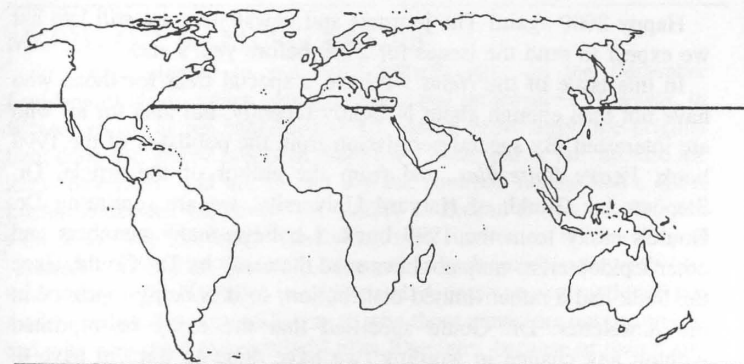


LEPIDOPTERA NEWS

March 2000

No. 1



NO SCIENCE WITHOUT FANCY, NO ART WITHOUT FACTS: THE LEPIDOPTERY OF VLADIMIR NABOKOV

by Stephen Jay Gould

[NOTE: This essay was first printed in 1999 in the book, *Vera's Butterflies*. Both the author and publisher have allowed this reprinting for *Lepidoptera News*. This reprint is unchanged from the original, other than format and the deletion of two page notations that refer to the 1999 book pagination, which would not apply here. This reprint lets a wider audience read this interesting commentary on Nabokov's studies of blue butterflies. The figures are added herein.]

I. THE PARADOX OF INTELLECTUAL PROMISCUITY

No one ever accused Francis Bacon of modesty, but when England's Lord Chancellor proclaimed his "great instauration" of human understanding and vowed to take all knowledge as his province, the stated goal did not seem ludicrously beyond the time and competence of a great thinker in Shakespeare's age. But as knowledge exploded, and then fragmented into disciplines with increasingly rigid and self-policed boundaries, the restless scholar who tried to operate in more than one domain became an object of suspicion — either a boastful pretender across the board ("jack of all and master of none" in the old cliché), or a troublesome dilettante in an alien domain, attempting to impose the methods of his genuine expertise upon inappropriate subjects in a different world.

We tend towards benign toleration when great thinkers and artists pursue disparate activities as a harmless hobby, robbing little time from their fundamental achievements. Goethe (and Churchill, and many others) may have been lousy Sunday painters, but Faust and Werther suffered no neglect thereby. Einstein (or so I have heard from people with direct experience) was an indifferent violinist, but his avocation fiddled little time away from physics.

However, we grieve when we sense that a subsidiary interest stole precious items from a primary enterprise of great value. Dorothy Sayers's later theological writings may please aficionados of religion, but most of her devout fans would have preferred a few more detective novels featuring the truly inimitable Lord Peter Wimsey. Charles Ives helped many folks by selling insurance, and Isaac Newton must have figured out a thing or two by analyzing the prophetic texts of Daniel, Ezekiel and Revelation — but, all in all, humanity might have preferred more music or mathematics.

Therefore, when we recognize that a secondary passion took substantial time from a primary source of fame, we try to assuage our grief over lost novels, symphonies, or discoveries by convincing ourselves that, a hero's subsidiary love must have informed or enriched his primary activity — in other words, that the loss in quantity must be recompensed by a gain in quality. But such arguments may be very difficult to formulate or sustain. In what sense did Paderewski become a better pianist by serving as Prime Minister of Poland (or a better politician by playing his countryman Chopin)? How did a former career in major league baseball improve (if we give a damn, in this case) Billy Sunday's evangelical style as a stump preacher. (He sometimes began sermons — I am not making this up — by sliding into the podium as an entering gesture.)

No modern genius has inspired more commentary in this mode than Vladimir Nabokov, whose "other" career as a taxonomist of butterflies has inspired as much prose in secondary criticism as Nabokov ever lavished upon *Ada*, *Lolita*, and all his other characters combined. In this case in particular because Nabokov was no dilettante spending a few harmless Sunday hours in the woods with his butterfly net, but a serious scientist with a long list of publications and a substantial career in entomology — we crave some linkage between his two lives, some way to say to ourselves: "we may have lost several novels, but Nabokov spent his entomological time well, developing a vision and approach that illuminated, or even transformed, his literary work." (Of course, speaking parochially, professional taxonomists, including the author of this essay, might regret even more the loss of several monographs, implied by Nabokov's novels!)

To allay any remaining suspicions among the literati, let me assure all readers about a consensus in my professional community: Nabokov was no amateur (in the pejorative sense of the term), but a fully qualified, clearly talented, duly employed professional taxonomist, with recognized "world-class" expertise in the biology and classification of a major group, the Latin American Polyommata, popularly known to butterfly aficionados as "Blues."

[Cont. on p. 4]

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TO OUR READERS

Happy 2000 again! The journals and newsletters are still late but we expect to send the issues for 2000 before year's end.

In this issue of the *News* we have a special treat for those who have not read enough about Nabokov recently, but also for all who are interested. By special permission from the publisher of the 1999 book, *Vera's Butterflies*, and from the author of the article, Dr. Stephen Jay Gould, of Harvard University, we are reprinting Dr. Gould's essay from the 1999 book. I believe many members and other lepidopterists may not have read the essay by Dr. Gould, since the book had a rather limited distribution, so it is being reprinted in our newsletter. Dr. Gould specified that the essay be reprinted without any change in wording (we have done so but did have to change two small page references that pertained only to the book *Vera's Butterflies*, and which would make no sense if left as is in this reprint).

J. B. HEPPNER
Executive Director

NOTES

- 2000 Annual Meeting:** April 14-16 in Gainesville.
- 2000 Annual Photo Contest:** deadline is March 15, 2000. Note that the Directors have decided henceforth not to have large prizes: as prizes were increased, we saw a decline of photo submissions, so there seems to be no correlation between higher prize amounts and photo submissions. Thus, to save funds, only winning notices will be issued to prize winners (except for \$100 to the Grand Prize winner).
- Cover Photos:** members can note that color photos for journal covers are always sought. ATL does not pay photo fees, but you do have the gratification of having your photo selected for one of the front or back covers. Photos should be exceptionally sharp and in our page proportion.
- ATL Debentures:** a number of ATL members have already taken advantage of our interest rates and invested in ATL debentures. Please let us know what you can do to help! Returns of principal (at end of period) and interest (paid annually) are guaranteed.
- ATL Home Page:** see it at <http://www.troplep.org>. Coming in 2000 (hopefully): color photo files of worldwide butterflies and moths!
- 1999 Journals:** the last of the 1999 journals are coming later this year. 2000 issues are in preparation and probably will be issued together in the autumn. Some mailings are also late and had to go surface mail. We apologize to members who paid for airmail for the last issues but the airmail budget was overextended. In 2000, the airmail rates will be raised to bring this part of the budget into line with current prices due to our heavy journals.
- ATL Photo Archives:** Do not forget to consider ATL as the ultimate depository for your valued color slides of moths and butterflies and larvae. Do not let your investment of time and effort go to relatives who may not appreciate photographs of Lepidoptera; donate them to the ATL Photo Archives. You are also welcome to send listings of your holdings to add to the ATL Photofile database: let others know what species you have recorded on film. You may have unique life history photos never seen before.
- Elections:** please return your ballot to arrive by March 15, 2000.
- Life memberships:** the Directors have voted to increase life member dues (note enclosed information sheet), so beginning June 1, the ATL life membership will cost \$2,000 (or \$400 per year for 5 years).
- Membership List 2000:** the new membership list is being compiled and should be out this year as an issue of the *News* (if it takes too long to complete, then in early 2001).

JOURNALS: separates (1990-95 only), \$1 first page, 25¢ each added page (specify author and citation). Past journal issues: \$22.50 each (1990-98) (1994 *HL* double issue: \$45). *Lepid. News*: \$10 per year.

CONTENTS for the journals are issued every two years.

LETTERS

MORE ON NAMING BLUES

We were pleased to see Zsolt Bálint's letter in the December *Lepidoptera News*, which was both witty and informative. However, in fairness to us, as we explained to Dr. Bálint previously, the original final draft and galley proofs of *Nabokov's Blues* did in fact not use the term "patronym" and did in fact use the common names Lolita Blue, Luzhin Blue, etc. However, our editors at Zoland Books, as they did with a number of things (including their insistence on the use of "genuses" instead of "genera"), changed it back to what they felt was more easy for the "layman" to understand. A complex explanation to our readers within *Nabokov's Blues* as to why those names are not patronyms and why they need to be called Lolita Blue, etc., because of their Latin suffix, was deemed far too complicated for the popular reader. We are just lucky that in numerous other places (like our arguments with editors insisting on "complex" explanations of words like "monophyly", etc.) we were allowed to provide these. Commercial popular writing always involves a set of tradeoffs between what the scientist wants and what the editor thinks the public can readily understand.

KURT JOHNSON and STEVE COATES
Brooklyn, New York

CONSERVATION IN CHILE'S PARKS

Dubi Benyamini reported to me in late February about a problem well-discussed in the book *Nabokov's Blues*: the over-grazing of protected areas in Chile. After continued information disseminated by concerned lepidopterists, Chilean park officials in Aconcagua National Park have begun a program of protecting the *Adesmia* (Fabaceae) cushion plants from the many mules that populate the park, due to the commercial mountain climbing trade and trails. Dubi reports that the many *Polyommata* (blues) that feed on *Adesmia* are rebounding in areas now off limits to mules. Dubi Benyamini discovered the *Adesmia*-based life histories of many Chilean and Argentine blues in the early 1990s and had recently seen a continued decline in their populations due to overgrazing. The new report shows progress in their conservation.

KURT JOHNSON
Brooklyn, New York

BIODIVERSITY REDUCTIONS?

A recent article in *Science* noted biodiversity reductions in North America. The author, F. J. Rahel, used the phrase "biotic homogenization" to define the reductions in regional differences of plant and animal species. As a fish biologist, he noted especially the biodiversity reductions in fish species, where small local populations of native species are becoming reduced or extirpated by the more popular game fish that are being introduced to natural streams and lakes. Thus, fish populations are becoming more alike from region to region and the rare species are becoming fewer in numbers.

Undoubtedly, this is happening with insects as well, although at a much slower rate. One can consider, however, the ever increasing popularity of the rather bizarre ritual of releasing live butterflies at weddings (why not white butterflies at funerals?). Although there is some controversy about how serious a problem this is (see the next issue of the *News* about this), one must wonder if the continual release of individuals from distant states is not wrecking havoc with the population biology of these species. After all, we have various named subspecies of many species, and if these are sent to artificially mix with other subspecies, to what value will future population biology or genetic studies be for these subspecies?

It is not known to what extent the release of live butterflies is allowed in other nations; members knowing of this are welcome to report on it. In many nations, such "tampering" with wildlife may well be illegal. In the United States, the USDA is restricting such live shipments from being sent between the extremes of West Coast and East Coast.

J. B. HEPPNER
Gainesville, Florida

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GOULD ON NABOKOV (cont. from p. 1)

No passion burned, longer, or more deeply, in Nabokov's life than his love for the natural history and taxonomy of butterflies. He began in early childhood, encouraged by a traditional interest in natural history among the upper class intelligentsia of Russia (not to mention the attendant economic advantages of time, resources, and, opportunity). Nabokov stated in a 1962 interview: "One of the first things I ever wrote in English was a paper on Lepidoptera I prepared at age 12. It wasn't published because a butterfly I described had been described by someone else" (Zimmer p. 216). Invoking a lovely entomological metaphor in a 1966 interview, Nabokov spoke of childhood fascination, continuous enthusiasm throughout life, and regret that political realities had precluded even more work on butterflies:

But I also intend to collect butterflies in Peru or Iran before I pupate . . . Had the Revolution not happened the way it happened, I would have enjoyed a landed gentleman's leisure, no doubt, but I also think that my entomological occupations would have been more engrossing and energetic and that I would have gone on long collecting trips to Asia. I would have had a private museum. (ibid.)

Nabokov published more than a dozen technical papers on the taxonomy and natural history of butterflies, mostly during his six years of full employment as Research Fellow (and unofficial curator) in Lepidoptery at the Museum of Comparative Zoology at Harvard University, where he occupied an office three floors above the laboratory that has been my principal scientific home for 30 years. (I arrived twenty years after Nabokov's departure and never had the pleasure of meeting him, although my knowledge of his former presence has always made the venerable institution, built by Louis Agassiz in 1859 and later tenanted by several of the foremost natural historians in America, seem even more special.)

