

# LEPIDOPTERA NEWS

June 1999

No. 2



## ATL 1999 Annual Meeting

The 1999 annual ATL Lepidoptera Symposium and Annual Meeting was held in Gainesville, Florida, April 16-17, and organized this year by Dr. Thomas C. Emmel, University of Florida. All meetings were held at the Division of Plant Industry, Florida Dept. of Agriculture & Consumer Services, home of the Florida State Collection of Arthropods. Contributions included the following:

*James K. Adams* (Dalton College, Dalton, GA)

The moth fauna of Northeast Mexico, the diversity and some comments about the origin of the fauna

*Thomas C. Emmel* (Univ. of Florida, Gainesville, FL)

The overwintering colonies of the monarch butterfly in Mexico (with James Ebner)

Eastern Ecuador, mecca for lepidopterists and biologists (with Steven D. Schlachta)

*Dale H. Habeck* (Univ. of Florida, Gainesville, FL)

Aquatic caterpillars, lichen feeders, and sand tube dwellers

*Mirian Medina Hay-Roe* (Univ. of Florida, Gainesville, FL)

Life history studies of two races of *Heliconius erato* which differ in body size

*John E. Rosenberg* (Hilton Head Butterfly Conservatory, SC)

The new Hilton Head Butterfly Conservatory in South Carolina

*J. Mark Scriber* (Michigan State Univ., East Lansing, MI)

Photoperiod induces and temperature terminates diapause in *Papilio troilus*, the spicebush swallowtail (with Patti Valella and Mark Deering)

*Andrei Sourakov* (Univ. of Florida, Gainesville, FL)

Some curious facts on island biogeography of Satyrinae

*Keith R. Willmott* (Univ. of Florida, Gainesville, FL)

Systematics, ecology, and biogeography of the Neotropical butterfly genus *Adelpha* (Lepidoptera: Nymphalidae: Limenitidinae).

In addition to the program of speakers, photo contest exhibition and prize awards for the winners, and banquet, there were award presentations for the ATL Henry Bates Award and the ATL Jacob Hübner Award. Meeting attendance came to about 30 registered members and guests.

The 1999 ATL Photo Contest had \$750 in regular prizes, including \$150 first place prizes in each of three categories (adult butterflies, adult moths, and immatures). There also was a \$100 Grand Prize for the overall top point winner, contributed by Butterfly World (Coconut Creek, FL). Winners of the 1999 ATL Photo Contest were as follows (scores are shown at right; there were two ties):

### BUTTERFLIES

<b>1st Place:</b>	<i>Ornithoptera priamus urvillianus</i> (Papilionidae), Solomons	368
	Jeremy J. Kuhn (San Antonio, TX)	
<b>2nd Place:</b>	<i>Haetera piera</i> (Nymphalidae), French Guiana	363
	Jeremy J. Kuhn (San Antonio, TX)	
	<i>Megathymus ursus</i> (Hesperiidae), USA (Texas)	363
	Jeremy J. Kuhn (San Antonio, TX)	
<b>3rd Place:</b>	<i>Trifisa phryne glacialis</i> (Nymphalidae), Russia	361
	Vladimir S. Kononenko (Vladivostok, Russia)	

### IMMATURES

<b>1st Place:</b>	<i>Argema mitrei</i> (Saturniidae), Madagascar	370
	Kirby L. Wolfe (Escondido, CA)	
<b>2nd Place:</b>	<i>Ornithoptera victoriae</i> (Papilionidae), Solomons	369
	Andrei Sourakov (Gainesville, FL)	
<b>3rd Place:</b>	<i>Antheraea godmani</i> (Saturniidae), Honduras	359
	Chris Conlan (San Diego, CA)	

### MOTHS

<b>1st Place:</b>	<i>Leucanella stuarti</i> (Saturniidae), Bolivia	359
	Chris Conlan (San Diego, CA)	
<b>2nd Place:</b>	<i>Hyperchiria incisa</i> (Saturniidae), Bolivia	355
	Kirby L. Wolfe (Escondido, CA)	
<b>3rd Place:</b>	<i>Agapema dentifasciata</i> (Saturniidae), Mexico (SLP)	354
	Kirby L. Wolfe (Escondido, CA)	
	<i>Copaxa lavendera</i> (Saturniidae), Honduras	354
	Kirby L. Wolfe (Escondido, CA)	

### GRAND PRIZE WINNER

	<i>Argema mitrei</i> (Saturniidae), Madagascar	370
	Kirby L. Wolfe (Escondido, CA)	

**ATL EXPEDITIONS:** Nov 1999 – SOUTH AFRICA (Cape, Drakensberg, Natal, and Transvaal)  
Aug 2000 – ARGENTINA (Tucuman and Iguazu Falls)

# LEPIDOPTERA NEWS

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

**CONTENTS** for the journals are issued every two years.

### EXPEDITIONS:

**SOUTH AFRICA** (Cape, Drakensberg, Natal, Transvaal) Nov 1999  
**ARGENTINA** (Tucuman and Iguazu Falls) Aug/Sep 2000  
Please write for details.

## TO OUR READERS

As the current Book News section was being prepared, my thoughts dealt on the exorbitant prices of some new books. Lepidoptera books are not unusual in this either, since many scientific books today often have even higher prices, basically coming to about \$1 page at the high end of monographs. Some artistic books of color plates can be even higher: note the \$52,000 price tag of a reprint of the early 18th century plates of Catesby's *Natural History*! Of course, today we have the internet, so some texts may eventually at least be summarized on-line.

A problem with high book costs, however, is the limitations it brings to the reading public. One is not talking here of antiquarian books, which are priced mainly based on availability. We are noting here the cost of new books which could be printed in larger editions if more readers would buy them, which they do not because of the high prices. I recall a number of professors and other scientists who often would complain about the cost of specialized books, yet who never would buy any books, even the most modestly priced field guides, always waiting for their institutional library to buy a copy. If more interested persons would buy books, publishers would see a better market and be able to reduce their prices. The \$300 books one sees are not only based on the cost of color plates: witness the Tyler *et al.* book, *Swallowtail Butterflies of the Americas*, with over 150 pages of color plates, yet priced at only \$49.50. The main cause of high book prices is the view of the publisher that only 100-200 copies will be sold, thus the production costs are divided by that number and priced accordingly. If 1000 copies could be sold, then that \$300 book might be priced at only \$60.

Thus, support your authors and their works by buying books as much as possible. With enough of a market increase, one will see some book prices come down. Authors can also do a service to the public by avoiding the most price-gouging of the publishers and seeking out publishers who offer their books at modest prices. The new world catalog of Geometridae (1400 pages in 2 vol.) costs \$400, yet were ATL the publisher, this work would sell for about \$65.

J. B. Heppner  
Executive Director

## NOTES

1. **2000 Annual Meeting:** April 14-16 in Gainesville.
2. **2000 Annual Photo Contest:** deadline is March 15, 2000.
3. **Cover Photos:** members can note that color photos for journal covers are always sought. ATL does not pay royalties, 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.
4. **ATL Debentures:** many ATL members probably have enough savings to be able to let ATL hold some of this money at 8-10% per annum, for 1-5 years or more, so more of our printing bills can be paid. Please let us know what you can do to help! Returns of principal (at end of period) and interest (paid annually) are guaranteed.
5. **ATL Home Page:** see it at <http://www.troplep.org>. Coming in 1999: color photo files of worldwide butterflies and moths!
6. **1999 Journals:** the journals are late this year but all will be mailed before the end of the year. There is at least one supplement coming for *Holarctic Lepidoptera* and two for *Tropical Lepidoptera*.
7. **Supplement Sale:** the backlog of orders has finally been mailed. Thus, anyone who ordered a supplement set at the special sale price and has not received it, please let us know.

**FRONT COVER.**— Front row, left to right (all Gainesville except as noted): Michael Sabourin (Grantsburg, WI), John Rosenberg (Hilton Head, SC), Mark Salvato, Leroy Simon (Belleview, FL), James Adams (Dalton, GA), John Heppner, Vanessa Heppner. Back row, left to right: Keith Willmott, Jeffrey Sloten, Grace Boender & Ron Boender (Ft. Lauderdale, FL), Eric Rundquist, Marc Minno, James Taylor (Savannah, GA), Andrei Sourakov, Jason Hall, Steven Fratello (W. Babylon, NY), Mark Scriber (E. Lansing, MI), Peter Eliazar, Dale Habeck, and Thomas Emmel.

# LETTERS

## HALF WINGS AND W. J. HOLLAND

Recently, I had the opportunity of examining the small oblong pocket guide, *The Butterfly Guide*, published in 1915 and designed especially for use by boy scouts, and written by W. J. Holland, well-known for his larger manual, *The Butterfly Book* (1898; 1931 rev. ed). In the smaller guide book of 1915, Holland noted some interesting proverbs in regard to using photographs showing only half the wings, and only one side of various butterflies, to save space for the very small format of the booklet. ATL members may find the following paragraph of interest, taken from his smaller butterfly guide:

"In some cases only half of the insect is shown. 'Half a loaf is better than no bread.' In some cases only one side of the wings is delineated. Usually this is sufficient for identification. The inhabitants of this earth have never seen but one side of the moon, but they know it when they see it, unless they be like the tipsy pair, one of whom said to the other, who was leaning against a lamp post, 'Friend, is that the moon, or a lamp?', and who received the reply: 'Don't ask me, I'm a stranger myself in these parts.' By showing only one half, or one side, of a species I have been able to illustrate many more than I could otherwise have done."

Holland is known for using proverbs, sayings, and humorous quips to illustrate a point or to present some aspect of the biology of butterflies, which can be found throughout his larger butterfly manual. He did the same for moths in his other well-known book, *The Moth Book* (1903).

The larger butterfly manual sold more than 60,000 copies after numerous, almost yearly, reprintings before 1930 and can be found in nearly every high school and college library in North America. It was revised and enlarged in 1931, shortly before Holland's death in 1932, and this edition sold many additional copies. The moth manual was never revised but also was reprinted many times until about 1955 (it was reprinted as a paperback by Dover Publications in 1968). Both manuals had a variety of covers over the years, and in the early years also produced in special editions for the publisher's Nature Library series, which included a volume on insects and similar volumes on other wildlife of North America. Although now outdated in the nomenclature of the species treated and incomplete in coverage, Holland's manuals still have usefulness due to the excellent color plates and the interesting text. The small butterfly guidebook, however, was reprinted only in 1916 and perhaps a few years thereafter, and has long been forgotten since then.

J. B. Heppner

## GREATEST SALES?

Holland (1931) noted that *The Butterfly Book* had sold over 60,000 copies by 1930. Sales figures are not available for the Peterson Field Guide series book on butterflies by Klots (1951), recently revised by Opler (1992), but sales probably are much more than for Holland's larger and more costly manual. Herbert Zim, former editor of the Golden Guides series, noted in an autobiographical paper in 1982 that their book on butterflies (Mitchell and Zim, 1964) had sold 1.5 million copies by 1980. It seems that the little butterfly guide by Mitchell and Zim may well be the top seller of all butterfly books.

J. B. Heppner

## BMNH COPYRIGHT

It was with dismay that I read the ATL report (March 1999) on BMNH attitude concerning research fees and copyright strategies. As an amateur entomologist, I have assembled a small collection of specimens or approximately 100 Cornell drawers. However small, I believe that the reference collection holds numerous specimens of scientific value.

