensis all through them, unless they are the wet ones). I reared Poanes viator from Carex lacustris in Minn. Pupating Pap. polyxenes larvae surely wandered onto Cosmos. Pap. glaucus balanced polymorphism was disproved. The Colias eurytheme records increase until Sept., in contrast to the steady C. philodice, evidently because it likes alfalfa more (do some disperse into Ohio later in the summer?; it is considered a resident in contrast to Junonia so can't migrate much). Lycaena phlaeas was not introduced from Europe. Ohio would have Lycaena epixanthe phaedra. Ohio has Satyrium titus watsoni=winteri. Satyrium acadica males rait in late afternoon-dusk, thus are less-active earlier. The book's ladon combines three species: Ohio has the spring Celastrina ladon over at least the SE ½ of the state, Cel. serotina on E edge in Columbiana Co. (pl. 24 row 6), & the June-Sept. Cel. neglecta all over. Cel. neglectamajor lacks hyphen. Celastrina nigra=ebenina. P. 117 writes that Speyeria diana is reestablishing itself in some areas such as W.Va. Boloria selene nebraskensis exists even in roadside ditches in Minn., so should be able to survive in Ohio. B. bellona has very fast development, so there are 3 gen. Ohio has Phyciodes tharos all over the state in 3+ gen. In Papilio (N.S.) #13 I showed that Phyc. diminutor diminutor also occurs across N Ohio (Lucas, Wood, Columbiana Cos., from a study by Porter & Mueller 1998; & Sandusky Co. [this book pl. 28 row 5 middle]) and flies L May-E June & L July-E Sept. in Ohio in several gen.; antenna club is usually orange, but mostly blackish in Columbiana Co. P. cocyta selenis=pascoensis has one gen. and does not occur in Ohio (the mapped dots from Highland & Hamilton Cos. I think are P. tharos, and the 1m1f from Elk Co. Pa. on Pl. 29 also look like tharos). We need a thorough study of Ohio Phyciodes incl. rearing from eggs/young larvae found on natural hosts. Does Nymphalis antiopa have one gen., or one emerging June-E July and a second emerging L July-Aug. that overwinters? The Aglais milberti histogram may suggest 3 gen. Note that Vanessa virginiensis & V. atalanta seem to overwinter (as adults surely). Cercyonis pegala maritima replaces the name alope. The Megisto cymela histogram does show two emergence peaks in E June & E July, the mysterious dual cohorts. P. 153 Aster undulatus not umbellatus is a P. batesii host. P. 165 MOR is used for Morrow on pl. 24 at least. Pl. 24 row 5 has 3 Cel. ladon, 2 Cel. lucia; row 6 is Cel. serotina from Columbiana Co. (according to O.D. Pavulaan & Wright 2005 Tax. Rept. 6:7); row 7 is Cel. neglecta. Pl. 28 row 5 2nd, is Phyc. diminutor from Sandusky Co. (the others are P. tharos). Pl. 29 1st row may be P. cocyta selenis. Pl. 40 P. satyrus were later named P. s. transcanada.

BUTTERFLIES OF NEW JERSEY. A Guide to their Status, Distribution, Conservation, and Appreciation. Michael Gochfeld & Joanna Burger. 1997. Rutgers University Press, New Brunswick, New Jersey. 327 p.

This is a good book, which is quite different from the usual butterfly book. There are only a few color photos of adults, and readers will need other books to see what the butterflies look like. But there is lots of local information specifically pertaining to New Jersey butterflies, especially distribution and flight times, and historical changes in distribution are discussed while citing previous works on N.J. species. Panthiades & Calycopis are expanding northward for instance. Sometimes the cited references on distribution are all that's known, for instance the authors offer little else on Erynnis lucilius occurrence, which remains mysterious. There is good info on habitats & climates in the state. N.J. has totally artificial state boundaries, but the book is a must-have for area butterfly fanciers anyway. Published hostplants, hibernation

stage, and other comments are listed for each species. The book analyzes census techniques & 4th-of-July butterfly counts. It discusses how forest overgrowth can choke out butterflies, and how the spraying for Gypsy Moths damaged lepidoptera (Amblyscirtes hegon, Panoquina panoquin, etc.) more than that moth. It's interesting that forest succession threatens Lycaena epixanthe and its cranberry bogs, and Calephelis borealis, etc. Detailed comments:

P. 29, later Scott & others split them into Argynnis (Speyeria) atlantis & S. hesperis. P. 43 Calycopis cecrops was later found to eat a wide variety of detritus. P. 55 hilltopping is just one type of mate-locating site, and gulching, tree-topping, etc. could also have been discussed. P. 102 Daucus carota flowers are not popular for nectar. P. 104 transplantations of butterflies should be done more often, for instance Melitaea phoebe should be transplanted from Eurasia to the west (Montana-Colorado etc.) to control weedy Centaurea; and lots of endangered/threatened species should be introduced to new suitable sites. P. 123 Papilio polyxenes has 1:1 sex ratio. P. 125 P. glaucus balanced polymorphism was thoroughly disproved. Papilio palamedes is not tropical. Colias philodice larvae hibernate, and C. eurytheme does too in Utah, even though S. Ae claimed it doesn't have much of a diapause in Conn. Colias eurytheme gradually colonized the northeast, so it must overwinter there, and is not just a migrant as various other books suggest, though people have seen eurytheme migrate in Kansas & Wash. etc. P. 139 eubule. Half-grown Lycaena phlaeas larvae hibernate. It's silly to want Lycaena thoe to be declared as threatened, as it is common in most of N.A. and is expanding in W U.S. Christopher Curtis found Lycaena epixanthe at a commercial cranberry bog at Whitesbog N.J. in the 1960s. Callophrys irus larvae are reported to be unmarked on Lupinus & striped on Baptisia; are those different taxa? Roy Kendall proved Diospyros texana as a host of Call. henrici. P. 159 Pinus banksiana. The Celastrina writeups are good, though p. 172 gives the impossible statement that Cel. neglectamajor eggs are found prior to adults even though pupae hibernate with a single gen. (if adults fly M May-E June then look for eggs in E June). P. 175 Scott & Wright 1990 (in Otakar Kudrna's Butt. Europe vol. 2) showed that Heliconiini includes Argynninae. 2450 eggs for one Speyeria idalia female! S. idalia may have spread east from the plains when the forests were cleared, as p. 183 notes for Boloria bellona, and now it's retreating as the forest regrows. P. 183 Lysimachia. Phyciodes selenis was named by Kirby in 1837, and P. cocyta is the proper name. One specimen is not enough to put cocyta in N.J., however P. Opler told me in 1998 that he has seen a series (of Phyc. diminutor?) from Sussex Co. in a shale barren with Calephelis borealis. P. batesii is rather doubtful from N.J. and most or all may have been P. cocyta; I have not studied specimens in eastern museums. P. 189 all Polygonia & Nymphalis & Aglais feed regularly on flowers. P. progne is generally rare so doubtfully has declined; does fall brood emerge in M Aug. or Oct.? P. 194 top is poorly written on one N. antiopa gen., & whole book is written poorly on overwintering adult "broods". Adult Vanessa atalanta & V. virginiensis hibernate. P. 201 weidemeyerii. Lethe eurydice & appalachia hibernate as larvae. N.J. was later declared to have Neonympha helicta septentrionalis. This book cites USFWS reports saying that collecting helped exterminate Neonympha mitchellii in N.J., evidently the source of Glassberg's vitriolic comments about collectors in his books; it also blames natural succession to upland forest, which Ray Stanford told me caused the extirpation of one N.J. site. Megisto cymela's hosts have been poorly studied so the host range is undetermined. P. 211 the 2nd gen. is produced by the 1st gen. in Ont., contrary to Brown. The variation in Cercyonis pegala is polymorphism. Scalloped Sootywing is the best name for S. hayhurstii. P. 226 maybe the identification was wrong of the garden columbine Erynnis. Legumes are the only proven valid hosts of E. persius. Pesticides are blamed for exterminating Pyrgus centaureae wyandot. Ambrosia is an error for Pholisora catullus, & Poa an error for Ancyloxypha numitor. Polites peckius larvae hibernate. Polites origenes: Scott 1986 did not mention Mich., & Andropogon scoparius was my error for And. gerardii. Shapiro only wrote that P. clandestinum was "suspected" for Wallengrenia egeremet. P. 245 bottom, page priority is not in ICZN Code. P. 248 Poanes taxiles is in Rocky Mts. Poa, Avena, & Cynodon were lab food only for Amblyscirtes vialis. P. 257, Cymaenes tripunctus has ~7 spots. The Panoquina panoquin host on Scirpus was an error (A. Shapiro pers. comm. to Scott, 1980).

BUTTERFLIES AND MOTHS OF NEWFOUNDLAND AND LABRADOR. Ray F. Morris. 1980. Research Branch, Agriculture Canada, Publ. 1691. Ottawa, Ontario.

This book has good distribution maps for Newfoundland., but it covers Labrador rather weakly. Butt. Canada helps update this book. No records are given for Papilio brevicauda in Labrador. Only P. glaucus canadensis occurs in Nfld. (the black females were mislabeled, D. Ferguson J. Lepid. Soc. 37:189). Hebron is dubious for Colias interior. For Colias nastes, fig. 10 is a moth larva with tubercles, which all Colias lack. Only Coenonympha tullia mcisaaci occurs in Nfld. Oeneis "chryxus" does not occur in Nfld. Erebia mancinus occurs in Labrador. Boloria titania arctica occurs in Lab. & Nfld. Chlosyne harrisii does not occur in Georgia. Nfld. has Phyciodes cocyta cocyta=arctica. Betula & Salix are errors for Polygonia gracilis. Polygonia progne does not occur in Siberia. Callophrys eryphon does not occur in Nfld. or Labrador. Newcomb reared many Lycaena dorcas to adult stage on "Potentilla" fruticosa. Lycaena epixanthe does not occur in BC. Plebejus glandon labrador was later named from Labrador. Celastrina lucia occurs in the area. Pyrgus centaureae larvae do not eat grasses.

BUTTERFLIES OF DELMARVA. Elton N. Woodbury. 1994.

Tidewater Publishers, Centreville, Maryland. 138 p.

A nice little book. Elton was the best butterfly photographer in America; all his photos are magnificent. He used a ~100-mm macro lens and powerful off-camera flash, and used experience to set his f-stop (see p. 104-5). There are photos of most adults, and of many immatures. The book contains all the info included in field guides, but contains little or no information on distribution within Delmarva. Skippers are not included. (Delmarva is a peninsula containing parts of Delaware and Maryland, between Chesapeake Bay & the Atlantic Ocean-Delaware Bay.)

Detailed comments: P. 45 Colias philodice does not prefer Trifolium. L. phlaeas was not introduced from Europe. P. 52 water dock is Rumex orbiculatus in glossary but this is an error as Shapiro's Butt. N.Y. "water dock" was R. verticillatus. Delmarva evidently has Celastrina ladon, C. neglecta, & C. idella; maybe the photos are C. ladon. May apple & purslane are dubious hosts of Euptoieta claudia. Dogbane is not a hostplant of Danaus plexippus. P. 101 petunias are not visited by butterflies for nectar.

BUTTERFLIES OF GEORGIA. Lucien Harris Jr. 1972.

University of Oklahoma Press, Norman, Oklahoma. 326 p.

This book was good, but is now out of date, so I will make just a few corrections.

Detailed comments: P. 3 Abbot lived 1750-1840. Monarda & Origanum are errors for Pholisora catullus. Pl. 5#21-22 are Celastrina neglecta. Pl. 8#9 is Argynnis (Speyeria) cybele female. B/W Pl. 6#1-2 look more like Euphyes arpa males as unh lacks pale veins. Pl. 10#12 is male. Pl. 11#9 is probably Thorybes pylades. Magnolia, Zanthoxylum & Cercis are errors for Papilio troilus, Magnolia an error for P. palamedes. Georgia has Celastrina neglecta all over, C. ladon in most of state except the S, C. idella on E edge, & C. neglectamajor & C. nigra in the north. Sedum is an error for Junonia coenia. Lysimachia is an error for Chlosyne gorgone.

A FIELD GUIDE TO THE BUTTERFLIES OF TEXAS. Raymond. W. Neck. 1996. Gulf Publishing Co., Houston, Texas. 323 p.

This book is the only one to cover Texas, which has the largest butterfly fauna in the U.S. It has a brief description, some hostplants, brief flight period & brief life history info, general range, & brief comments for each species. There are nearly 200 color photos of living butterflies in nature, which are nice, but many of them are misidentified, and less than half the Texas species are figured; b/w figs. could have been added in text for the others with little expense. It has more than 50 nice color photos of immatures. There is a crude little outline map of Texas next to each species, with the range shaded in black=native or lined=stray or stippled=rare strays, but these maps are not accurate, compared to the county dot maps of Ray Stanford. Some records mentioned in text are not on maps. Another 20+ species are known from Tex. since the book; evidently most of the NE Mex. fauna will sooner or later be found as strays in Tex. (another 50 sp. at least). Overall, the text is too brief. I checked all the hosts, but have not studied much of the text.

Plates: Pl. 21#39 is Phoebis agarithe (straight unf line). Pl. 24#56 is Lycaena dione. Pl. 26#79 is Calycopis cecrops. Pl. 27#87 is Callophrys irus hadros. Pl. 28#98 is Ministrymon clytie. Pl. 28#100 is Strymon istapa. Pl. 31#123 looks like C. nemesis. Pl. 33#130 is A. virgulti duryi. Pl. 37#161 is Phyciodes tharos female. Pl. 43#193 is Adelpha basiloides. Pl. 48#230 is Lethe anthedon female. Pl. 57#353 is Hesperia (leonardus pawnee?, maybe attalus) male. Pl. 59#372 is Hesperia viridis male. Pl. 63#428 is Panoquina panoquinoides. Pl. 64#441 is Agathymus mariae.

Detailed comments: At the top of each species are letters, E=egg, L=larva, C=chrysalis, A=adult, signifying the presence of color photos of these. P. 34, ilioneus is a homonym, and texana a syn. P. 37 spelled Viscaceae. Pieris napi does not occur in Tex. Euchloe hyantis lotta—often treated as a sp.—is in Tex. P. 46 spelled clorinde. Amelanchier is dubious for Satyrium titus. Calycopis isobeon has narrow unf red band, & much red on unh thecla-spot, compared to C. cecrops. Brephidium isophthalma in SE Tex. are not strays, and intermediates between exilis & isophthalma were reported from Nueces Co. & La. Euphilotes rita occurs S of Alpine in Aug.-Sept. (not in Big Bend Park, not June) & eats Eriog. wrightii. E Tex. has Celastrina neglecta, W Tex. evidently C. neglecta cinerea. Plebejus alupini texanus occurs in Tex. Calephelis r. rawsoni occurs in C Tex., and C. r. freemani occurs N of Alpine & in Big Bend Park. (& C. r. arizonensis in Ariz.). Apodemia virgulti duryi (not mormo) occurs S of Alpine on April 18 assoc. Eriog. wrightii. It's Apodemia nais chisosensis. Libythea carinenta larvata has the white upf costal spot separated from the larger white spot. P. 116 Turnera ulmifolia. Poladryas minuta flies Apr.-Sep. in C & W Tex. (records W Guadeloupe Park, & W of Alpine). Chlosyne chinatiensis flies in W Tex. near N.M. and at Terlingua. C. d. definita occurs in C & S Tex., C. d. anastasia in W Tex.; spelled Stenandrium. Siphonoglossa is eaten only in lab for C. rosita, Beloperone in lab for Phyc. texana. Phyc. texana seminole & P. frisia tulcis. Euphydryas chalcedona is an error. P. 133 Artemisia. Junonia evarete nigrosuffusa is a common resident of S Tex., whereas the Black Mangrove Buckeye P. genoveva is a stray there. Texas has Adelpha eulalia. Dynamine serina dyonis is known from near Dallas; D. tithia is surely an error. Hamadryas guatemalena. H. iphthime was recorded from Burnet Co. (not Rio Grande V.), & maybe was mislabeled. Myriocarpa was perhaps an error for Smyrna blomfildia?; & Arctocarpus & Chlorophora may be errors for Marpesia chiron? P. 155 monanthogynus. Texana is a syn. of A. clyton louisa. Avery Freeman wasn't sure about seeing the Morpho. Neonympha areolata records are really N. helicta?, and Sorghastrum was probably just used in lab. Greta polissena is surely an error. Urbanus proteus larva is the

Bean Leaf Roller. Stenotaphrum is a lab host only for Urbanus procne. Gilberti is a syn. of Astraptes alector hopfferi. Astraptes anaphus hosts are Pueraria lobata, & "creeping wild bean" in S.A. Lespedeza texana was eaten only in lab for Achalarus lyciades. Thorybes pylades albosuffusa is in W Tex. P. 287 Cologania. Dyscophellus euribates is an error. P. 202 Acacia angustissima. All Pellicia angra records refer to P. arina. P. 204 bottom delete "Texas subspecies georgina" which belongs on p. 213. The Staphylus azteca was a misid. S. ceos female. The correct name for Gorgythion begga=beggina vox eludes me. J. Burns mapped E. juvenalis juvenalis from Davis Mts. Texas. Quercus emoryi & Q. grisea were assoc. records only by J. Burns for E. tristis. Pyrgus oileus has zigzags on unh submargin. Hesperopsis alpheus eats Atriplex canescens. Piruna haferniki has unh base grayish. Nastra lherminier & N. neamathla have wider ranges, & julia is a ssp. of neamathla. The hosts of Lerema liris are from R. Kendall, maybe just in lab. Poa is an error for Ancyloxypha numitor. The Adopaeoides prittwitzi record was E of Davis Mts. Hesperia viridis unh is not green. Panicum is assoc. only for Hesperia attalus. Polites rhesus flies in May. Polites subreticulata is not in U.S. (only Sinaloa to Panama, J. Burns 1994 J. Lep. Soc. 48:39). Stenotaphrum is lab only for Polites vibex; ssp. vibex occurs in E Tex., praeceps in S Tex; brettoides is not in Tex. & is evidently a syn. of praeceps. Wallengrenia egeremet spelling. P. 253 logan. P. 255 Dactylis. Alabamae is just a form of Euphyes dion. SE coastal Tex. also has E. dion bayensis. P. 259 ssp. metacomet & turneri are synonyms. Atrytonopsis pittacus flies in L Mar.-July. A. ovinia edwardsi eats Bouteloua curtipendula in Ariz. Panicum bulbosum was only suspected in Ariz. for Amb. nysa, Panicum obtusum was only probable in Ariz. for A. eos, & Poa was only a lab food for Amblyscirtes vialis. Avery Freeman recorded both Amb. celia & belli near Dallas, & I found a celia in Davis Mts.; the blotch ranges of both are too small. The blotch for Amb. fimbriata is misplaced; it surely does not occur in Chinati Mts., and is absent on Ray Stanford's maps, so does not occur in Texas or anywhere near Tex. Dysaules is still a ssp. or form of Lerodea arabus. Agathymus neumoegeni eats Agave parryi=neomexicana; A. lechuguilla is an error; chisosensis is a ssp. Ag. mariae eats Ag. lechuguilla (not lecheguilla on p. 278-9), & gilberti is a syn. Agathymus remingtoni has ssp. or synonyms estelleae & valverdiensis. Coloradensis is a ssp. of Meg. yuccae; maculosa a ssp. of Stallingsia smithi.

BUTTERFLIES OF HOUSTON & SOUTHEAST TEXAS. John & Gloria Tveten. 1996. University of Texas Press, Austin, Texas. 293 p.

An outstanding book. There are nice color photos from nature for adults of most species, and many for immatures too. Only one misidentified photo! Fine glossy pages. The text is more complete than in most books, with lengthy discussions of interesting stuff and local information; no skimpy formulaic word-processing here. They have done a lot of work on the hostplants and biology of Texas butterflies (they should write Butterflies of Texas). There are good insights on the hosts of Feniseca, new life history info & larva photos on Phaeostrymon, conclusive analysis of Calpodes hosts, etc. They clearly seem to demonstrate that isobeon is a ssp. of Calycopis cecrops (they intergrade in Houston & Baytown, and intermediates are illustrated on p. 79 & 81), and cite studies by Mike Rickard that show that julia is a ssp. of Nastra neamathla. They also show isophthalma-like adults from a colony of Brephidium exilis near Rockport in Aransas County, suggesting that these are ssp. too.