Nabokov worked for Harvard, at a modest yearly salary of about \$1000, between 1942 and 1948, when he accepted a teaching post in literature at Cornell University. He was a respected and recognized professional in his chosen field of entomological systematics. The reasons often given for attributing to Nabokov either an amateur, or even only a dilettante's status arise from simple ignorance of accepted definitions for professionalism in this field.

First, many leading experts in various groups of organisms have always been "amateurs" in the admirable and literal (as opposed to the opposite and pejorative) sense that their love for the subject has inspired their unparalleled knowledge, and that they do not receive adequate (or any) pay for their work. (Taxonomy is not as expensive, or as laboratory-driven, as many scientific fields. Careful and dedicated local observation from childhood, combined with diligence in reading and study, can supply all the needed tools for full expertise.)

Second, poorly remunerated and inadequately titled (but full time) employment has, unfortunately, always been *de rigueur* in this field. The fact that Nabokov worked for little pay, and with a vague title of Research Fellow, rather than a professorial (or even a curatorial) appointment, does not imply nonprofessional status. When I took my position at the same museum in 1968, several heads of collections, recognized as world's experts with copious publications, worked as "volunteers" for the symbolic "dollar a year" that gave them official status on the Harvard payroll.

Third, and most important, I do not argue that all duly employed taxonomists can claim enduring expertise and righteous status. Every field includes some clunkers and nitwits, even in high positions! I am not, myself, a professional entomologist (I

work on snails among the Mollusca), and therefore cannot judge Nabokov's credentials on this crucial and final point. But leading taxonomic experts in the large and complex group of "Blues" among the butterflies testify to the excellence of his work, and grant him the ultimate accolade of honor within the profession by praising his "good eye" for recognizing the (often subtle) distinctions that mark species and other natural groups of organisms (see bibliography for two articles by leading butterfly taxonomists: Remington; and Johnson, Whitaker and Bálint). In fact, as many scholars have stated, before Nabokov achieved a conventional form of literary success with the publication of *Lolita*, he could have been identified (by conventional criteria of money earned and time spent) as a professional lepidopterist and amateur author!

In conjunction with this collegial testimony, we must also note Nabokov's own continual (and beautifully stated) affirmation of his love and devotion to all aspects of a professional lepidopterist's life. On the joys of field work and collecting, he effuses in a letter to Edmund Wilson in 1942: "Try, Bunny, it is the noblest sport in the world" (quoted in Zimmer p. 30). Of the tasks traditionally deemed more dull and trying — the daily grind of the laboratory and microscope — he waxed with equal ardor in a letter to his sister in 1945, in the midst of his Harvard employment:

My laboratory occupies half of the fourth floor. Most of it is taken up by rows of cabinets, containing sliding cases of butterflies. I am custodian of these absolutely fabulous collections. We have butterflies from all over the world . . . Along the windows extend tables holding my microscopes, test tubes, acids, papers, pins, etc. I have an assistant, whose main task is spreading specimens sent by collectors. I work on my personal research . . . a study of the classification of American "blues" based on the structure of their genitalia (minuscule sculpturesque hooks, teeth, spurs, etc., visible only under the microscope), which I sketch in with the aid of various marvelous devices, variants of the magic lantern . . . My work enraptures but utterly exhausts me . . . To know that no one before you has seen an organ you are examining, to trace relationships that have occurred to no one before, to immerse yourself in the wondrous crystalline world of the microscope, where silence reigns, circumscribed by its own horizon, a blindingly white arena — all this is so enticing that I cannot describe it. (quoted in Zimmer p. 29)

Nabokov worked so long and so intensely in grueling and detailed observation of tiny bits of insect anatomy that his eyesight became permanently compromised — thus placing him in the company of several of history's most famous entomologists, especially Charles Bonnet in the 18th century and August Weismann in the 19th, who sacrificed their sight to years of eyestraining work. In a television interview of 1971, Nabokov stated:

Most of my work was devoted to the classification of certain small blue butterflies on the basis of their male genitalic structure. These studies required the constant use of a microscope, and since I devoted up to six hours daily to this kind of research my eyesight was impaired forever; but on the other hand, the years at the Harvard Museum remain the most delightful and thrilling in all my adult life. (ibid.)

Nonetheless, and as a touching, final testimony to his love and dedication to entomology, Nabokov stated in a 1975 interview that his enthusiasm would still pull him inexorably in ("like a moth to light" one is tempted to intone) if he ever allowed impulse to vanquish bodily reality:

Since my years at the Museum of Comparative Zoology in Harvard, I have not touched a microscope, knowing that if I did, I would drown again in its bright well. Thus I have not, and probably never shall, accomplish the greater part of the entrancing research work I had imagined in my young mirages. (quoted in Zimmer, p. 218)

Thus, in conclusion to this section, we cannot adopt the first

solution to "the paradox of intellectual promiscuity" by arguing that Nabokov's lepidoptery only represents the harmless diversion of an amateur hobbyist, ultimately stealing no time that he might realistically have spent writing more novels. Nabokov loved his butterflies as much as his literature. He worked for years as a fully professional taxonomist, publishing more than a dozen papers that have stood the test of substantial time.

Can we therefore invoke the second solution by arguing that time lost to literature for the sake of lepidoptery nonetheless enhanced his novels, or at least distinguished his writing with a brand of uniqueness? I will eventually suggest a positive answer, but by an unconventional argument that exposes the entire inquiry as falsely parsed. I must first, however, show that the two most popular versions of this "second solution" cannot be defended, and that the paradox of intellectual promiscuity must itself be rejected and identified as an impediment to proper understanding of the relationships between art and science.

II. TWO FALSE SOLUTIONS TO A NONPROBLEM

In surveying commentaries written by literary scholars and critics about Nabokov's work on butterflies, I have been struck by their nearly universal adherence to either of two solutions for the following supposed conundrum: why did one of the greatest writers of our century spend so much time working and publishing in a markedly different domain of such limited interest to most of the literate public.

A) The Argument for Equal Impact

In this first solution, Nabokov's literary fans may bemoan their losses (just as any lover of music must lament the early deaths of Mozart and Schubert). Still, in seeking some explanation for legitimate grief, we may find solace in claiming that Nabokov's transcendent genius permitted him to make as uniquely innovative and distinctive a contribution to lepidoptery as to literature. However much we may wish that he had chosen a different distribution for his time, we can at least, with appropriate generosity, grant his equal impact and benefit upon natural history. Adherents to this solution have therefore tried to develop arguments for regarding Nabokov's lepidoptery as specially informed by his genius, and as possessing great transforming power for natural history.

But none of these claims can be granted even a whisper of plausibility by biologists who know the history of taxonomic practice and evolutionary theory. Nabokov, as documented above, was a fully professional and highly competent taxonomic specialist on an important group of butterflies — and for this fine work, he gains nothing but honor in my world. However, no natural historian has ever viewed Nabokov as an innovator, or as an inhabitant of what the humanities call the "vanguard" (not to mention the *avant-garde*) and scientists the "cutting edge." Nabokov may have been a major general of literature, but he can only be ranked as a trustworthy, highly trained career infantryman in natural history.

Nabokov was a conservative specialist on a particular group of organisms, not in any way a theorist or a purveyor of novel ideas or methods. He divided and meticulously described; he did not unify or generalize. (I will explain in the next section why a natural historian can make such a judgment without intending any condescension or lack of respect). Nonetheless, four arguments have been advanced again and again by literary commentators who seem driven by a desire to depict Nabokov as a revolutionary spirit in natural history as well.

1. *The myth of innovation.* Many critics have tried, almost with

an air of desperation, to identify some aspect of Nabokov's methodology that might be labeled as innovative. But taxonomic professionals will easily recognize these claims as fallacious — for the putative novelty represents either a fairly common (if admirable) practice, or else an idiosyncrasy (a "bee in the bonnet") that Nabokov surely embraced with great ardor, but that cannot be regarded as a major issue of scientific importance.

As a primary example, many critics have stressed Nabokov's frequent complaints about scientists who fail to identify the original describers when citing the formal Latin name of a butterfly — either in listing species in popular field guides, or in identifying subspecies in technical publications. Zimmer, for example, writes: "A growing number of non- and semi-scientific publications nowadays omit the author. Nabokov called it a deplorable practice of commercial origin which impairs a number of recent zoological and botanical manuals in America" (p. 10).

By the rules of nomenclature, each organism must have a binomial designation consisting of a capitalized genus name (*Homo*) and a lower case "trivial" name (*sapiens*), with the two together forming the species name (*Homo sapiens*). (Linnaean taxonomy is called "binomial" in reference to these two parts of a species name.) It is also customary, but not required, to add (not in italics) the name of the first describer of the species after the binomial designation — as in *Homo sapiens* Linnaeus. This custom certainly helps specialists by permitting easier tracing of the history of a species's name. But this practice is also extremely time-consuming (locating the original describer is often tedious and difficult; I don't know the first authors for several of the snail species most central to my own research). Moreover, when hundreds of names are to be listed (as in popular field guides), rigid adherence to this custom requires a great deal of space for rather limited benefit.

Therefore, popular publications (especially the manuals of Nabokov's ire above) generally omit the names of describers. In addition, and for the same reason, technical publications often compromise by including describers' names for species, but omitting them for subspecies (trinomial names for geographically defined subgroups within a species). Honorable people can argue either side of this issue; I tend to agree with Nabokov's critics in this case — but I cannot generate much personal passion over this relatively minor issue.

In another example, Boyd praises Nabokov's methods: "Nabokov's mode of presentation was ahead of his time. Instead of showing a photograph of a single specimen of a butterfly species or a diagram of the genitalia of a single specimen, he presented when necessary a range of specimens of certain subspecies in nine pages of crowded plates" (TAY p. 128). Here I side entirely with Nabokov and his proper recognition of natural history's primary subject matter: variation and diversity at all levels. But Nabokov was not being either unique or unusually progressive in illustrating multiple specimens (I rather suspect that his decision reflected his fussy and meticulous thoroughness more than any innovative theoretical vision about the nature of variation). This issue has provoked a long history of discussion and varying practice in taxonomy — and many other specialists have stood with Nabokov on the right side (as I would say) of this question.

2. *The myth of courage.* As an adjunct (or intensification) to claims for innovation, many literary critics have identified Nabokov as theoretically courageous (and forward looking) in his expressed doubts about Darwinian orthodoxies, particularly on the subject of adaptive value for patterns of mimicry in butterfly wings.

In this context, a remarkable passage from *Speak, Memory* has

often been cited. Nabokov apparently wrote, but never published, an extensive scientific article in an attempt to refute natural selection as the cause of mimicry by denying the purely adaptive value of each component of resemblance (see Charles Lee Remington, "Lepidoptera studies," p. 282). (Darwinians have assumed that mimicry — the evolution in one butterfly species of striking resemblance, usually in color patterns of the wings, to another unrelated form — arises for adaptive benefit, usually for permitting a "tasty" species to gain protection by simulating a noxious species that predators have learned to avoid). This paper has been lost, except for the following fragment that Nabokov included in *Speak, Memory*.

"Natural selection," in the Darwinian sense, could not explain the miraculous coincidence of imitative aspect and imitative behavior, nor could one appeal to the theory of "the struggle for life" when a protective device was carried to a point of mimetic subtlety, exuberance, and luxury far in excess of a predator's power of appreciation. I discovered in nature the nonutilitarian delights that I sought in art. Both were a form of magic, both were a game of intricate enchantment and deception.

An understandable prejudice of intellectual life leads us to view tilers at orthodoxy as courageous front-line innovators. Nonetheless, one may also attack a common view for opposite reasons of conservative allegiance to formerly favored ideas. On Nabokov's forcefully expressed doubts about Darwinian interpretations of mimicry, two observations identify his stance as more traditionally conservative than personally innovative or particularly courageous. First, when Nabokov wrote his technical papers in the 1940s, the modern Darwinian orthodoxy had not yet congealed, and a Nabokovian style of doubt remained quite common among evolutionary biologists, particularly among taxonomists immersed in the study of anatomical detail and geographic variation (see Robson and Richards for the classic statement; see Gould and Provine for documentation that a hardline Darwinian orthodoxy only coalesced later in the 1950s and '60s). Thus, Nabokov's views on mimicry represent a common attitude among biologists in his time, a perspective linked more to earlier consensuses about non-Darwinian evolution than to legitimate modern challenges. (I am, by the way and for my sins, well recognized, and often reviled, for my own doubts about Darwinian orthodoxies, so I do not make this judgment of Nabokov while acting as *defensor fidei*).