It has always been my intention to donate the collection to a scientific institute upon my demise or inability to care for the collection. For the record, I assure anyone concerned that my collection will not be deposited with any institute which treats reference material as a source of income. I urge other amateur entomologists to consider this issue and take the same course of action.

Charles J. DeRoller  
Webster, New York

## BIBLIOGRAPHY OF LEPIDOPTERA

Once again you have produced a wonderful world bibliography of Lepidoptera for the year 1997. For the past few years I have eagerly awaited this issue. The synopsis of world Lepidoptera periodicals on page 1 of the December *News* is also much appreciated.

I do have a request. At the FSCA you must be blessed with a very complete library. Many of the European and Asian serials are not available to us locally. Two suggestions:

1. Round out the information on page 1 with a more complete description of each journal cited in the bibliography along with the current address and e-mail of the editor/membership contact. This could be included in a future newsletter.

2. Supply your readership with a database of author addresses. This is perhaps too ambitious to put in the newsletter but you might maintain it at your website. Actually, fulfilling request #1 would probably suffice as interested readers could contact editors and obtain author information or even photocopies of short papers.

With this information, readers could quickly write or e-mail for reprints while in the process of scanning the list of authors and their publications.

George Balogh

Portage, Michigan

[EDITORS NOTE: Good suggestions! We will try to accommodate your requests. We did an annual author index the first two years, but although useful, it proved to be so time-consuming to number the articles for the author index that it has been left out since then. However, we might be able to provide a list of authors each year and include their addresses, etc., as long as the list would not be part of an index to the articles.]

## NATURAL HISTORY TOURS IN RUSSIA

Yuri Bereznoi notes his tour service for Russia and Central Asia for lepidopterists. He has been conducting such tours for four years now. In 1999 the tours went to the Tien-Shan Mts., but this notice could not be inserted in our newsletter in time for anyone to respond to the trips. However, those interested should contact Mr. Bereznoi for trips in 2000. One price includes all expenses within country, including accommodation, provisions, transportation, and any needed permits. In 1999, the fees were \$600 for each 2-week tour. He also can arrange specialized and individual tours on request.

Contact: Y. Bereznoi, Box 33, P. O. 071, Sochi 354071, Russia  
e-mail: kingdom@sochi.ru Tel: (7-8622) 94-54-62 FAX: (7-8622) 62-05-01

## LIGHT TRAPS

Light traps for sale: 12 volt DC or 110 volt AC, with 15 watt or 20 watt black lights. Traps are portable and easy to use. Rain drains and beetle screens protect specimens from damage. For a free brochure and price list contact: Leroy Koehn, 6085 Wedgewood Village Circle, Lake Worth, FL 33463 Tel: (561) 966-1655 e-mail: leptraps@aol.com

## TURKISH LEPIDOPTERA STUDIES

Dr. Ahmet Omer Koçak, of the Center for Entomological Studies, in Ankara, Turkey, notes the following internet sites:

Museum of the Center for Entomological Studies, Ankara

[www.members.tripod.com/~Cesa\\_1988/on.html](http://www.members.tripod.com/~Cesa_1988/on.html)

Butterflies of West Asia, North Africa, and Europe (BWNE)

[www.members.tripod.com/~BWNE\\_1998home/on.html](http://www.members.tripod.com/~BWNE_1998home/on.html)

Contact Dr. Koçak via e-mail: [a\\_kocak@mailcity.com](mailto:a_kocak@mailcity.com)

# ANNUAL REPORT 1998

## MEMBERSHIP (December 31, 1998)

	Total	USA	Other Nations (76)
Life Members	94	35	59
Benefactors	2	2	--
Patrons	6	5	1
Sustaining Members	9	5	4
Regular Members	902	481	421
Basic Members	133	88	45
Exchanges	78	8	70
<b>TOTAL</b>	<b>1224</b>	<b>624</b>	<b>600</b>
Members in Arrears	457	238	219
Members resigned (removed)	5 (109)	2 (55)	3 (54)
Died	2	--	2

## FINANCIAL SUMMARY

ASSETS	1998
<b>Current Assets</b>	
Net Funds (cash Dec 31)	12,189
Foreign Currency Dues	951
Publications Stock <sup>1</sup>	489,500
Endowments	37,900
Book Reserves	16,250
Computer/Office Equipment	10,804
Grant remainders	14,083
<b>Total Current Assets</b>	<b>581,677</b>
<b>Other Assets</b>	
Memberships Due	89,550
Life Memberships Due	2,750
Payments Due	17,410
Page Charges Due	23,914
<b>Total Other Assets</b>	<b>133,624</b>
<b>Total Assets</b>	<b>\$ 715,301</b>
<b>LIABILITIES</b>	
<b>Current Liabilities</b>	
Printing Invoices	37,405
Supplies/misc.	450
<b>Total Current Liabilities</b>	<b>37,855</b>
<b>Other Liabilities</b>	
Notes Due	3,000
Debentures	5,000
<b>Total Other Liabilities</b>	<b>8,000</b>
<b>Total Liabilities</b>	<b>45,855</b>
<b>BALANCE</b>	<b>\$ 669,446</b>

The 1998 Annual Report is presented herewith. Membership growth of 90 new members in 1998 was offset by reductions due to 5 resignations, plus the removal of 109 members in arrears more than 5 years. Conservation donations were large, and about 80% of these were expended in 1998, primarily as special funds dedicated for conservation projects in Brazil (Rondonia) and Ecuador. Books published included 3 parts of the worldwide *Lepidopterorum Catalogus*.

The Society has considerable printing bills due which could well be paid if past dues from members in arrears would be paid. Even the past year of dues from the 457 members in arrears would net the society \$26,000 or more.

The overall balance of ATL assets is very high, but members are reminded that this is primarily in unsold back stocks of books and journals, not cash. Members are encouraged to subscribe to all ATL books and series.

J.B.H

## RECEIPTS AND EXPENDITURES

RECEIPTS	1998
Cash (from previous year)	17,367.10
Member Dues	36,157.90
Life Memberships	10,040.00
Newsletter Dues (Basic only)	465.00
Foreign Currency Dues	951.00
Grants	14,020.00
ATL Expeditions	--
Contributions	1,850.40
Conservation Donations	46,492.63
Publication Sales	4,138.20
Program Services (page charges)	10,709.50
Interest	2,825.41
Annual Meeting	376.29
Advertising	600.00
Misc. (includes air mail postage)	1,039.00
Debentures	5,000.00
<b>TOTAL RECEIPTS</b>	<b>\$ 152,032.43</b>
<b>EXPENDITURES</b>	
Conservation Projects	43,272.94
Research Projects	--
Research Grants (grant supported)	7,500.00
ATL Expeditions	--
Journal Printing <sup>2</sup>	36,702.58
Newsletter Printing <sup>2</sup>	4,441.41
Photographic Costs	1,189.58
Book Stocks	1,391.10
Postage <sup>3</sup>	11,454.61
Fees	1,062.80
Office Equipment	748.00
Supplies	4,639.40
Research Equipment/Supplies (grants)	--
Advertising	456.21
Interest (notes/debts)	300.00
Annual Meeting	1,650.54
Misc.	--
<b>TOTAL EXPENDITURES</b>	<b>\$ 114,809.17</b>
<b>BALANCE</b>	<b>\$ 37,223.26</b>

1. Book value of back stock (reduced as issues are sent to members).

2. Includes invoices carried over from previous year as received from printer.

3. Includes postage for advertising.

Association for Tropical Lepidoptera  
1999

## HENRY BATES AWARD

In Recognition of Outstanding and Extraordinary  
Efforts Toward the Knowledge and  
Conservation of Tropical Lepidoptera

### Ronald Boender



Ronald Boender (left) receiving award plaque from Thomas C. Emmel.

The 1999 ATL Henry Bates Award for outstanding original research and noteworthy contributions to the study and conservation of tropical Lepidoptera is presented to Ronald Boender, of Ft. Lauderdale, Florida.

Ronald Boender has brought the stimulating ecological fervor of the tropical rainforest and its amazing lepidopteran fauna to millions of people since his public butterfly house, Butterfly World, first opened in Coconut Creek in 1988. Still one of the largest such displays of living tropical butterflies in the world, and the first butterfly house in North America, Butterfly World has also been a focal point for countless educational television broadcasts and printed reports on butterflies, moths, their hostplants, and their interesting biologies. In 1996, a hummingbird aviary was also added to the butterfly house.

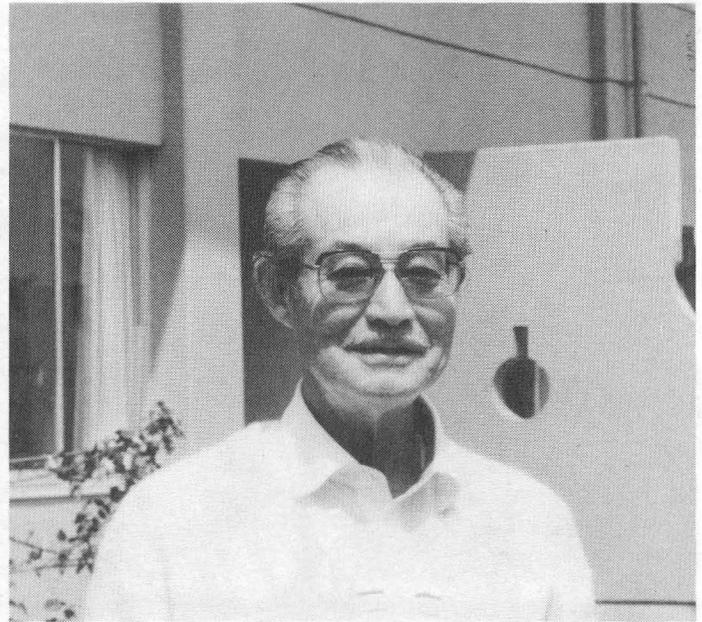
Before becoming the first butterfly house director in the United States, he developed and directed an electronic communications company in Indiana, and is still President of another such corporation he founded in Ft. Lauderdale in 1968. In 1983, he founded a company to pioneer butterfly farming in the United States, rearing sufficient caterpillars for shipment to other butterfly houses abroad and later for Butterfly World. He has carried out extensive personal field and laboratory studies on heliconiine butterflies and their Passifloraceae hosts for nearly two decades, throughout Central and South America and also in culturing them at Butterfly World. He has supplied research material to many leading universities for further studies of the plant species and varieties, and of the butterfly caterpillars feeding on them. He has done considerable research into the species of passion vines and has the largest selections of these plants in North America, at the Butterfly World facility, even having a new species of passion vine named after him. He also started a "Bring Back the Butterflies" conservation campaign in the United States in 1993 that has inspired thousands of people to a new  
[cont. on p. 6]

Association for Tropical Lepidoptera  
1999

## JACOB HÜBNER AWARD

In Recognition of Significant Contributions for the  
Advancement of the Systematics of Lepidoptera