Detailed comments: Battus philenor is illustrated with both black & red larvae. P. 28 has the thoroughly-disproved balanced polymorphism theory again. The discussion of Pontia protodice scent glands & uv reflection is incomplete; females have repellent scent glands, and butterfly pheromones are not well studied. P. 82, gryneus was in Mitoura, then was placed in Callophrys, but now the splitters are mounting more zombie attacks (Loranthomitoura etc. hypersplitting), but we must resist & keep it in Callophrys. Interesting that Callophrys henrici larvae were red on seed pods, green on leaves. Very odd that Texas Strymon melinus larvae are only green, as they are very polymorphic in Colo. S. melinus raits on bushtops even in spring, after 1 p.m. to dusk, so surely they mate then. Echinargus isola life history & many hosts were in Papilio (N.S.) #6. E. Tex. has Celastrina neglecta; the photos seem to be Cel. lucia f. marginata from Canada. P. 98 Colombia. Libytheinae & Heliconiini are wrongly raised to family rank, & Dione vanillae is wrongly stated to be not closely related to Argynnis (Speyeria), when actually it is closely related to Euptoieta. They write that Euptoieta hibernates as adults in Houston. Evidently Phyciodes t. texana occurs in Houston. Note that all 1m2f Phyc. tharos tharos figured have orange antenna nudum instead of black, a high frequency as in La. Only Vanessa atalanta adults hibernate. They note Vanessa cardui in midwinter in Houston! Cross out the sentence on intraspecific hybrids & isolating mechanisms on p. 163. P. 171 parag. 5 describes raiting behavior of male Asterocampa celtis, not challenges or salt-seeking. SE Tex. has Neonympha areolata rather than N. helicta, based on the photo. Megisto cymela still needs a lot more work, and J. Calhoun found that viola intergrades with cymela in the Fla. panhandle. P. 206 Apyrrothrix araxes is native in Ariz. Epargyreus clarus usually ovip. on the host. Thorybes pylades courts & mates all day. Intermediates of Erynnis zaruccoXfuneralis are reported in La. & Fla., which may just represent whiter-fringed zarucco, as Houston has only E. funeralis. Scott wrote that Nastra julia ranges S to Costa Rica; W-Tex.-Ariz.-Calif. records of Nastra neamathla are errors for julia; this book shows that julia is a ssp. of neamathla. Wallengrenia egeremet occurs at Lake Houston just N of Houston (p. 242) so should have been included in book. P. 244 the antenna base is pale in Euphyes vestris too. Atalopedes has become common in S Minn. & Denver, so I suspect it now overwinters farther N than we thought. Poanes yehl also occurs at Lake Houston (p. 248) & should also have been included. Euphyes dion bayensis occurs in extreme SE Tex. Photo of Amb. vialis is actually A.

alternata female. P. 253, wax is produced to protect the pupa from physical damage in the nest, not to protect a larva outside the nest from predators. Good info on choice of Cannas by Calpodes; the translucent body shows the tracheae—not circulation—and 2 testes (p. 252 larva also shows 2 testes). Index: cauliflower is B. oleracea botrytis. Frog-fruit P.incisa 141. Nasturtium is Tropaeolum. Tube-tongue is Siphonoglossa.

BUTTERFLIES OF SOUTHEASTERN ARIZONA. Richard A. Bailowitz & James P. Brock. 1991. Sonoran Arthropod Studies Inc., Tucson, Arizona. 353 p.

This is a good book, which covers the SE 1/6 of Ariz. Much is known but unpublished about Arizona butterflies, which will not be published during the lifetime of the major discoverer, so this publication is welcome. It has b/w photos for each species, along with distributions within the area (mostly the mountain ranges occupied) and flight periods, together with habitat. Life history information is limited to hostplants; it reports some good hostplants for butterflies in the region. Unfortunately, the book often uses the wrong terms for mate-locating behavior, thus for a dozen species it says they "patrol hilltops" when their main behavior is perching to await females on hilltops (if you walk onto a hilltop and disturb him, he will fly around, but will land when you stop disturbing him). And often the book uses the word perch for just sitting on a substrate. The new terminology will help here: raiting behavior consists of males resting (landing) to await females at certain characteristic sites to await females, flaiting behavior consists of males flying around a small area where they await females (example Papilio eurymedon flying slowly about tiny clearings among trees on ridgetops/hilltops to await females), and fleeking behavior consists of males flying about a larger area (canyons for Anthocharis sara, or the canopy of a lot of host trees for Hypaurotis, etc.) to seek females. Various species discussed and labeled as "hypothetical" are in general just errors. Of course new species since have been found in S Ariz. (Grais stigmaticus, Strymon cestri, Euchloe [hyantis] guaymasensis, Chlosyne marina, Phyciodes pallescens, etc.).

Detailed comments: P. 5 population pressures don't cause migration, it's genetic. Epargyreus exadeus records are probably E. windi according to A. Warren. P. 22 maybe Oslar's May specimen was an error; in Colo. he mislabeled May Oeneis alberta as Sept. Zestusa dorus raits on hilltops. I haven't had any trouble sorting Achalarus albociliatus, toxeus, & jalapus by their distinctive genitalia. Ach. "jalapus" in Ariz. are really A. toxeus (A. Warren, pers. comm.). There must be several gen. of Thorybes pylades. Dobra is a syn. of Thorybes mexicana. Codatractus valeriana=mysie is the correct name (O. Mielke & A. Warren, Rev. Brasileira Zool. 21:307-8), contrary to J. Burns. Erynnis brizo & E. propertius meridianus & E. persius males rait on hilltops. J. Burns reported Quescus hypoleucoides, not Q. grisea, for E. juvenalis clitus. I think there's a possibility that Pyrgus communis & P. albescens are just dominant/recessive genitalic polymorphs, because of peculiar suggestive variation of mtDNA in Calif. and the costal fold and valva polymorphism in Mex. and the recent replacement of communis by albescens in Fla., but rearing studies will be necessary to study this. I found Pyrgus philetas mostly at wet habitats. Systasia pulverulenta was fig. from Baboquivari Mts. in J. Comstock's Butt. Calif. Hesperopsis alpheus likes alfalfa flowers in Colo. Cingo should be called Piruna aea mexicana. Nastra julia occurs from Tex. to Calif., & neamathla from Tex. to Fla., and this record is julia if valid (Butt. Houston wrote they are conspecific). Adopaeoides is common E Aug.; host spelled Paspalum distichum. Book probably means Yvretta carus raits on hilltops. Hesperia uncas & H. comma susanae & H. pahaska rait on hilltops, & H. viridis raits in gulches. I found H. woodgatei raiting on Chiricahua Mts. hilltops. Paratrytone "Ochlodes" snowi actually feeds only on Muhlenbergia montana (Blepharoneuron was my error). Atrytonopsis hianna deva (only differs by variable stigma) raits in gulches. Edwardsi is a ssp. of Atrytonopsis ovinia. I later named Amb. aenus megamacula for the region. A. oslari males rait in gulches all day. Amb. tolteca prenda is in Ariz. Amb. nysa raits in gulches incl. low points on roads, all day. P. 107 Thespieus. Megathymus yuccae males do sip mud. Meg. ursus females are slower so can sometimes be caught, whereas faster males are nearly impossible to catch. Battus philenor larvae are usually dull red in the region. Papilio polyxenes coloro surely raits & flaits on hilltops; was the coloro record the yellow form? P. 121 top photo is the yellow-form P. polyxenes f. pseudoamericus male from Whetstone Mts., and bottom looks like P. p. asterius female. P. cresphontes & P. thoas are easy to distinguish using wing pattern and dorsal view of male abdomen tip (see my 1986 book). P. glaucus rutulus occurs in Ariz.; arizonensis is a syn.; rutulus has a partial gen. until Sept. in Denver. P. 134, the text means "rest" with wings fluttering. P. 141, 146 Thysanocarpus. All the Pontia protodice photos are spring f. It's Ascia josephina howarthi. The Anth. sara inghami photos look more like ssp. thoosa; mine from Sabino Can. have less black; males mostly fleek in gulches. P. 148 eriphyle is a slighly-orangish ssp. limited to BC. Eurema nise lacks the unh basal dot of E. lisa. Nathalis iole always flies low; and dark soil would reflect more heat. Callophrys spinetorum has one gen. in Colo. Satyrium favonius ilavia is in Ariz. (S. polingi is a separate sp. eastward.) Strymon melinus raits on hilltop bush/tree tops. I found Erora laeta quaderna in the Patagonia Mts. Ariz. probably has Celastrina neglecta cinerea. Euphilotes bernardino martini. P. 204 the photos are Apod. virgulti mejicanus from (p. 310) Empire Mts.; ssp. mormo lacks ups red, and occurs at Portal in Chiricahua Mts. (Gordon Pratt), & I found it at Molino Basin. Apodemia palmeri photos are female. Apodemia phyciodoides was surely mislabeled from Ariz., as the original collectors were often in Sonora. (Argynnis) Speyeria hesperis nausicaa is in Ariz. Segregate #1 is Poladryas minuta arachne=gilensis; #2 is P. m. near-nympha; males rait on hilltops in morning, and may fleek on flowers in afternoon. Chlosyne leanira fulvia raits & flaits on hilltops. Chl. acastus sabina mostly raits in washes. P. 230 Anisacanthus. Phyciodes frisia tulcis. P. pallescens is known from St. David (Sept. 12 1958 Ray Stanford 1f), and other

"campestris" records from SE Ariz. may be pallescens. P. picta canace & P. mylitta arizonensis are in Ariz. P. mylitta should be stated to rait & fleek in washes. P. 239 surely Urtica dioica gracilis. Nymphalis antiopa raits in valley bottoms & back yard clearings. Nymphalis milberti raits all day on talus/clearings just off hilltops, & migrates to higher altitude in summer, explaining its presence near summits. Junonia evarete nigrosuffusa. Limenitis weidemeyerii often visits flowers. Adelpha eulalia is a distinct sp. from A. bredowii as they are sympatric in S Mex. P. 267 Croton texensis. Asterocampa celtis montis occurs in SE Ariz., & compared to antonia it has oranger ups and pale median uph band and the spot in fw cell CuA_1 mostly solid black. Texana is a syn. of A. clyton louisa. Cyllopsis pyracmon henshawi has 1st gen. (henshawi) & 2nd gen. (nabokovi); Douglas Mullins reared one from the other. Allyni is a ssp. of Paramacera xicaque. The numbers on Appendix B are species nos. not page nos.

BUTTERFLIES OF ANZA-BORREGO DESERT STATE PARK & ENVIRONS. Lynn & Gene Monroe. 2004. Published by authors.

This is a nice book. The best part is the numerous nice photos of adults and some immatures. The book includes lots of hostplant information from the literature (which are unfortunately not distinguished from local hostplants that the authors or other lepidopterists might have discovered), and a lot of indexes to such information, which seems to be a waste of space to me; I would have preferred that space be used for more local info and local lore.

Looking over the book I found few goofs: P. 19 lower right photo looks like P. p. coloro not zelicaon. P. 26 left middle photo is P. protodice f. vernalis, note weak apical markings (and sisymbrii has unf cell-end bar broken in middle). P. 28 upper right looks like E. ausonides but is hyantis as the book states, because ausonides does not occur near there. P. 41 lower right L. helloides is male, not female. P. 53 it seems that Everes is just part of the genus Cupido, so Cupido is the correct name. P. 59 the acmon uph orange band is pink, without a dark inner border except in spring. P. 83 should be Prudic et al. 2001. P. 102, Cynodon dactylon is a very dubious host of O. sylvanoides, as that bug eats only hay grasses mostly on N-facing slopes.

THE BUTTERFLIES OF SOUTHERN CALIFORNIA. Thomas C. Emmel & John F. Emmel. 1973. Natural History Museum Los Angeles Co., Science Series 26. Los Angeles, Calif. 148 p.

This is a good book, and has few errors. It has good color plates of all species, and has lots of b/w drawings (most by Charles Dammers) and some b/w photos of immatures. It has a lot of local lore. Argynnis (Speyeria) adiaste atossa went extinct in 1959 when I first started collecting butterflies, the later-named Philotes sonorensis extinctis has been long-extinct, and since then several others such as Euph. editha have become nearly extinct in S Calif.; weeds and global warming are diminishing the already sparse (except for host races of Eriogonum feeders) fauna. The book is out of date, as much more has been discovered: vallismortis has been transferred to Chlosyne acastus, Euphilotes & Apodemia have been expanded greatly and plunged into chaos, Cercyonis sthenele near-sthenele has been found, many genera have changed, and numerous new ssp. have been named (many mentioned above).

Detailed comments: The text notes that the eyespots on larvae of Papilio glaucus rutulus, P. eurymedon, & P. multicaudata are quite variable in pattern, which is interesting as that trait has been used to distinguish rutulus from P. g. glaucus which has just the big eyespot. The pupa drawing of Pontia beckeri is Colias based on wing pattern and lack of hump on A2-3 & lack of bird-dropping appearance. P. 19 top, Colias alexandra altamont & C. edwardsii ssp. have two gen. Colias philodice hibernate as half-grown larvae. Adults & pupae of Zerene cesonia are claimed to hibernate. The Nathalis sex-brand is red. Catalina is claimed to be a distinct ssp. but the photos look the same as cethura. Gunderi is a syn. of thoosa or is very close. Andrewsi is said to have larvae that look like E. hyantis, yet adults resemble ausonides, & p. 25 says an E. hyantis lotta pop. flies near it near E end of San Bernardino Mts., which provokes questions (and hyantis and lotta are reported to intergrade on Kern Plateau, why hasn't that been published?). Ken Davenport found Cercyonis pegala in S Calif. in Kern Co. Viridicornis is now considered a syn. of S. hydaspe hydaspe. E. chalcedona quino was later named E. c. hennei, and E. editha wrighti is now E. editha quino, which is now nearly extinct. Microtia (Dymasia) dymas chara flies most of the year in Ariz. P. tharos tharos occurs in S Calif. (or occurred), while campestris is now known as P. pulchella pulchella. Phyc. phaon jalapeno is in Calif. Fig. 39 is supposed to be from Edwards 1884 but that's not in references, Edwards' Butt. N.A. is 1884 but the fig. isn't in my microfiche copy of BNA, and the fig. didn't come from Can. Ent. 13:226. P. 49 Apodemia virgulti deserti does occur in the W Mojave Desert. A. dialeuca (host E. wrightii, not kennedyi), A. mormo, & A. cythera are now considered separate species. Still no study of whether avalona is just a ssp. of S. melinus; they reportedly hybridize on Santa Catalina I. where melinus has been introduced. Ines is the fall f. of Ministrymon leda. P. 58 notes that Callophrys gryneus juniperaria & C. g. loki intergrade at NE end of San Bernardino Mts.; nelsoni is a ssp. of C. gryneus too. P. 68 the greenish pops from Tehachapi & Tejon Ranges are Pleb. chlorina chlorina. (P. chlorina monticola & P. acmon also occur in S Calif. of course). Euphilotes bernardino eats Eriog. fasciculatum not nudum in El Paso Mts. Glaucopsyche piasus sagittigera also occurs in inland mts., rather close enough to ssp. piasus that one wonders whether it might be a separate species G. daunia sagittigera? Agathymus stephensi egg shape is wrong (it is flatter, see Bull. So. Cal. Acad. Sci. 33:84). Hesperia pahaska martini was later found to be smaller, so is a

syn. Hylephila phyleus phyleus occurs in most of S-Calif., but the later-named H. p. muertovalle occurs at Needles, and in diluted form ranges W-ward in Mojave Desert. Fig. 70, the lower left larva & pupa are actually Hesperopsis libya, while lower right larva & pupa are Pholisora catullus. Hesperopsis libya in Inyo Co. are near-libya (lena is limited to Montana-Colo.). H. alpheus gracielae has multiple gen. Heliopetes domicella was just a stray at Parker Dam, based on one specimen that I caught (somehow one wing disappeared during capture). Sidalcea is an error for Pyrgus ruralis, which was later named P. ruralis lagunae, now scarce. E. afranius as well as other Erynnis hibernate as mature larvae. Many more species have been recorded from So. Calif. since the book, including Dione moneta from Fullerton Calif. July 20 1929 1 male; Phyc. texana from Anza-Borrego SP (Michael Young & Dave Wagner). W. Field's Butt. Kansas p. 108 recorded Anaea aidea from Sierra Madre Cal., but maybe he meant Mex. Bull. So. Cal. Acad. Sci. 30:93 mentioned Urbanus simplicius from Fertilla, evidently referring to the U. procne mentioned on p. 95. P. 99, Evans W. H. 1952 & Evans W. H. 1955 are two different people, the latter Brigadier W. H. Evans of British Museum Nat. History, the former an LA resident. Pl. 4 fig. 36 & 38 are both from Mint Can., so 38 must be Chl. leanira wrightii also, the cerrita phenotype.

BUTTERFLIES OF CALIFORNIA John A. Comstock. 1927

Published by author. 334 p. & 63 plates.

This book is long out of print, but is of historical importance, and the plates are very nice. So I'll just correct bad misidentifications on the plates, and ignore the endless obvious name changes of species & genera that the reader can easily update. The leather cover has a beautiful embossed butterfly. The book has a lot of drawings of immatures by Charles Dammers and others. The text is interesting reading with lots of lore.