Second — although we must always struggle to avoid the primary error of historiography (the anachronistic use of later conclusions to judge the cogency of an earlier claim) in assessing Nabokov's views on mimicry — it remains fair to note that Nabokov's convictions on this subject have not withstood the standard scientific test of time (*veritas filia temporis*, to cite Bacon once again). The closing words of a world's expert on the evolutionary biology of butterflies, and a firm admirer of Nabokov's science, may be cited here. My colleague Charles Lee Remington writes:

impressive though the intellectual arguments are . . . it would be unreasonable to take them very seriously in science today. Mimicry and other aspects of adaptive coloration and shape involve such superb and elaborate resemblances that various biologists had questioned the Darwinian explanations during the early decades of this century. Subsequent publication of so many elegant experimental tests of mimicry and predator learning . . . and color-pattern genetics . . . has caused the collapse of the basic challenges, in my view as a specialist in the field. However, I do guess that Nabokov had such a strong metaphysical investment in his challenge to natural selection that he might have rejected the evolutionary conclusions for his own satisfaction. He was an excellent naturalist and could cite for himself very many examples of perfect resemblances, but he may have been too untrained in the

complexities of modern population genetics. (p. 282)

Finally, I must also note that several other prime components of Nabokov's biological work would now be viewed as superseded rather than prescient, and would also be judged as a bit antiquated in their own time rather than innovative or even idiosyncratic. In particular, as a practical taxonomist, Nabokov advocated a definition of species based only on characters preserved in specimens of museum collections. Today (and, for the most part, in Nabokov's time as well), most evolutionary biologists would strongly insist that species be recognized as "real" and discrete populations in nature, not as units defined by identifiable traits in artificially limited data of human collections. Many species owe their distinction to genetic and behavioral features that maintain the cohesion of a population in nature, but may not be preserved in museum specimens. Nonetheless, Nabokov explicitly denied that such populations should be recognized as species — a view that almost all naturalists would now reject. Nabokov wrote in one of his technical papers: "For better or worse our present notions of species in Lepidoptera is based solely on the checkable structure of dead specimens, and if Forster's Furry cannot be distinguished from the Furry Blue except by its chromosome number, Forster's Furry must be scrapped" (cited in Zimmer p. 15).

3. *The myth of artistry.* Nabokov made many drawings of butterflies, both published, and as charming, often fanciful, illustrations in copies of his books presented to friends and relatives, especially to his wife Véra. These drawings are lovely, and often quite moving in their sharp outlines and naïve brightnesses — but, putting the matter diplomatically, the claim (sometimes made) that these drawings are either unusual in their accuracy or special in their beauty can only be seen as kindly hagiographical, especially in the light of a truly great tradition for wonderful and sensitive art among the best natural history illustrators, from Maria Merian to Edward Lear (who wrote limericks as a hobby, but worked as a skilled illustrator for a profession).



Fig. 1. Nabokov drawing on title page of the Japanese translation of his book, *Lolita*, as presented to his wife, Véra (from *Véra's Butterflies*, 1999).

4. *The myth of literary quality.* Some critics, recognizing the merely conventional nature of Nabokov's excellence in taxonomy, have stated that, at least, he wrote his non-innovative descriptions in the most beautifully literate prose ever composed within the profession. Zaleski, for example, extols Nabokov for writing, in technical papers, "what is surely the most polished prose even applied to butterfly studies" (p. 36). Again, such judgments can only be subjective — but I have spent a career reading technical papers in this mode, while applying at least a serious amateur's

eye to literary style and quality. Nabokov's descriptive prose flows well enough, but I find nothing distinctive in his contributions to this highly restricted genre, where rules and conventions of spare and "objective" writing offer so little opportunity to spread one's literary wings.

B) The Argument for Literary Illumination

Once we debunk, for Nabokov's case, two false solutions to the paradox of intellectual promiscuity — the argument, refuted in section one, that his lepidoptery represented a harmless private passion, robbing no substantial time from his literary output; and the claim, rejected in the first part of this section, that his general genius at least made his lepidoptery as distinctive and as worthy as his literature — only one potential source for conventional solace remains: the proposition that, although time spent on lepidoptery almost surely decreased his literary output, the specific knowledge and the philosophical view of life that Nabokov gained from his scientific career directly forged (or at least strongly contributed to) his unique literary style and excellence.

We can cite several important precedents for such a claim. Jan Swammerdam, the greatest entomologist of the 17th century, devoted the last part of his life to evangelical Christianity, claiming that a fundamental entomological metaphor had directed his developing religious views: the life cycle of a butterfly as an emblem for the odyssey of a Christian soul, with the caterpillar (larva) representing our bodily life on earth, the pupa denoting the period of the soul's waiting after bodily death, and the butterfly marking the glorious resurrection.

In another example, one that would be viewed as more fruitful by most contemporary readers, Alfred Kinsey spent 20 years working as an entomologist on the taxonomy of the gall-wasp *Cynips* before turning to the surveys of human sexual behavior that would mark his notoriety as a pivotal figure in the social history of the 20th century. In a detailed preface to his first great treatise on *Sexual Behavior in the Human Male* (1948), Kinsey explained how a perspective gained from insect taxonomy upon the nature of populations — particularly the copious variation among individuals, and the impossibility of marking one form as normal and the others as deviant — had directly informed and inspired his research on sexual behavior. He wrote:

The techniques of this research have been taxonomic, in the sense in which modern biologists employ the term. It was born out of the senior author's long-time experience with a problem in insect taxonomy. The transfer from insect to human material is not illogical, for it has been a transfer of a method that may be applied to the study of any variable population.

We know that Nabokov made continual and copious reference to entomological subjects, particularly to butterflies, in all his literary productions — in passages ranging from the minutely explicit, to the vaguely cryptical, to the broadly general. Several scholars have tabulated and annotated this rich bounty (I have relied on Zimmer's most recent and most thorough account in writing this essay). Nabokov's critics could therefore scarcely avoid the potential hypothesis, especially given the precedents of Swammerdam and Kinsey, that Nabokov's lepidoptery shaped his literature in direct and crucial ways.

Literary scholars have often ventured such a claim, particularly by asserting that Nabokov used his knowledge of insects as a rich source for metaphors and symbols. In the strongest version, most, if not nearly all, citations of butterflies convey a level of deep symbolic meaning in Nabokov's prose. For example, Joann Karges wrote in her book on Nabokov's Lepidoptera: "Many of

Nabokov's butterflies, particularly pale and white ones, carry the traditional ageless symbol of the anima, psyche, or soul . . . and suggest the evanescence of a spirit departed or departing from the body" (cited in Zimmer p. 8).

Two arguments, one a specific denial of this search for symbolism, and the other a more general statement about art and science, strongly refute this last hope for the usual form of literary solace in Nabokov's dedication to science — a claim that the extensive time thus spent strongly improved Nabokov's novels. For the first (quite conclusive and specific) argument, Nabokov himself vehemently insisted that he not only maintained no interest in butterflies as primary symbols, but that he would also regard such usage as a perversion and desecration of his true concerns. (Artists, and all of us of course, have been known to dissemble, but I see no reason to gainsay Nabokov's explicit and heartfelt comments on this subject.) For example, he stated in an interview: "That in some cases the butterfly symbolizes something (e.g. *Psyche*) lies utterly outside my area of interest" (quoted in Zimmer p. 8).

Over and over again, Nabokov debunks symbolic readings in the name of respect for factual accuracy as a primary criterion. For example, he criticizes Poe's symbolic invocation of the death's-head moth because Poe didn't describe the animal and, even worse, because he placed the species outside its true geographic range: "Not only did he [Poe] not visualize the death's-head moth, but he was also under the completely erroneous impression that it occurs in America" (quoted in Zimmer p. 186). Most tellingly, in a typical Nabokovian passage in *Ada*, he playfully excoriates Hieronymous Bosch for including a butterfly as a symbol in his *Garden of Earthly Delights*, but then depicting the wings in reverse by painting the gaudy top surface on an insect whose folded wings should be displaying the underside!

A tortoiseshell in the middle panel, placed there as if settled on a flower — mark the 'as if,' for here we have an example of exact knowledge of the two admirable girls, because they say that actually the wrong side of the bug is shown, it should have been the underside, if seen, as it is, in profile, but Bosch evidently found a wing or two in the corner cobweb of his casement and showed the prettier upper surface in depicting his incorrectly folded insect. I mean I don't give a hoot for the esoteric meaning, for the myth behind the moth, for the masterpiece-baiter who makes Bosch express some bosh of his time, I'm allergic to allegory.

Finally, when Nabokov does cite a butterfly in the midst of a metaphor, he attributes no symbolic meaning to the insect, but only describes an accurate fact to carry his more general image. For example, he writes in *Mary*: "Their letters managed to pass across the terrible Russia of that time — like a cabbage white butterfly flying over the trenches" (cited in Zimmer, p. 161).

Second, and more generally, if we wish to argue that Nabokov's lepidoptery gave direct substance, or set the style, of his literature, then we must face a counterclaim — for the best case of explicit linkage led Nabokov into serious error. (And I surely will not propagate the smug scientist's philistine canard that literary folks should stick to their lasts and leave us alone because they always screw up our world with their airy-fairy pretensions and insouciance about accuracy.) If I wanted to advance a case for direct linkage, I would have to emphasize a transfer from Nabokov's artistic vision to his science, not *vice versa* — unfortunately, in this instance, to the detriment of natural history. Nabokov frequently stated that his non-Darwinian interpretation of mimicry flowed directly from his literary attitude — as he tried to find in nature "the nonutilitarian delights that I sought in art" (see p. 94 for a fuller citation of this passage). And, as argued previously, this claim represents the most serious general error in Nabokov's scientific writing.

III. THE SOLUTION OF ACCURACY

In standard scientific practice, when tests of a favored hypothesis have failed, and one is beating one's head against a proverbial wall, the best strategy for reclaiming a fruitful path must lie in the empirical record, particularly in scrutinizing different basic data for hints of a pattern that might lead to a different hypothesis. In Nabokov's case, both his explicit statements and his striking consistency of literary usage build such a record and point clearly to an alternative solution. The theme has not been missed by previous critics, for one can hardly fail to acknowledge something that Nabokov emphasized so forcefully. But I feel that most published commentary on Nabokov's lepidoptery has failed to grasp the centrality of this argument as a primary theme for understanding Nabokov's own concept of the relationship between his literary and scientific work — primarily, I suppose, because we have been befogged by a set of stereotypes about conflict and difference between these two great domains of human understanding.

Conventional solutions fail because they have focussed on too specific a level — that is, to the search for how one domain, usually science in this case, impacted the other. But the basic source of relationship may be hiding at a deeper level (deeper, that is, in a geometric sense, not in any claim about morality or greater importance). Perhaps the major linkage lies in some distinctive, *underlying* approach that Nabokov applied *equally* to both science and literature — a procedure that conferred the same special features upon his efforts in both domains. In this case, we should not posit a primary and directional impact of one domain upon the other. Rather, we should investigate the hypothesis that Nabokov's art and science both benefited, in like measure, from his application of a method, or a mode of mental functioning that exemplifies the basic character of his particular genius.

All natural historians know that "replication with difference" builds the best test case for a generality — for how can we prove a coordinating hypothesis unless we can apply it to multiple cases, and how can we be confident in our conclusion unless these cases be sufficiently different in subject matter to demonstrate that any underlying commonality must lie in a single mental approach applied to disparate material? Among great 20th-century thinkers, I know no better case than Nabokov's for testing the hypothesis that an underlying unity of mental style (at a level clearly meriting the accolade of genius) can explain one man's success in extensive and fully professional work in two disciplines conventionally viewed as maximally different, if not truly opposed. If we can validate this model for attributing interdisciplinary success to a coordinating and underlying mental uniqueness, rather than invoking the conventional argument about overt influence of one field upon another, then Nabokov's story may teach us something important about the unity of creativity and the falsity (or at least the contingency) of our traditional separation, usually in mutual recrimination, of art from science.