### Dr. Hiroshi Inoue



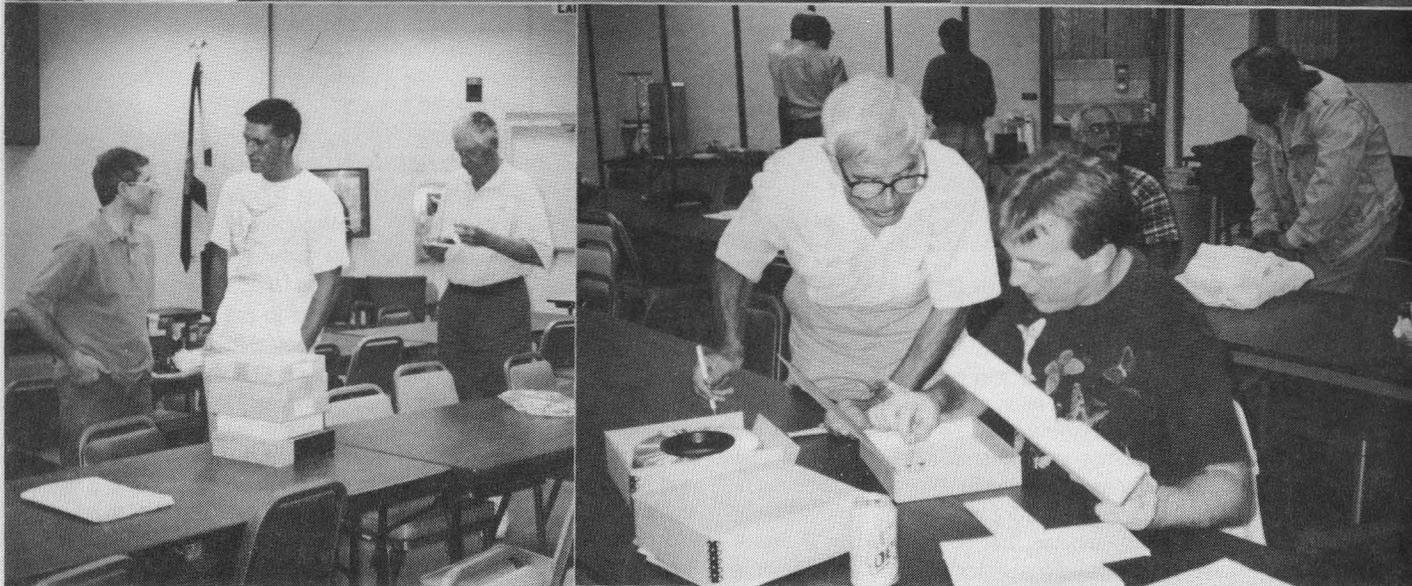
Dr. Hiroshi Inoue, in Tokyo.

In honoring Dr. Inoue with the ATL Hübner Award for 1999, we recognize a lifetime of research and publication on Lepidoptera, primarily on moths of the family Geometridae. He graduated from Tokyo Agricultural College in 1941 with a degree in entomology. He started his career as a high school teacher in schools in the Tokyo-Yokohama area and in Yokosuka. In 1959 he was appointed a researcher at a research institute affiliated with Tokyo University of Agriculture. With postgraduate taxonomic studies on the green Geometridae of Asia (subfamily Geometrinae), he received the doctorate in agriculture in 1961 from Hokkaido University. In 1967 he joined the faculty of Otsu Women's University, in Tokyo, and remained there until his retirement in 1993, whereupon he was elected Professor Emeritus.

From his early years, Dr. Inoue has been an avid collector and researcher of moths, especially Geometridae and Pyralidae of east Asia. He has also worked on a number of other groups such as Nolinae Noctuidae and Epipleniidae, among others, especially of the Taiwan and Japanese faunas. In the last few years he has done considerable work on the moth faunas of Thailand and Nepal. His large collection of about 200,000 specimens and 600 holotypes, plus 13,000 genitalia slides, was donated to the British Museum of Natural History, in London, in 1992.

His studies have resulted in over 700 papers and notes since 1933, with numerous larger revisions among these. His major works have involved the family Geometridae, but he also worked on other families and was involved in the *Checklist of the Lepidoptera of Japan*, from 1954-61. He was one of the main contributors and editors of the *Moths of Japan* volumes (1982), and more recently a main contributor for the *Moths of Nepal* parts (1992-98). He is co-editor of the ATL series, *Lepidoptera of Taiwan*, and a major contributor to the catalog issued in 1992.

[cont. on p. 6]



Scenes from the 1999 ATL Annual Meeting: Mark Scriber lecturing (top left); Keith Willmott lecturing (top right); members Jeff Slotten, Mark Salvato, and Jim Taylor (lower left); members Leroy Simon and James Adams (lower right).

**Ronald Boender [cont.]**

awareness of butterflies in nature and in their backyards with the encouragement of butterfly gardens. Also in 1993, together with the U.S. Fish & Wildlife Service and Dr. Thomas C. Emmel, his support helped establish an endangered species laboratory at the University of Florida, now named after him.

Ronald Boender has published papers on *Heliconius* and other butterflies, and has studies in press on other butterfly life histories and the *Heliconius* species of Ecuador. He is a Charter Member and also a Life Member of ATL, and has been on the Advisory Council since 1989. He is a member of a number of other Lepidoptera societies and conservation societies, and is founder and director of the Passiflora Society, which he founded to foster research in these interesting plants.

**Hiroshi Inoue [cont.]**

Dr. Inoue is a member of numerous scientific societies, including the Lepidoptera Society of Japan, the Japan Heterocerists' Society, and the Lepidopterists' Society. He also is a charter member of ATL, and has been on the Advisory Council since 1994.

# NOMENCLATURAL FAUX-PAS AMONG WESTERN NORTH AMERICAN BUTTERFLIES

GERARDO LAMAS

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"After a ten-year gestation and development period," as aptly mentioned by its editor, a long-announced compilation of papers discussing various taxonomic aspects of the butterflies of Western North America, was finally offered to the public in December 1998. Seventy-two chapters, and an additional introductory account, written by 22 authors, and painstakingly edited by T.C. Emmel, treat a variety of taxonomic problems posed in particular by the butterfly species found in California and Nevada, but whose geographical distributions often go beyond the boundaries of those states. Thus, the hypotheses presented by the 22 authors of this *magnum opus*, entitled *Systematics of Western North American Butterflies*, transcend the purely regional arena and have far-reaching consequences on the systematics of the New World butterflies.

Following an initial perusal of the book, it became apparent to me that the commendable central purpose of the book, to "make formal scientific names available... to western butterfly populations, and . . . to describe new taxa from the area . . ." (*Introduction*, p. 1), was somewhat marred by an uneven and oftentimes erroneous application of the International Code of Zoological Nomenclature. As the fundamental aim of that Code is to "provide the maximum universality and continuity in the scientific names of animals compatible with the freedom of scientists to classify animals according to taxonomic judgments" (ICZN, 1985: xiii), it is of paramount importance to follow its provisions and recommendations, in order to reach stability and universality in those scientific names.

Two species and 210 subspecies new to science, in addition to 11 new specific combinations, and 15 subspecific names raised from synonymy are proposed in this book. It is not the purpose of the present paper, to judge on the propriety of such taxonomic hypotheses, but to point out those instances that have come to my attention, where the provisions of the Code have been transgressed, and to recommend measures to remedy them.

The procedure adopted herein has been as follows. Each case is treated individually, indicating first the page (between parentheses) of the book where it occurs, followed by the nomenclatural act or scientific name involved. An explanation of the nomenclatural transgression is offered, followed by the Code articles [between brackets] which refer to them. A recommended course of action is offered at the end of each case.

(pp. iii-iv): "Published December 1998". Date of publication incomplete [21(c)]. [Recommendation 21C] has not been followed; T. C. Emmel (*in litt.*, April 6, 1999) has informed me that the book began to be distributed on December 18, 1998, and that the earliest library-stamped copy he is aware of, is deposited at the University of Florida's Marston Science Library, bearing a stamp indicating "Received on December 21, 1998." In the absence of evidence to the contrary, the exact date of publication should be regarded as [18] December 1998 [21(g), Recommendation 22A].

(p. 31): *Melitaea callina* Boisduval, 1869. Barnes & McDunnough's (1916: 92) valid designation of the male specimen illustrated by Oberthür

(1914: pl. 261, fig. 2185) as lectotype of *callina* fixed the status of that specimen, which is kept at the National Museum of Natural History, Washington, DC (USNM) [74(a)(i)]. There is no doubt such specimen was a syntype of *callina* [72(b), 73(b)], and the later designation of another (formerly) syntype, in the Carnegie Museum of Natural History (CMNH), by Higgins (1960: 452) is invalid [73(b)(ii), 74(a)(i), (iv)]. The type locality of *callina* is "México" [74(a) (iii)], and this nomenclatural matter is fully resolved.

(p. 31): *Melitaea epula* Boisduval, 1869. Higgins (1981: 88) explicitly selected as lectotype of *Melitaea epula* Boisduval the male specimen illustrated by Oberthür (1914) on figure 2176 of his plate 259, but indicated erroneously that such lectotype was housed at the British Museum (Natural History) [now the Natural History Museum, London - BMNH]. In fact, the specimen selected by Higgins is at the USNM, being the male "syntype" referred to by J. F. Emmel, T. C. Emmel & Mattoon. The female "syntype" erroneously selected as lectotype of *epula* by these authors was illustrated by Oberthür (*op. cit.*) on figure 2177 of his plate 259, who regarded it as a 'variety' of *epula*. Higgins' designation of the specimen illustrated on Oberthür's figure 2176 is perfectly valid [74(a)(i)]; the later designation by J. F. Emmel, T. C. Emmel & Mattoon is invalid.

(pp. 31-32): *Melitaea orsa* Boisduval, 1869. Once again, Higgins (1981: 88) explicitly selected a specimen illustrated by Oberthür (1914: pl. 259, fig. 2178) as the lectotype for *Melitaea orsa* Boisduval, but indicating erroneously that such lectotype was kept at the BMNH. That lectotype is at the USNM. Higgins' selection is valid, the later designation by J. F. Emmel, T. C. Emmel & Mattoon is not [74(a)(i)].

(p. 32): *Melitaea pola* Boisduval, 1869. As Brown (1967: 273) remarked, Boisduval (1869: 56) does not say Lorquin collected the holotype of *pola*. Thus, there is no hard evidence this unique specimen, cited as having been captured in "Sonora" may have been obtained in California, other than its reputed similarity to ". . . a slightly melanic specimen of what is currently called . . . *gabbii* . . . in southern California." Furthermore, another species, also captured "dans la Sonora" (*Melitaea callina* Boisduval, cf. above), has never been found in California. J. F. Emmel, T. C. Emmel & Mattoon did not follow [Recommendation 72H] in their hasty restriction of the type locality of *pola*, and that restriction should not be accepted.

(p. 32): *Melitaea sonora* Boisduval, 1869. The same remarks given immediately above apply to this name.

(p. 115): *Lycaena shasta* W. H. Edwards, 1862. The designation of a new neotype for this name, made by Austin, J. F. Emmel & T. C. Emmel, is invalid [75(e)]. Brown (1970: 404) validly designated a neotype for *shasta* [75(d)]; if Austin, J. F. Emmel & T. C. Emmel believe Brown's neotype should be set aside, because they consider Brown's type locality restriction erroneous, they should refer the matter to the International Commission on Zoological Nomenclature, to rule whether Brown's neotype is or is not to be retained [78(b)]. Until the Commission publishes a ruling, the type locality of *shasta* will continue to be that determined by Brown's designation [75(f)].

(p. 367): *Thessalia theona minimus* Austin & Smith, 1998. The genus *Thessalia* is a feminine noun, and the subspecific name proposed by

Austin & Smith is a Latin adjective. The subspecific name must agree in gender with the genus name [31(b)]. Accordingly, the subspecific name must be corrected to *minima* (justified emendation).