Pl. 1#6 is Papilio zelicaon (all LACM specimens from area are zelicaon, says K. Davenport). Pl. 5#7 has typical P. phoebus smintheus sphragis. Pl. 6#4&7-8 P. p. smintheus. Pl. 8#16 Pieris marginalis reicheli. Pl. 9#7-8 P. marginalis; 12 P. marginalis venosa. Pl. 10#4-5 Euchloe hyantis lotta. Pl. 11#1-3 A. cethura cethura; 13 A. julia flora; 14 A. julia columbia; 15 A. julia near-stella. Pl. 14#7-12 Colias philodice. Pl. 15#11-13 Colias columbiensis pseudocolumbiensis. Pl. 16#14 Eurema daira palmira; 16 E. daira daira. Pl. 18#7-8 Coenonympha tullia ampelos; 9-10 C. tullia sweadneri; 19-21 C. pegala nephele. Pl. 19#2-6 C. pegala nephele; 7-10&12 C. pegala near-stephensi. Pl. 20#15 C. oetus charon. Pl. 24#1-3 Argynnis (Speyeria) egleis utahensis; 4&6 S. zerene behrensii; 5 S. zerene hippolyta; 7 S. hesperis chitone; 10 S. zerene conchyliatus. Pl. 25#3-5 S. hydaspe near-hydaspe. Pl. 26#1 S. zerene zerene; 2 S. hesperis cottlei=dodgei; 4-6 S. hesperis irene; 7 S. zerene zerene; 8 S. zerene bremnerii, mislabeled from Calif. Pl. 27#4-6 S. zerene gunderi; 7-8 S. coronis snyderi. Pl. 29#4-6 S. coronis coronis; 7-8 S. callippe liliana. Pl. 30#1-3 S. callippe juba; 4-5 S. callippe rupestris; 6-9 S. callippe macaria; 10-12 S. egleis oweni. Pl. 31#1-3 S. zerene malcolmi; 4-6 S. egleis egleis; 7-9 S. mormonia mormonia; 10-12 S. egleis tehachapina. Pl. 33#1 Euph. chalcedona chalcedona; 4-5&9 E. "colon" wallacensis. Pl. 34#11&13&15&17 E. editha nubigena. Pl. 35#5 Euph. chalcedona sierra. Pl. 36#13-#19 Chlosyne palla palla. Pl. 37#1 Chl. palla altasierra; 3 Chl. palla dark-female ssp.; 19-21 Chl. leanira obsoleta. Pl. 38#1 Chl. leanira wrighti. Pl. 39#1-3 Phyc. phaon jalapeno; 4-6 Phyc. pulchella near-pulchella; 16 looks like a mislabeled Phyc. pallida barnesi. Pl. 40#2-8&10 Polygonia satyrus satyrus. Pl. 43#4&7 Vanessa atalantaXcarye annabella; 11 Junonia evarete nigrosuffusa. Pl. 44#11 Junonia evarete nigrosuffusa. Pl. 45#2 Lim. weidemeyerii latifascia; 5-6 L. lorquini ilgae. Pl. 46#3 D. gilippus thersippus. Pl. 47#1-3 L. carinenta larvata; 5 Apodemia virgulti deserti; 13-14 A. virgulti mejicanus; 15&18-19 Calephelis nemesis; 16-17 Calephelis wrighti. Pl. 48#7-9 Strymon istapa. Pl. 49#6-8 Satyrium sylvinus desertorum; 19-23 Sat. saepium. Pl. 50#4 Callophrys gryneus nelsoni; 16&20 Callophrys [sheridanii] viridis ["dumetorum", a name soon to be banished]; 17-19&21 Call. affinis perplexa; 25 Call. [sheridanii] viridis?; 26&28 Satyrium fuliginosa "tildeni"; 27 Satyrium (fuliginosa) semiluna "maculadistinctum". Pl. 52#1-2 Lycaena xanthoides editha; 3 L. xanthoides edithaXxanthoides "pseudonexa" (unh spots smaller than regular editha)(Dunsmuir is a famous site for these intermediates, see J. Scott 1981 J. Res. Lepid. 18:50-59). Pl. 53#10-12 Hemiargus hanno gyas; 19 Cupido amyntula amyntula; 21-22 Plebejus atrapraetextus fridayi; 23-25 Pleb. melissa paradoxa; 29-31 Pleb. podarce. Pl. 54#1-2&4-5 Plebejus saepiolus aehaja; 3 Pleb. saepiolus gertschi; 16 Pleb. saepiolus rufescens; 17-19 Pleb. icarioides icarioides. Pl. 55#7-9 Plebejus alupini alupini; 10-12 Plebejus chlorina monticola; 13&15 Pleb. chlorina chlorina; 14&16 Pleb. chlorina chlorinaXPleb. neurona; 27-28&33 Euphilotes glaucon oregonensis; 29-32 Euph. bernardino. Pl. 56#7-11&14-15 Philotes sonorensis extinctis; 20-23 Glaucopsyche piasus sagittigera; 24 Glaucopsyche lygdamus incognitus; 25 Glauc. lygdamus columbia; 30-31 G. lygdamus xerces. Pl. 57#1-5 G. lygdamus xerces polymorphs. Pl. 58#1-2 Thorybes pylades; 19-21 Hesperopsis alpheus gracielae. Pl. 59#1 Erynnis brizo lacustra; 2-3 surely Erynnis persius; 4 Erynnis afranius; 5-6 E. pacuvius pernigra; 7-8 E. pacuvius callidus; 9&11 Erynnis propertius. Pl. 60#17-18 Hesperia comma near-hulbirti; 19 H. comma leussleri; 20 Hesperia pahaska; 21 Hesperia juba; 22 H. comma idaho. Pl. 61#1-3 Hesperia lindseyi; 10-12&14-15&19 Ochlodes agricola nemorum; 13 Ochlodes yuma?; 29 Polites sabuleti sabuleti variant like chusca. Pl. 62#18-21 Panoquina panoquinoides errans.

BUTTERFLIES OF BAJA CALIFORNIA. John W. Brown, H. G. Real, David K. Faulkner. 1992. Lepidoptera Research Foundation, Inc., Beverly Hills Calif. 145 p.

This is a good book, which brought together lots of data on this W Mexico peninsula for the first time. (Since then, there has been little study of the fauna, as collectors are arrested and their bugs seized if they do not have the extortion-priced nearly-$1000.00 Mexican butterfly-collecting permit.) There are nice dot maps of each species, and 8 nice color plates show all species. N Baja is dry in May-Sept. like Calif., most of Baja is dry all year, and the Cape is moist in Aug.-Oct. Evidently the 17-25 Pleistocene ice advances, along with drought, have kept most of the central mainland Mexican fauna out of Baja Calif.

There aren't many mistakes in this book. P. 18, there are not as many endemics as the book writes, as festata is a syn. of Hypostrymon critola, & comstocki, dawsoni, harbisoni, cedrosensis, howarthi, murphyi, & poodiae are ssp. of other taxa, as noted below. Codatractus (not Thorybes) valeriana. P. 30 line 13 should be Pyle (1981). Staphylus ceos isn't especially shade-loving. Erynnis afranius raits (perches to await females) in gulches/swales in Colo., so I doubt that it mate-locates on hilltops in Baja. I wonder if Pyrgus communis vars. could occur in the upper Sierra San Pedro Martir? Abutilon & Sida are errors for P. oileus (belong to P. communis). Hesperopsis alpheus gracielae. Real neamathla does not occur W of Texas; Baja has Nastra neamathla julia (see Butt. Houston). Hylephila phyleus phyleus occurs in Baja. Bromus is a Hesperia juba host in Colo. Vulpia is dubious for Hesperia comma leussleri. The Hesperia pahaska in upper Sierra San Pedro Martir look a little odd as if they might have introgressed with H. columbia. (Note that Polites sabuleti norae of the Sonora coast on Distichlis spicata is the same as margaretae but male lacks stigma & sterigma has a few fewer folds.) Poanes melane melane. Amblyscirtes tolteca prenda is in Baja as the figs. are prenda. Dysaules is a syn. or form of Lerodea arabus. Panoquina panoquinoides errans. Comstocki, dawsoni, & the later-named harbisoni are ssp. of Agathymus stephensi, & coloradensis a ssp. of Megathymus yuccae. Papilio glaucus rutulus. It's Ascia josephina howarthi. Lycaena arota host is Ribes quercetorum. Habrodais grunus poodiae will be a distinct species when poodles sprout wings & fly. P. 119 says 1 Hypaurotis crysalus specimen is known from Sierra San Pedro Martir. Baja has Callophrys affinis perplexa, & dumetorum should not be used as it surely will be suppressed by ICZN. Nelsoni & loki & cedrosensis are ssp. of Callophrys gryneus; cedrosensis is related to C. g. thornei. Festata is a syn. of Hypostrymon critola. Strymon istapa not columella. Hemiargus hanno gyas, Echinargus isola, Cupido amyntula, & Celastrina neglecta echo occur in Baja. 126b is Euphilotes mojave; the host is probably Eriog. davidsonii, because E. pusillum does not occur in Baja Calif. The blue of Glaucopsyche lygdamus maritima was no doubt just darker due to fading; maybe mislabeled? Plebejus chlorina monticola. Apodemia virgulti maxima was recorded from Jan. 2, Mar. 23-25, May 26, Sept. 29-Oct. 1, Nov. 9-13, Dec. 28 by Opler & Powell. Deserti also seems to be a ssp. of Apod. virgulti, while Apod. dialeuca is evidently a different sp. Murphyi is an obvious ssp. of Apod. palmerii. Libythea carinenta larvata is in Baja. C Baja Chlosyne leanira were later named austrima Austin & Smith 1998. Phyc. phaon jalapeno is in Baja. P. 103 the O.D. named it Euphydryas chalcedona hennei (so no parentheses). P. 158½ says Aglais milberti was seen in Sierra de Juarez. The common Junonia from mangrove tidal flats at Puerto Lopez Matteos at Magdalena Bay has host and narrow upf band like true Fla. J. genoveva, but the band is a little whiter and the uph is blacker with narrower orange submarginal band, like fig. 18, thus is evidently J. genoveva new ssp. (the sp. name has been switched back to genoveva from evarete). Fig. 19 is J. evarete nigrosuffusa from mainland Sonora. Mestra dorcas amymone. P. 124 Gorelick. Most of the butterflies on the plates should have been illustrated on uns, not ups (& most butterflies throughout the world should be mounted to show uns, because the identification traits are usually on uns, not ups). Numbers were trimmed off the bottom of several plates. Pl. 1#34 is Nastra neamathla julia.

THE BUTTERFLIES OF WEST VIRGINIA AND THEIR CATERPILLARS.

Thomas J. Allen. 1997. University of Pittsburg Press, Pittsburg, Pennsylvania. 388 p.

This is a very good book. The author seems to have good biological knowledge of butterflies & plants, the text is mostly accurate, there are shaded-county maps placed with the species, and best of all, there are nearly 150 color photos of larvae & pupae. The color plates are nice, though many are a little overexposed.

Detailed comments: Most of the hostplants were copied from Opler & Krizek etc., and evidently few hostplants were found in W.Va. Oviposition times based on small sample sizes in Opler & Krizek are repeated with erroneous claims that oviposition occurs only during that part of the day. The book uses the word "perch" for resting, so mate-locating behavior is seldom described. P. xii & 4 has a superfluous line dividing Kanawha Co. P. 32, Lonicera & Syringa & Phlox & Vicia are not very popular nectar sources for butterflies, & Viola is shunned. P. 50 some of the Papilio "canadensis" in this book later proved to be Papilio appalachiensis (add 8 co. records for the new appalachiensis in E W.Va.), which has the unf marginal stripe like canadensis but is claimed by Pavulaan & Wright to be usually larger than glaucus & canadensis (a bit smaller than glaucus in Scriber's studies below). This book claims that canadensis is smaller so most of the specimens discussed in the text may represent small spring-form glaucus that look like canadensis. P. appalachiensis has been treated as a distinct sp. with different mtDNA (but later work showed that mtDNA is not very useful for phylogeny), whereas canadensis is just a ssp. of glaucus tending toward P. glaucus rutulus (since the O.D., D. Wright wrote me that his gels of W.Va. canadensis represent small glaucus, and thus there is no sympatry between canadensis & appalachiensis). Actually (J. M. Scriber & G. Ording, Ent. Exp. Appl. 115:247-263; & Scriber, Ording, & R. Mercader 2008, chap. 6 Introgression & Parapatric Speciation in a Hybrid Zone, p. 69-87 in book Evol. Of Pops. & Species), appalachiensis would seem to be just a

ssp. of P. glaucus, as it is a "hybrid swarm" between glaucus & canadensis that is obligate-diapause univoltine between the first two flights of glaucus thus is allochronic with glaucus; it has intermediate degree-day habitat & hw black band width & tails, its larvae can detoxify both Liriodendron & aspen, it has the Ldh allozymes of canadensis but the Pgd allozymes of glaucus, & mostly lacks black females; thus it is basically a hybrid swarm with a few odd enzyme recombinations. Interestingly, Scriber etc. found a similar hybrid zone in C N.Y. & N.Y.-Vermont that is almost the same as appalachiensis but a bit smaller in size and has all the Pgd allozymes of both glaucus & canadensis, & flies after the local canadensis; this hybrid zone may be recent as it increased its ability to detoxify Liriodendron from 10% to 35% since the 1980s. They note (on p. 71) that these could all be considered ssp. of one species, as the appalachiensis & N.Y.-Vt. hybrid swarms are allochronic and look like lab hybrids. P. 54, Pontia protodice mates all day. P. 62 Colias philodice mates all day long. Larvae of philodice & C. eurytheme—normally not pupae—hibernate (though Ward Watt states that eurytheme lacks organized diapause). P. 74 Crataegus is an error for Feniseca by C. Abbot. P. 76 half-grown L. phlaeas larvae hibernate. P. 77 L. thoe oviposits on detritus at hostplant base like most Lycaena. Evidently S. titus watsoni=winteri=campus occurs in W.Va. P. 92 Callophrys polios ovip. on stems below the flowers, and if Arc. uvaursi is absent in W.Va. then the polios record must have been an error. P. 99 humuli is a syn. of S. melinus. P. 104, Celastrina neglecta occurs throughout W.Va. in summer, C. ladon in E counties in spring, & C. serotina "type II" in E counties later in spring. P. 120 Podophyllum & Desmodium are dubious hosts of C. Abbot. P. 122 S. diana eggs surely do not take 4 weeks to hatch. Evidently there are no demonstrated Viola hosts for Argynnis (Speyeria) in W.Va. P. 135 C. nycteis eggs are not white. P. 137 the unh marginal brown patch in tharos only sometimes contains a pale crescent. P. 138 all Phyciodes hibernate as unfed 4th-stage larvae. The male on pl. 15 row 2 left has uph like cocyta, but it may be tharos as flight time & small black antenna club suggest tharos. P. 139 W. Edwards' nearly 100 specimens from Coalburgh Kanawha Co. were mostly P. cocyta selenis=marcia, with some P. tharos, according to R. Gatrelle; P. c. selenis has one generation, while the similar-appearing large P. diminutor incognitus Gatrelle has two gen. and ranges evidently from NE Ga. and SE Kentucky to E Penn., so should be looked for in W.Va. too. P. 140-1 it would be nice to reexamine W. Edwards' supposed specimens of batesii; the pupa is not more pointed, & most of Shapiro's "batesii" specimens were evidently P. cocyta. P. 142 E. phaeton eggs surely take less than 3 weeks. P. 147 P. faunus ovip. on stems. P. 151 maybe N. antiopa has 2 gen. sometimes, as in Colo. P. 156 V. cardui kershawi is in Australia. P. 156 Cirsium is Asteraceae. P. 157 V. atalanta ovip. all day. P. 158, atalanta adults hibernate. P. 160 arthemis. P. 162 archippus mates all day. P. 164 A. celtis may ovip. singly or in small clusters. P. 171 Lethe appalachia ovip. all day. P. 172 Cynodon dactylon is lab host only for C. gemma. P. 177 nephele is surely just a form in W.Va. P. 180 plexippus mates at overwintering sites. P. 195 E. brizo egg turns red, & is laid on twigs (the plate "brizo" larva is evidently E. horatius). P. 199 E. martialis eggs turn light orange. P. 205 P. centaureae ovip. all day; mature larvae surely turn redder and then diapause (not pupae). P. 207 P. communis males mate-locate by resting sometimes also (the behavior described is flaiting, which is patrolling a small area to await females). P. 218 H. leonardus larvae don't have green highlights. P. 220 mature larvae of H. metea hibernate. P. 223 P. themistocles ovip. all day. P. 225 P. origenes mating & ovip. occur all day. P. 225 Andropogon scoparius; Carex scrabrata is evidently only a lab food. P. 227 Opler & Krizek didn't say Paspalum setaceum was favored (it surely isn't). P. 228 P. mystic mates all day. P. 229 the W. egeremet immatures description may refer to W. otho. p. 230 P. verna probably mates all day. P. 231 A. campestris ovip. all day. P. 233 Anatrytone logan mates all day. P. 234 Poa is dubious for Poanes hobomok. P. 239 E. vestris mates and ovip. all day; the egg develops a red ring & red top; the error Cyperus is a lab host only. P. 240 A. hianna surely ovip. all day. P. 243 A. vialis mature larvae hibernate. P. 244 sugar cane is a grass.

Plates: Localities are later listed for adults on these plates, but not immatures! According to Pavulaan & Wright, Pl. 3 row 1 left is appalachiensis male Rt. 1, Prince, Fayette Co. WV May 22 1987; row 2 right is appalachiensis black female East Fork Glady Creek, Randolph Co. WV June 18 1984; row 3 left is appalachiensis dusted female E fk Glady Crk. June 18 1984. Pl. 7 should show E. nicippe as orange. Pl. 10 "type I violacea" is C. ladon, "C. l. ladon" is C. neglecta; 4th row right is probably true C. ladon rather than C. serotina "type II". Pl. 15 4th row are P. batesii near-batesii from Ont. Pl. 20 top right is appalachiensis male from Lanesville, Tucker Co. WV June 18 1973. Pl. 35 upper right is Celastrina sp. unknown, probably true C. ladon as it is shown on fruits of Prunus serotina; 2nd row left is evidently true C. ladon as host is Cornus florida flower; middle is maybe Cel. neglectamajor as claimed but may be C. neglecta (see next); right is evidently C. neglecta even though it is from Cimicifuga, as the photo is the reverse of the C. neglecta on p. 69#6 in Allen et al.'s Caterpillars in the Field & Garden book, which claims that both species eat Cimicifuga; row 3 left is on a leaf of some plant. Pl. 40 "brizo" looks like E. horatius larva. P. 47 "tharos" pupa has small cones (& pl. 37 larva is pale too though a bad photo mostly of uns) so maybe it is P. cocyta selenis?

CATERPILLARS IN THE FIELD AND GARDEN. A FIELD GUIDE TO THE BUTTERFLY CATERPILLARS OF NORTH AMERICA. Thomas J. Allen, Jim P. Brock, J. Glassberg. 2005. Oxford Univ. Press, Oxford, England. 232 p.

This is a very nice book, with lots of great photos of caterpillars of most butterfly species in North America. The book makes no scientific use of the photos, but enterprising scientists can now make use of them to improve classification and phylogeny (a few phylogenetic changes are suggested below). Most of the photos were taken with quality macro lens &

ring flash, so we get good lighting all over the larvae (the only drawback of flash is a tiny ring reflection on shiny heads such as Chlosyne nycteis on p. 87 & the two reflecting spots on Megathymus yuccae on p. 151 etc., a minor problem compared to the great views of all sides of the larvae [a single flash off to the side produces bad shadows on part of the larva]).

Since not many people like caterpillars, the book will doubtfully make money; it was supported financially by the "binoculars" books of Glassberg. I have thousands of photos of eggs/1st-stage larvae/older larvae/pupae of esp.-Colorado butterflies, but wonder where the $ can be found to publish those photos, since I doubt that a book on immature butterflies would sell enough to recoup publication LO$$E$, as state books and caterpillar books are vanity-press projects like the usual scientific papers (in which authors must pay page charges & reprint charges etc. and get zero $ in return).

I'm puzzled: where are the eggs, 1st-stage larvae, and pupae??, don't they deserve study too? We have the cult of the binoculars, in which people worship butterfly watching and want to throw collectors in jail. Now do we have the cult of the caterpillar, in which books are published with caterpillar photos but no mention is made of egg 1st-stage larva or pupa? Why?? Just another inexplicable hula-hoop craze??

In the text, many related species without photos are still listed beside photographed species, and the text is a hodgepodge of all those species, which only clutters the text and causes confusion. The book uses the NABA checklist for common names on the photos, which causes confusion in identifying some of the photos of difficult groups "stenchospecies", so one must consult the useful Photo Locations and Credits (p.177-192) to clarify which bookkeeping species they are, as noted below. Many color pages have missing numbers in the sequence (for example p. 45 has photos 1,2,3,4,5,6,8,9, with 7 missing), and in many of those cases the sequence differs in Photo Locations; I have tried to make sense of this below. The missing numbers were evidently lower-quality photos that were deleted at the last minute, throwing the sequences into chaos. They should have simply placed text and photo and photo location and credit in one spot for each species; why scatter them in three places to deliberately produce confusion and errors? Compounding the confusion, the text pages facing the photo pages have numbers on some species, which refer to numbers on the maps, not numbers on the photos. And then where the text got too long, they just oozed out the excess text onto pp. 155-176.

I haven't studied the text of this book much, as it has mostly just a few hosts and simple stuff like all the Butterfly Watching books, which is often wrong (for instance p. 161 says it is best to search for Phyciodes larvae prior to flights, which is actually the worst time as they are solitary in litter during the day then). To find caterpillars, one must know the hibernation stage, which isn't often given. I would rather have those missing photos included, and eliminate the text.