Above all else — and why we should not take him at his word? — Nabokov vociferously insisted that he cherished meticulous accuracy in detail as the defining feature of all his productions (as illustrated in the passage quoted from *Ada*). All commentators have noted these Nabokovian claims (for one could hardly fail to mention something stated so frequently and forcefully by one's principal subject). Previous critics have also recognized that a commitment to detailed accuracy not only defines Nabokov's maximally rich and meticulously careful prose, but might also be greatly valued for professional work in the description of butterfly species. Unfortunately, however, most commentary then follows a lamentable stereotype about science

(particularly for such "low status" fields as descriptive natural history), and assumes that Nabokov's commitment to accuracy must have imposed opposite qualities upon his work in these two professions — thus, and again lamentably, reinforcing the conventional distinction of art and science as utterly different and generally opposed. Such detail, we are told, enriches Nabokov's literature, but also brands his science as pedestrian, unimaginative and "merely" descriptive (as in the cliché about folks who never see forests because they only focus on distinctive features of individual trees). The stereotype of the taxonomist as a narrow-minded, bench-bound pedant then reconfirms this judgment. Zaleski, for example, sums up his article on Nabokov's lepidoptery by writing:

In both books and butterflies, Nabokov sought ecstasy, and something beyond. He found it in the worship of detail, in the loving articulation of organic flesh and organized metaphor . . . He was perfectly suited as a master novelist and a laboratory drudge. (p. 38)

Zaleski reports that Nabokov importuned his Cornell students with a primary motto: "Caress the details, the divine details." "In high art and pure science," he stated, "detail is everything" (*ibid.*). Indeed, Nabokov often praised the gorgeous detail of meticulous taxonomic language as inherently literary in itself, speaking of "the precision of poetry in taxonomic description" (quoted in Zimmer, p. 176). He also, of course, extolled precision in anatomical description for its scientific virtue. He wrote a letter to Pyke Johnson in 1959, commenting upon a proposed jacket design for his *Poems* (cited in Remington p. 275):

I like the two colored butterflies on the jacket but they have the bodies of ants, and no stylization can excuse a simple mistake. To stylize adequately one must have complete knowledge of the thing. I would be the laughing stock of my entomological colleagues if they happened to see these impossible hybrids.

In reading through all Nabokov's butterfly references (in his literary works) as preparation for writing this essay, I was struck most of all by his passion for accuracy in every detail of anatomy, behavior or location. Even his poetical or metaphorical descriptions capture a common visual impression — as when he writes in "The Aurelian," a story from 1930, about "an oleander hawk [moth] . . . its wings vibrating so rapidly that nothing but a ghostly nimbus was visible about its streamlined body." Even his occasional fantasies and in-jokes, accessible only to a few initiates (or readers of such study guides as Zimmer's) build upon a strictly factual substrate. For example, Nabokov thought he had discovered a new species of butterfly during his Russian boyhood. He wrote a description in English and sent it to a British entomologist for publication. But the English scientist discovered that Nabokov's species had already been named in 1862 by a German amateur collector named Kretschmar, in an obscure publication. So Nabokov bided his time and finally chose a humorous form of revenge in his novel *Laughter in the Dark*: "Many years later, by a pretty fluke (I know I should not point out these plums to people), I got even with the first discoverer of my moth by giving his own name to a blind man in a novel" (quoted in Zimmer p. 141). Literary critics sometimes chided Nabokov for his obsessive attention to detail. Nabokov, in true form, described these attacks with a witty (and somewhat cryptic) taxonomic reference — speaking in *Strong Opinions* of detractors "accusing me of being more interested in the subspecies and the subgenus than in the genus and the family" (quoted in Zimmer p. 175). (Subspecies and subgenera represent categories for fine subdivision of species and genera. The rules of nomenclature recognize these categories as available for convenience, but not required in practice. That is, species need not be divided into subspecies, nor genera into

subgenera. But genera and families represent basic and more inclusive divisions that must be assigned to all creatures. That is, each species must belong to a genus, and each genus to a family.)

Nabokov generalized his defense of meticulous detail beyond natural history and literature to all intellectual concerns. In a 1969 interview, he scornfully dismissed critics who branded such insistence upon (and provision of) detail as a form of pedantry: "I do not understand how one can label the knowledge of natural objects or the vocabulary of nature as pedantry" (my translation from Nabokov's French, as cited in Zimmer p. 7). In annotating his personal copy of the French translation of *Ada*, Nabokov listed the three unbreakable rules for a good translator: intimate knowledge of the language from which one translates, experience as a writer of the language into which one translates, and the third great dictate of detail: "that one knows, in both languages, the words designating concrete objects (natural and cultural, the flower and the clothing)" (my translation from Nabokov's French original, cited in Zimmer p. 5).

Zimmer epitomizes the central feature of Nabokov's butterfly citations: "They are all real butterflies, including the invented ones which are mimics of real ones. And they usually are not just butterflies in general, but precisely the ones that would occur at that particular spot, behaving exactly the way they really would. Thus they underscore, or rather help constitute, the veracity of a descriptive passage" (p. 8). In an insightful statement, he generalizes this biological usage to an overarching Nabokovian principle with both aesthetic and moral components:

Both the writer of fiction and the naturalist drew on a profound delight in precise comparative observation. For Nabokov, a work of nature was like a work of art. Or rather it was a profound work of art, by the greatest of all living artists, evolution, and as much a joy to the mind and a challenge to the intellect as a Shakespeare sonnet. Hence it deserved to be studied like it, with never ending attention to detail and patience. (p. 7)

But perhaps the best summary of Nabokov's convictions about the ultimate value of accurate detail can be found in "A Discovery," a short poem written in 1943:

Dark pictures, thrones, the stones that pilgrims kiss
Poems that take a thousand years to die
But ape the immortality of this
Red label on a little butterfly.

(Again, some taxonomic exegesis must be provided to wrest general understanding from the somewhat elitist — scarcely surprising given his social background — and not always user-friendly Nabokov. Museum curators traditionally affix red labels only to "holotype" specimens — that is to individuals chosen as official recipients of the name given to a new species. The necessity for such a rule arises from a common situation in taxonomic research. A later scientist may discover that the original namer of a species — defined the group too broadly by including specimens from more than one genuine species. Which specimens shall then keep the original name, and which shall be separated out to receive a separate designation for the newly-recognized species? By official rules, the species of the designated holotype specimen keeps the original name, and members of the newly-recognized species must receive a new name. Thus, Nabokov tells us that no product of human cultural construction can match the immortality of the permanent name-bearer for a genuine species in nature. The species may become extinct of course, but the name continues forever to designate a genuine natural population that once inhabited the earth. The holotype specimen therefore becomes our best example of an immortal physical object.)

Nabokov's two apparently disparate careers therefore find their common ground on the most distinctive feature of his unusual intellect and uncanny skill — the almost obsessive attention to meticulous and accurate detail that served both his literary productions and his taxonomic descriptions so well, and that defined his uncompromising commitment to factuality as both a principle of morality and a guarantor and primary guide to aesthetic quality. Science and literature therefore gain their union on the most palpable territory of concrete things, and on the value we attribute to accuracy, even in smallest details, as a guide and an anchor for our lives, our loves, and our senses of worth.

This attitude expresses a general belief and practice in science (at least as an ideal, admittedly not always achieved due to human frailty). Of all scientific subfields, none raises the importance of intricate detail to such a plateau of importance as Nabokov's chosen profession of taxonomic description for small and complex organisms. To function as a competent professional in the systematics of Lepidoptera, Nabokov really had no choice but to embrace such attention to detail, and to develop such respect for nature's endless variety.

But this attitude to detail and accuracy carries no ineluctable status in literature — so Nabokov's unaltered skills and temperament, now applied to his second profession, conferred distinction, if not uniqueness, upon him. The universal and defining excellence of a professional taxonomist built a substrate for the uncommon, and (in Nabokov's case) transcendent, excellence of a writer. After all, the sheer glory of voluminous detail does not ignite everyone's muse in literature. Some folks can't stand to read every meandering and choppy mental detail of one day in the life of Leopold Bloom, but others consider *Ulysses* the greatest novel of the 20th century. I ally myself with the second group. I also love *Parsifal* — and the writing of Vladimir Nabokov. I have always been a taxonomist at heart. Nothing matches the holiness and fascination of accurate and intricate detail. How can you appreciate a castle if you don't cherish all the building blocks, and don't understand the blood, toil, sweat and tears underlying its construction?¹

I could not agree more with Nabokov's emphasis upon the aesthetic and moral — not only the practical and factual — value of accuracy and authenticity in intricate detail. This sensation, this love, may not stir all people so ardently (for *Homo sapiens*, as all taxonomists understand so well, is nothing if not a highly variable entity). But such a basic aesthetic, if not consensual, surely animates a high percentage of humanity, and must evoke something very deep in our social and evolutionary heritage. May I mention just one true anecdote to represent this general argument. The head of the National Air and Space Museum in Washington, DC once hosted a group of blind visitors to discuss how exhibits might be made more accessible to their community. In this museum the greatest airplanes of our history — including the Wright Brothers' biplane from Kitty Hawk and Lindbergh's Spirit of St. Louis — hang from the ceiling, entirely outside the perception of blind visitors. The director apologized, and explained that no other space could be found for such large objects, but then asked his visitors whether a scale model of the Spirit of St. Louis, made available for touch, would be helpful. The blind visitors caucused and returned with their wonderful answer: yes,

1. Incidentally, Nabokov represented an intractable mystery to me until I learned that he grew up trilingual in Russian, English, and French — a common situation among the Russian upper classes in his day. Even as a teenager reading *Lolita*, I couldn't understand how anyone who learned English as a second tongue could become such a master of linguistic detail. Indeed, one cannot. Conrad narrated wonderful stories, but could never play with his adopted language as Nabokov did with one of his native tongues.

they responded, we would appreciate such a model, but it must be placed directly under the unperceptible original. If the aesthetic and moral value of genuine objects can stir us so profoundly that we insist upon their presence even when we can have no palpable evidence, but only the assurance that we stand in the aura of reality, then factual authenticity cannot be gainsaid as a fundamental desideratum of the human soul.

This difficult and tough-minded theme must be emphasized in literature (as the elitist and uncompromising Nabokov understood so well), particularly to younger students of the present generation, because an ancient, and basically anti-intellectual, current in the creative arts has now begun to flow more strongly than ever before in recent memory — the tempting Siren song of a claim that the spirit of human creativity stands in direct opposition to the rigor in education and observation that breeds both our love for factual detail and our gain of sufficient knowledge and understanding to utilize this record of human achievement and natural wonder.

No more harmful nonsense exists than this supposition that deepest insight into great questions about the meaning of life or the structure of reality emerges most readily from a free, undisciplined, and uncluttered (read, rather, ignorant and uneducated) mind soaring above mere earthly knowledge and concern. The primary reason for emphasizing the supreme aesthetic and moral value of detailed factual accuracy, as Nabokov understood so well, lies in our need to combat this alluring brand of philistinism if we wish to maintain artistic excellence as both a craft and an inspiration. (Anyone who thinks that success in revolutionary innovation can arise *sui generis*, without apprenticeship for basic skills and education for understanding, should visit the first (chronological) room of the Turner annex at the Tate Gallery in London — to see the early products of Turner's extensive education in tools of classical perspective and representation, the necessary skills that he had to master before moving far beyond into a world of personal innovation.)

This Nabokovian argument for a strictly *positive* correlation (as opposed to the usual philistine claim for negative opposition) between extensive training and potential for creative innovation may be more familiar to scientists than to creative artists. But this crucial key to professional achievement must be actively promoted within science as well. Among less thoughtful scientists, we often encounter a different version of the phoney argument for dissociation of attention to detail and capacity for creativity — the fallacy embedded in Zaleski's statement (cited on p. 103) that Nabokov's obsessive love of detail made him a "laboratory drudge," even while opening prospects of greatness in literature.

The false (and unstated) view of mind that must lie behind this assertion — and that most supporters of the argument would reject if their unconscious allegiance were made explicit — assumes a fixed and limited amount of mental "stuff" for each intellect. Thus, if we assign too much of our total allotment to the mastery of detail, we will have nothing left for general theory and integrative wonder. But such a silly model of mental functioning can only arise from a false metaphorical comparison of human creativity with irrelevant systems based on fixed and filled containers — pennies in a piggy bank or cookies in a jar.

Many of the most brilliant and revolutionary theoreticians in the history of science have also been meticulous compilers of detailed evidence. Darwin developed his theory of natural selection in 1838, but prevailed because, when he finally published in 1859, he had also amassed the first credible factual compendium (overwhelming in thoroughness and diversity) for the evolutionary basis of life's history. (All previous evolutionary

systems, including Lamarck's, had been based on speculation, however cogent and complex the theoretical basis.) Many key discoveries emerged and prevailed because great theoreticians respected empirical details ignored by others. In the most familiar example, Kepler established the ellipticity of planetary orbits when he realized that Tycho Brahe's data yielded tiny discrepancies from circularity that most astronomers would have disregarded as "close enough" whereas Kepler knew that he could trust the accuracy of Tycho's observations.