(p. 368): *Melitaea chinatiensis* Tinkham, 1944. Tinkham (1944: 12) described *chinatiensis* based on a "Type ♂", an "Allotype ♀", and 6 "Paratypes" (2♂, 4♀). The female lectotype designated by Austin & Smith is invalid, as it is obvious from Tinkham's text that his "Type ♂" is the holotype [73(a)(i)].

(p. 399): *Euphydryas editha bingi* Baugham & Murphy, 1998. The subspecies name is proposed ". . . in honor of Peter and Helen Bing . . ." A species-group name, if a noun in the genitive case formed directly from a modern personal name is to be formed by adding to the stem of that name *-orum* if of man and woman together [31(a)(ii)]. The name introduced by Baugham & Murphy must be corrected to *bingorum* (justified emendation).

(p. 411): *Euphydryas editha mattooni* Austin & Murphy, 1998. The subspecies name is proposed ". . . after Sterling and Eileen Mattoon . . ." The name introduced by Austin & Murphy is incorrect [31(a)(ii)] and must be corrected to *mattoonorum* (justified emendation).

(p. 511): *Libytheana carinenta streckeri* Austin & J. F. Emmel, 1998. Field (1938: 124) proposed *streckeri* as a quadrinomial (*Libythea bachmanii larvata* f. *streckeri*), clearly an infrasubspecific name [45(f)(iii)], excluded from the species group and the provisions of the Code [1(b)(5), 45(e)]. Austin & J. F. Emmel have made *streckeri* available by using it for a subspecies [10(c)], and authorship and date should be credited to them [23(j), 50(c)(i)].

(p. 513): *Limenitis lorquini powelli* Austin & J. F. Emmel, 1998. Field (1936: 24) introduced *powelli* as the name of a "transitional form" of *Basilarchia lorquini*, in an undoubted infrasubspecific sense, thus being an excluded name. Austin & J. F. Emmel have made it available by using it for a subspecies [10(c)], and authorship and date should be credited to them [23(j), 50(c)(i)].

(p. 712): *Papilio indra pygmaeus* J. F. Emmel, T. C. Emmel & Griffin, 1998. This name is a junior primary homonym of *Papilio pygmaeus* Fabricius, 1775 [53(c)], and thus invalid [57 (b)]. It must be replaced by a new replacement name (nomen novum), unless it is rejected as a junior synonym [60(a)]. Following the recommendation in [Appendix A, 3], I refrain from publishing a replacement name herein.

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It is to be hoped the 14 transgressions to the Code listed herein are all there are, and not just the tip of an iceberg. Nevertheless, readers of the book are recommended caution in following the nomenclatural decisions adopted by the authors of this important work.

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# AGRIAS HEAVEN: BUTTERFLY PHOTOGRAPHY IN SOUTHEASTERN VENEZUELA, FEBRUARY 1999

ANDREW NEILD

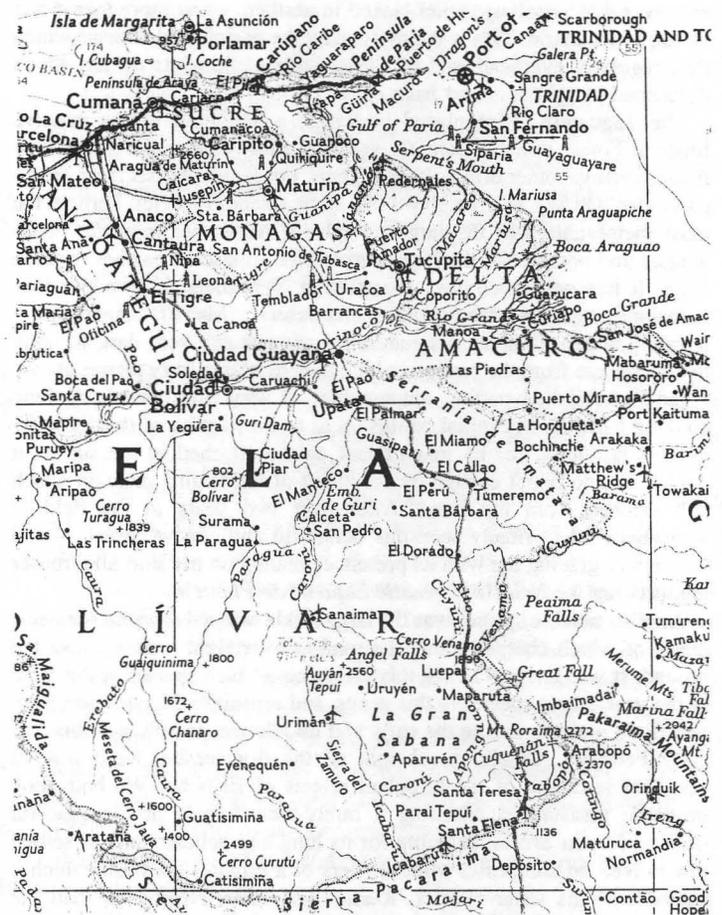
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While working on Part 2 of my series, *The Butterflies of Venezuela* (Part 1 was issued in 1996), I have had the pleasure of organising and leading a number of bespoke butterfly photography tours. This article presents the highlights of my latest trip with Rosemary Collins, with whom I have shared a number of highly entertaining tours.

Venezuela is a remarkably convenient destination for North American or European visitors, for along with neighbouring Colombia, it is the nearest country on the South American continent. Ironically, many lepidopterists land here in transit to well-known fabled destinations such as Tingo María or Iquitos in eastern Peru. Perhaps if they knew what they were missing they would reconsider. Venezuela is blessed with over 2,400 butterfly species, a monumental total which places it in the world's top five, along with Colombia, Peru, Ecuador, and Brazil. Almost the whole country is served by a number of efficient national airlines and by an extensive network of paved roads which allow easy access to most forested regions. There are over 35 National Parks which encompass the extraordinary variety of habitats in the country, from lowland tropical forest in the Orinoco and Amazon basins, desert and savannah grasslands, to alpine tundra at over 5,000 metres above sea level in the Andean chain. When you add to these notable natural attractions a good number of comfortable hotels, modern infrastructure, and a friendly population, it seems extraordinary that Venezuela is so infrequently visited.

Inspired by the tremendous success of our butterfly photography tour to north-western Venezuela in October 1998, Rosemary and I had decided that a follow-up visit to the south-east of the country would afford us an interesting and contrasting experience. Rosemary expressed an interest in this region after noting in my book that its habitats and topography — and hence its butterflies — are markedly distinct from those which we had jointly observed in the Andean north-west. In fact, south eastern Venezuela shares affinities with the fauna of the Guianas which lie to the east, while the north-western fauna is generally associated with that of the Colombian Andes and, to a lesser extent, of Central America.

Southeastern Venezuela is characterised by extensive lowland and premontane tropical forests which are punctuated erratically by vast tepuis (table mountains, or mesas). These tepuis, some of which protrude over 1000 metres above the jungle at their base, are composed of sandstone and quartz conglomerate. They are scattered over the massive Guiana Shield, itself composed of igneous and metamorphic rocks which are among the world's oldest (estimated at 2,000-3,000 million years old). The region is famous for the Angel Falls, which are the highest in the world. They cascade for 979 metres down the flank of Auyán Tepui, itself nearly 2,500 metres high. The area is also well known for Mount Roraima, the inspiration for Sir Arthur Conan Doyle's *The Lost World*. Roraima is the tallest tepui in the Guianas, and towers 2810 metres over neighbouring Guyana, Brazil, and Venezuela, whose borders meet on its summit. The latter word is rather inappropriate, for the top of this tepui is flat, at least from a distance. In fact, the visitor to the summit of this and other tepuis is struck by the surreal wind-sculpted moonscape: vast monoliths, their interiors eaten away by the relentless winds, are carved into hollow skeletons, rocks the size of buses balance precariously atop knife-edged boulders below, and squads of immense rock columns stand rigidly to attention. Everywhere streams trickle into small pools and marshes, and the vegetation is tough, spiky, and barely higher than one's knees.



Rather conveniently, the main road to Brazil passes through this region down the whole of the eastern border with Guyana. Inconveniently, however, this is the *only* road, which meant that we would have to return by the same route. Hence all the localities mentioned below were visited twice, though to save time, I have taken some literary licence and condensed all observations into chronologically unified accounts.

The opportunity existed for a trip departing on the final day of January 1999, though with the rainy season normally ending in late December, I was worried that we might find the region very dry, and butterfly numbers low. In fact I need not have worried. The meteorological phenomenon of El Niño was still dramatically affecting the whole of the country, just as we had witnessed in the Andean foothills three months earlier. The previous rainy season here in the south had failed to break as usual in April or May (1998), resulting in a protracted dry season broken only by sporadic and ineffectual rains which had only just commenced in early January. Hence we had inadvertently timed our "dry season" trip to coincide with one of the wettest periods of the past 12 months. Thankfully the rains were not particularly heavy, though excessive cloud cover was a little problematic during the first few days. Our brush with El Niño was a blessing — the rains encouraged a great variety of superb butterflies to emerge from apparent aestivation. Once again, Rosemary and I were in for a remarkable trip.

We touched down at Maiquetia airport, on the Caribbean coast below Caracas, within nine hours of leaving London on our non-stop flight. We retired to the nearby hotel, eager for the night to pass as quickly as possible — for before midday on the very next morning we planned to be in the forest with our first butterflies.

We awoke very early, to catch a short one-hour flight south-east to Puerto Ordaz ("Ciudad Guayana" on many maps), an ugly industrial eyesore lying on the southern banks of the Orinoco river. Here we hired our "macho" Toyota Land Cruiser, and headed two hours to the south-east. This northern transect of our trip, following the main road south to Brazil, took us across lowland scrub and through patches of semi-deciduous woodland. We reached our first "base" in the village of El Palmar, at the rather grandly named "Parador" Taguapire. Nevertheless, whatever this very basic hotel lacked in aesthetics was more than made up for by its charm. This was provided by the parrots and toucans which flew regularly overhead, and by the amiable smile of its owner, which threatened to split his head from ear to ear.

The Taguapire lodge placed us within a half hour of the massive Imataca Forest reserve, famous amongst birdwatchers for the Harpy Eagle, amongst other ornithological gems. For lepidopterists there are no particular "Oh My"s, though we saw some splendid species. Perhaps the most memorable was the large nymphalid *Napeocles jucunda*, hook-winged and notable for the large purple-blue iridescent patches on each wing. It has only ever been recorded in Venezuela on two previous occasions, and both from within this reserve. My first sight was a puzzling one, a glimpse of something large fast and very dark winging in towards me from the canopy, which towered some forty metres above. I had just finished putting out our bait of very ripe plantain (a long cooking banana). My initial confusion as to the identity of this butterfly did not last long, for its magnificent patches flashed in the sun as it circled me, no doubt excited by the juices of fermenting plantain which still dripped from my hand. After over two years in the field in Venezuela, I had finally seen this delightful and elusive insect — and here it was gracing me with its presence, landing on my shirt and trouser leg, probing for *Neild's Aromatic Liqueur de Plantain*.