Detailed comments: P. 5 bottom, if you want to get anything done studying bugs in nature, you should go alone; if you go with other lepidopterists you will waste time talking instead of working. P. 12 says that Wallengrenia otho larva carries its shelter with it!, is that true?? (very dubious, it isn't a caddisfly). P. 16 claims that Dryas iulia & Siproeta exude acidic fluid from their scoli that causes a skin rash—I wonder if that's true. P. 20 Eriogonum & Ceanothus are poor garden plants as they are difficult to grow. P. 28 polydamas. P. 35 photo 4 is labeled 35.5 in Photo Locations, evidently just change it to 35.4. P. 37#5 is P. "marginalis" venosa. P. 43 Colias meadii johanseni larva is identical to meadii. P. 39 #8 is E. hyantis lotta. P. 41#1 is A. cethura pima; #2 is A. sara sara; #3 has no location but is the A. sara (not julia/stella) phenotype. P. 43#4 is Col. occidentalis wasatchia; #5 is C. harfordii (not alexandra). P. 49#4 "dorcas" is L. florus dospassosi. The map should show where L. xanthoides editha intergrades with xanthoides in SW Ore. & N-C Calif. P. 53 my Hypaurotis larvae weren't pink, is the photo too red? P. 55#4 & p. 57 #7 are both Satyrium favonius ilavia from Hualapai Mts., text p. 54 calls it Satyrium favonius and text p. 56 calls it Satyrium ilavia. P. 57 evidently change photo 9 to 8 to match Photo Locations. P. 58 the dumetorum name is horrible here, as it properly applies only to the coastal Calif. bug viridis (map shows C. affinis perplexa, C. a. affinis, & C. a. apama), and now sheridanii is the same species as viridis (the name dumetorum should be suppressed by ICZN, and sheridanii given priority over viridis); p. 59# 1 is Kern Co. C. affinis perplexa, #3 is Mendocino Co. C. (ignoring evil name dumetorum) sheridanii viridis , #4 is C. sheridanii [viridis] neoperplexa. P. 61 evidently change #9 to 8 like Photo Locations. P. 63 has C. gryneus gryneus on photos #1-2, C. gryneus siva #3. P. 65#3 looks like S. istapa larva, but Photo Locations says it's from Gainesville Fla., yet bug does not occur in N Fla., so this location must be wrong or it's the butterfly greenhouse; also, data for inset photo is missing on p. 181. P. 68-69 wrongly lumps various Celastrina into C. ladon based on NABA dogma: based on photo locations/text, p. 69 photo 4 is Celastrina lucia Auct., 5-6 are Cel. neglecta, 7 is Cel. idella, 8 is Cel. serotina. P. 71 1 & 3 are evidently E. "battoides" ellisii Kane Co. Utah; 9 is Plebejus podarce (not glandon) from Tioga Pass Cal. (actually cassiope—not podarce--is closely-related to "glandon" megalo and would be considered a ssp. except that S. Kohler has found cassiope in Mont. maybe near megalo). P. 73 photo 4 is Plebejus scudderi empetri from N.B. P. 73 photo 5 has no inset, yet p. 182 says it does. P. 75, change #7,8,9 to 6,7,8 to match Photo Locations. P. 77#5 is A. mormo mormo. P. 79#1 is Libythea carinenta bachmanii. P. 81 photo #7 looks like callippe, but there's an error somewhere, because p. 183 says this photo is from Hondo, Medina Co. Tex., yet S. callippe does <u>not</u> occur in Tex. P. 83 #8 is B. titania grandis. P. 87 photo 2 is Chlosyne acastus neumoegeni, 5 is C. palla calydon; 8 is C. acastus sabina. P. 89 #1 is C. leanira leanira, #3 is C. l. coronado. P. 91 #1 is Euph. anicia maria from Weber Co. Utah (the photographer Todd Stout told me that maria has the same whiter-hairy larva as E. colon nevadensis [though another photo on a paler background shows less-noticeable white hairs on the scoli], so perhaps maria hybridized with E. colon to give them similar larvae, as the adults are also similar; one

might even think that maria is a ssp. of colon, as its larva is like colon, adults are mostly blackish like colon, and Todd Stout finds that there is no blend zone with E. anicia wheeleri; but the valvae are like anicia, so perhaps these similarities are due to tremendous hybridization/introgression with colon "nevadensis", as such hybridization has been proven to occur in NE Nevada); #3 is E. anicia wheeleri from Tooele Co. Utah; #4 is E. anicia aniciaXeurytion (windi) from Yellowstone Nat. Park; #5 is E. chalcedona near-olancha from Kern Can., Kern Co. Calif. P. 93#1 is bad (overexposed, bad view). P. 93, the Photo Locations on p. 184 lists THREE explanations for 93.6, even though there are only two photos; evidently the third from N.B. should be deleted. P. 95 the insert on photo 10 looks like Hemileuca? moth larvae, & has no data except photo JG=J. Glassberg. P. 101#1 is Lim. arthemis astyanax; #3 L. a. arizonensis. P. 103#7 is evidently some kind of moth, as it lacks the known long head horns of Eunica and lacks scoli present on Nymphalinae. P. 109#1 is evidently N. areolata rather than N. helicta; #5 has an error, as Photo Locations says this is from W.Va. yet C. tullia does not occur in or near W.Va., so maybe photo is C. tullia from somewhere else. P. 117 Codatractus valeriana=mysie does look like it's related to Zestusa & Cod. arizonensis, and not to Thorybes where it was placed. But why are Urbanus proteus & dorantes in the same genus? P. 122 juvenalis. P. 123, #123.8 & 123.17 are missing on Photo Locations. P. 124 Pyrgus scriptura always has several generations. P. 127#11 is obviously P. alpheus gracielae. P. 129, why is Nastra lherminier so much like Atrytone arogos? P. 131 the Copaeodes minima looks exactly like Oarisma garita top, so either they are extremely similar and it is Oarisma minima, or this photo is mislabeled (the Copaeodes aurantiaca photo differs greatly). P. 135, #5 missing in Photo Locations. P. 139 #10 is too pink. P. 143 note narrower evil Cyclops eye on E. pilatka. P.145 has error, photo 11 Asbolus capucinus is only in Fla., yet Photo Location says Arizona, maybe photo is ok and it really came from Fla.? P. 146 says that the spectacular dracula fangs on Amblyscirtes heads are not used to whack predators as I thought, but are used to drag the leaf nest across the ground—I wonder if that's true?, it seems very dubious as these aren't caddisflies either (Butt. Houston describes A. aesculapius pupating on the host leaf beyond a stretch chewed down to the midrib, and others who have reared Amblyscirtes incl. Richard Heitzman and myself have not noticed caddisfly behavior). Amblyscirtes have good traits of head pattern to identify some species/groups. P. 214 Heather Blue does not eat Dodecatheon.

FLORIDA BUTTERFLY CATERPILLARS, AND THEIR HOST PLANTS. Marc C. Minno, J. Butler, D. Hall. 2005. University Press of Florida, Gainesville, Florida. 342 p.

This book is amazing. Half the book is on caterpillars with color photos, and the other half is color photos of their hostplants! I assume the book will lose a lot of money due to weak sales, but it's nice to have the book anyway.

Just a few gripes: Where are the photos of eggs and pupae?, who says that people care about caterpillars but not eggs & pupae?? Technically, the authors should buy a nice ring flash for their macro lens: Canon, Pentax, Sony, Olympus, Sunpak, & Nikon all have nice guide #14 in meters ring flashes. Or at least a dual-flash attached to the lens tip. These are important for butterfly and especially larva photography, because they get closer to the subject when the lens focuses closer, so that more light is placed on the subject and depth of field is greater and necessary f-stop adjustment is much less. Flash provides extra light so that small f-stop can be used to get more of the bug in focus, and it freezes ($1/500^{th}$ sec) the action of a fast-crawling larva etc. And ring-flash provides even illumination all around the subject to put the whole caterpillar in view. Look at Erynnis baptisiae larva p. 201 for instance, the authors used sunlight or lamp to light the larva and the underside and the whole front of head is black because of poor illumination; with ring flash this would be a beautiful photo, because a side view of larva with head turned toward the camera is the ideal position to get a great single shot of nearly all of a larva's parts. One can see with half/most of the book's photos that they have not used ring flash, as many larvae are too dark or parts are in shadow etc., so the photos in general are not as good as those in Allen's Caterpillars in the Field & Garden. (Those zealots who claim that ring-flash provides unnatural flat illumination compared to one light source at the side, should retire to the art museum where they belong, and never come out again; we need to light up all the parts, not create shadows for art-lovers.)

Details: P. 5 some structures on the larval head are wrong. The worst goof is p. 167 Nathalis iole photo, which is actually Phoebis agarithe larva from p. 171; and that agarithe photo differs from agarithe in Caterp. in Field & Garden, so is it misidentified too? P. 171 why is Feniseca larva whiter than the better photo on p. 31? P. 185 has interesting Junonia 3 sp. larva photos (the evarete & genoveva names should be switched back the way Scott book treated them, based on Neild's Butt. Venez.)(Turner & Parnell [1985 J. Res. Lepid. 24:142-153] reported Mangrove Buckeye to have iridescent turquoise bases of the upper rows of scoli, whereas Tropical Buckeye has iridescent purple bases). P. 193 M. cymela photo is too dark. P. 211 Polites origenes larva too dark. P. 207 note Euphyes pilatka has a narrower "evil Cyclops eye" on top of front of head, which is wider in all other Euphyes. P. 215 Poanes aaroni & yehl photo are too red. P. 296 top doesn't look like Colo. Fraxinus pennsylvanica.

CATERPILLARS OF EASTERN NORTH AMERICA. A Guide to Identification and Natural History. David. L. Wagner. 2005. Princeton University Press, Princeton New Jersey. 512 p.

This great book is mostly about moths, but 51 pages are butterflies. The photos are very nice—very few eggs or pupae again—and seem to be correctly identified. The text below each photo gives identification tips (not very useful as few of a

genus's species are included), plus life history notes, and some hostplants. The book gives only common names of hostplants, a mistake as the people who study moths—and most of these studying butterflies--are going to want to use just latin names of the plants; and there is no list translating these common names into scientific names. It gives some new hosts (for Erynnis for instance).

Detailed comments: Euphyes vestris chooses dryland sedges in the west, esp. Carex pensylvanica which is common in the east too. Hedylidae larva & pupa appear in the Pieridae introduction, which is odd as the larva looks more like Satyrinae. Pontia protodice was probably never fully native in the NE, just a stray. Colias philodice is polyphagous on legumes and does not prefer Trifolium in Colo. Satyrium calanus has amazing larval polymorphism. The book does not give localities of photos, and I had thought that the Phyciodes phaon photo was P. cocyta, but the same photo reversed is in the Caterp. in Field & Garden book where it is from Collier Co. Fla. Dave Wagner, so it is P. phaon, & the white head reported in lit. for phaon evidently may just not be visible on these side views, as the larva looks like Charles Dammers' drawing of phaon. The adult male Phyc. "tharos" has a P. cocyta uph, but a tharos antenna club, so may be tharos; young larvae are gregarious, and the first two stages sometimes feed on top of a silk web, never under a silk nest; P. cocyta larvae are not pinkish; unfed 4th stage larvae hibernate in all Phyciodes. P. 131 has Asterocampa clyton photos above A. celtis photos evidently.

THE AUDUBON SOCIETY FIELD GUIDE TO NORTH AMERICAN BUTTERFLIES. **Robert M. Pyle. 1981.** Alfred A. Knopf, N.Y. 916 p.

I already published a rather complete corrections/review of this book (J. Res. Lepid. 20:55-58) so here I give only complete revised photo corrections: Photo 17 is Phyciodes tharos (not mylitta) larva/pupa, 31 is aberrant Adelpha, 89 is Colias interior, 108 is Phoebis agarithe, 127 is Kricogonia lyside female, 165 right is Ochlodes sylvanoides, 203 is a reduced-spotting aberrant if it is Paratrytone snowi female, 326 & 337 are Papilio polyxenes (note black tegulae), 354 & 357 are European machaon, 365 is Libythea carinenta larvata, 368 left is Polygonia gracilis zephyrus, 368 right is Nymphalis l-album j-album, 396 is Satyrium calanus, 430 is Callophrys apama homoperplexa, 457 is Callophrys niphon, 501 is evidently Plebejus (atrapraetextus?) samuelis female, 509 is Celastrina sp. like ladon, 516 is Lycaena rubidus female, 543 is Calephelis nemesis, 553 is Emesis ares female, 555 is E. zela female, 557 is E. chalcedona sierra? or E. anicia, 575 ups is Phyciodes cocyta selenis female, 575 uns may be P. batesii lakota or P. c. selenis male, 590 is P. pulchella near-pulchella female, 607 left is Argynnis (Speyeria) coronis halcyone, 610 left is S. mormonia, 610 right is probably S. zerene picta, 613 left is Boloria bellona, 630 male is P. cocyta selenis, 654 is Adelpha iphicla, 662 right is Asterocampa celtis, 663 right is Asterocampa leilia, 686 is Smyrna blomfildia, 687 is Diaethria anna, 732 is Oeneis taygete, 737 looks like O. calais stanislaus or O. calais altacordillera, 743 is evidently O. calais altacordillera, 758 is Hamadryas februa, 759 is Hamadryas guatemalena.

WESTERN BUTTERFLIES . PETERSON FIELD GUIDES. **Paul A. Opler. Illustrated by Amy B. Wright. 1999.** Houghton Mifflin Co. New York, N.Y. 540 p.

This book is replete with errors. The paintings are bad (they are wiggly as if viewed under water), many are misidentified, about 50% of the black identification lines seem to be placed at random and not on identification features, and there are errors aplenty on about every page. The 1983 Tilden & Smith field guide that preceded it was a little dated, but was more accurate. The book was produced rapidly on a word processor and little editing on text or plates was done thereafter. (The Brock & Kaufman book has replaced the Peterson Field Guide books for amateurs.)

Plates: Fig. 6, W BC is really in the northwest coast biome, and N Tex. is part of the Great Plains biome (which isn't much of a biome it's so depauperate). P. 32, wyomingo is not known to be reproductively isolated. Middle of page meant Euph. chalcedona, not anicia. Pl. 4, it's the space not the notch that is viewed from above. Pl. 5, glaucus & canadensis interbreed extensively. Pl. 8 the words Great Southern White are placed on the wrong bug. Pl. 9, lotta fig. has white scales in bar, legend says it doesn't. Pl. 10, chrysomelas border too narrow. Pl. 11, hecla fig. looks like canadensis, & canadensis looks like a narrow-bordered hecla. Pl. 14, what paler band inside margin? Pl. 17, text says longula has tail. The comstocki looks misidentified as band should be sinuous. Pl. 19, the cassius unf is not visible. C. humulus does not ovip. on leaves. The amyntula is too spotted. Podarce uns looks surreal. Pl. 24, atlantis uns looks like S. hesperis beani. Pl. 25 should have shown uns, only experts can identify most Boloria from ups. Pl. 27, vesta unf not shown! Pl. 28, mylitta crescent words too far from bug. Pl. 29, oreas is really silenus. Pl. 30, astyanax is p. 332 not TKK. Pl. 31, arrows point to wrong Asterocampa spots. Pl. 32, "formosa" is next to wrong bug and is on plate but not on legend. E. disa & mancinus are transposed. Pl. 33-34 the Oeneis unf is not shown, when it should be on O. alberta etc. Pl. 34, the rosovi upperside has the tiny yellow points. Pl. 36, Urbanus arrows misplaced. Pl. 38, juvenalis looks like zarucco. Baptisiae misspelled. Persius doesn't look like it. Pl. 39, mejicana unh is blue-black. Pl. 40, upper numitor appears to be labeled Chisos Skipperling. Pl. 41, viridis arrow misplaced. Origenes spots too big. Pl. 43, elissa & hegon have no legs, elissa head upside down, vialis too brown on unh. Toltec Roadside Skipper is Amb. tolteca not aea. Arabus arrow misplaced. Panoquina leucas & ocola transposed.

I haven't read most of the text, so a careful study of the text would find a lot more errors. A lot of species are split following tradition, even when there's no data. Joanae is missing (it is usually treated as a species but is a ssp. of Papilio machaon). Papilio ornythion larva can't be smaller as adults are the same size. P. glaucus alexiares is in NE Mex. Rutulus is not closer to P. eurymedon. The phony Pieris marginalis range stops at Yukon. P. 157 says lotta & hyantis are intermediate on Kern Plateau but keeps them as separate sp. anyway! The Anthocharis "sara" are split into 4 species, when there can't be more than 2; stella doesn't patrol ridgetops. If Colias eurytheme were a migrant into Colo., I would have seen individuals migrating, and I haven't. Colias occidentalis & christina & alexandra text & maps are all confused, the occidentalis map includes "astraea"/wasatchia etc., christina map includes "astraea", alexandra map includes columbiensis. C. meadii is in C Ida. too. P. 173, Zerene eurydice lacks a black border only in female. L. phlaeas is just a stray in Colo. & Neb. & Dakotas, isn't in Ida. on map, & wasn't introduced from Europe. P. 188, L. cupreus artemisia is rather intermediate between Cal. & Rocky Mts. pops. L. editha should be L. xanthoides editha. L. dorcas map is wrong in W Canada. L. helloides in Alaska in text, not on map. L. hermes host is buckthorn family. Parrhasius m-album Colo. record was error. If Calycopis cecrops & isobeon intergrade, lump them. Fixsenia polingi map misses Chisos Mts. Satyrium acadica was mislabeled W to Ida. Satyrium californica host in Ore. is most often Purshia (A. Warren Butt. Ore.). The Call. johnsoni on plate has black edging of postmedian white line. The Callophrys gryneus group bugs are sorted incomprehensibly into species. Callophrys polios raits in gulch bottoms, and on host. If Strymon melinus genetically swamps avalona, then they are ssp. Brephidium exilis map is wrong, it's year-round in Mex. and C Valley of Calif. Leptotes marina overwinters farther north too. Zizula cyna is resident in W Tex. in text, not on map. "Everes" comyntas is BC in text, not on map; it occurs in Panama. P. 232, Gaspe' not Gasp. P. 233 echo probably belongs in C. neglecta, certainly not in C. ladon; all year in SE Ariz. is a lot more than one flight; C. ladon does not range southward as bad map shows. C. neglecta has 2-4 gen. The current dogma host-races rather than real species are used in Euphilotes. Baueri is claimed to have weak fringe checkering, but it is strong on plate. E. pallescens and E. rita are said to blend on p. 241, so why aren't they lumped? Philotiella speciosa is Ore. in text, not on map. Cranberry Blue map has missing gaps. P. 246 Kamehameha. Plebejus acmon has pink uph band not edged by dark (except in spring), & ranges N to Chelan Wash. That idiotic name Lupine Blue for P. alupini again. The Apodemia treatment is bad: duryi is not yellowish & is little different from mejicanus except on unh; the lump of mejicanus with deserti doesn't match the other splitting; davenporti is missing; dialeuca doesn't belong in this virgulti concept; virgulti has several gen.; larva is not purplish-blue; too many cooks here. Apodemia palmeri has ssp. in Baja Cal. A. phyciodoides was mislabeled from Ariz. P. 265, submarginal black dots are not useful to identify chisosensis. P. 267 the long palpi mimics a petiole. P. 266 & 268 Heliconius coil their pollen-covered proboscis, exude a drop of fluid into the coil, wait for pollen proteins to dissolve into the drop, then suck up the drop with proboscis tip; proteins are NOT absorbed through impermeable-chitin proboscis walls. Hel. charithonius range has a silly chicken-head. Winter range of Euptoieta claudia is surely underestimated. Argynnis (Speyeria) cybele is not in C Colo., and S. idalia only strays there. P. 275 photo flower is probably Machaeranthera bigelovii. S. edwardsii is in E portions of the Rockies. S. callippe doesn't occur in S-C Colo. S. atlantis in Mont. in text, not on map. S. hesperis snaky range in NWT is silly. Boloria bellona in Ga. in text, not on map. B. freija isn't on alpine tundra. B. a. distincta isn't greenish. The larval BODY is orange in Poladryas minuta minuta, white in arachne. Chlosyne californica has orange upf basal spots; text does not distinguish it from lacinia. C. definita is in Lower Sonoran Zone also. C. marina is not on pl. 26. C. gorgone larva is black, or varying degrees of red; hole in range map is silly; occurs in coastal S.C.; it was just a stray in Utah-Ida. etc. Phyciodes texana crab-claw stray range is silly. P. 304, all the Phyciodes have spring f. marcia. P. 305 photo, it's the unf pattern of P. phaon that is highly contrasting; it doesn't colonize Colo. or Neb. White crescent is variable in the unh marginal patch of P. tharos & cocyta & batesii, but the brown patch is usually narrower & darker in tharos, broader & oranger in cocyta. (The book doesn't even mention the antenna club, which in tharos is usually black in the east and orange in Great Plains, vs. orange in most cocyta.) The cocyta larva is NOT pinkish as C. Oliver miswrote. The TL of P. (cocyta) diminutor was S Minn. not shown on map. Only some cocyta hosts (and most eastern batesii) have large stem-clasping leaves. P. batesii doesn't occur in E S.D. The antenna club of Phyc. pulchella=pratensis is orange from Ore.-Mont. to Alaska; the key ID feature of pulchella is the orange postmedian-subapical costal unf spot (which has black in tharos-cocyta-batesii); the bug on gumweed is a female; pulchella does not eat fleabane=Erigeron. P. 310 photo is P. pulchella montana (uph postmedian band is yellow only at rear). Phyc. pallida has one flight. Phyciodes mylitta: spelled Silybum; Kans. not on map. P. 317 photo legend, replace hindwing by forewing. Polygonia gracilis often has two gen. Nymphalis californica map: it surely overwinters more places than that (A. Shapiro claims that they only occupy the Cascades to breed in summer, then fly back to lowland Calif. for the winter). Text says N. vaualbum breeds in Alaska & NWT, not shown on map. Aglais milberti males actually rait (perch) on cliffs/talus just below hilltops. Vanessa virginiensis map has silly northern space (unless Scotty on the Space Ship Enterprise beamed it up, if the bug flew north to Alberta, it surely must have gone through Montana on the way), and overwinters far to the north of range shown (Butt. Ohio says it is "only occasionally migratory" and "is one of the first butterflies to appear each spring", based on a lot of data). Vanessa tameamea: spelled Pipturus. V. carye annabella winter range is surely wrong (text says all year in S Ariz.). The lorquiniXweidemeyerii hybrid zone is 200 miles wide. Text wrongly claims that lorquini occurs in S Ariz.! Map & text disagree on W & S Tex. for Myscelia ethusa. Hamadryas glauconome orange scales are basal to black crescent. Marpesia