I do not deny that some scientists see trees but not forests, thereby functioning as trustworthy experts of meticulous detail, but showing little interest or skill in handling more general, theoretical questions. I also do not deny that Nabokov's work on butterfly systematics falls under this rubric. But I strenuously reject the argument that Nabokov's attention to descriptive particulars, or his cherishing of intricate factuality, precluded strength in theory on principle. I do not understand Nabokov's psyche or his ontogeny well enough to speculate about his conservative approach to theoretical questions, or his disinclination to grapple with general issues in evolutionary biology. We can only, I suspect, intone some clichés about the world's breadth (including the domain of science), and about the legitimate places contained therein for people with widely divergent sets of skills.

I therefore strongly reject any attempt to characterize Nabokov as a laboratory drudge for his love of detail and his lack of attention to theoretical issues. The science of taxonomy has always honored, without condescension, professionals who develop Nabokov's dedication to the details of a particular group, and who establish the skills and "good eye" to forge order from nature's mire of confusing particulars. Yes, to be frank, if Nabokov had pursued only butterfly taxonomy as a complete career, he would now be highly respected in very limited professional circles, but not at all renowned in the world at large. But do we not honor the dedicated professional who achieves maximal excellence in an admittedly restricted domain of notoriety or power? After all, if Macbeth had been content to remain Thane of Cawdor — a perfectly respectable job — think of the lives and grief that would thus have been spared. But, of course, we would then have to lament a lost play. So let us celebrate Nabokov's excellence in natural history, and let us also rejoice that he could use the same mental skills and inclinations to follow another form of bliss.

IV. AN EPILOG ON SCIENCE AND LITERATURE

Most generously minded intellectuals (that is, I trust, most of us) favor a dialogue between professionals in science and the arts. But we also assume that these two subjects stand as polar opposites in the domain of learning, and that diplomatic contact for understanding between adversaries forms the major rationale for such a dialogue. At best, we hope to dissipate stereotypes and to become friends (or at least neutrals), able to put aside our genuine differences for temporary bonding in the practical service of a few broader issues demanding joint action by all educated folk.

A set of stereotypes still rules perceptions of "otherness" in these two domains — images based on little more than ignorance and parochial fear, but powerful nonetheless. Scientists are soulless dial-twirlers; artists are arrogant, illogical self-absorbed blowhards. Dialogue remains a good idea, but the two fields, and the personalities attracted to them, are truly and deeply different.

I do not wish to forge a false union in an artificial love feast. The two domains differ, truly and distinctly, in their chosen subject matter and established modes of validation. The magister-

ium (teaching authority) of science extends over the factual status of the natural world, and to the development of theories proposed to explain why these facts, and not others, characterize our universe. The magisteria of the arts and humanities treat ethical and aesthetic questions about morality, style and beauty. Since the facts of nature cannot, in logic or principle, yield ethical or aesthetic conclusions, the domains must remain formally distinct on these criteria.

But many of us who labor in both domains (if only as an amateur in one) strongly feel that an overarching mental unity builds a deeper similarity than disparate subject matter can divide. Human creativity seems to work much as a coordinated and complex piece, whatever the different emphases demanded by disparate subjects — and we will miss the underlying commonality if we only stress the distinctions of external subjects and ignore the unities of internal procedure. If we do not recognize the common concerns and characteristics of all creative human activity, we will fail to grasp several important aspects of intellectual excellence — including the necessary interplay of imagination and observation (theory and empirics) as an intellectual theme, and the confluence of beauty and factuality as a psychological theme — because one field or the other traditionally downplays one side of a requisite duality.

Moreover, as argued previously, we must use the method of "replication with difference" if we wish to study and understand the human quintessence behind our varying activities. I cannot imagine a better test case for extracting the universals of human creativity than the study of deep similarities in intellectual procedure between the arts and sciences.

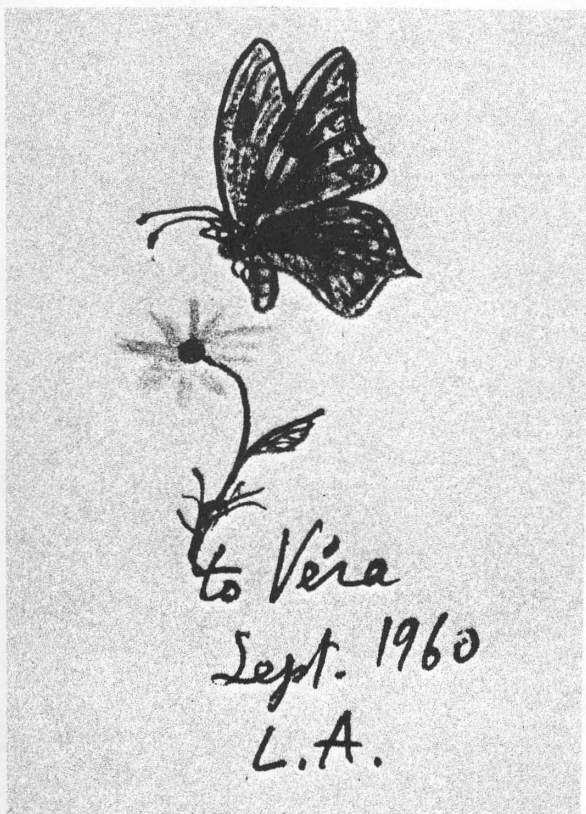


Fig. 2. Another title-page Nabokov drawing in the 1960 printing of his book, *The Real Life of Sebastian Knight*, as presented to his wife, Véra (from *Véra's Butterflies*, 1999).

No one grasped the extent of this underlying unity better than Vladimir Nabokov, who worked with different excellences as a complete professional in both domains. Nabokov often insisted that his literary and entomological pursuits shared a common mental and psychological ground. In *Ada*, while invoking a common anagram for "insect," one of Nabokov's characters beautifully expresses the oneness of creative impulse and the pervasive beauty of chosen subject matter: "If I could write," mused Demon, "I would describe, in too many words no doubt, how passionately, how incandescently, how incestuously — *cest le mot* — art and science meet in an insect."

Returning to his central theme of aesthetic beauty in both the external existence and our internal knowledge of scientific detail, Nabokov wrote in 1959: "I cannot separate the aesthetic pleasure of seeing a butterfly and the scientific pleasure of knowing what it is" (quoted in Zimmer p. 33). When Nabokov spoke of "the precision of poetry in taxonomic description" — no doubt with conscious intent to dissipate a paradox that leads most people to regard art and science as inexorably distinct and opposed — he used his literary skills in the service of generosity (a high, if underappreciated, virtue underlying all attempts to unify warring camps). He thus sought to explicate the common ground of his two professional worlds, and to illustrate the inevitably paired components of any integrated view that could merit the label of our oldest and fondest dream of fulfillment — the biblical ideal of "wisdom." Thus, in a 1966 interview, Nabokov broke the boundaries of art and science by stating that the most precious desideratum of each domain must also characterize any excellence in the other — for, after all, truth is beauty, and beauty truth. I could not devise a more fitting title for this essay, and I can imagine no better ending for this text:

The tactile delights of precise delineation, the silent paradise of the camera lucida, and the precision of poetry in taxonomic description represent the artistic side of the thrill which accumulation of new knowledge, absolutely useless to the layman, gives its first begetter . . . There is no science without fancy, and no art without facts.

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JOURNAL ABBREVIATIONS: Current Journals

The journals listed here include the more important ones covered in the annual literature listing for Lepidoptera. Abbreviations used are in the left column, with full names to the right. Journals on Lepidoptera or primarily Lepidoptera are noted with an asterisk (*). Current cities of publication are noted.