Another notable species was the large sickle-winged *Morpho rhetenor*, males of which charged along the road at over eight metres above the ground. It was unusual to see this gleaming all-blue species at this time of the year. Many species in this genus, and especially *M. rhetenor*, have two flight periods, during the early and middle wet season, and this was early February, usually the height of the dry season. Here was an excellent reminder of the turbulent effects of El Niño. We both took immense pleasure in admiring a rarely-seen female of the graceful riodinid *Rhetus arcus*, stunning for its long and delicate tails. It settled low to feed on composite white flowers of a *Eupatorium* bush, which it shared with its sister species, *Rhetus perianther*. Nearby we had the immensely good fortune to spy a male of the flying metallic gemstone, *Arcas imperialis* (Lycaenidae). With its under surface entirely cloaked in brilliant iridescent green and pinkish scales, this exquisite creature must rank amongst the world's most beautiful butterflies. It sat high on a bush for a few minutes, temptingly twisting its long double tails to divert the peck of any curious predator, and then vanished in a blur of sparkling blue and green. A little later we were also lucky to see the scarce lycaenid "*Thecla*" *pholeus*, with iridescent green and yellow bands crossing its deep velvety black underside.

We stayed only a couple of nights at the Taguapire, then pushed on south through the mining towns of Guasipati, El Callao, Tumeremo, and El Dorado. Our route initially took us through scrubby cattle land and semi-deciduous forest below 200 metres elevation, but as we approached the banks of the unseasonably swollen Cuyuní River, the forest became more luxuriant and tangled, and where previously it was rarely visible except in the far distance, now it began to approach the road. After crossing the enormous river, the vegetation changed noticeably in character. Thick tropical lowland forest bordered the road, often festooned with magnificent carpets of vines. Each branch was laden with bromeliads, their crowning silhouettes adding to the multitude of other curious shapes that never ceased to grab our attention. This natural beauty contrasted painfully with the ill-effects of encroaching settlers. Intent on clearing their own patches to eke out a pitiful living with

plantains or cassava, they plant their crops amongst the forlorn charred stumps of once-glorious trees. Thankfully this destruction is still spasmodic, and there are still long stretches of uninterrupted forest along both sides of this, the main road to Brazil. After an hour's drive south from El Dorado, we arrived at the ramshackle settlement of Km. 85. Here we pulled in to stay at the comfortable Anaconda Camp, thankfully walled-off on three sides from the eyesore that surrounds it. Despite its name, the herpeto-phobe need not blanch, for no large snakes live in the grounds nor even the superb forest which lies at the end of the garden, for these have long since been despatched by over-zealous locals and their dogs. Lying at just under 200 metres above sea level, and surrounded by thick forest which maintains a very high level of humidity, we felt that we were really in the bush, despite staying in comparative luxury. At night, as a million insects called to us from the tropical forest so nearby, it seemed strangely incongruous to be eating delicious food and quaffing ice-cold local beer. Later, accompanied by the high-pitched twittering of bats, we watched the repeated blinking of countless fireflies as they competed in vain with the brilliant stars above.

We spent nearly a week in this region. We divided our time between a fabulous mining track at Km. 80.5, along which we were able to drive through splendid forest for six kilometres (details follow), and the main road, which rises sharply at about Km. 90 to wind dramatically up the slopes of the thickly wooded Sierra de Lema. It is on this road, at roughly Km. 98, that the impressively large Canaima National Park begins — it is the fifth largest in the world, with an area of 30,000 Km<sup>2</sup> (the size of Belgium). The main road passes over 200 kilometres through the park, a fact which more easily conveys the huge size of this protected area. The forest which lines the road up the Sierra de Lema is magnificently lush and very thick, and throughout the day reverberates to the glaring clangs of numerous bell birds. As we climbed the slope the vegetation gradually changed, and we eventually entered magnificent cloud forest which continued to just over 1,400 metres elevation. Then, dramatically, we burst through the gloom of the thickly forested slopes onto the barren "Gran Sabana" (Great Savannah). The contrast could not have been more dramatic: where previously we could not see further than the nearest tree, here the horizon unfurled before our gaze, as rolling grasslands undulated between gentle but barren hills, devoid of trees and with only a scattering of lonely bushes. At this point, sensing that this was not the best place to seek butterflies, we headed back to the paradise below.

We discovered rather perversely, that despite the magnificent lowland forest further down the Sierra, the majority of the butterfly population preferred to spend their time on flowers near the summit, at a height of between 1,350 and 1,400 metres. This included numerous species which in the Andean foothills I have never recorded higher than about 1,000 metres, the general cut-off point for lowland species. Most notably these included several orange-banded females of the large *Callicore cynosura*, and a single female of *Archaeoprepona licomedes*. The most startling sighting, and even more so at this height, was of a magnificent fresh female of *Agrias claudina*.

I had selected a fallen log of great girth as a suitable location for placing bait, and crudely dumped a temptingly over-ripe plantain flat amongst numerous bromeliads on the gnarled and mossy wood — surely a stunning shot for the video camera. Barely two minutes later, as I listened to the clanging toll of a nearby White Bellbird, a large shadow alerted me to the presence of one of the Neotropical region's greatest splendours, an *Agrias*. As my heart pounded in my throat, this magnificent insect approached me in a rapidly swirling blur of blood-red forewings, then landed deftly, head-down, on the nearby stump of a sapling. Its hindwings were dark and immediately divulged its sex, devoid as they were of the brilliant blue of the male. Her cryptic greyish underside, adorned with contrasting black striae and a necklace of indigo-centred large ocelli, immediately identified her as *Agrias claudina*, the most widespread species in the genus. As she basked in the sun while surveying the area for possible danger, she gradually opened her wings to reveal the stunning crimson within, then abruptly flew towards the bait, around which she spiralled in ever-tighter circles. Upon landing she strutted gingerly over the bait, greedily probing with her proboscis until she found a site which yielded the delicious juices within.

She stayed settled for at least ten minutes while we photographed her, allowing us to approach to within a few centimetres. Occasionally she shifted position, but generally remained still. However, when a female of *Catonephele acontius* (another species at a record elevation) landed nearby, her jealous nature became apparent — this was her bait, and nobody else's! As soon as the intruder approached, she rapidly beat her wings with great aggression, and made such a crinkling racket that Rosemary heard it from several yards away. This aggression in robust butterflies is common, and we have witnessed it in particular in the charaxines *Archaeoprepona* and *Prepona*, as well as in brassoline *Caligo*. The latter in fact go one stage further — in the Andes we even videoed one individual of *C. prometheus* as it took off, grabbed an unwelcome gastronome, and unceremoniously ejected the surprised diner from the table. At 1,400 metres above sea level this is the highest reliable record known to me for *A. claudina*. The previous highest record is from the mountains of northern Venezuela, where this species has been observed very rarely at 1,200 metres elevation. Over the course of the next few days we saw three further *Agrias claudina* in flight in this same location. These were two males fighting, and one female searching for an oviposition site. Sadly none landed on our bait, at least not while we were present.

A number of other remarkable species were observed at this height, or slightly lower, on the Sierra de Lema. I should remark here that the Sierra has been visited many times by lepidopterists, but due to a notorious combination of poor weather and local butterfly seasonality, most visitors see only a handful of butterflies in the Sierra on any trip. Hence it was a real privilege for us to see so many species, and in such quantities, on the several days that we visited. Another interesting observation is that there are a large number of subspecies, many undescribed, which are endemic in this Sierra (and usually also neighbouring tepuis). Almost all of these extraordinary cloud-forest butterflies are geographical races of Andean species, isolated on this Sierra from their closest Andean relatives by almost 1,000 kilometres of tropical lowland forests and semi-desertic plains. Recent collecting on other tepuis has shown that there are further related subspecies on other tepuis (and presumably on most if not all of them). We encountered by the roadside, mostly on white or pink composite flowers of *Eupatorium*, several as yet undescribed subspecies (Neild, *in litt.*) of the following notable species: *Callithomia lenea*, *Dircenna adina*, *Hyposcada aegle*, *H. zarepha*, *Pteronymia artema*, *P. asopo*, and *P. nubivaga* (all Ithomiinae), and in the Pieridae, *Enantia melite*, *Lieinix* species near *viridifascia*, *Melete leucadia*, plus the undescribed female of a new subspecies of *Pseudopieris viridula* (De Marmels & Clavijo, *in litt.*). We also had the good fortune to see a single male of what appears to be a new species in a new Ithomiine genus (Neild, *in litt.*), similar to *Hypomenitis*. This species has been recorded from a number of tepuis throughout southern Venezuela and even in western Guyana (Steve Fratello, pers. comm.), and appears to be endemic in the Guiana Shield. We also observed other tepui endemics such as the ithomiine *Hypothyris lema lema*, the pierids *Dismorphia zathoe proserpina*, *D. crisia roraimae*, and the satyrine *Pedaliodes roraimae*, the latter very rare in collections. Furthermore, the presence of the very localised *Mechanitis lysimnia bipuncta* (Ithomiinae) dramatically increased its known distribution (previously only known from the road between Santa Elena and Icabarú, 200 kilometres to the south), and provided further evidence for the unpublished observation that the Sierra de Lema is biogeographically closer to the fauna of the Pantepui than that of the Imataca region, only a few kilometres further down the mountainside.

In the lowland forest dominated by the towering Sierra de Lema, we spent three days on a mining track which branched westwards from the main road at Km. 80.5. Here at only 180 metres above sea level, we gladly endured the oppressive heat and humidity, for after the noisy interruptions of the traffic on the main road, we enjoyed the pleasant tranquillity of this track, visited at most by two vehicles a day. Here, as pairs of shrieking parrots streaked regularly overhead, we were entranced by the magnificent tall forest, and by a number of splendid butterflies. Of particular note were the relatively large number of high-flying and long-winged *Heliconius* butterflies (Heliconiinae). These were *H. egeria egerides* and *H. burneyi catharinae*, both emblazoned on their black

upper wings with a crimson red basal band and yellow discal patches. The former species is rarely seen, partly due to its seasonality, but also because it tends to spend its time in the canopy, at up to 40 metres above the ground. It very rarely descends below 10 to 15 metres, and where flowers attract it down, it visits the highest only, shunning those below. On the other hand, *H. burneyi* flies a little lower than *H. egeria*, but unlike the latter, will occasionally visit flowers within 5 or 6 metres of the ground. Both species, indeed most *Heliconius*, are particularly attracted to red flowers, although those that are orange are also favoured. Mention should also be made of the attractive *H. antiochus salvinii*, with its yellow and white bands on an iridescent dark blue background, which was as common here as it was to the north in the Imataca reserve.

Another scarce species that attracted our attention at Km. 80.5 was the brassoline *Catoblepia versitincta*, whose large orange-banded female is embellished with a blue sheen, quite uncharacteristic of its genus. She was attracted to a bait of fermenting plantain, as was a male of *C. xanthicles*, itself barely known in Venezuelan collections. On our final day in this location we were treated to a graceful flying-display by the delicate *Morpho adonis* (Morphinae), usually absent in the dry season months, thus demonstrating once again the impact of El Niño on butterfly populations. Males of this species are seasonally common, and tend to hatch in highly localised broods. The female is very rarely seen; indeed I have never seen it in over 36 months in the field in Venezuela and Ecuador. This rarity is most likely a reflection of behaviour than true scarcity, for females probably spend their time deep inside the forest searching for oviposition sites. On our final morning we watched individual males flying at head-height in one direction along a particular stretch of the road, their silver-blue iridescence visible for over a hundred yards, their flight an almost feeble flapping with little erratic movement, and slow enough to follow at a gentle jog. All these males emerged and entered the forest at the same points. This has always intrigued me - since they all fly independently and without sight of one another, what hidden signpost ensures that they all follow the identical route along tracks and through the forest? Although this species was not attracted to our baits, two black and blue-banded *Morpho* did visit them. These two species, *M. helenor* and the scarcer *M. achilles* were very common, with up to five individuals on each bait.