chiron map has silly club. Anaea andria is native in S Colo., and Butt. & Moths of Missouri writes seeing them fly around in winter there. P. 344 top photo has two white-centered black rings. Asterocampa clyton map is wrong, it's native in SE S.D. etc. Morpho polyphemus often flies fairly low in my experience. Lethe eurydice mate-locates all day. Cyllopsis pertepida doesn't occur in W Utah desert. Megisto rubricata is bivoltine in Tex. Cercyonis meadii isn't in N-C Colo. & S-C Wyo. Erebia vidleri map missed Wash. Erebia stubbendorfii theano isn't on Vancouver I.; it occurs on grassy places just below or just above timberline. Mckinleyensis is an obvious ssp. of E. magdalena. Neominois ridingsii surely occurs all over E Montana; wyomingo is a ssp. Oeneis (nevadensis) macounii is on Isle Royale Mich. O. uhleri is in S Utah. Oeneis melissa text, replace Mt. Katahdin, Me., with Mt. Washington, N.H. O. philipi "rosovi" text should have mentioned the strong unh median band. Danaus plexippus larva has only 2 pairs of black filaments. P. 377-8, spelled Icthyomethia. Codatractus valeriana ranges S to Oaxaca (mysie is a syn.). Achalarus albociliatus does not have contrasting pale margin. Thorybes pylades range has silly holes from Neb.-Sask. T. mexicana LACKS costal fold; T. drusius has it. Cogia outis is a breeding resident in SW Missouri, and does not stray. Erynnis brizo larvae aren't purplish, except probably turning redder in diapause. The unh pale apical spots are greatly reduced in size in E. propertius propertius, and reduced or absent in E. propertius meridianus, contrary to p. 398. E. zarucco in N Ill. in text, not on map. Erynnis afranius doesn't occur in Alaska-Yukon, and doesn't nectar on Golden Banner. E. persius is not on tundra. Pyrgus centaureae, E U.S. range missing on map. Pyrgus scriptura is surely all over E Mont. Pyrgus oileus, hollyhock host refers to P. communis. Heliopetes domicella isn't resident in Calif. H. ericetorum is native in Wash. H. laviana in N.M. & N Tex. in text but not on map. Pholisora mejicanus C Tex. in text, not on map. Hesperopsis alpheus in Coahuila in text, not on map; occurs 50 miles from H. a. gracielae. Piruna pirus W Tex. in text, not on map. Nastra neamathla julia are ssp. reportedly integrading in Houston; julia is native along Colorado R. and in C Tex. Lerema accius resident in Ariz. in text, not on map. Ancyloxypha arene is native in S Tex. Oarisma garita eats numerous grasses & sedges. Thymelicus lineola is in Colo. (missed on map) and S Minn. Hylephila phyleus another silly map gap in N Tex. Silly amoebalike gap in N range of Hesperia uncas & H. ottoe & Polites themistocles & origenes. H. juba hw is not translucent; larvae overwinter, not adults. H. leonardus montana has yellow-to-dark brown unh. H. pahaska yellow felt does not protrude from stigma (one must use a needle to see the color). H. attalus is on mid-tallgrass prairie. H. dacotae is W of sassacus. H. juba fw is not more pointed than nevada. Atalopedes in Man. in text, not on map. Polites rhesus, Tex. in text, not on map. Polites peckius peckius is in Gunnison/Saguache Cos. Colo. Polites sabuleti norae is in Sonora; NW Mont. in text, SW Mont. on map. P. themistocles is in N Calif. & Ore. Silly hollows in taiga range of Polites mystic. Polites sonora: replace sonorensis with sonora & sirius with siris; sonora & mystic seldom fly in same habitat. P. vibex in Ohio in text, not on map. Pompieus verna no map. Atrytone arogos, Ill. in text, not on map. Mex.-El Salvador Anatrytone is A. mazai, and logan isn't in Ariz. Ochlodes yuma is in C Calif.; Ida. not on map. Poanes hobomok is in Capitan Mts. of C N.M.; Poa is an error. Poanes zabulon is not in N.M. (& not on map). P. melane, N.M. not on map. Partrytone snowi, pine dropseed is an error. Euphyes bimacula, S Va. not on map. E. vestris lacks blacker veins, & its head is not very orange; Alta. not on map. Atrytonopsis hianna, Ont. not on map (deva is a ssp. of hianna). A. vierecki is also in grassland. A. python does have hourglass spot. Pyle's rotten Sheep Skipper name again! for A. ovinia edwardsii (the sheep Bob referred to are only in N Ariz.). P. 458, replace TK by 426. Amblyscirtes aenus map, with its silly amoeba-like protrusions, looks like Bullwinkle the Moose! A. tolteca f. prenda is wet-season form. A. nereus unh is not green. A. eos is just a rare stray in S Colo.; more odd gaps in map in C Tex. A. vialis silly gaps in N-C Alta. & N plains. A. phylace fw is not squared, and isn't in C Mex. P. 466, roadside skippers don't have stubbier wings. Calpodes ethlius occurs in N Fla.-S Ala. Panoquina panoquinoides errans does not wander. Nyctelius, Calif. not on map. P. 470, only Megathymus larvae move up & down in their burrow. Agathymus neumoegeni isn't in S Ariz. as shown; scabrous Agave is an error. A. aryxna baueri, Calif. not on map. P. 537, idalia not dalia.

A FIELD GUIDE TO WESTERN BUTTERFLIES. The Peterson Field Guide Series. J. W. Tilden & Arthur C. Smith. 1986. Houghton Mifflin Co., Boston, Massachusetts. 370 p.

This is a better book than the above, despite getting my name wrong on p. viii. The plates are nice photos, though some are b/w. The book is old and out of print, so I won't make many comments, and will ignore various minor misspellings and taxonomic progress. I wrote to Tilden about new host records in book, and he replied & clarified some*.

Plates: Pl. 1 fig. 4 is toothed-line C. pyracmon spring f. nabokovi. Pl. 11 fig. 6 is brownish on uns as is rusticus. Pl. 13 fig. 6 should be green. Pl. 16 fig. 1 is Phyciodes cocyta. Pl. 26 fig. 3 female is C. columbiensis. Pl. 28 fig. 1 is Colias columbiensis pseudocolumbiensis male. Pl. 28 fig. 6 female is E. salome. Pl. 30 fig. 8 is Satyrium sylvinus nootka. Pl. 42 fig. 3, Ochlodes sylvanoides. Pl. 44 fig. 13 is Nastra julia. Pl. 45 fig. 6 is Pyrgus scriptura spring f. pseudoxanthus.

P. 44, damei is a form of C. sthenele, not pegala. P. 53, excubitor was named by 4 authors. O. alberta is an error from Mt. Graham. P. 64, Vaccinium staminium was a dubious Abbot & Smith host. Crataegus is an error for Nymphalis antiopa as Tilden (*pers. comm. 1986) could not find data. Jatropha is an error for Anartia jatrophae. Boloria selene has 3 gen., nebraskensis isn't in N.D., & sabulocollis is spelling. P. 89 Uncompahgre. Phyciodes texana: Beloperone used only in lab. P. picta & Microtia (Texola) elada, Siphonoglossa eaten only in lab. Papilio eurymedon is recorded from Ceanothus cordulatus & thyrsiflorus, dubious? Isomeris arborea is an error* for Pontia protodice. Colias behrii, Gentiana newberryi is error. Colias nastes, Trifolium repens is lab only. Eurema lisa, Trifolium is lab only. Anthocharis cethura, the Sisymbrium

host is an error for Descurainia pinnata. Satyrium liparops, Crataegus & Acer negundo are both errors. Callophrys comstocki doesn't eat Eriog. umbellatum. Callophrys gryneus assoc. Juniperus scopulorum in W Texas*. Euristrymon polingi, Quercus grisea has no data*. E. ontario, Crataegus is error, Quercus turbinella is assoc. only. Strymon melinus, Yucca is new*. Lycaena cupreus: spelled Rumex paucifolius. Echinargus isola assoc. Prosopis glandulosa var. torreyana*=mesquite & P. pubescens*=screwbean. Plebejus acmon, Trifolium & Medicago sativa are errors. P. 204, replace midtibia by hind tibia. Agathymus neumoegeni chisosensis is not on Agave scabra. A. aryxna baueri eats A. chrysantha, not parryi. Lerodea eufala & Polites vibex, Stenotaphrum eaten only lab. All the Amblyscirtes vialus hosts are lab only. Atrytonopsis hianna deva isn't in Colo. or Utah. Euphyes vestris, Cyperus is lab only. O. pratincola is evidently O. sylvanoides. Ancyloxypha arene, Polypogon semiverticillata is assoc.* only. Celotes limpia is not recorded on Sida. Heliopetes laviana, Sphaeralcea is dubious as source unknown*. Pyrgus ruralis, Horkelia tenuiloba is based on Lembert's Sierra Nevada Horkelia fusca, & tenuiloba is not in Sierra Nevada anyway; H. bolanderi clevelandii is assoc. only. Erynnis afranius, Lotus scoparius is new.

A FIELD GUIDE TO EASTERN BUTTERFLIES. Peterson Field Guides. Paul A. Opler. Illustrated by Vichai Malikul. 1992. Houghton Mifflin Co., Boston, Massachusetts. 396 p.

This is a better book than the western field guide.

The paintings on the plates are good, though usually printed too small; sometimes wing shapes are a little off. Pl. 18 Colias palaeno has a red ring misplaced on wing (real palaeno lacks ring, it looks like C. pelidne, and if it is pelidne it can't be from Churchill). Pl. 18 C. occidentalis from Fort Calgary BC is C. occid. christina from Calgary Alta. Pl. 22, C. hesseli has unf line broken. Pl. 25, Celastrina "ebenina" female looks like C. ladon female. Pl. 27, Libytheana is carinenta larvata. Pl. 28, fulvia female not labeled on plate. Pl. 30, Chlosyne marina painting & text is not the Chlosyne melitaeoides that occurs in Tex. Pl. 32 uses Tropical Buckeye under bug for genoveva. Pl. 38, "chryxus" is O. calais strigulosa. Pl. 43, arrow wrong on poweshiek. Pl. 48, Panoquina "fusina" doesn't look like the weak-banded Mex. ssp. evansi. P. panoquin has no dash, so looks like P. ocola.

Only common names are given for hosts (for instance, the host of Lycaena dione Broad Dock, is what?, presumably Rumex obtusifolius, which is Broad-leaved Dock in Britton/Brown flora. Front of Papilio machaon joanae head is black, not yellow. P. 56, E Mex. has Papilio glaucus alexiares. P. 71, Coliadinae females are usually larger than males. P. 73, only Colias alexandra has 2 flights (not "broods") in Sask. Map missed Colias occidentalis krauthi in S.D. P. 93, Lycaena phlaeas overwinters as half-grown larva (& it was not introduced from Europe). Satyrium titus host is chokecherry not chokeberry. P. 121, no Balloon-Vine Hairstreak in book. Heliconius don't absorb pollen proteins through proboscis wall! P. 156, Boloria eunomia has silver unh spots. P. 162, leanira has priority over fulvia. P. 170, Phyciodes cocyta (selenis) larva & spines are not pinkish. Phyciodes picta, Siphonoglossa is lab host only. Polygonia satyrus has two flights. Polygonia progne uph is black on outer half only in summer gen.; elm is dubious host. Nfld. missing from Nymphalis vau-album map. N. californica map has silly stray hook amid distribution dots. Nymphalis urticae is an artificial import. Vanessa cardui kershawi occurs on Australia. Chrysopelea is a ssp. of Anartia lytrea. P. 191 Adelpha map has silly dip in E N.M. P. 203, A. celtis oviposits singly. There is no blend zone of Lethe eurydice fumosus & eurydice in Neb. Neonympha mitchellii was in NW, not NE, Ohio. There are not two Megisto sp. in Fla. as shown. Erebia stubbendorfii theano is also in subalpine zone. P. 218, Oeneis overwinter as young & old larvae. Danaus plexippus larva has tubercles only on T1 & A8. P. 244, SE Kansas is native on map, stray in text. P. 259, it's E. persius with numerous long white hairs on upf. Hollyhock & mallows hosts belong to Pyrgus communis, not P. oileus. Pholisora catullus, mints are errors . Nastra neamathla is native in La. & Miss. Hesperia uncas is native NW of Minneapolis. H. pahaska is absent in E Tex.-La. Silly space in Polites mystic map in Dakotas. Poanes taxiles larva head is uniformly red-brown. Bayensis is just a ssp. of Euphyes dion. P. 303 all Amblyscirtes like flowers. P. 335, hutchinsi is a ssp. of Euphydryas editha. The "life list" wastes 31 pages!

BUTTERFLIES OF NORTH AMERICA. Jim Brock & Kenn Kaufman, 2003.

Kaufman Focus Guides. Houghton Mifflin Co. New York, New York. 384 p.

This is a good little book, a pocket "field guide", which has taken over the function of the Petersen Field Guides. The book looks similar to the nice Golden Field Guide to Birds. The photos are very nice, and distracting background greenery is removed. There isn't much in the book about the butterflies' biology or behavior, mostly just a brief mention of hostplants, as the book concentrates on identification. Most of the photos are correctly identified. The book lumps some of the more closely-related species and often confuses the result (there isn't room to explain difficult bugs), and splits the usual species--I won't comment on most of the taxonomic controversies. If there are very distinctive-looking ssp., the book often illustrates some as "variations" without naming them. Most maps have just one color, but many maps that have both light-green and dark-green are confusing, as p. 11 says light green means uncommon vs. dark-green common; most such maps show dark-green vs. dark-green as roughly the overwintering vs. summer migrant range, but not quite, and that distinction is contrary to p. 11 that describes both colors as "summer, or more than one season"; and Junonia coenia uses

the colors to say that it is not common in the west, which is quite wrong; Danaus plexippus is less common all over the Great Basin; Neominois and most Erebia and Oeneis jutta are mapped wholly in light-green implying wrongly that they are uncommon; Pyrgus ruralis is shown in error to be common in the U.S. and uncommon in Canada; Cercyonis meadii & many Hesperiinae etc. are wrongly shown to be uncommon in the north or west; these colors in Amblyscirtes make no sense at all. Thus these map colors are very poorly chosen and are usually defective and should be ignored. Details: P. 98, the orange cap is nearly always present in S. californica. P. 21 P. canadensis photos are close to P. glaucus rutulus. P. 24 P. eurymedon flaits (patrols a small area) in tiny clearings in ridgetop trees all day to await females. P. 33 middle photo is yellow form Bruce's Swt. which extends into Canada. P. 34 P. indra raits (perches to await females) on cliffs below hilltops. P. 55 "widespread form" is C-N Calif. ssp. hyantis. Anthocharis sara lumps A. julia. P. 62 confuses Colias alexandra/C. christina/C. occidentalis, each one an artificial mixture of 2-3 species; the orange male on bottom is christina. The C. occidentalis photos are a mixture of occidentalis? and occid. sacajawea or occid. wasatchia. The two pelidne uns look more like scudderii. P. 65 male uns looks like gigantea. P. 84 the Rocky Mts. Canadian/Alaska L. florus are wrongly lumped into L. dorcas; the salt marsh bug is in N.B. too. P. 112, the Callophrys dumetorum/perplexa species is ridiculously confused, as C. viridis "dumetorum" is a different species from C. affinis perplexa (affinis name is older than perplexa, and viridis is same bug as older-but-soon-to-be-banished dumetorum, and Coastal is viridis "dumetorum", and the name sheridanii should be protected from viridis by ICZN so that the coastal bug should be called C. sheridanii viridis). P. 126 the pale variant of Leptotes marina is L. cassius. P. 130 C. humulus is similar to C. neglecta, not spring C. ladon. Cherry Gall Azure missed. C. nigra has larger unh submarginal black dots. P. 132 P. acmon lumps acmon & P. alupini (top middle male is evidently P. alupini lutzi). The female P. "lupinus" is P. chlorina monticola, the male looks like P. chl. monticola, & the uns may be P. alupini alupini. P. 136 podarce is a distinct species. P. 144 arizonensis is ssp. of C. rawsoni. P. 156 Dryas iulia misspelled. P. 161 the upper left photo of Great Basin Frit. is the Montana ssp. albrighti female. P. 163 the middle left pale male of Callippe Frit. is Argynnis (Speyeria) coronis male. P. 164 nokomis map missed N Ariz., C Ariz., S Ariz., NE N.M., & SE N.M. populations. P. 167 the upper left photo of "Northwestern" Atlantis Fritillary is obviously S. hydaspe rhodope (top middle and top right are ssp. nausicaa, bottom left and bottom right ssp. ratonensis, bottom middle ssp. irene or its clones. P. 174 montinus & chariclea are ssp. of B. titania. Natazhati is the Pleistocene Fritillary. P. 176 P. batesii map missed Wyo., Neb., N Ariz. P. 178 P. pulchella=campestris has orange antenna club from Ore.-Mont. to Alaska. P. 179 the female orseis is P. pulchella montana. P. 183 the Black Crescent uns is male P. frisia tulcis. P. 184 C. whitneyi damoetas is darker in Colo. P. 187 Chlosyne gabbii photos say Utah where gabbii does not occur (acastus is in Utah). P. 187 ssp. hoffmanni (middle photo) does not occur in Ore. P. 192 minuta map missed C Tex. & S-C Tex. P. 196 P. satyrus averages a little paler in July gen. P. 198 progne uph is mostly black only in summer. P. oreas map missed C Wyo. & Utah. P. 202 N. antiopa raits (males perch to await females) in gulches, not patrols. P. 204 Vanessa cardui doesn't overwinter in north as map shows. P. 207 the upper right tropical buckeye is a mangrove buckeye; reverse the names evarete & genoveva again. The upper right P. genoveva may be evarete. Nigrosuffusa is a ssp. P. 225 Cream Banded missing on plate. P. 230 do rubricata males really hilltop in midmorning?? (dubious). P. 232 P. xicaque allyni; Paramacera misspelled. P. 237 the middle C. sthenele is C. oetus oetus, and the left is probably oetus too. P. 242 E. disa has more obvious white band. E. callias & E. stubbendorfii theano etc. hosts see Scott Papilio (N.S.) #6. P. 244 E. fasciata host cottonsedge. P. 248 O. alpina occurs near Great Slave Lake. P. 260 T. pylades raits just off the hilltop—not on top--all day. P. 265 Coyote Cl. photo too red. P. 281 both zarucco ups may be E. baptisiae?, valva is often needed to separate these. P. 282 E. propertius meridianus. P. 292 H. ericetorum is common native in Wash. too. Heliopyrgus would seem to be a subgenus of Heliopetes, as the genitalia of Heliopetes purgia is similar. P. 295 Xenophanes photo has weird gray areas, evidently a photoshop error. Hoary Skipper photo is odd too. P. 297 male ups "hayhurstii" is mazans (hw margin more scalloped in hayhurstii). P. 306 prittwitzi dot occurs farther E in W Tex. In O. poweshiek the black unh anal margin is diagnostic. P. 313 right male "juba" I think is H. comma; lower right H. "attalus" looks like H. ottoe. P. 315 right uns male "pahaska" looks more like H. viridis, & the left ups female & right uns female "Apache" look like H. pahaska. P. 317 "pawnee" uns female looks like H. l. montana or pawneeXleonardus. P. 321 "macswaini" is H. juba. P. 329 Woodland Sk. should have a yellow-unh variation photo too. P. 334 "berryi" female ups is Problema byssus. P. 338 At. hianna occurs in E Colo. & NE N.M.; loammi is ssp. of A. hianna (as is deva). P. 342 linda is ssp. of A. aenus. P. 344 reversa unh is not reversed (background is just darker). P. 346 Notamblyscirtes simius males rait (perch to await females) on hilltops, they don't "patrol below hill summits" (Brock has unfortunately confused the mate-locating behavior of quite a number of species, see Butt. Ariz.). P. 352 dysaules is a variety of arabus. P. 355 upper right "Ocola" looks like P. lucas=sylvicola. P. 371 Jeffrey R. Slotten.