- Abh. Senck. Naturfor. Ges.*
Acta Agric. Boreal.-Occident. Sinica
Acta Biol. Hung.
Acta Biol. Paran.
Acta Ent. Bohem.
Acta Ent. Chil.
Acta Ent. Fenn.
Acta Ent. Mus. Natl. Prag.
Acta Ent. Serb.
Acta Ent. Sinica
Acta Soc. Biol. Bohemoslov.
Acta Zool. Acad. Sci. Hung.
Acta Zool. Bulg.
Acta Zool. Cracov.
Acta Zool. Fenn.
Acta Zool. Hung.
Acta Zool. Lillo.
Acta Zool. Lituan.
Acta Zootaxon. Sinica
Actias
Afr. Ent.
Alexanor
Amazon.
Amer. Butt.
Amer. Midland Nat.
Amer. Mus. Novit.
Amer. Nat.
An. Soc. Ent. Bras.
Anal. Inst. Patagonia
Anal. Soc. Cient. Arg.
Anim. Behav.
Ann. Carnegie Mus.
Ann. Ent. Soc. Amer.
Ann. Hist.-Nat. Mus. Natl. Hung.
Ann. Natal Mus.
Ann. Naturhist. Mus. Wien
Ann. Rev. Ecol. Syst.
Ann. Rev. Ent.
Ann. S. Afr. Mus.
Ann. Soc. Ent. Fr.
Ann. Soc. Roy. Zool. Belg.
Ann. Transvaal Mus.
Ann. Zool.
Appl. Ent. Zool.
Arch. Ins. Biochem. Physiol.
Arq. Inst. Biol.
Arq. Zool.
Atalanta
Aust. Ent. Mag.
Aust. Ent.
Aust. J. Ent.
Aust. J. Zool.
Behav.
Behav. Ecol.
Behav. Ecol. Sociobiol.
Beitr. Ent.
Biodiv. Conserv.
Biol. Conserv.
Biol. J. Linn. Soc.
Biosci.
Biotrop.
Bishop Mus. Occas. Pap.
Bool. Cient. Mus. Hist. Nat.
Bol. Ent. Venez.
Bol. Mus. Ent. Univ. Valle
Bol. Mus. Nac.
Bol. Mus. Nac. Hist. Nat. Parag.
Bol. Soc. Port. Cienc. Nat.
Bol. Soc. Port. Ent.
Bol. Zool.
Boll. Assoc. Rom. Ent.
Boll. Ist. Ent. Univ. Stud. Bologna
Boll. Lab. Ent. Agrar.
Boll. Lab. Ent. Agrar. Silv.
Boll. Mus. Civ. Stor. Nat. Venezia
Boll. Mus. Civ. Stor. Nat. Verona
Boll. Mus. Ist. Biol. Univ. Genova
Boll. Soc. Ent. Ital.
Boll. Soc. Hist. Nat. Balears
Boll. Soc. Nat. Napoli
Boll. Zool. Agrar. Bach.
Brenesia
Brit. J. Ent. Nat. Hist.
Bull. Allyn Mus.
Bull. Amer. Mus. Nat. Hist.
Bull. Ann. Soc. Roy. Ent. Belg.
Bull. Br. Mus. (Nat. Hist.), Ent.
Bull. Calif. Ins. Surv.
Bull. Carnegie Mus.
Bull. Ent. Res.
Bull. Ent. Soc. Egypt
Bull. Mus. Comp. Zool.
Bull. Mus. Natl. Hist. Nat.
- Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft, Frankfurt-am-Main, Germany*
Acta Agricultura Borealis-Occidentalis Sinica, Yangling, Shaanxi, China
Acta Biologica Hungarica, Budapest, Hungary
Acta Biologica Paranaense, Curitiba, Paraná, Brazil
Acta Entomologica Bohemoslovaca, Prague, Czech Republic
Acta Entomologica Chilena, Santiago, Chile
Acta Entomologica Fennica, Helsinki, Finland
Acta Entomologica Musei Nationalis Pragae, Prague, Czech Republic
Acta Entomologica Serbica, Belgrad, Yugoslavia
Acta Entomologica Sinica, Beijing, China
Acta Societatis Zoologicae Bohemoslovacae, Munich, Germany
Acta Zoologica Academiae Scientiarum Hungaricae, Budapest, Hungary
Acta Zoologica Bulgarica, Sofia, Bulgaria
Acta Zoologica Cracoviensia, Kraków, Poland
Acta Zoologica Fennica, Helsinki, Finland
Acta Zoologica Hungarica, Budapest, Hungary
Acta Zoologica Lilloana, Tucuman, Argentina
Acta Zoologica Lituanica, Vilnius, Lithuania
Acta Zootaxonomica Sinica, Beijing, China
- * *Actias, Russian Journal of Scientific Lepidopterology, Moscow, Russia*
African Entomologist, Pretoria, South Africa
- * *Alexanor, Revue Française de Lépidoptérologie, Paris, France*
Amazoniana (Limnologia et Oecologia Regionalis Systematis Fluminis Amazonas), Plön, Germany
- * *American Butterflies, Chappaqua, New York, USA*
American Midland Naturalist, Notre Dame, Indiana, USA
American Museum Novitates, New York, New York, USA
American Naturalist, Chicago, Illinois, USA
Anais da Sociedade Entomológica do Brasil, Itabuna, Brazil
Anales del Instituto de la Patagonia, Punta Arenas, Argentina
Anales de la Sociedad Científica Argentina, Buenos Aires, Argentina
Animal Behaviour, London, England
Annals of the Carnegie Museum, Pittsburgh, Pennsylvania, USA
Annals of the Entomological Society of America, Lanham, Maryland, USA
Annales Historico-Naturales Musei Nationalis Hungarici, Budapest, Hungary
Annals of the Natal Museum, Pietermaritzburg, South Africa
Annalen des Naturhistorischen Museums in Wien, Vienna, Austria
Annual Review of Ecology and Systematics, Palo Alto, California, USA
Annual Review of Entomology, Palo Alto, California, USA
Annals of the South African Museum, Cape Town, South Africa
Annals de la Société Entomologique de France, Paris, France
Annales de la Société Royale Zoologique de Belgique, Brussels, Belgium
Annals of the Transvaal Museum, Pretoria, South Africa
Annales Zoologici, Warsaw, Poland
Applied Entomology and Zoology, Tokyo, Japan
Archives of Insect Biochemistry and Physiology, New York, New York, USA
Arquivos de Instituto Biológico, São Paulo, Brazil
Arquivos de Zoologia, São Paulo, Brazil
- * *Atalanta, Munich, Germany*
Australian Entomological Magazine, Indooroopilly, Queensland, Australia
Australian Entomologist, Brisbane, Queensland, Australia
Australian Journal of Entomology, Carlton, Victoria, Australia
Australian Journal of Zoology, Melbourne, NSW, Australia
Behaviour, Leiden, Netherlands
Behavioral Ecology, Cary, Indiana, USA
Behavioral Ecology and Sociobiology, Berlin, Germany
Beiträge zur Entomologie, Berlin, Germany
Biodiversity and Conservation, London, England, UK
Biological Conservation, Oxford, England, UK
Biological Journal of the Linnean Society, London, England, UK
Bioscience, Washington, DC, USA
Biotropica, Lawrence, Kansas, USA
Bishop Museum Occasional Papers, Honolulu, Hawaii, USA
Boletín Científico, Museo de Historia Natural, Universidad de Caldas, Manizales, Colombia
Boletín de Entomología Venezolana, Maracay, Venezuela
Boletín de Museo Entomología de Universidad del Valle, Cali, Colombia
Boletim do Museu Nacional, Rio de Janeiro, Brazil
Boletín del Museo Nacional de Historia Natural del Paraguay, San Lorenzo, Paraguay
Boletim da Sociedade Portuguesa de Ciências Naturais, Lisbon, Portugal
Boletim da Sociedade Portuguesa de Entomologia, Lisbon, Portugal
Boletim de Zoologia, São Paulo, Brazil
Bollettino Associazione Romana di Entomologia, Rome, Italy
Bollettino dell'Istituto di Entomologia della Università degli Studi di Bologna, Bologna, Italy
Bollettino del Laboratorio di Entomologia Agraria, Portici, Italy
Bollettino del Laboratorio di Entomologia Agraria Filippo Silvestri, Naples, Italy
Bollettino del Museo Civico di Storia Naturale di Venezia, Venice, Italy
Bollettino del Museo Civico di Storia Naturale di Verona, Verona, Italy
Bollettino del Museo e degli Istituti Biologici dell'Università di Genova, Genoa, Italy
Bollettino della Società Entomologica Italiana, Genoa, Italy
Bolleti de la Societat d'Història Natural de les Balears, Palma de Mallorca, Spain
Bollettino della Società dei Naturalisti in Napoli, Naples, Italy
Bollettino di Zoologia Agraria e di Bachicoltura, Milan, Italy
Brenesia, San Jose, Costa Rica
British Journal of Entomology and Natural History Reading, England, UK
- * *Bulletin of the Allyn Museum, Sarasota, Florida, USA*
Bulletin of the American Museum of Natural History, New York, New York, USA
Bulletin et Annales de la Société Royale Entomologique de Belgique, Brussels, Belgium
Bulletin of the British Museum (Natural History), Entomology Series, London, England, UK
Bulletin of the California Insect Survey, Berkeley, California, USA
Bulletin of the Carnegie Museum of Natural History, Pittsburgh, Pennsylvania, USA
Bulletin of Entomological Research, London, England, UK
Bulletin of the Entomological Society of Egypt, Cairo, Egypt
Bulletin of the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA
Bulletin du Museum National d'Histoire Naturelle, Paris, France

- Bull. Otsuma Wom. Univ., Home Econ.*
Bull. Soc. Ent. Fr.
Caldasia
Can. Ent.
Can. J. Zool.
Carib. J. Sci.
Carolinea
Chin. J. Ent.
Chromosome Sci.
Ciencia Agrotecn.
Cryobiol.
Curr. Biol.
Ecography
Ecol. Appl.
Ecol. Austral.
Ecol. Ent.
Ecol. Monog.
Ecosci.
Ecosyst.
Ent.
Ent.
Ent.
Ent. Abh.
Ent. Ber.
Ent. Exp. Appl.
Ent. Fenn.
Ent. Gaz.
Ent. Gen.
Ent. Medd.
Ent. News
Ent. News Russia
Ent. Meddel.
Ent. Mon. Mag.
Ent. Nachr. Ber.
Ent. Nachr. Bl.
Ent. Obozr.
Ent. Rec. J. Var.
Ent. Rev.
Ent. Roman.
Ent. Scand.
Ent. Sci.
Ent. Sinica
Ent. Tidskr.
Ent. Zeit.
Entomofaun.
Entomon
Entomophaga
Entomotaxon.
Environ. Conserv.
Environ. Ecol. Stat.
Envir. Ent.
EOS Revta. Esp. Ent.
Esper.
Euphytica
Eur. J. Ent.
Evol.
Evol. Biol.
Evol. Ecol.
Evol. Monog.
Facetta
Far East. Ent.
Faun. Abh.
Faun. Ent. Scand.
Faun. Norv.
Faun. Sinica
*Florida Dept. Agric. Consumer Serv.,
 Div. Plant Indus., Ent. Circ.*
Florida Ent.
Fla. Sci.
Foo. Biol. (Prague)
Foo. Biol. (Warsaw)
Fol. Ent. Hung.
Fol. Ent. Mex.
Frag. Ent.
Frag. Faun.
Frust. Ent.
Functional Ecol.
Galathea
Gayana Zool.
Genus
Giorn. Ital. Ent.
Global Ecol. Biogeog. Lett.
Graellsia
Gt. Basin Nat.
Gt. Lakes Ent.
Herbipol.
Heredity
Holarctic Lepid.
Indian J. Sericult.
Ins. Biochem. Molecular Biol.
Ins. Helv. Faun.
Ins. Koreana
Ins. Mais.
Ins. Molecular Biol.
Ins. Mundi
Ins. Norv.
Int. J. Ins. Morphol. Embryol.
Invert. Neurosci.
Invert. Taxon.
- Bulletin of the Otsuma Women's University, Home Economics, Tokyo, Japan*
Bulletin de la Société Entomologique de France, Paris, France
Caldasia, Museo de Historia Natural, Universidad Nacional de Colombia, Bogotá, Colombia
Canadian Entomologist, Ottawa, Canada
Canadian Journal of Zoology, Ottawa, Canada
Caribbean Journal of Science, Mayagüez, Puerto Rico, USA
Carolinea, Karlsruhe, Germany
Chinese Journal of Entomology, Taipei, Taiwan
Chromosome Science, Hiroshima, Japan
Ciencia e Agrotecnologia, Lavras, Brazil
Cryobiology, Orlando, Florida, USA
Current Biology, London, England, UK
Ecography, Copenhagen, Denmark
Ecological Applications, Tempe, Arizona, USA
Ecologia Austral, Buenos Aires, Argentina
Ecological Entomology, London, England
Ecological Monographs, Tempe, Arizona, USA
Ecoscience, Quebec, Canada
Ecosystems, New York, New York, USA
Entomologica, Bari, Italy
Entomologist, London, England, UK
l'Entomologiste, Paris, France
Entomologische Abhandlungen, Dresden, Germany
Entomologische Berichten, Amsterdam, Netherlands
Entomologia Experimentalis et Applicata, Amsterdam, Netherlands
Entomologica Fennica, Helsinki, Finland
 * *Entomologists' Gazette, Wallingford, England, UK*
Entomologia Generalis, Stuttgart, Germany
Entomologiske Meddelelser, Copenhagen, Denmark
Entomological News, Philadelphia, Pennsylvania, USA
Entomological News from Russia, Saratov, Russia
Entomologiske Meddelelser, Copenhagen, Denmark
Entomologists' Monthly Magazine, Wallingford, England, UK
Entomologische Nachrichten und Berichte, Dresden, Germany
Entomologische Nachrichtenblatt, Vienna, Austria
Entomologicheskoe Obozrenie, Moscow, Russia
 * *Entomological Record and Journal of Variation, Surrey, England, UK*
Entomological Review, New York, New York, USA (English translation of Ent. Obozr.)
Entomologica Românica, Cluj, Romania
Entomologica Scandinavica, Copenhagen, Denmark
Entomological Science, Tokyo, Japan
Entomologica Sinica, Beijing, China
Entomologisk Tidskrift, Stockholm, Sweden
Entomologische Zeitschrift, Frankfurt-am-Main, Germany
Entomofauna, Munich, Germany
Entomon, Trivandrum, India
Entomophaga, Paris, France
Entomotaxonomia, Yangling, Shaanxi, China
Environmental Conservation, Cambridge, England, UK
Environmental and Ecological Statistics, London, England, UK
Environmental Entomology, Lanham, Maryland, USA
EOS Revista Española de Entomología, Madrid, Spain
Esperiana, Schwanfeld, Germany
Euphytica, Dordrecht, Netherlands
European Journal of Entomology, České Budějovice, Czech Republic
Evolution, Lawrence, Kansas, USA
Evolutionary Biology, New York, New York, USA
Evolutionary Ecology, London, England, UK
Evolutionary Monographs, Chicago, Illinois, USA
 * *Facetta, Ingolstadt, Germany*
Far Eastern Entomologist, Vladivostok, Russia
Faunistische Abhandlungen, Dresden, Germany
Fauna Entomologica Scandinavica, Leiden, Netherlands
Fauna Norvegica, Trondheim, Norway
Fauna Sinica, Beijing, China
*Florida Dept. of Agriculture and Consumer Services, Division of Plant Industry, Entomology
 Circular, Gainesville, Florida, USA*
Florida Entomologist, Gainesville, Florida, USA
Florida Scientist, Orlando, Florida, USA
Folia Biologica (Prague)
Folia Biologica (Warsaw)
Folia Entomologica Hungarica, Budapest, Hungary
Folia Entomologica Mexicana, Xalapa, Veracruz, Mexico
Fragmenta Entomologica, Rome, Italy
Fragmenta Faunistica, Warsaw, Poland
Frustula Entomologica, Pisa, Italy
Functional Ecology, Oxford, England, UK
 * *Galathea, Nuremberg, Germany*
Gayana Zoologia, Concepción, Chile
Genus, Wrocław, Poland
Giornale Italiano di Entomologia, Cremona, Italy
Global Ecology and Biogeography Letters, Oxford, England, UK
Graellsia, Madrid, Spain
Great Basin Naturalist, Provo, Utah, USA (see W. N. Amer. Nat.)
Great Lakes Entomologist, East Lansing, Michigan, USA
 * *Herbipolitana, Markt-leuthen, Germany*
Heredity, Oxford, England, UK
 * *Holarctic Lepidoptera, Gainesville, Florida, USA*
Indian Journal of Sericulture, Mysore, India
Insect Biochemistry and Molecular Biology, Oxford, England, UK
Insecta Helvetica Fauna, Geneva, Switzerland
Insecta Koreana, Chuncheon, South Korea
Insecta Matsumurana, Sapporo, Japan
Insect Molecular Biology, Oxford, England, UK
Insecta Mundi, Gainesville, Florida, USA
Insecta Novogiae, As, Norway
International Journal of Insect Morphology and Embryology, Oxford, England, UK
Invertebrate Neuroscience, Sheffield, England, UK
Invertebrate Taxonomy, Canberra, ACT, Australia