Charaxines (Nymphalidae) were generally scarce in this locality, although they can be seasonally common. We were fortunate to video the large blue-banded *Prepona laertes laertes* and *P. philipponi rothschildi*, and an obliging *Archaeoprepona licomedes*, this time a male. More notable was the rare sight of a beautifully fresh female of *Memphis polycarmer*, her cryptically mottled orange-brown undersurface adorned with two small grey-blue ocelli. Inside her wings are wholly iridescent, gleaming with deep blues and hints of mauve. On our second day at Km. 80.5, as we listened to the melancholy whistles of a pair of toucans nearby, we were both delighted to meet southern Venezuela's rarest and most localised *Agrias* species, *A. narcissus stoffeli*. Despite numerous trips to the region around Km. 85, to which this species appears to be restricted, this was my first ever encounter, and it proved to be most memorable. In a situation reminiscent of that experienced with *A. claudina* on the Sierra de Lema, I was crouching on the ground to photograph a scarce female of the large owl-butterfly *Caligo idomeneus* (Brassoliniinae), when a shadow and simultaneous flutter around my head, alerted me to the presence of something potentially interesting (rather an understatement). "Agrias!" hissed Rosemary through clenched teeth, too terrified to speak louder or even to move, for fear of scaring off this object of our total desire. As I froze, this superb creature, having warily circled me and the bait, landed on an exposed leaf within two metres of myself and the video camera. As I struggled to control the uncontrollable — my shaking hands and pounding heart — this freshly hatched male, with its wings coyly clamped shut, gradually, almost imperceptibly, began to open its wings, while I videoed the whole scene. The effect from my position was magical, for as the wings parted the regal colours within slowly came into view. Firstly came the bloodied crimson, then followed the iridescent blue which bathed the remaining wings below, like a vibrant sun rising above deep sapphire waters below. Suddenly however it flew off, only to settle precipitously on a lower leaf, this time with both wings held fully flat to the greenery, its whole upper side

resplendent in a sumptuous display of glorious colour. Within a few seconds, clearly happy that we posed it no danger, it circled the bait rapidly then settled, and began to guzzle greedily. The next day, again around mid-morning, we became aware of a large female *Agrias* near one of our baits, circling widely in and out of the forest vegetation in our vicinity. Despite waiting quietly, she remained wary, and after a few minutes disappeared from view. We waited within view of the bait for a quarter hour. Based on previous experience I have noted how cunning and cautious *Agrias* can be, and that as long as one stays within sight of a wary *Agrias* it will not come down to feed. Hence I suggested to Rosemary that we move up the road to the next bait, about 50 metres away. Within a couple of minutes we were pleased to see a blood-red blur of wings circling the bait, where it promptly settled. This, the sixth *Agrias* we had seen on the trip, and the third we had filmed, was a very scarce female of *A. narcissus staffeli*, again in immaculate condition.

After this success we continued our trip southwards, this time pushing over the Sierra de Lema and gradually descending across the Gran Sabana, passing a number of attractive waterfalls on the way, the most photogenic being the Kamá Falls at Km. 201, with a free fall of 55 metres. The grasslands of the Gran Sabana are majestic, and are best appreciated in the late evening just before sunset, when the intense yellow-green of the grass contrasts sharply with the deep blue skies, and when the warm orange glow of the dying sun lights up the vaulting flanks of the numerous scattered tepuis. These grasslands contrast greatly with those of Africa, where large mammals are common. Here there are no comparative large mammals, though we were entertained by a "cuddly" tamandua, which came shuffling along on all fours, its long ant-seeking snout almost indistinguishable from its equally long tail but for the unequivocal direction of travel.

After a full day's tourism we reached our final base, the peaceful border town of Santa Elena, at 890 metres above sea level. From here we headed two kilometres northeast out of town, up onto one of the surrounding hillsides, on which Yakoo Camp is nestled between savannah and forest. After the relative hustle and bustle of the previous two hotels, both set in hamlets, the peace of Yakoo was blissful, offset by the calling of birds and the occasional troop of howler monkeys. Amongst the various flowering bushes in the gardens we regularly saw small flocks of chirping tanagers, including the Paradise Tanager, a garish piece of costume jewellery in comparison to some of the more tasteful jewels in its genus. The male of this astonishing species sports a glittering green head, while its entire body is clothed in iridescent blue, interrupted by a scarlet patch on the rump which is only visible during flight. Here also we were entertained by the curiosity of numerous colourful hummingbirds, and by the plaintive whistling of pairs of toucans in the forest nearby. Butterflies were notable by their absence, but not so only five minutes down the entrance track, where the latter cut perhaps 300 metres across a narrow corridor of forest linking two extensive woods. Along this track we found a profusion of butterfly species, though riordinids were the most outstanding, particularly those in the genera *Semomesia* and *Mesosemia*. These included the scarce blue-banded *S. capanea*, and the spectacular, rare, and endemic *M. phace*. Also notable here was the local heliconiine subspecies *Heliconius elevatus roraima*, always a treat to see, with its deep red forewing base and yellow discal patches. Several descended gracefully from the subcanopy to feed from yellow flowers of the red "hot lips" plant (*Cephealis* sp.), around which numerous individuals of ithomiines had gathered, including the translucent beauty, *Callithomia lenea*. Below these flowers delicate *Pierella* satyrs sailed daintily along the path, never more than ten centimetres above the ground. Their wings reflect patches of brilliant blues which disappear abruptly upon settling, along with the butterfly itself, as they hide their brilliant canvas beneath their dark leafy undersurface.

There are two great butterfly sites which are worth visiting from Santa Elena. The main destination is the road to the mining town of Icabarú, over 120 kilometres to the west. This muddy unpaved track which is barely passable in places, traverses long stretches of superb primary forest. Time constraints meant that we concentrated our attention on the forest from kilometre 21 up to the river Surukún bridge at Km. 40, though the forest is equally good beyond this. Here on consecutive days

we had the good fortune to see our first ever specimens of *Agrias sahlkei* (incorrectly referred to in most literature as "*A. claudia*"). While Screaming Pihás evocatively lambasted our ears, each of the freshly hatched female *Agrias* posed beautifully for our cameras, pumping their blood-red wings aggressively at other butterflies and flapping away irritating flies and wasps. We did not see them arrive, and with all the traffic on the track were lucky to have seen them before they were disturbed. Both individuals seemed much more nervous than the others we had seen, perhaps because of the movement on the road, and both visits were short, lasting for only a few minutes. At this stage of the trip we could surely say that we were breaking all Venezuelan records, having seen more *Agrias* individuals and species than *Prepona*, and only marginally fewer even than *Memphis*. In fact, our luck continued, and this record further improved over the final few days. We had by now seen eight individuals representing three species of *Agrias*, a tally previously undreamt of. We now lacked only one species to complete the list for southern Venezuela. Were we going to achieve a full house?

The road to Icabarú proved to hold a number of great surprises, the first being the discovery of the common Andean nymphalid, *Hypanartia lethe*. This species has not previously been recorded from the Guianan region. However the relatively high elevation (1,020 metres) at which we found it makes this record seem less incredible, and I believe the species will eventually be found at suitable elevations throughout the tepui region. Our first encounter with this insect was a rare one, even in the Andes where the species is so common — a female feeding at flowers. Then followed two fresh males, both of which emerged from the forest to feed from urine soaked soil. As an added bonus, an analysis of wing markings revealed that this is a new subspecies (Neild, *in litt.*). In the same location we also had the good fortune to video an exciting find — the first individual of *Callicore texa* (Limenitidinae) recorded from the Pantepui region. This male nymphalid was attracted to sweat, and as it gently probed my clothing, it slowly pumped its wings open and closed, revealing the massive red band on its forewing. However, it was the hindwing which drew my attention — no red flash, as sported by subspecies *skinneri* to the north and west, in fact just black, interrupted only by a short series of blue spots near the hind margin. It seems that this is yet another undescribed subspecies.

Apart from a number of large owl butterflies (Brassolinae), including a few males of the iridescent blue and yellow *C. idomeneus*, the largest and by far the most graceful giant we saw was a single male of the very localised *Morpho cisseis phanodemus*. At about six inches across the forewings, and with all the visual impact of a small airborne dinner plate, this flying saucer sails gently along at the pace of a gentle jog, barely moving its wings except for the occasional dipping flick, allowing but a tantalising glimpse of the blue of its upper wings. Sadly we saw no more of this remarkable insect, nor any of its more widespread sibling, *M. hecuba obidona*, whose dorsal surface is a deep orange.

As for the Pieridae, there were two good sightings along the Icabarú road. One was of *Dismorphia crisia roraimae*, already seen on the Sierra de Lema, but providing an interesting expansion of its range, the other of the highly elusive *Hesperocharis nera nymphaea*. The latter, with its delicate yellow and grey chequered ventral surface, delighted us for over an hour. It remained resolutely settled on a urine soaked patch beside the track, despite the swirling distractions of a multitude of other pierids, including the common white *Appias drusilla*, the deep yellow *Phoebis philea*, richly daubed with vibrant orange patches, the sulphurous *Melete lycimnia*, and numerous small *Eurema*'s. Amongst this swirling throng were a number of large sword-tailed papilionids in the genus *Eurytides*, including *E. protesilaus*, *E. telesilaus*, and *E. agesilaus*.

With the notable exception of the many nervous *Phoebis*, the remaining species, having settled for a short time, became remarkably complacent, and we enjoyed sitting in their company for some while, even gently stroking the various guests at their salty table, swallowtails included. While a group of parrots shrieked petulantly from the skies above, a single *Lasaia* (Riodinidae) descended nearby, though as was its custom, did not deign to join the other drinkers. Always a welcome sight at these aggregations, this stunning star of glaring blue with black bands nervously skitted from patch to patch, rarely stopping for long enough to get a good shot, and disappeared after a short while.

Before embarking on this tour, and while working on Part II of *The Butterflies of Venezuela*, I had identified new subspecies of the widespread orange and black acraeinae *Actinote pellenaea* and its Andean congener, *A. anteas*, both of which are very scarce in collections. One of my primary goals was to seek these out in order to better define wing characters, as well as to observe their natural behaviour. Thankfully these seasonal species were flying in considerable numbers, in addition to the poorly known Guianan *A. thalia thalia*. The latter is only known in Venezuela from a handful of female specimens, and we had the very good fortune to observe a number of males, the first recorded in the country. Most of these *Actinote* were attracted to the omnipresent white *Eupatorium* flowers. They fluttered weakly and awkwardly in the gentle breeze as they jostled to maintain their feeding positions on the swaying flower heads, accompanied by a number of ithomiines, melitaeines, and an occasional jewelled *Ancyluris* (Riodinidae). Sadly I was unable to locate even a single specimen of a unique undescribed *Actinote* species collected in the region almost a decade earlier, and still only known from a single male specimen (Romero and Neild, *in litt.*). Most likely the species is more localised than its siblings, and may even prove to be a tepui endemic, preferring to fly at heights above 1,000 metres. This elusive creature shall remain an enigma for some time to come.