BUTTERFLIES THROUGH BINOCULARS. A Field Guide to Butterflies in the Boston-New York-Washington Region. Jeffrey Glassberg. 1993. Oxford Univ. Press, N.Y., N.Y. 245 p.

This book was the start of his series of "binoculars" books, using nice photos from nature. The text of the "Binoculars" books doesn't have much scientific content, so I mostly just correct the photos of these books.

P. 34, Christopher Curtis once told me that Lycaena epixanthe occurred in the commercial cranberry bog at Whitesbog N.J. P. 55, the P. batesii at Cresheim Pa. may have been Phyciodes cocyta; all the N.J. & Philadelphia area records are

dubious, and there were no 20th century records until Shapiro's dubious records which were not verified. P. 57, P. progne overwinters Oct.-May. Plate 5 fig. 7 is spring form male protodice. Pl. 15#4 is Phyciodes phaon from way south, with orange antennae, not batesii. Pl. 17#4 is Polygonia faunus faunus. Pl. 19#3 line positioned wrong.

BUTTERFLIES THROUGH BINOCULARS. THE EAST. Jeffrey Glassberg. 1999.

Oxford University Press, New York, New York. 246 p.

The photos are nice in this book (only the blurred one on plate 42#4 is bad), which is intended for butterfly identification for butterfly watchers. P. 29 & 183 note that the U.S. Forest Service exterminated a colony of Atrytone arogos in Fla. by burning it. P. 32 blames the demise of Neonympha mitchellii on one collector, then p. 136 blames its demise on a group of greedy immoral collectors (I wrote to ask for details but got no response), but Ray Stanford told me it was killed by successional overgrowth of vegetation along a power line due to cessation of mowing following the abandonment of the power line. Despite the title, this book does not cover most of N Canada.

P. 124, lupini misspelled lupinus. P. 131, Asterocampa celtis males usually land on people's heads to mate-locate (raiting behavior). Asclepias is an error for Danaus eresimus.

The plate numbers should have been printed above the photos, and not just on the side of the page to the left. Plate 23#12 is Glaucopsyche lygdamus male, not Celastrina. Plate 24#7 is Plebejus anna (or maybe Pleb. atrapraetextus fridayi) from Calif. Plate 32# 9 is not cocyta but is P. batesii batesii from N.C. (and note the background leaf compared to photo 7). On plate 32 reverse the numbers #9 & 10 below the photos & leave the other words the same, as 9 is batesii & 10 is P. cocyta (note that the leaf on #7 & 9 is the same). Plate 34 fig. 8 looks like Polygonia faunus. Plate 44#3 is Oeneis calais stanislaus, not the very different O. calais strigulosa occurring in the east. Plate 55#4 is Lerodea eufala female (neamathla has upf spots weak and only in male). Plate 55#6 is maybe Nastra julia but the spots are too white. P. 222 missed Scott's book.

BUTTERFLIES THROUGH BINOCULARS. THE WEST. Jeffrey Glassberg. 2001.

Oxford University Press. New York, New York. 374 p.

The title adds "A field guide to the butterflies of Western North America", but the book actually only covers western U.S. The photos are very nice, and this is a good book for butterfly watchers. P. 49 photo #3 is Papilio zelicaon female. P. 57#5 is Euchloe ausonides I think. P. 59 fig. 5 is Anth. julia browningi. P. 67#3 is Colias cesonia. P. 83#8 is Lycaena florus near-florus male, #2 is L. florus near-megaloceras female. P. 97 photos 3 & 4 are reversed? as 4 is greener. P. 123 #3 is Plebejus atrapraetextus, #4 has too much orange to be anna & may be Pleb. atrapraetextus fridayi, #5 male & 6 inset female are Pleb. atrapraetextus fridayi from Sonora Pass. P. 129#5 is probably Calephelis nemesis, & #4 may be nemesis also. P. 133#3 is Apodemia virgulti deserti. P. 141 fig. 5 is S. atlantis sorocko, #3-4 & #6-8 are S. hesperis. P. 149#3 is Argynnis (Speyeria) zerene platina. P. 153#2 is Boloria freija female. P. 167#5-6 are Chlosyne harrisii hanhami. P. 169#3 inset looks more like C. palla. P. 174 P. pulchella "campestris" antenna clubs are orange from Ore.-Mont. northward, as on fig. 1 on p. 175. P. 177, P. tharos has mostly black antenna clubs from E S.D. S to S Kans. & Tex. eastward, W to Ariz.-W Colo. P. batesii also has orange clubs in Utah-Colo.-Wyo. P. 177 photo 7 is Phyciodes batesii batesii from N.C., 8 is evidently batesii lakota from McNair Minn. (the same female as fig. 10 of the EAST book) or could be P. cocyta. P. 240 P. xanthus has a strong X on upf, and I've never seen a postbasal white uph dot on P. scriptura. P. 244 the Pholisora catullus map is wrong and the unh is never bluish. P. 253#1 is too red on unh & #2 has the spots too whitish, but maybe these are Nastra julia. P. 259#5 is Ochlodes sylvanoides. P. 260 H. attalus occurs on tall/midgrass--not shortgrass--prairie. P. 263#11 is what? P. 264#10-12 are ssp. peckius from Ariz., while the Great Plains has ssp. surllano with narrow unh patch. P. 267#8 is ssp. sabuleti not chusca. P. 276, an opera singer is a diva, not a deva. P. 286, Notamblyscirtes simius is a hilltopper, not a roadside skipper. P. 289#4 is Panoquina lucas=sylvicola. P. 308 I haven't seen any valid legume host records for lutzi or texana.

BUTTERFLIES THROUGH BINOCULARS. A Field, Finding, and Gardening Guide to Butterflies in FLORIDA. Jeffrey Glassberg, Marc C. Minno, John V. Calhoun. 2000.

Oxford University Press, New York, New York. 242 p.

The photos in this book are very nice, and all or nearly all are properly identified! The photo of Celastrina "ladon" on pl. 16 is odd and almost looks like C. nigra, but the date is more like C. neglecta, is it ladon? The Polites origenes female on pl. 34 may be P. themistocles. The Poanes yehl female on pl. 38 looks like P. viator, but maybe it is yehl. The little identification bars are good, showing nice little identification spots on the uns of Eurema for instance.

BUTTERFLIES of the CAROLINAS FIELD GUIDE (2003, 414 p.), BUTTERFLIES of OHIO FIELD GUIDE (2004, 344 p.), BUTTERFLIES of MICHIGAN FIELD GUIDE, (2005, 376 p.),

(not seen: Butterflies of Georgia Field Guide, & Butterflies of Florida Field Guide), all by **Jaret C. Daniels**, Adventure Publications Inc., Cambridge, Minnesota.

Here's a new strategy: mass production of state field guides for butterflies. The text and photos are prepared for each species in a master file, and then a state book is assembled by just using pages from the master book file for the species occurring in that state (each page does include a little map of the state with the range shown). On the positive side, Daniels is a professional nature photographer at Univ. of Florida, and the main photos are nice and are big (3-4"), and he evidently used the butterfly experts there because nearly all the photos are properly identified. Little photos are often included of the other sex and undersides and larvae, and the larva photos are nice, though small. The text for each species includes the usual stuff plus a short description of larva and hostplants. There is a good conversion list of plant common names to scientific names. Mass production of field guides would be a good idea, if the master file contained expert information, and a local expert added local color for each state. The only problem is that lepidopterists are poor, and state butterfly books are money losers, so how can this series succeed even with those efficiencies of mass production?, will it continue? My main gripe is that the species are arranged in each book in what appears to be random/haphazard fashion. The species are intended to be arranged by a conspicuous color, such as black, blue, brown, white, yellow, etc., and the color is shown on the edge of the page. But the result appears to be a haphazard arrangement of species in each book that I don't like, and often the same species will be repeated! just 20+/- pages onward, if one sex differs from the other, and both copies have identical text with just the big & little adult photos switched between male and female, which wastes a lot of space.

If identification were the goal, these books should have just reproduced tiny photos of each species all ganged by similar appearance in a 20-page section in the front of each book, with brief name & page # below each tiny photo, directing the reader to the full-page treatment later on.

I haven't checked most of the hosts and other detailed info in these books, as it is the usual info. Below are a few corrections on the photos, etc.

Butterflies of the Carolinas: Pyrgus centaureae is not a stray. Celastrina ladon isn't everywhere in the Carolinas. P. 113 mistakenly prints the name Callophrys irus for niphon. P. 150 photo looks like Wallengrenia egeremet rather than otho to me. I wonder if the larvae of Poanes aaroni p. 302 & P. viator p. 326 are really that pink? Euphyes berryi is misspelled beryi. Phyciodes selenis is properly called P. cocyta, which ranges S to W.Va., but the bug in N.C. should be called P. diminutor incognitus, which is not a stray. The Euphyes pilatka photo is too orange.

Butterflies of Ohio: The photo of Amblyscirtes hegon looks strange, as if the bottom of the hw were replaced by the abdomen of a blue. The photo of Wallengrenia egeremet looks like W. otho vesuria from Jamaica. Phyciodes selenis is properly called P. cocyta, which p. 269 says is not present in Ohio; actually P. diminutor diminutor occurs all across northern Ohio, at least in Lucas, Wood, Sandusky, & Columbiana Cos., as I noted in Papilio (New Series) #13; it resembles P. cocyta but has two gen. The small ventral photo of Argynnis (Speyeria) aphrodite looks like S. atlantis to me. I found Speyeria idalia common in the Cleveland suburb of North Royalton about 1961. Text lists Pieris virginiensis in NW Ohio, but map shows it in NE.

Butterflies of Michigan: The photo of Oarisma poweshiek looks like O. garita, it's too tawny for poweshiek. The photo of Wallengrenia egeremet looks like W. otho vesuria from Jamaica. The Erynnis horatius larva is probably E. juvenalis. The photo of Oeneis chryxus is real O. chryxus which occurs in the Rocky Mts., and is quite unlike Mich. O. calais strigulosa. The Asterocampa celtis photo is evidently the Florida ssp. The photo of Phyciodes batesii is ssp. batesii from N.C., it's not ssp. lakota from Mich., which has a large brown unh marginal patch. The photo of Polygonia gracilis is P. g. zephyrus from W N.A. not Mich. ssp. gracilis. I haven't seen any Oeneis macounii females with that much brown on upf base, but I have one O. nevadensis female with almost that much brown, so I assume the little female O. macounii photo is nevadensis. The ventral Speyeria aphrodite photo is S. atlantis. The Euchloe olympia ups is aberrant.

SWALLOWTAIL BUTTERFLIES OF THE AMERICAS. A Study in Biological Dynamics, Ecological Diversity, Biosystematics, and Conservation. Hamilton Tyler, Keith S. Brown Jr., Kent Wilson, 1994. Scientific Publishers, Gainesville, Florida. 377 p.

Keith Brown is one of the foremost experts on latin american butterflies, and Kent Wilson has studied Papilionidae for more than 50 years.

This book reminds me of a "Dilbert" cartoon by Scott Adams, showing Dilbert giving a presentation to an audience. Panel one: "This next transparency is an incomprehensible jumble of complexity and undefined acronyms." Panel two: "You might wonder why I'm going to show it to you since the only possible result is to lower your opinion of my communication skills." Panel three, as Dilbert points to the tortuous mess on the wall screen: "Frankly, it's because I like making complex pictures more than I like you." Please Keith, do not write any more complex scientific papers, just give your info to someone who knows how to effectively communicate information. The goal is to publish data accurately so that the original data can be reconstructed, and present it so that users can easily find what they want. I gave my Papilionidae hostplant card file info to Keith, and I see in this book that little of it was used, and one cannot look up the hosts and reconstruct the original bug-plant hostplant records, as the host data has been simplified/changed so much. It

takes quite a while to figure out all the complexity in this book, the jumble of numbers and letters in the plates, the positioning of photos of a taxon in multiple places, the oozing of plate legends from one plate to the next, the overlapping map ranges, the abbreviations for everything, lines & arrows going everywhere, everything that possibly could be made confusingly complicated has been thus mesmerized. Instead of one easy index, there are three, so one must first search for the right index. Every table and fig. and box is a new puzzle for deciphering. This book is a perfect example of how it would be easiest to just put the bug's name under each photo, to aid readers and reduce errors (then put the text on the internet so that it could be fixed and continually updated). The deliberate attempt to complicate everything (notable in Keith's prior papers on Heliconius etc.) has introduced numerous errors, which would take many months and a lot of expertise to fully decipher; it would be easier to start over with a new book. And a lot of the book concerns general principles of mimicry and & other biology that Keith evidently teaches in his classes, but frankly, Papilio lovers don't really want a book loaded down with that general stuff, which forces the Papilio treatments to be compressed (folded, spindled, & mutilated like the original IBM data cards) so much that data retrieval is difficult. And I doubt that many college biology students really care about Papilios anyway. Of course there is a lot of good stuff in this book that will be of use to people, though it will take some study to extract, and verification of extracted detailed information will be desirable. So, we need a new book.

The book lumps previously-oversplit species using the biological species concept, which is good, because in popular (and some nonpopular) groups of butterflies, every new variant was named as a new species. But in North America, I still treat Papilio zelicaon & P. polyxenes as distinct species. P. zelicaon & P. p. coloro overlap a little in range at the E side of the mts. from San Diego Co. to Kern Co. Calif., where they don't interbreed. True, in C Colo. you find a lot of intermediates between zelicaon & polyxenes, but there are also a lot of intermediates between P. machaon bairdii/brucei & polyxenes, & between P. m. bairdii/brucei and zelicaon (I have many drawers full of the various intermediates and forms, as there is great variation within each, for instance each critter varies completely from wide-banded to narrow-banded, etc.), yet the three species still exist and have not merged, so I keep them all as three species (they are bookkeeping species within the stenchospecies P. machaon). In Alta. machaon & zelicaon have merged in some areas and are distinct in others, according to F. Sperling. I do treat joanae as P. machaon joanae though as the book does, as it has various eyespot etc. traits & mtDNA of bairdii (though mtDNA has proven to be comparatively useless for the study of phylogeny), and is reproductively compatible with P. machaon, even though introgression has made it look more like polyxenes. The book treats brevicauda as a ssp. of P. machaon also, which is reasonable as the few crossing experiments showed compatibility; brevicauda looks different but its major characteristics (lack of sexual dimorphism, black form) also occur in other machaon ssp., and the amount of orange varies within brevicauda (gaspeensis has little ups orange, bretonensis is intermediate between gaspeensis & the orangish brevicauda thus invalid). P. machaon brucei=dodi is a valid yellow-form ssp. Pl. 91: S is brucei not gaspeensis; R is kahli from Riding Mts. Man.; H is aberrant nitra female from Little Belt Mts. Mont.; 8 is really nitra from Pine Creek Calgary Alta.; V is polyxenes; 2 is aberrant. Pl. 92: S is female, probably of zelicaon (listed also for coloro); Q is not named but is looks like pseudoamericus, maybe from Mex. In Papilio indra, phyllisae is a syn. of indra, & nevadensis is just a variable intergrade. Pl. 90, kaibabensis in on S Rim of Grand Can. also. The book correctly treats rutulus as a ssp. of Pap. glaucus, but maynardi is a syn. of glaucus. Note how P. glaucus alexiares has the mtDNA & allozymes of glaucus (p. 147-148) and has some black females like glaucus, yet has the wing pattern & valva of rutulus (p. 321); so why do misguided people continue to treat rutulus as a distinct sp. from glaucus (and treat canadensis as a distinct sp. from glaucus, despite extensive intergradation)? Arcticus is a form of canadensis resembling rutulus. Texanus & ilioneus are syns. of Papilio troilus, and fakahatcheensis Gatrelle was later named for the S Fla. ssp. Magnus & xanthus & sayii & montanulus & yukonensis are syns. of Parnassius phoebus smintheus, maximus is a valid ssp. in C Mont. with blackish females, & golovinus, alaskensis, & elias are syns. of apricatus. The "unnamed ssp." of P. phoebus from "Region of Ciudad Victoria, Mexico" fig. on pl. 50 is obviously just mislabeled Rocky Mts. smintheus, maybe from Colo. where Arthur Moeck also collected. In P. clodius, strohbeeni is a distinct ssp., but the others are basically synonyms in a variable species in which few bugs in any locality look different (a ridiculous farce of naming ssp. only by locality without actual distinguishing features). Pl. 52, 18 is not indexed & B is given two names; there are too many names for Antillean Battus polydamas ssp. P. 61, males emerge a day or two earlier than females ("protandry") in discrete-generation insects in order to place the maximum population of sexually-active males during the time when most females are emerging, for three reasons: in order to maximize the number of matings for males, & minimize the time required for females to mate, & maximize the number of offspring (J. Scott, J. Anim. Ecol. 46:909-924, 1977). P. 114, Papilio troilus larvae look like snake mimics. P. 127, fig. 5.6 does not exist. P. 192, the several dozen rain forest refugia Brown concludes have not fared so well in studies of other creatures. There are one too many veins on Fig. 11.2 #B. The Papilio homothoas that I caught in Colombia surely is a ssp. of P. cresphontes; melonius probably is also. Pl. 64, S on photo has "sera" above it so must be serapis. P. 27 Baronia is not transandean.

The book gives "Fast Keys" to adults and larvae, and maybe they do mostly work. Unfortunately keys are bad for identification purposes, because just one mistake in the sequential chain of a dozen comparisons will lead one to a grossly wrong identification. Perfection at every couplet is required to successfully identify something with a key, while butterflies are variable and are far from perfect. Tables are the proper way to identify butterflies, for many reasons: one can compare

all the traits to the bug to see if there is a genuine best match, one can quickly read the most distinctive traits that are the easiest to use, variation can be included, the tables double as a data repository, adding a new sp. to a table is easy but very difficult to a key, etc. etc. The human brain excels at pattern recognition, which is closest to what is done by simultaneously considering all the traits in a table. It's difficult and time-consuming to construct keys, and considering their large failure rate during use, one should spend the time making tables instead, which have actual lasting value.