- Japan Heteroc. J.*
Japan. J. Appl. Ent. Zool.
Japan. J. Ent.
J. Agric. Ent.
J. Anim. Ecol.
J. Appl. Ecol.
J. Appl. Ent.
J. Asia-Pac. Ent.
J. Aust. Ent. Soc.
J. Biogeog.
J. Bombay Nat. Hist. Soc.
J. Chem. Ecol.
J. Econ. Ent.
J. Ent. Sci.
J. Ent. Soc. Br. Colum.
J. Ethol.
J. Evol. Biol.
J. Exp. Biol.
J. Heredity
J. Ins. Behav.
J. Ins. Conserv.
J. Ins. Physiol.
J. Ins. Sci.
J. Kansas Ent. Soc.
J. Lepid. Soc.
J. Lepid. Soc. Korea
J. Molecular Evol.
J. New York Ent. Soc.
J. Nat. Hist.
J. NW. For. Coll.
J. Res. Lepid.
J. Sericult. Sci. Japan
J. Taiwan Mus.
J. Trop. Ecol.
J. Ukrain. Ent. Soc.
J. Zool.
Korean J. Appl. Ent.
Korean J. Ent.
Korean J. Syst. Zool.
Korean J. Zool.
Lambill.
Lepid.
Lepid. J.
Lepid. News
Linn. Belg.
Mariposas Mundo
Maryland Ent.
Medical Ent. Zool.
Melanargia
Mem. Amer. Ent. Soc.
Mem. Ent. Soc. Can.
Mem. Ent. Soc. India
Mem. Ent. Soc. S. Afr
Mem. Natl. Sci. Mus.
Mem. Soc. Ent. Ital.
Misc. Fund. Lillo
Misc. Zool.
Misc. Zool. Hung.
Mitt. Ent. Ges. Basel
Mitt. Ent. Ver. Stuttgart
Mitt. Münch. Ent. Ges.
Mitt. Thür. Ent.
Mitt. Zool. Mus. Berl.
Molecular Biol. Evol.
Molecular Phylogenet. Evol.
Nachr. Ent. Ver. Apollo
NachrBl. Bayer. Ent.
Nature
Nat. Conserv. Qtr.
Nat. Croat.
Nat. Hist.
Nat. Hist. Mus. Los Angeles Co. Sci. Ser.
Natl. Geog. Mag.
Naturwiss.
Naturwiss. Rundsch.
NE. Nat.
Neue Ent. Nachr.
New Zealand Ent.
News Lepid. Soc.
N. Carolina Agric. Res. Serv., Tech. Bull.
Nota Lepid.
Nouv. Rev. Ent.
Nova Suppl. Ent.
Novon
NW. Nat.
Occas. Pap. Calif. Acad. Sci.
Occas. Pap. Ent.
Occas. Pap. Florida St. Colln. Arth.
Occas. Pap. Syst. Ent.
Oecolog.
Oecolog. Mont.
Oedippus
Oikos
Opusc. Ent.
Opusc. Zool. Flumin.
Oriental Ins.
Pacific Conserv. Biol.
Pan-Pac. Ent.
Papilio
- * *Japan Heterocerists' Journal*, Tokyo, Japan
Japanese Journal of Applied Entomology and Zoology, Tokyo, Japan
Japanese Journal of Entomology, Tokyo, Japan
Journal of Agricultural Entomology, Clemson, South Carolina, USA
Journal of Animal Ecology, Oxford, England, UK
Journal of Applied Ecology, Oxford, England, UK
Journal of Applied Entomology, Hamburg, Germany
Journal of Asia-Pacific Entomology, Seoul, South Korea
Journal of the Australian Entomological Society, Canberra, Australia [see *Austr. J. Ent.*]
Journal of Biogeography, Hull, Ontario, Canada
Journal of the Bombay Natural History Society, Bombay, India
Journal of Chemical Ecology, New York, New York, USA
Journal of Economic Entomology, Lanham, Maryland, USA
Journal of Entomological Science, Tifton, Georgia, USA (formerly *J. Ga. Ent. Soc.*)
Journal of the Entomological Society of British Columbia, Victoria, Canada
Journal of Ethology, Kyoto, Japan
Journal of Evolutionary Biology, Basel, Switzerland
Journal of Experimental Biology, Cambridge, England, UK
Journal of Heredity, Cary, Indiana, USA
Journal of Insect Behavior, New York, New York, USA
Journal of Insect Conservation, Dordrecht, Netherlands
Journal of Insect Physiology, Oxford, England, UK
Journal of Insect Science, Ludhiana, India
Journal of the Kansas Entomological Society, Lawrence, Kansas, USA
 * *Journal of the Lepidopterists' Society*, Los Angeles, California, USA
 * *Journal of the Lepidopterists' Society of Korea*, ??
Journal of Molecular Evolution, Berlin, Germany
Journal of the New York Entomological Society, New York, New York, USA
Journal of Natural History, London, England, UK
Journal of the Northwest Forestry College, Yangling, Shaanxi, China
 * *Journal of Research on the Lepidoptera*, Beverly Hills, California, USA
Journal of Sericultural Science of Japan, Ibaraki, Japan
Journal of the Taiwan Museum, Taipei, Taiwan
Journal of Tropical Ecology, Cambridge, England, UK
Journal of the Ukrainian Entomological Society, Kiev, Ukraine
Journal of Zoology, London, England, UK
Korean Journal of Applied Entomology, Suwon, South Korea
Korean Journal of Entomology, Seoul, South Korea
Korean Journal of Systematic Zoology, Seoul, South Korea
Korean Journal of Zoology, Seoul, South Korea
 * *Lambillionea*, Tervuren, Belgium
 * *Lepidoptera*, Copenhagen, Denmark
 * *Lepidopterists' Journal*, Quebec, Canada
Lepidoptera News, Gainesville, Florida, USA (formerly *Tropical Lepidoptera News*)
 * *Linneana Belgica*, Beersel, Belgium
 * *Mariposas Mundo*, Buenos Aires, Brazil
The Maryland Entomologist, Baltimore, Maryland, USA
Medical Entomology and Zoology, Tokyo, Japan
 * *Melanargia*, Düsseldorf, Germany
Memoirs of the American Entomological Society, Philadelphia, Pennsylvania, USA
Memoirs of the Entomological Society of Canada, Ottawa, Canada
Memoirs of the Entomological Society of India, New Delhi, India
Memoirs of the Entomological Society of South Africa, Pretoria, South Africa
Memoirs of the National Science Museum, Tokyo, Japan
Memorie della Società Entomologica Italiana, Genoa, Italy
Miscelanea, Fundación Miguel Lillo, Tucuman, Argentina
Miscellanea Zoológica, Barcelona, Spain
Miscellanea Zoologica Hungarica, Budapest, Hungary
Mitteilungen der Entomologischen Gesellschaft Basel, Basel, Switzerland
Mitteilungen Entomologischer Verein Stuttgart, Stuttgart, Germany
Mitteilungen Münchener Entomologischen Gesellschaft, Munich, Germany
Mitteilungen des Thüringer Entomologenverbandes, Kranichfeld, Germany
Mitteilungen aus dem Zoologischen Museum in Berlin, Berlin, Germany
Molecular Biology and Evolution, Chicago, Illinois, USA
Molecular Phylogenetics and Evolution, Orlando, Florida, USA
 * *Nachrichten des Entomologischen Verein Apollo*, Frankfurt, Germany
Nachrichtenblatt Bayerische Entomologen, Munich, Germany
Nature, London, England, UK
Nature Conservation Quarterly, Chin-Chin, Taiwan
Natura Croatica, Zagreb, Croatia
Natural History, New York, New York, USA
Natural History Museum of Los Angeles County, Science Series, Los Angeles, California, USA
National Geographic Magazine, Washington, DC, USA
Naturwissenschaften, Berlin, Germany
Naturwissenschaftliche Rundschau, Stuttgart, Germany
Northeast Naturalist, Steuben, Maine, USA
 * *Neue Entomologische Nachrichten*, Markt-leuthen, Germany
New Zealand Entomologist, Auckland, New Zealand
News of the Lepidopterists' Society, Los Angeles, California, USA
North Carolina Agricultural Research Service, Technical Bulletin, Raleigh, North Carolina, USA
 * *Nota Lepidopterologica*, Basel, Switzerland
Nouvelle Revue d'Entomologie, Paris, France
Nova Supplementa Entomologica, Berlin, Germany
Novon, St. Louis, Missouri, USA
Northwestern Naturalist, Olympia, Washington, USA
Occasional Papers, California Academy of Sciences, San Francisco, California, USA
Occasional Papers in Entomology, California Dept. of Food & Agric., Sacramento, California, USA
Occasional Papers of the Florida State Collection of Arthropods, Gainesville, Florida, USA
Occasional Papers on Systematic Entomology, Natural History Museum, London, England, UK
Oecologia, Berlin, Germany
Oecologia Montana, Brno, Czech Republic
 * *Oedippus*, Schweinfurt, Germany
Oikos, Copenhagen, Denmark
Opuscula Entomologica, Lund, Sweden
Opuscula Zoologica Fluminensium, Flumserberg, Switzerland
Oriental Insects, Gainesville, Florida, USA
Pacific Conservation Biology, Chipping Norton, NSW, Australia
Pan-Pacific Entomologist, San Francisco, California, USA
 * *Papilio* (new series), Lakewood, Colorado, USA