The second, and certainly the most memorable butterfly site near Santa Elena, is at the Jasper Falls. These take their name after the semi-precious bedrock over which the cascade's stream tumbles. Though the falls are not spectacular in themselves, the combined effect of the location on the visitor is profound: wetted by the shallow waters above, the intense deep red bedrock, interspersed with patches of orange and gold which gleam in the midday sun, winds like a bizarre road through the thick tropical forest that surrounds it. If ever there were a paradise in which to sit and watch butterflies, then this must be it. Apart from the spectacular setting, there is a profusion of cool shade, and numerous rocky outcrops provide excellent benches from which to comfortably view the butterflies.

Quantity is not the main attraction of the Jasper Falls, for although well over 500 species fly here, this does not compare with the eastern Venezuelan Andes, where I estimate that over 1,500 species can be found. Indeed, butterfly numbers here are generally low, and it is rare to see more than a few individuals, even of the common species. No, it is the *quality* of the local butterfly fauna which impresses the visitor. More specifically, this is an excellent site for desirable charaxines, for the high trees and the natural amphitheatres which they cradle provide numerous suitable perching sites. Here there is a colony of the highly localised *A. amydon* (or *pericles*) *aurantiaca*, individuals of which I have observed at this site on every trip. Accompanied by Mauricio Williamson, the local Park Warden whom we befriended, we walked slowly down the entrance path, through some hundred metres of near-impenetrable forest. Here the forest canopy is relatively open, and sufficient light penetrates to allow a crowd of saplings to reach for the sky, creating a wall of thin stumps, remarkably devoid of branches. As we progressed we disturbed a number of large *Morpho deidamia* from their low perches, and they flapped off indignantly, their dorsal colours flashing a brilliant double-banded blue. High above us in a small clearing a single male of the localised *Heliconius xanthocles cleoxanthe* sailed lazily above us. As we craned our heads, it entered a narrow shaft of sunlight, illuminating its brilliant yellow dorsal patches like stained-glass windows. As we emerged from the trail onto the jasper bedrock, my eye caught a tell-tale sailing flash of orange only some ten metres above the stream — *Agrias amydon*. Elated, I screamed to Rosemary above the roar of the falls. To have seen the object of our visit so quickly was a real plus, though admittedly it was hardly unexpected at this site. This, our ninth individual *Agrias*, completed the list of all four species known from the region. Rosemary was on cloud nine, and I was in seventh heaven! As we videoed this obligingly tame male on his perch, a dead branch in the canopy of a dead tree, he gradually spread his wings to reveal the glowing orange patch within. This individual had occupied the principal perching territory of the stream, a massive natural jasper-paved amphitheatre with a view over to the falls themselves and downstream towards a leafy bend. I walked off eagerly to lay out some bait, knowing from previous experience that there are a number of suitably-spaced

perching sites, for I once counted five perching males of *A. amydon* along this stream in the space of just twenty minutes. Within minutes the bait began to pull in a number of charaxines, including the noble *Polygrapha* ("*Anaea*") *xenocrates*, a scarce species notable for its large size, mottled underside, and deep blue wings intermittently splashed with iridescent light blue patches. As I approached to get a better shot, the common zebra-striped nymphalid, *Colobura dirce*, flew down and flapped around the bait, seeking a good landing site. As it rounded the plantain, almost out of sight, it was roundly rebuffed by a vigorous swishing of robustly-angled wings, and seen off in an artist's feast of brilliant red, tinged with mauve and glorious magenta, dazzling both the rude intruder and this rather astonished photographer. Here was yet another *Agrias*, this time a male of *A. claudina*. What a day! More relaxed now after so many encounters with *Agrias*, I eventually approached this obliging male to within a few centimetres, engaging the camera in macro mode with enormous depth of field, the beautiful background of jasper and forest adding to the pleasurable aesthetics of the occasion. This male occasionally flexed his wings open in warning, presumably reacting to his "rival" *doppelgänger* reflected in the lens, and revealed the sumptuous blue velvet on his hindwings.

Later that afternoon I took Rosemary to a favourite perching spot of the sylph-like riodinid, *Chorinea faunus*. A single male has always perched in this spot ever since my first visit in 1989, and each individual is a courteous though hesitant host to his visitors, tolerant of our intruding lenses. Its delicate transparent wings and long tail are outlined in black, dabbed with a fleck of deep red, and embellished with a deep iridescent blue flush. Every so often this male would fly off for a few seconds, his wings beating so fast that he appeared to us observers to be a wasp — presumably also a line of defence, at least against some predators.

Our second day was the most productive, for we notched up yet another female of *Agrias claudina*, and a resplendent male of *A. amydon*. Both were attracted to our bait, on which they sat feeding for many minutes, once again allowing me to approach to within kissing distance. These were our final *Agrias* of the tour, leaving us more than satisfied with a magnificent total of 12 sightings of four species, and nine of these on video and stills. I doubt very much that I shall ever rival this number of individuals in one trip, let alone this number of species, though one can always dream.

On our final day at the Jasper Falls we witnessed highly unusual behaviour in a very scarce insect. While ambling slowly along the stream bed, a brown and blue *Pierella*-like butterfly sailed low out of the forest, flapping sporadically, and then touched down on the wet rock, where it promptly started to drink. The mysterious drinker was a female of the morphine *Antirreha philoctetes*, an elusive deep forest dweller which I have only ever seen on one other occasion in Venezuela. Despite its rarity, it was this feeding behaviour that had most attracted my attention, and the fact that it had abandoned the relative safety of the tangled forest floor for this dangerously open area. There was enough time to photograph it feeding, its proboscis clearly visible, before it was scared off by an errant tourist (later repentant, oh, so very repentant!). This water-feeding or "puddling" by females is rare in most nymphalids, and especially so in both sexes of morphines. Hence it is interesting to note that I have witnessed females of other morphines feeding like this on rare occasions — most notably *M. rhetenor* (both sexes) and *M. theseus* (females only). This female feeding adds a behavioural dimension to the shared early stage characters which justify the inclusion of this genus and *Caerois* within the Morphinae.

On our return journey to Pto. Ordaz we were able to reflect on the success of our trip. Although butterfly numbers had never been as high as on our previous tour of the Venezuelan Andean region (where we logged nearly 500 species), nevertheless we succeeded in recording an impressive proportion of the southeast's butterfly fauna: roughly 300 species, about one third of the total species expected to occur there. However, we had been privileged to see a number of very rare taxa, and entertained by a gentle stream of cooperative *Agrias*. We had witnessed many superb butterflies in stunning surroundings, and been regaled by the calls of numerous beautiful birds. Moreover we had over 12 hours of delicious video with which to bore our friends and relatives to death!

# THE PIONEER CENTURY OF AMERICAN ENTOMOLOGY

by H. B. Weiss

Continued from Chapter V (see *Lepidoptera News*, March 1999) – J. B. Heppner, Editor

## CHAPTER VI

### ASA FITCH AND OTHER ENTOMOLOGISTS

(1845 to 1854)

The Hon. J. Barlow disported himself on the pages of the *American Quarterly Journal of Agriculture and Science* in 1845 (vol. 2, No. 2, Oct., pp. 218-220) in an article entitled "On the study of Entomology." He spoke of the fascination of entomology and of the benefits of such a study to farmers:

"It is not with indifference that we can witness the change from the lifeless egg to the living crawling larva; from this to the dormant aurelia; and from this to the gay and splendid butterfly, gilded with its golden tinges, mounting upon its gaudy wings, triumphant over the creeping things of the earth, flitting from flower to flower, and sipping the sweets gathered in their cups and upon their leaves . . . Not only do we draw moral, but high religious instruction from this source," and so on in the same vein.

This *Journal* was printed at Albany, New York, and conducted by Doctors E. Emmons and A. J. Prime.

In the same journal (vol. 3, No. 1, pp. 45-46) a Thomas Barlow wrote on "Entomology: novel productions." This is a general account by a general observer. He observes that,

"We are told, by high authority, that in the creation of the world, it was declared that every seed should bring forth after its kind" and that although this is true, there are many apparent departures.

From the aurelia of a butterfly he saw hundreds of small flies spring forth. From the pupae of apple tree caterpillars in their cocoons, he knew that common horseflies came. A cricket in his hand ejected a worm or "hair snake." Such departures, he said, were due to the activities of certain flies that penetrated the walls of the pupae and deposited eggs which developed into larvae that destroyed their hosts. Nearly one-half of his account is devoted to the "hair snake," of the cricket, of which he knew nothing.

In 1845, the *Literary Record* of the Linnaean Association of Pennsylvania College, Gettysburg, Pennsylvania, published another series of papers on entomology. In volume 1, number 3, and in four succeeding numbers, there appeared articles entitled "Ant-iana" by "Rusticus," in which he outlines his observations in a popular way. However, the names of the species are not mentioned. In volume 1, numbers 6 and 7, "Rusticus" had two papers on bots in horses and other animals. Life-histories, habits and descriptions are given and both papers are well put together. According to volume 1, number 5, the "Cabinet" of the Linnaean Association in six months' time had accumulated 63 native and foreign birds, 92 reptiles in spirits and stuffed, 97 fishes and Crustacea, 10 mammals, 900 shells, 1,100 insects, 40 dried plants, 2,100 minerals, 60 fossils, 13 anatomical preparations, 35 paintings and engravings, 70 plaster casts and a large number of miscellaneous natural and artificial curiosities. The "Cabinet" was located in the college library. Volume 2, number 2, of the *Literary Record* carried "An introduction to the natural history of lepidopterous insects; abridged from the French of Boisduval." This is a technical paper dealing with introductory matter relative to the Lepidoptera. The anatomy of the head, thorax, abdomen, wings and legs of butterflies and moths is discussed.

WILLIAM SAMUEL WAITHMAN RUSCHENBERGER (1807-1895)

Dr. W. S. W. Ruschenberger's book, *Elements of Entomology; prepared for the use of schools and colleges . . . from the text of Milne Edwards and Achille Comte* was published in Philadelphia in 1845 by Grigg and Elliot. This book of one hundred and twenty-one pages was the sixth in the series entitled *First Books of Natural History* and it included a consideration of "Articulated Animals, Insects, Myriapods, Arachnidans, Crustaceans, Cirrhopods, Annelidans and Zoophytes, or radiated animals." The book is illustrated by ninety-one "beautiful woodcuts, executed in his best style by Mr. G. Thomas, of Philadelphia." There is a glossary of entomological terms and the works of Edwards and Comte, Cuvier, Lamarck, T. Rymer Jones, Thomas Say and others were freely used. The book is essentially one of classification and is devoted mainly to the characters of various groups. The insect orders that receive consideration are Thysanoura [sic], Parasita, Suctoria, Coleoptera, Orthoptera, Hemiptera, Neuroptera, Lepidoptera, Hymenoptera, Rhipiptera and Diptera. The characters of each are outlined, then their metamorphoses. There are general remarks about families or tribes or both, and sometimes about the genera, including notes on habits, distribution, life history and economic importance, but all rather brief.

William Samuel Waithman Ruschenberger was born on a farm near Bridgeton, New Jersey, September 4, 1807, and educated in the schools of Philadelphia and New York City. When not quite nineteen, or on August 10, 1826, he was appointed surgeon's mate in the United States Navy and his first cruise was on the U.S.S. Brandywine of the Pacific Squadron. Later he was commodore's secretary during 1828-29 under Commodore Jacob Jones. In the meantime he had entered the medical department of the University of Pennsylvania, from which he graduated on March 24, 1830.