DISCUSSION

How to write butterfly books. Here are some general thoughts for those people who contemplate writing butterfly books. If you are writing a book on some state or province, you will not make any money. When your manuscript is finished, send it to some real butterfly experts to try to get the errors corrected. Show it to some ordinary people to get their opinion as to its organization, ease of use, quality of illustrations, etc. Put the map and ideally the photos on the same page as the text. Don't use crummy paintings of butterflies. Do not illustrate flying butterflies in the mounted position (with the rear edge of both forewings parallel) as butterflies don't fly that way, and lepidopterists will know you are an idiot if you position them this way. If you don't put the photos with the text, group them in one section of plates, and save money by showing only left half ups next to right half uns of each individual. Don't waste space repeating info (don't describe the bug if there's a picture [most books have useless descriptions of the adult butterfly which nobody ever reads] and limit descriptions of photographed bugs to distinguishing features; don't describe distribution if there's a map; etc.). Get rid of "checklists", they are useless waste of space, and nobody looks at them either. Combine all indexes into one. Do not use just common names of plants, because those common names are difficult to convert to scientific names (I have all the big floras, and looking up the common names in those always leaves one with a residue of common names that cannot be deciphered without uncertainty or error). (Most amateurs know very few plants, so they will know very few of the common names of plants anyway, so you might as well just give the scientific names of the plants. And as a comparative "expert" on plants myself, I try not to learn the stupid common names of plants. The few people who are experts on plants and are interested in butterflies, want to see plant scientific names, not common names.) I know you will copy much of the information from other books, but try to copy from books that are mostly accurate, and if you write something very different or unusual, try to document it at least with a slight reference as to its origin in your state or whatever. (Book authors tend to copy each other a lot, and most of the hosts listed are generally copied from other states without a statement that few or none are from the current state, so lots of old mistakes such as confusing the hostplants of Pyrgus oileus & communis=syrichtus, and stating that Phyciodes cocyta has pinkish spines, are later repeated in dozens of books, each book copying the one before.)

Necessary butterfly books. The current system of writing books produces too much repetition of past errors and not enough presentation of current better knowledge. What we really need, is a Wikipedia-style internet encyclopedia of all butterfly species in the world, the text for each prepared by expert(s) on that group and corrected continuously as new knowledge and new experts arise, with synonymy, information on hostplants and biology and behavior with references, and low-res jpg color photos of the egg larva pupa & adult. Science publishing has become so fragmented and expensive that it is now impossible to keep up with the literature, and even large libraries can obtain only a very small fraction of publications, because their money goes to a few "must have" $2000./year big journals, so a wikipedia-style butterfly reference authored by thousands of people is necessary. There is controversy of taxonomic treatment in many groups, and many taxonomists are vehemently opposed to the other view, so maybe the encyclopedia would have to accept several different treatments for a group for a few decades until the controversy is settled, or an editor would have to enforce the stenchospecies =superspecies & bookkeeping species =semispecies organization upon the taxa. We need a simple moth book covering all the moths of North America, which would in vol. 1 simply illustrate every species, 100 per page, one half ups next to other half uns, with just one species or ssp. name & sex below each, so that 300 pages could illustrate two each of 15,000 species. Then vol. 2 would be the text identifying each illustration, and providing information on the species & drawings etc., which would be wikipedia-style coauthored by hundreds of people and updated as information expands. We need a Butterflies of Latin America with the same format. Ditto for Africa, tropical Asia, etc. Can we make these books without $support from a super-rich person or government? Maybe not. (A total reform of science publishing is also necessary. Each scientific paper would have to be submitted to one of three repositories, and if it passes minimum standards, it would be duplicated to the other two repositories, and only the abstract would be published (online). Journal & magazine & book publishers such as Oecologia & Science etc. would have to bid for the right to publish articles, and at last authors would receive a fair portion of that money; few would get bids of course, so the majority of articles would be "published" only by copies ordered by purchasers. Individuals could subscribe to all the papers with a given subject matter, at the lowest-possible cost of transmission [such as Adobe Acrobat] consistent with financially maintaining the system.)

ACKNOWLEDGEMENTS

I thank John Rawlins of Carnegie Museum for helping with some matters regarding William Henry Edwards' types. Virginia Scott of Univ. of Colorado Museum helped me research butterflies there. Many lepidopterists offered opinions as to identification of photos and other matters in these books over the decades, which often found their way into these corrections. The authors of many of these books helped decipher some of the questions I had with their books, as noted

above, and those clarifications are listed herein. Norbert G. Kondla & Crispin Guppy contributed some corrections to the Pelham Catalogue, and Kondla contributed corrections to other books. Jonathan Pelham kindly sent some old papers and advice.

PAPILIO BONUS

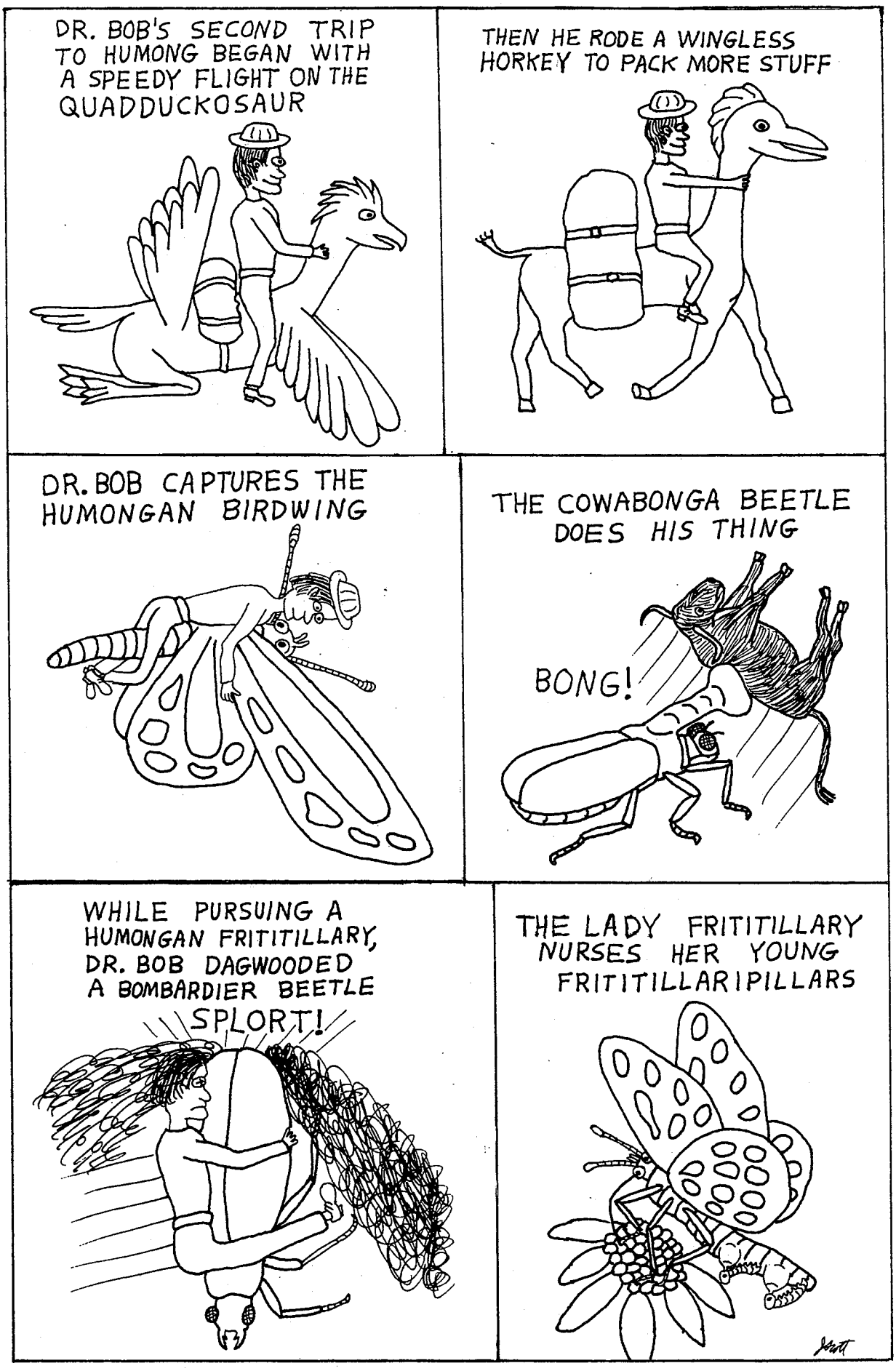
Bad Taxonomist's Credo. If I named it, it is a species. If you named it, it is a subspecies. If you named it and I don't like you, it is a synonym.

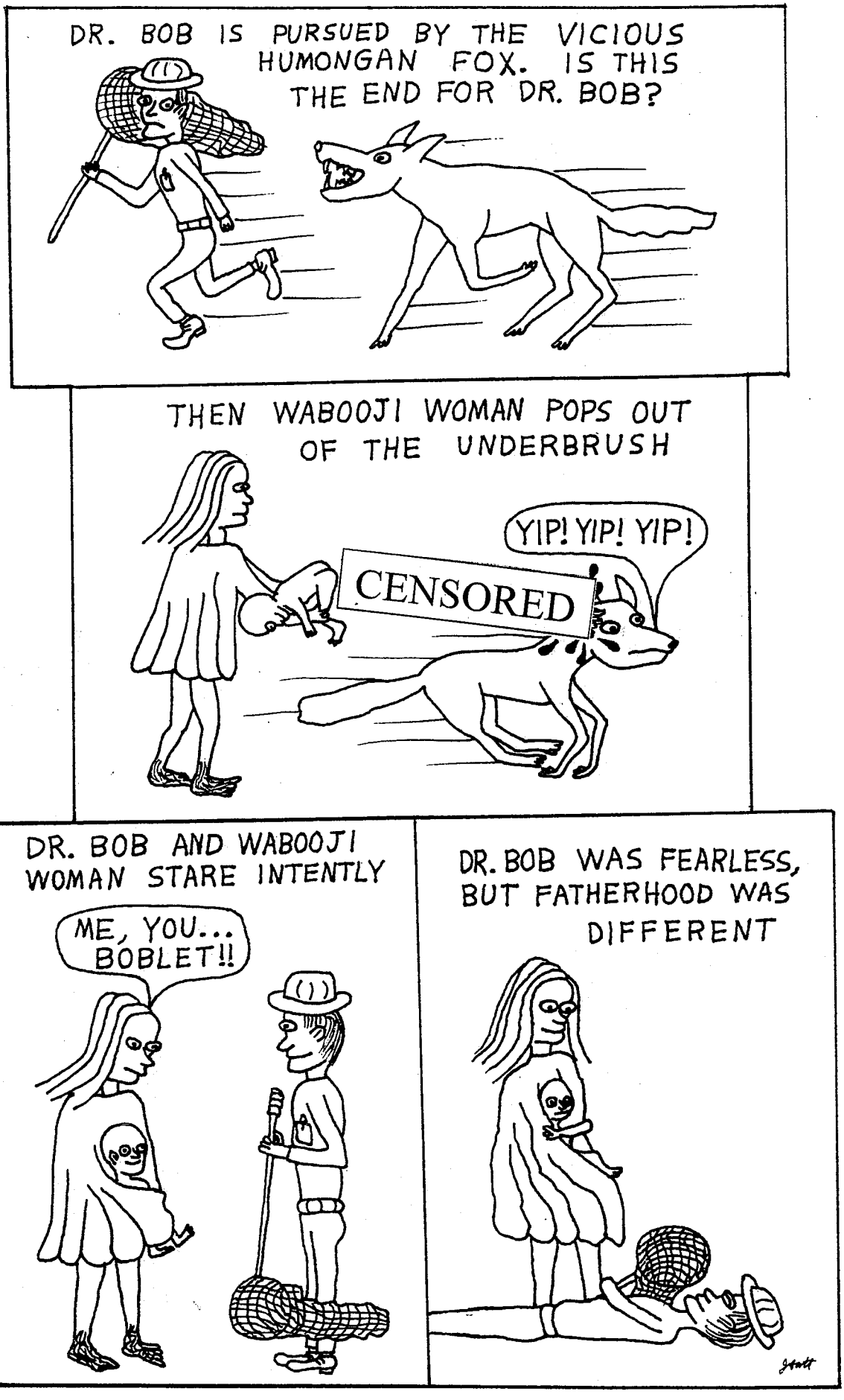
ISSUES OF PAPILIO (NEW SERIES)

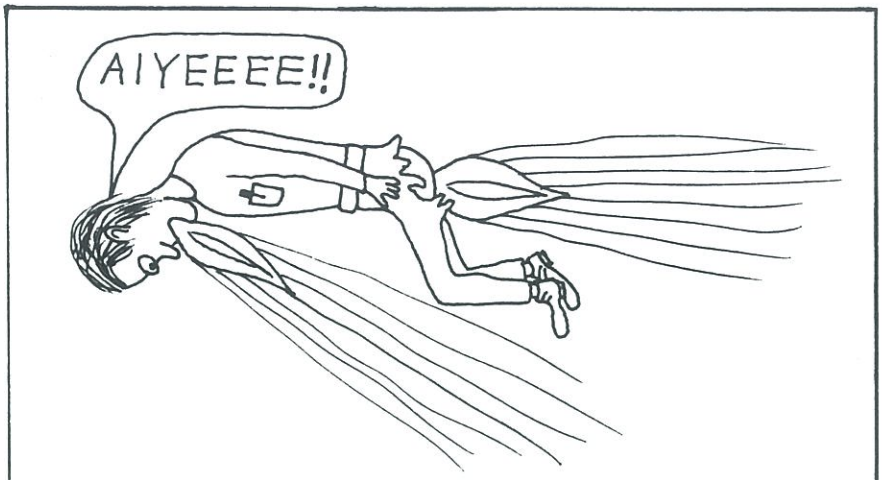
1. New Papilionoidea and Hesperioidea from North America. James A. Scott, 1981, 1-12, $2.00
2. The life history and ecology of an alpine relict, *Boloria improba acrocnema* (Lepidoptera: Nymphalidae), illustrating a new mathematical population census method. James A. Scott, 1982, 1-12, $2.00
3. Distribution of Caribbean Butterflies. James A. Scott, 1986, 1-26, $2.50
4. Larval hostplant records for butterflies and skippers (mainly from western U.S.), with notes on their natural history. James A. Scott, 1986, 1-37, $3.00
5. The courtship of *Phyciodes*, and the relationship between *Phyciodes tharos tharos* and *Phyciodes tharos morpheus* (=*pascoensis*) in Colorado. James A. Scott, 1986, 1-8, $1.00
6. Hostplant records for butterflies and skippers (mostly from Colorado) 1959-1992, with new life histories and notes on oviposition, immatures, and ecology. James A. Scott, 1992, 1-185, $14.00
7. Biology and systematics of *Phyciodes* (*Phyciodes*). James A. Scott, 1994, 1-120, $9.00
8. *Speyeria hesperis* and *Speyeria atlantis* are separate species. James A. Scott, Norbert G. Kondla, and Stephen M. Spomer, 1998, 1-31, $3.00
9. A new *Celastrina* from the eastern slope of Colorado. James A. Scott & David M. Wright, 1998, 1-15, $2.00
10. *Phyciodes* (*Phyciodes*): new discoveries, new subspecies, and convergence. James A. Scott, 1998, 1-42, $4.00
11. New western North American butterflies. James A. Scott & Michael S. Fisher, 1998, 1-12, $1.00
12 .Taxonomic Studies and New Taxa of North American butterflies. James A. Scott, Michael S. Fisher, Norbert G. Kondla, Steve Kohler, Crispin S. Guppy, Stephen M. Spomer, and B. Chris Schmidt, 2006. 74 p. & 6 color pl., $14.00
13. *Phyciodes* (*Phyciodes*): More Progress. James A. Scott, 2006, 38 p., $7.00
14. Butterfly Hostplant Records 1992-2005, with a treatise on the evolution of *Erynnis*, and a note on new terminology for mate-locating behavior. James A. Scott, 2006, 74 p., $10.00
15. Building the California Academy Drawer. James A. Scott, 2006, 40 p., $6.00
16. Portable (Six Drawer) Cabinets for California Academy Drawers. James A. Scott, 2006, 10 p., $1.50
17. Proposals for a new insect study, commerce, and conservation law that deregulates dead insects, and proposals for fixing the endangered species act as applied to insects. James A. Scott, 2006, 17 p., $3.50
18. Geographic variation and new taxa of western North American butterflies, especially from Colorado. James A. Scott & Michael S. Fisher, with some parts by David M. Wright, Stephen M. Spomer, Norbert G. Kondla, Todd Stout, Matthew C. Garhart, & Gary M. Marrone, 2008, 84 p., 10 figs., 5 color plates, $9.00
19. Corrections/reviews of 58 North American butterfly books. James A. Scott, 2008, 129 p., $8.00
20. Biological Catalogue of North American butterflies. James A. Scott, 2008, 51 p., $5.00

NOTE: PAPILIO (NEW SERIES) appears irregularly. It is mailed free to the British Museum (Natural History); others must pay. There is no subscription. Instead of subscription charges, persons desiring reprints should request them from authors, enclosing the advertised price. Any new name or nomenclatural act in this publication is intended for permanent, public, scientific record. Manuscripts must be scientifically sound and readable, but are not edited for format or style or length. To eliminate page charges and reprint charges (all charges demanded by the traditional vanity press scientific journals), publication delays, correcting proofs, and printer's errors, accepted papers are reproduced by modern quality photo/print methods by the author(s), dated, and mailed by the author(s). Mss. should be sent to Dr. James A. Scott, 60 Estes Street, Lakewood, Colorado 80226 U.S.A. "Papilio Bonus" parts are diversions from the regular scientific content— political or sarcastic commentaries or purely humorous cartoons or writings—concerning some aspect of entomology.