- Phegea*
Physiol. Ent.
Phytoparasit.
Plant Prot. Sci.
Polsk. Pismo Ent.
Prairie Nat.
Proc. Acad. Nat. Sci. Phila.
Proc. Denver Mus. Nat. Hist.
Proc. Ent. Soc. Washington
Proc. Haw. Ent. Soc.
Proc. Roy. Soc. Lond.
Proc. Zool. Inst. Russ. Acad. Sci.
Psyche
Quadrifina
Rec. Zool. Surv. India
Redia
Rep. Mus. Nat. Hist. Univ. Wisc.
Restor. Ecol.
Revta. Biol. Trop.
Revta. Bras. Biol.
Revta. Bras. Ent.
Revta. Bras. Zool.
Revta. Chil. Ent.
Revta. Chil. Hist. Nat.
Revta. Colomb. Ent.
Revta. Nicar. Ent.
Revta. Peru. Ent.
Revta. Rom. Ent.
Revta. Soc. Ent. Arg.
Rev. Fr. Ent.
Sci.
Sci. Amer.
Senckenberg. Biol.
SHLAP Revta. Lepid.
Smithson. Contr. Zool.
So. Lepid. News
SW. Ent.
Sp. Diversity
Spixiana
Stapfia
Steenstrup.
Stud. Neotrop. Fauna Environ.
SW. Nat.
Syst. Ent.
Taxon. Rep.
Theses Zool.
Tijds. Ent.
Tinea
Toxicon
Trans. Amer. Ent. Soc.
Trans. Lepid. Soc. Japan
Transvaal Mus. Bull.
Trav. Mus. Hist. Nat. G. Antipa
Trop. Lepid.
Trop. Sci.
Trop. Zool.
Univ. Calif. Publ. Ent.
Verh. Dtsch. Zool. Ges.
Verh. K. Ned. Akad. Wet. Afrd. Natuurk.
Verh. Naturwiss. Ver. Hamburg
Verh. Zool.-Bot. Ges. Österr.
Veröff. Naturhist. Mus. Basel
Veröff. Naturhist. Mus. Wien
Veröff. Tirol. Landesmus. Ferdinand.
Vest. Zool.
Vlinders
W. N. Amer. Nat.
Yadoriga
Yugato
Zborn. Sloven. Narod. Muz.
Zeit. Arbeitsgem. Österr. Ent.
Zool. Abh.
Zool. Anz.
Zool. Beitr.
Zool. Bijdr.
Zool. Jahrb., Syst. Oekol. Geog. Tiere
Zool. Jahrb., Zool. Physiol. Tiere
Zool. J. Linn. Soc.
Zool. Meded.
Zool. Polon.
Zool. Res.
Zool. Stud.
Zool. Verh.
Zool. Zhurn.
Zoologica
Zoomorph.
- * *Phegea*, Antwerp, Belgium
Physiological Entomology, London, England, UK
Phytoparasitica, Rehovot, Israel
Plant Protection Science, Brno, Czech Republic
Polski Pismo Entomologica, Warsaw, Poland
Prairie Naturalist, Grand Forks, North Dakota, USA
Proceedings of the Academy of Natural Sciences of Philadelphia, Philadelphia, Pennsylvania, USA
Proceedings of the Denver Museum of Natural History, Denver, Colorado, USA
Proceedings of the Entomological Society of Washington, Washington, DC, USA
Proceedings of the Hawaiian Entomological Society, Honolulu, Hawaii, USA
Proceedings of the Royal Society of London, London, England, UK
Proceedings of the Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia
Psyche, Cambridge, Massachusetts, USA
 * *Quadrifina*, Vienna, Austria
Records of the Zoological Survey of India, Calcutta, India
Redia, Florence, Italy
Reports of the Museum of Natural History, University of Wisconsin, Stevens Point, Wisconsin, USA
Restoration Ecology, Malden, Massachusetts, USA
Revista de Biologia Tropical, San Jose, Costa Rica
Revista Brasileira de Biologia, Rio de Janeiro, Brazil
Revista Brasileira de Entomologia, São Paulo, Brazil
Revista Brasileira de Zoologia, Curitiba, Brazil
Revista Chilena de Entomologia, Santiago, Chile
Revista Chilena de Historia Natural, Santiago, Chile
Revista Colombiana Entomologia, Bogota, Colombia
Revista Nicaraguense de Entomologia, León, Nicaragua
Revista Peruana de Entomologia, Lima, Peru
 * *Revista Românica Entomologica*, Cluj, Romania
Revista de Sociedad Entomologica de Argentina, La Plata, Argentina
Revue Française d'Entomologie, Paris, France
Science, Washington, DC, USA
Scientific American, New York, New York, USA
Senckenbergiana Biologica, Frankfurt-am-Main, Germany
 * *Sociedad Hispano-Luso-Americana de Lepidopterologia*, *Revista de Lepidopterologia*, Madrid, Spain
Smithsonian Contributions to Zoology, Washington, DC, USA
Southern Lepidopterists' News, Gainesville, Florida, USA
Southwestern Entomologist, Dallas, Texas, USA
Species Diversity, Sapporo, Japan
Spixiana, Zeitschrift für Zoologie, Zoologische Staatssammlung München, Munich, Germany
Stapfia, Linz, Austria
Steenstrupia, Copenhagen, Denmark
Studies on Neotropical Fauna and Environment, Lisse, Netherlands
Southwestern Naturalist, San Marcos, California, UK
Systematic Entomology, London, England, UK
 * *Taxonomic Report*, Goose Creek, South Carolina, USA
Theses Zoologicae, Königstein, Germany
Tijdschrift voor Entomologia, Amsterdam, Netherlands
 * *Tinea* (Japan Heterocerists' Society), Tokyo, Japan
Toxicon, Oxford, England, UK
Transactions of the American Entomological Society, Philadelphia, Pennsylvania, USA
 * *Transactions of the Lepidopterists' Society of Japan*, Tokyo, Japan (formerly *Tyô to Ga*, Osaka)
Transvaal Museum Bulletin, Pretoria, South Africa
Travaux du Muséum d'Histoire Naturelle "Grigore Antipa", Bucharest, Romania
 * *Tropical Lepidoptera*, Gainesville, Florida, USA
Tropical Science, Letchworth, England, UK
Tropical Zoology, Florence, Italy
University of California Publications in Entomology, Berkeley, California, USA
Verhandlungen der Deutschen Zoologischen Gesellschaft, Stuttgart, Germany
Verhandelingen van de Koninklijke Nederlandse Academie van Wetenschappen, Afd. Natuurkunde, Amsterdam, Netherlands
Verhandlungen des Naturwissenschaftlichen Vereins in Hamburg, Hamburg, Germany
Verhandlungen der Zoologisch-Botanischen Gesellschaft in Österreich, Vienna, Austria
Veröffentlichungen aus dem Naturhistorisches Museum Basel, Basel, Switzerland
Veröffentlichungen aus dem Naturhistorisches Museum Wien, Vienna, Austria
Veröffentlichungen des Tiroler Landesmuseum Ferdinandeum, Innsbruck, Austria
Vestnik Zoologii, Kiev, Ukraine
 * *Vlinders*, Wageningen, Netherlands
Western North American Naturalist, Provo, Utah, USA (formerly *Gt. Basin Nat.*)
 * *Yadoriga*, Tokyo, Japan
 * *Yugato*, Niigata, Japan
Zbornik Slovenského Národného múzea, Bratislava, Slovakia
Zeitschrift der Arbeitsgemeinschaft Österreichischer Entomologen, Vienna, Austria
Zoologische Abhandlungen, Dresden, Germany
Zoologischer Anzeiger, Jena, Germany
Zoologische Beiträge, Berlin, Germany
Zoologische Bijdragen, Leiden, Netherlands
Zoologische Jahrbücher, Abt. für Systematik, Oekologie und Geographie der Tiere, Jena, Germany
Zoologische Jahrbücher, Abt. für allgemeine Zoologie und Physiologie der Tiere, Jena, Germany
Zoological Journal of the Linnean Society, London, England, UK
Zoologische Mededelingen, Nationaal Natuurhistorisch Museum, Leiden, Netherlands
Zoologica Poloniae, Warsaw, Poland
Zoological Research, Beijing, China
Zoological Studies, Taipei, Taiwan
Zoologische Verhandlungen, Nationaal Natuurhistorisch Museum, Leiden, Netherlands
Zoologicheskij Zhurnal, Moscow, Russia
Zoologica, Stuttgart, Germany
Zoomorphology, Berlin, Germany

BOOK NEWS

GEOMETRID MOTHS OF THE WORLD:

A Catalogue (Lepidoptera, Geometridae)

edited by M. Scoble. 1999. CSIRO, Collingwood, Australia. 2 vol. (1,016pp + 129pp + 129pp) (21 x 30cm). \$295.00 cloth (+ CD-ROM).

This new catalog documents the world fauna of described species of the family Geometridae. The family had been partially cataloged prior to World War II in the first *Lepidopterorum Catalogus* series, but this was never completed. The present work is a massive (ca. 12 pounds) compilation in two large volumes, plus a CD-ROM to all the names. The catalog is alphabetical for valid genera and species, with all recognized synonyms listed under each genus or species name. Items lacking include misspellings, emendations, and all infraspecific names. The CD offers an index listing (and a few photos), plus 3 separate files that contain the repetitive statement that the book is copyrighted by the British Museum.

FORESTER MOTHS

by K. A. Efetov and G. M. Tarmann 1999. Apollo Books, Stenstrup, Denmark. 192pp (13 pl) (17 x 24cm). DK 520 (ca. \$68.00) cloth.

This revision of European burnet moths (called forester moths in Europe but Agastinae noctuids are called forester moths in the USA) treats the small green species found in Europe to Central Asia, the genera *Theresimima*, *Rhagades*, *Jordanita*, and *Adscita*. The present book includes a review of the subfamily Procrinae (the only subfamily treated in this work), a checklist, and taxonomic notes for all 63 species treated in the 4 genera covered. Two new subgenera are described, plus new lectotypes are given for 17 species. There are keys to all species.

MICROLEPIDOPTERA OF EUROPE. 3. GELECHIIDAE I

(*Gelechiinae: Teleiodini, Gelechiini*)

by P. Huemer and O. Karsholt. 1999. Apollo Books, Stenstrup, Denmark. 356pp (14 pl.) (17 x 24cm). DK 580 (ca. \$75.00) cloth.

This continuation of the *Microlepidoptera of Europe* series, presents us with a treatment of the first part of the Gelechiidae. This new work on Gelechiidae is the third in the series and treats 151 species. Coverage is for the western Palearctic: Europe to the Urals, plus adjacent areas like Turkey and North Africa, with some species ranging to Central Asia. All species are illustrated on the color plates of adults, plus male and female genitalia are also figured on the genitalia plates (302 halftone fig.). This revision of the tribes Teleiodini and Gelechiini for Europe includes descriptions of 10 new species.

THE LIFE HISTORIES OF THE TAIWANESE THECLINI

by H. Uchida. 1999. Numazu, Japan. 208pp (80 color pl.) (20 x 30cm). ¥19,000 (ca. \$190) cloth (boxed).

This large-format book treats in detail the life histories of 25 of the 66 thecline Lycaenidae known for Taiwan. The book begins with 80 exceptional sharp and clear color pages showing the transformation and habitats of each of the species treated, along with figures of museum specimens of both sexes. Mixed in with the life history and habitat photos are occasional tourist photographs of scenery in Taiwan. The text is entirely in Japanese; in fact, there is not a word of English in the entire book or cover, except for the title in micro-print English along with the publication credits on the last page of the book. Latin names of the butterflies are given at each species heading. In addition to the color plates, there is text for each species, plus a travelog section.

THE WESTERN PALAEARCTIC ZYGAENIDAE (*Lepidoptera*)

by C. M. Naumann, G. M. Tarmann, and W. G. Tremewan. 1999. Apollo Books, Stenstrup, Denmark. 304pp (12 pl) (17 x 24cm). DK 600 (ca. \$78.00) cloth.

This review of European burnet moths (called forester moths in Europe) treats all known species in the European region, including North Africa and Turkey. The day-flying moths of the genus *Zygaena* have been under especially intensive study over the past 100 years, particularly due to their bewildering genetic make-up and ecological plasticity which has produced many hundreds of color forms even within any one species. The result has been a huge number of subspecies and form names being proposed. Fortunately, this new book makes sense of all the data on European burnets. The text treats 116 valid species.

THE BUTTERFLIES OF SAKHALIN IN NATURE

by J. Asahi, S. Kanda, M. Kawata, and Y. Kohara. 1999. Hokkaido Shimbun Press, Sapporo, Japan. 310pp, foldout map (15 x 21cm). ¥3200 (ca. \$32) paper.

Books on butterflies from Japan are mostly written entirely in Japanese, so this first modern guidebook to the butterflies of Sakhalin Island, north of Japan, has some welcome English in the text. There are English figure caption notes, plus range, habitat, flight period, and hostplant information summarized in English at the end of each species treatment. The authors present the results of 10 years study of the Sakhalin butterfly fauna. The guidebook is full color: all butterflies are illustrated from museum specimens in the text, plus some taken in nature at the beginning of the book. There are 93 butterfly species treated.

MICHIGAN BUTTERFLIES & SKIPPERS:

A Field Guide and Reference

by M. C. Nielsen. 1999. Michigan St. Univ. Ext., East Lansing, Michigan. 248pp (14 x 21cm). \$19.95 paper.

This new full-color field guide treats 159 species occurring in Michigan. The families are grouped taxonomically, with page edges having tabs that are color-coded to easily flip to the different families. The introduction briefly discusses the history of butterfly studies for Michigan, including notice that the author himself has worked on the state butterfly fauna for more than 50 years, partly in preparation for this guidebook. There is a short chapter on the ecology of Michigan and the various butterfly habitats to be encountered.

HELIOTHINE MOTHS OF AUSTRALIA:

A Guide to Pest Bollworms and Related Noctuid Groups

by M. Matthews. 1999. CSIRO Publishing, Collingwood, Vict., Australia. 320pp (23 color pl.) (17 x 25 cm), plus CD-ROM. \$90 cloth. (*Monographs on Australian Lepidoptera*, No. 7).

The author provides a careful taxonomic revision of a group that all students of the Noctuidae will find useful. The book treats 38 species from Australia, with 18 new synonymies and 8 new species, in 5 genera. The book has excellent illustrations, including 23 color plates of all adults and known larvae, plus 460 other figures (halftone photographs or SEM micrographs) illustrating genitalia and other morphological characters of adults and immatures. The CD includes a complete listing of all label data from the phenomenal 14,800 specimens examined for this study.

MEETINGS

2000	Apr 14-16	Association for Tropical Lepidoptera, Gainesville, Florida, USA
	May 28 - Jun 1	Societas Europaea Lepidopterologica, Bialowieza Forest, eastern Poland
	Jun 23-25	Lepidopterists' Society, Pacific Slope Section, Grants Pass, Oregon, USA
	Jul 26-30	Lepidopterists' Society, Winston-Salem, North Carolina, USA
	Aug 20-26	XXI International Congress of Entomology, Iguazu Falls, Brazil
2001	Apr 20-22	Association for Tropical Lepidoptera, Gainesville, Florida, USA
	Jul 26-29	Lepidopterists' Society, Corvallis, Oregon, USA

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3	- Letters
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16	- Book News