PAPILIO BONUS: DR. BOB'S SECOND EXPEDITION TO THE LAND OF HUMONG




DR. BOB IS PURSUED BY THE VICIOUS HUMONGAN FOX. IS THIS THE END FOR DR. BOB?
THEN WABOOJI WOMAN POPS OUT OF THE UNDERBRUSH
YIP! YIP! YIP!
CENSORED
DR. BOB AND WABOOJI WOMAN STARE INTENTLY
ME, YOU... BOBLET!!
DR. BOB WAS FEARLESS, BUT FATHERHOOD WAS DIFFERENT



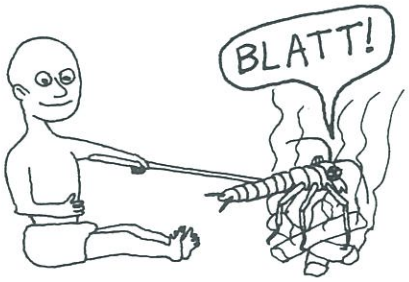
DR. BOB ATE A TINY HUMONGAN CHILE PEPPER, AND DISCOVERED A NEW FORM OF PROPULSION

BOBLET CAPTURES HIS FIRST BUTTERFLY

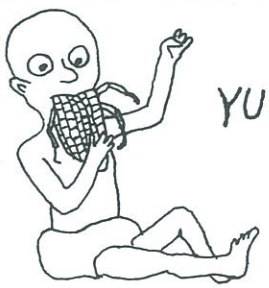
SO YOUNG, YET ALREADY AN EXPERT BONER

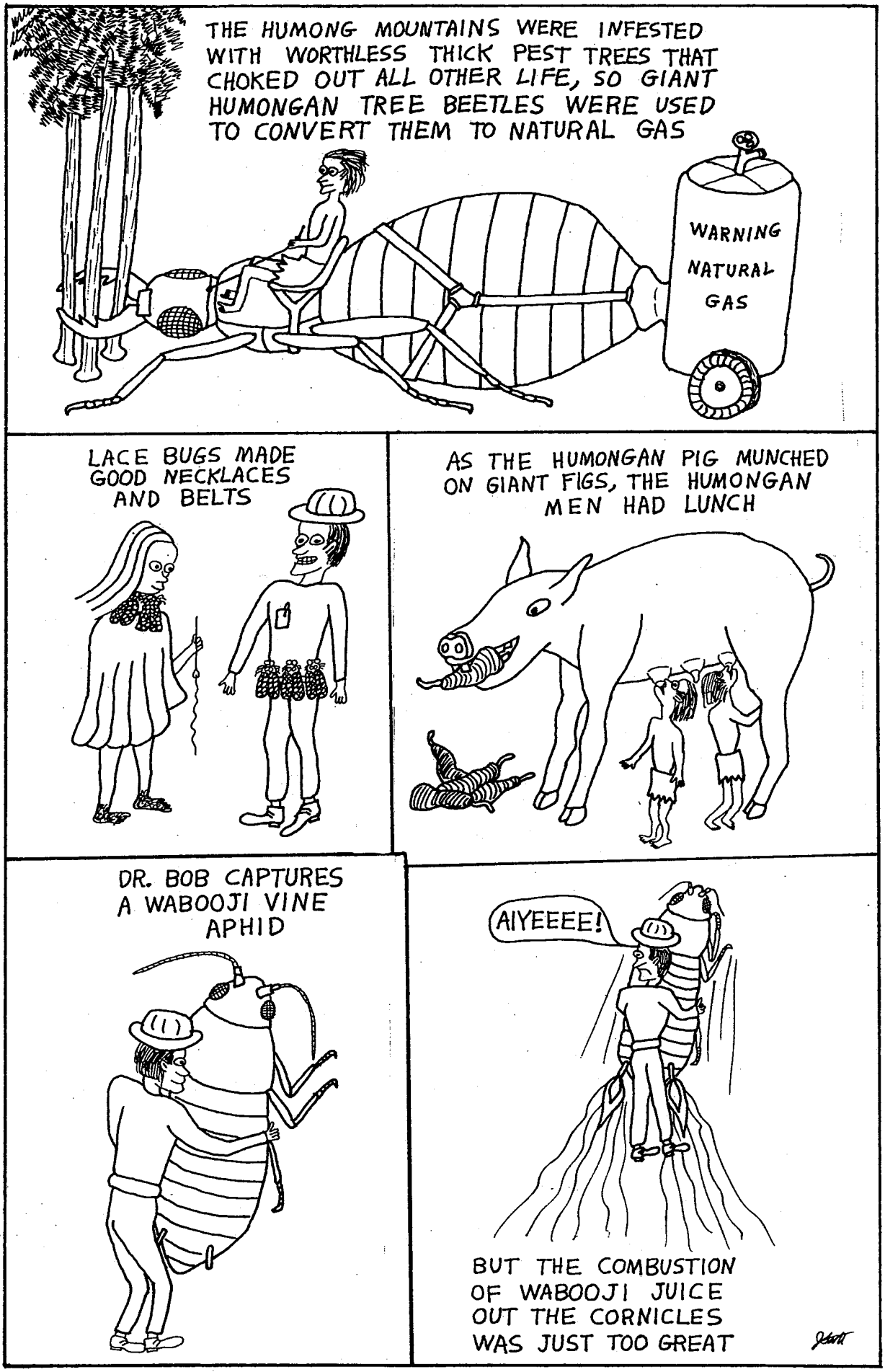
LIFE WAS GREAT IN HUMONG: FAMILY, WABOOJI JUICE, AND ROASTED HUMONGAHOPPER FEMURS

BOBLET LIKED THE GRILLOBLATTIDS THE BEST, BECAUSE WHEN GRILLED THEY MADE A FUNNY SOUND



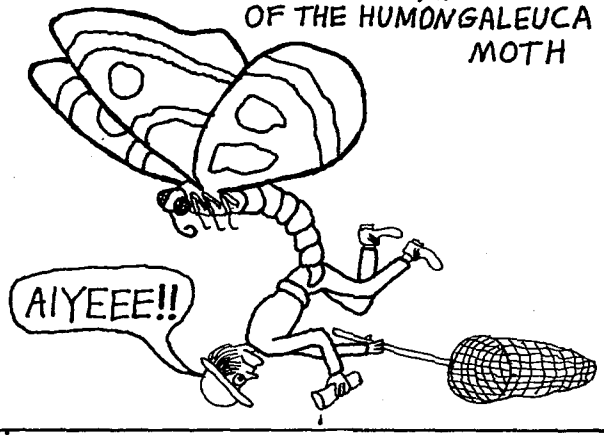
UH-OH, BOBLET JUST ATE THE HOLOTYPE



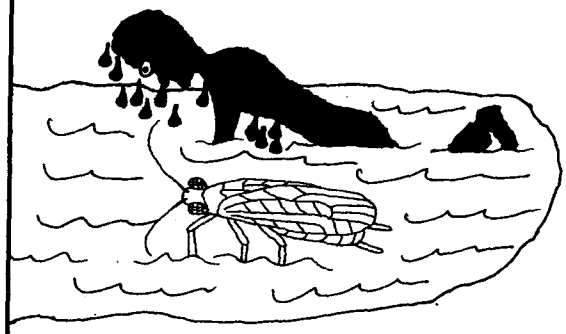

THE HUMONG MOUNTAINS WERE INFESTED WITH WORTHLESS THICK PEST TREES THAT CHOKED OUT ALL OTHER LIFE, SO GIANT HUMONGAN TREE BEETLES WERE USED TO CONVERT THEM TO NATURAL GAS
WARNING NATURAL GAS
LACE BUGS MADE GOOD NECKLACES AND BELTS
AS THE HUMONGAN PIG MUNCHED ON GIANT FIGS, THE HUMONGAN MEN HAD LUNCH
DR. BOB CAPTURES A WABOOJI VINE APHID
AIYEEEE!
BUT THE COMBUSTION OF WABOOJI JUICE OUT THE CORNICLES WAS JUST TOO GREAT

STONED STONEFLIES WERE CAPTURED WITH WABOOJI JUICE

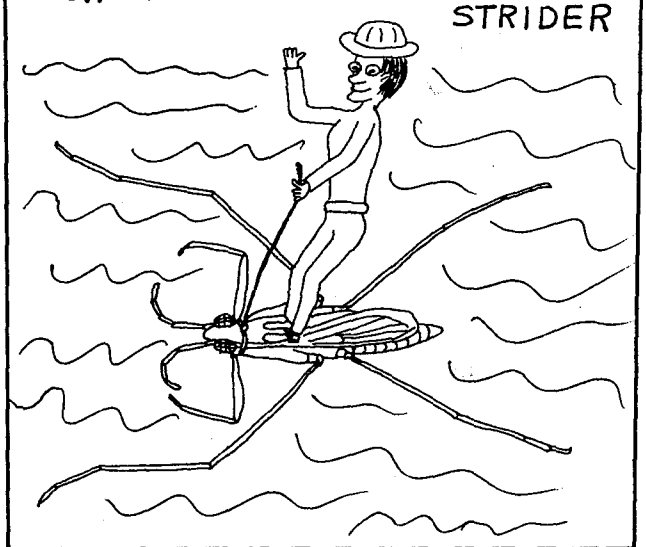
DR. BOB'S WABOOJI JUICE WAS JUST TOO SIMILAR TO THE FEMALE PHEROMONE OF THE HUMONGALEUCA MOTH



THE MUDFLY WAS JUST TOO QUICK FOR DR. BOB



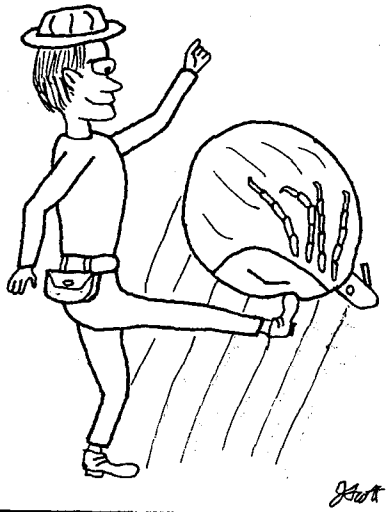
DR. BOB TAKES A FAST RIDE ON THE HUMONGOUS WATER STRIDER



DR BOB WAS ATTACKED BY THE HUMONGAN TICK

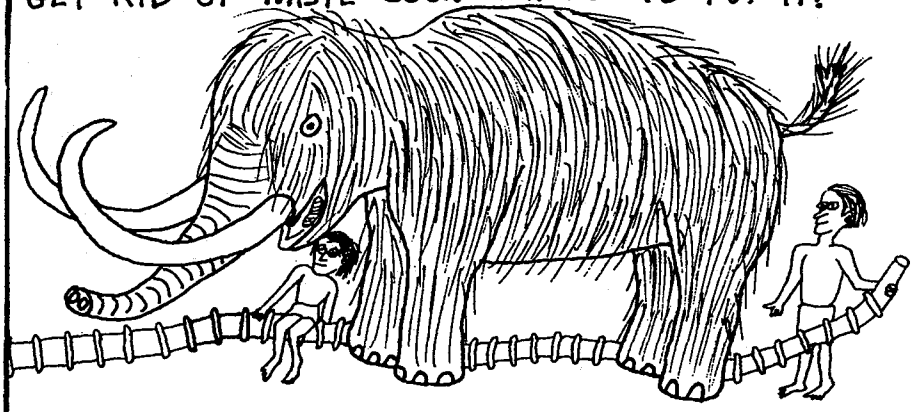
LUCKILY, DR. BOB HAD A FULL CAN OF CHEESE FIZZ

NOW THE HUMONGANS HAD A NEW GAME —TICK KICK

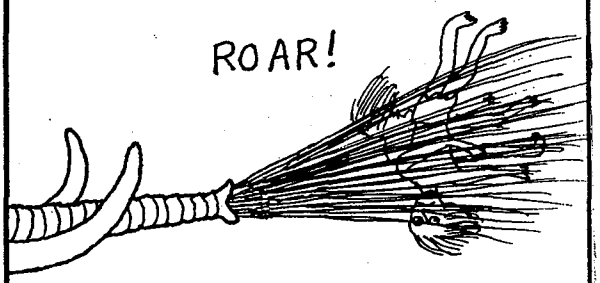


TO FERTILIZE THEIR GARDENS & WABOOJI VINES, THE HUMONGANS COPIED DUNG BEETLES AND USED WOOLLY MAMMOTH POO

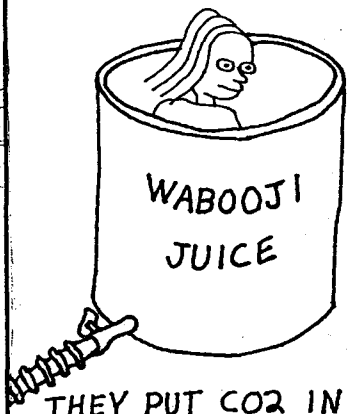
THEY USED MAMMOTH POO TO GENERATE NATURAL GAS ALSO. BUT AFTER LISTENING TO DR. BOB WARN OF GLOBAL WARMING, THEY DECIDED THEY MUST GET RID OF WASTE CO2. WHERE TO PUT IT?



ROAR!

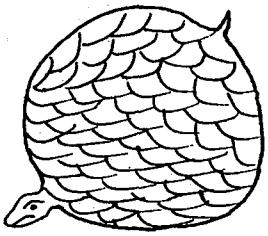


THAT'S NOT THE PLACE TO PUT CO2!

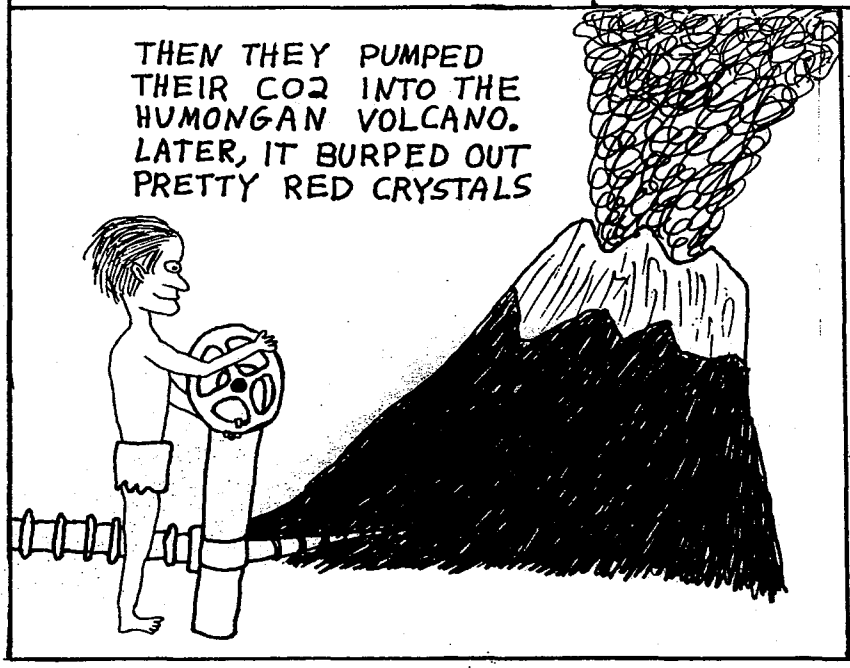


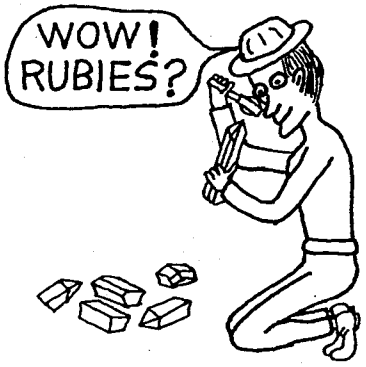
THEY PUT CO2 IN WABOOJI JUICE, AND MADE WABOOJAMPAGNE

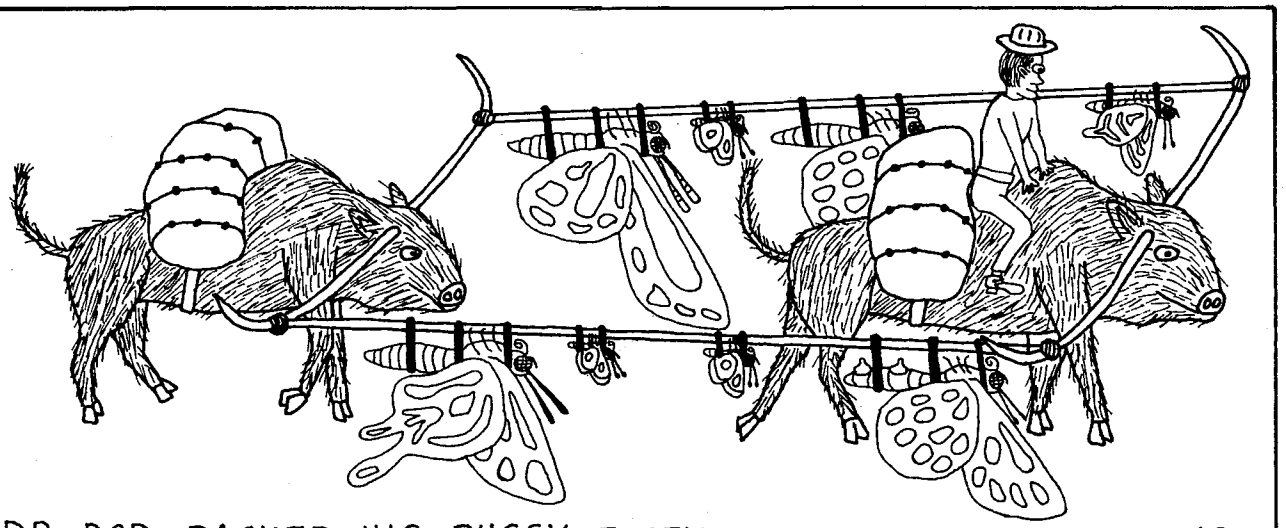
THEN THEY MADE PYTHON BALLOONS



THEN THEY PUMPED THEIR CO2 INTO THE HUMONGAN VOLCANO. LATER, IT BURPED OUT PRETTY RED CRYSTALS

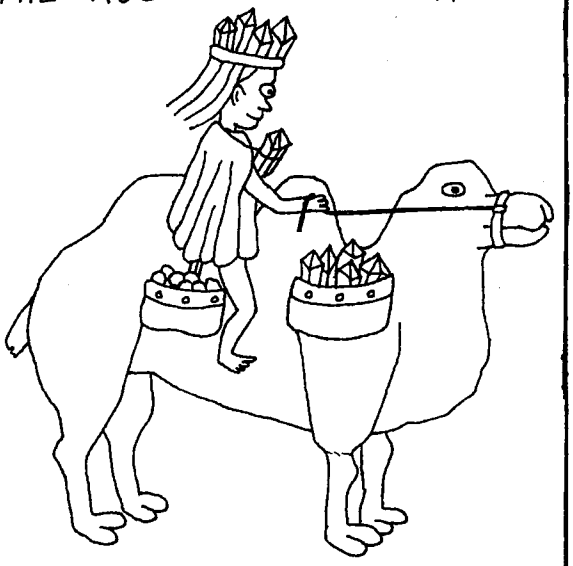




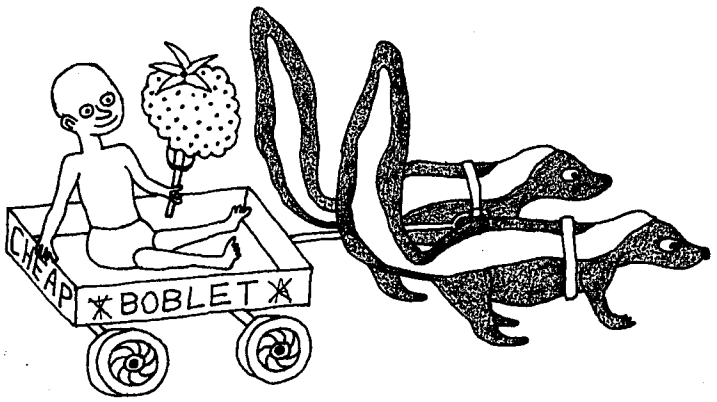


DR. BOB PACKED HIS BUGGY BOOTY FROM HUMONG, INCLUDING THE FABULOUS PAPILIO HUMONGOSO, TWO FRITITILLARIES, A HUMONGAN BIRDWING, A TAILED BOBLET, & PYGMY REDS. THESE HUBOKUFFOARS WERE TAMED WITH WABOOJI JUICE.

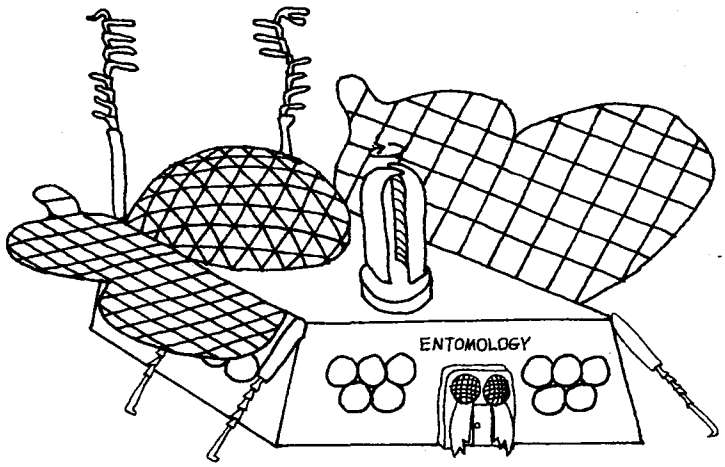
WABOOJI WOMAN HAULED THE RUBIES AND TOPAZ



BOBLET TOOK BERRIES FOR SNACKS



JScott



DR. BOB NOW HAD ENOUGH MONEY FROM WABOOJAMPAGNE AND GEMS AND HDTV AND WIND-VANE POWER, TO PUT SOLAR CELL WINGS ON HIS BUG MUSEUM, & PLAN A THIRD EXPEDITION TO THE LAND OF HUMONG. GLORY BE, THOUGHT DR. BOB.