On April 4, 1831, he was commissioned as a surgeon in the Navy and in this position he made a number of trips to various parts of the world. He was an able and prolific writer. Among his writings are, a translation of a paper by Dr. C. Bertero entitled "A List of the Plants of Chili," which appeared in *Silliman's Journal; Three Years in the Pacific*, published in 1834 and dealing with geography, politics and sociology; *A Voyage around the World*, published in 1838; *Notes and Commentaries During Voyages to Brazil and China*, published in 1854; *An Account of the Institution and Progress of the College of Physicians of Philadelphia, During 100 Years*, published in 1887; and his *First Books on Natural History*. Other shorter articles appeared from his pen, such as the various papers relating to the Academy of Natural Sciences, published in 1852, 1871, 1873 and 1876.

In 1832 he was elected a correspondent of the Academy of Natural Sciences of Philadelphia and later, when he resided in Philadelphia, he was made an active member. When he was stationed at the Naval Rendezvous in Philadelphia, from 1840 to

1842, he kept in close touch with the Academy, attending meetings and making contributions to the museum and library. His last period of naval service was from 1860 to 1861, as fleet surgeon in the Mediterranean. From then on he lived in Philadelphia, except for the Civil War period, 1861-1864, when he was stationed at the Boston Navy Yard. During his residence in Philadelphia, his connections with the Academy, the American Philosophical Society and the College of Physicians were most fruitful. He retired in 1869 and lived until March 24, 1895, when he died in his eighty-eighth year. He was an interesting personage, his prejudices were strong and his criticisms were severe. He deserves a much more extended account.

#### PETER P. GOOD

Previous to the Civil War, when the nation was hankering for culture, Peter P. Good helped to appease this longing by publishing his *Family Flora* and *Materia Medica Animalia*, both quarterly journals, "terms \$3.00 a year, always in advance." He was led to print the *Family Flora* and *Materia Medica Botanica* because of the neglect into which medical botany had fallen and "to gratify the prevailing taste for Works of Art." With its "choice and valuable" text and with its colored plates, he believed it to be "acceptable and appropriate" as a "Parlor or Lady's Book," besides being the "cheapest Periodical extant." When Benedict Jaeger in 1854 published his *Life of North American Insects*, with its execrable colored plates, he also had an eye on the parlor, for he said in the preface,

"It is my design to make this work a valuable ornament for the parlour table, as well as an instructive and amusing companion."

For his *Family Flora* which first appeared in 1845, with later editions in 1847 and 1854, Good drew largely from the books and manuscripts of his uncle, John Mason Good, M.D., who had contemplated writing a similar work. In his account of the chemical and medical properties of water cress, Good says,

"Animalcules are the cause of various disorders. A variety of internal complaints in the stomach, lungs, liver, and intestines, is brought on by swallowing myriads of animalcules and other imperceptible living creatures which inhabit raw vegetables and fowl water; and finding the heat and food of the stomach congenial to their growth, they become a new species of an alarming size, and prey upon the vital parts to the great detriment of the patient's health and oftentimes at the expense of his life before the malady can be known or even suspected."

He then tells of a person who ate, unknowingly, spawn attached to watercress — later vomiting an "incredible number of small tadpoles;" also of a girl in Hampshire "who brought up" a living toad attributed to eating watercresses which had spawn attached:

"Nothing would have saved her from poison but the animal having been bred and nourished up as it were in her own body, and had assimilated so much with her nature as to have thus long proved harmless."

Encouraged by the success of his *Family Flora*, Good planned his *Materia Medica Animalia* (1853) along similar lines, and included therein accounts of animals used medicinally. The complete volume contains descriptions of some twenty-four animals, in addition to a portrait of the author, an essay upon the classification of animals and a glossary. Each description is accompanied by a colored plate, from the lithographic press of E. C. Kellogg, of Hartford, Connecticut.

Good's treatment of the species is uniform throughout. He first gives the characters of the genus and species and then its natural history, chemical and medical properties, and uses. Among his animals are *Gallus domesticus*, *Bos taurus*, *Sus scrofa*, earth-

worms, blood-sucking leeches, snails, cuttle-fish, the whale, the cod, the oyster, and four insects: the blister beetle, the honey bee, the cochineal insect and the gall insect. His descriptions are now inadequate from a scientific standpoint, although at the time they undoubtedly had quite a technical flavor, and his accounts, compiled as they were from various pharmacopoeias, dispensaries, and encyclopedias of science, partake of the dullness of their sources.

The volume would be void of interest at the present time were it not for its hand-colored lithographs from the press of E. C. Kellogg. These brightly colored prints show the animals in their natural settings, and if Good's book really appeared on the parlor table of the period, it was because of its pictures rather than its text.

According to the *Family Flora*, Good was an A.M., and lived at Elizabethtown, New Jersey, in 1847, and later, about 1853, as indicated in his *Animalia*, at North Cambridge, Massachusetts. He edited Olinthus Gregory's *Memoirs of the late John Mason Good* and sold the plates of *Elementary Anatomy in Sixteen Plates representing the full-length human Figure, half the size of life, together with a separate explanatory text, the whole forming a concise manual of physiological anatomy*, by Bourguery and Jacob — translated by J. C. Comstock, A.M." (New York, 1849).

In one of the testimonial letters appended to his *Animalia*, he is referred to as "a most successful teacher, a ripe scholar and a gentleman in whose integrity the public may place the most implicit confidence" and according to the New Jersey Medical Reporter he was his own "engraver, printer, agent and editor."

#### NOYES DARLING (1782-1846)

At the annual fair of the New Haven Agricultural Society, held at New Haven, Connecticut, Mr. Noyes Darling delivered, on October 1, 1845, an address upon injurious insects. He gave a popular talk on the importance of knowing about insects and much of his information came from Harris's *Insects Injurious to Vegetation*. He mentioned in part such species as were then attracting attention, the pea weevil, cutworms, May beetles, grasshoppers, the Hessian fly, rose chafers, striped cucumber beetles, squash bugs, apple-tree borers, tent-caterpillar, raspberry saw-fly, aphids, peach-tree borers, oak pruner, plum curculio, coaling moth, mosquitoes, the bot fly, hen lice, cheese maggots, etc. And his remedies were those such as were advised by Harris.

Darling recommended the study of insects as a part of our education and said,

"If the time ever comes, as it may come, when the interference of Government shall be required to stay the ravages of insects, a thorough knowledge of them will be indispensable to enlightened and well directed legislation."

In addition, he asked,

"Why should not government make war upon cutworms and plum weevils, as well as upon barberry bushes and Canada thistles?"

Darling did not live long enough to see the practical application of his beliefs.

Noyes Darling was born at Woodbridge, Connecticut, in 1782, and died at New Haven, September 17, 1846. He graduated from Yale College in 1801 and was a tutor there from 1804 to 1808. At one time business in New York City engaged his attention, but he afterwards became interested in horticulture and in the habits of injurious insects. He wrote frequently on this subject and became a distinguished agriculturist. The latter part of his life was lived at New Haven and at one time he was mayor of that city. At another time he was county surveyor and at his death he was judge of the county court.

#### EBENEZER EMMONS (1799-1863)

From 1846 to 1854, there appeared the five volumes of Ebenezer Emmons on the *Agriculture of New-York; comprising an account of the classification, composition and distribution of the soils and rocks, and the natural waters of the different geological formations; together with a condensed view of the climate and the agricultural productions of the state*. These were published at Albany and were the outcome of a request that Governor Bouck had made, for an investigation of the agricultural resources of New York. Volume 5 (The Natural History Survey of New York. Division 5. Agriculture) was published in 1854 and was devoted to "Insects Injurious to Agriculture." According to the preface, Emmons was assisted by Asa Fitch. This volume was severely criticized. Strecker, in his *Butterflies and Moths of North America* (Reading, Pa., 1878) said,

"The plates are execrably drawn and as badly coloured and the text abounds in errors of all sorts."

Later writers have been equally severe, especially about the plates. Emmons, of course, was not well versed in entomology and could, for the most part, only compile from the available sources. In spite of the help he received from Doctor Fitch, Mr. Haldeman, and from the works of Doctor Harris, his volume did not meet approval, and apparently it was not consulted extensively either by entomologists or farmers. From its general make-up, it was not suitable for general readers. The fifty plates, which especially aroused the ire of entomologists, were drawn by E. Emmons, Jr. The colors of the insects are not correct and Doctor Emmons apologized for this in the preface.

Ebenezer Emmons was born May 16, 1799, or 1800, at Middlefield, Massachusetts. As a boy his pockets were full of stones and his rooms were full of butterflies and other insects. As a student at Williams College, from which he graduated in 1818 or 1820, his interest in science was encouraged by Professors Amos Eaton and Chester Dewey. After graduation, Emmons continued his studies at the Rensselaer School, graduating 1826, the same year that he published his *Manual of Mineralogy and Geology* for the use of the students of that school. He studied medicine at the Berkshire Medical School and practiced it in Chester, Massachusetts. In 1828 he moved to Williamstown, where he lived for ten years, continuing as a practising physician, and in the same year he was appointed lecturer on chemistry in Williams College. In 1833 he was made professor of natural history at Williams, a chair he held until 1859, when the department was divided, upon which he retained mineralogy and geology until his death.

In 1836 he was appointed upon the Geological Survey of New York, and in 1838 he was chosen as professor of chemistry in the Albany Medical College. He moved to Albany in that year and was later transferred to the professorship of obstetrics. He was on the faculty of the college until 1852. Emmons did considerable work in mineralogy, which it is not necessary to note here. It was in 1843 that the governor of New York asked him to investigate the agricultural possibilities of the state, and his report on this subject has already been mentioned. About the time the third volume of this report came from the press, Emmons was appointed State Geologist of North Carolina, and three volumes of reports were issued by him.

In 1818 he married Miss Maria Cone, of Williamstown, and was a grandfather at thirty-seven. He died in Brunswick County, North Carolina, October 1, 1863, and was survived by his wife, a son and two daughters. Doctor Emmons had a quiet manner and was deeply religious. He persevered in his work and was enthusiastic. The Rev. Mark Hopkins, president of Williams

College, 1836-1872, said that Emmons was a man of remarkable power and great accuracy of observation.

#### ASA FITCH (1809-1879)

Although interested in entomology for many years, it was not until 1845 that Asa Fitch published his first formal paper. Fitch undoubtedly was one of the ablest economic entomologists ever produced in this country. He was born at Fitch's Point, Salem (Washington County), New York, on February 24, 1809, and his childhood and early years were passed on a farm and in attendance at the district school. Later he attended an academy at Salem, and clerked at a neighboring store, all the while being deeply interested in natural history. Very early in his life he started a journal which he continued, except for a few lapses, until his death. His first interests were botanical, but later they became exclusively entomological. In 1826 he started studies at the Rensselaer School at Troy, and it was there that zoology took his fancy, culminating in entomology in a sport time. He graduated with honors in 1827 and then studied medicine at the Vermont Academy of Medicine at Castleton. In 1829 he graduated as a doctor of medicine and then attended lectures at the Rutgers Medical College in New York City, concluding his work in the office of Doctor March, of Albany, New York. When the Rensselaer School Expedition of 1830 went to Lake Erie, Fitch accompanied it, and at this time Professor Eaton regarded him as the best entomologist in the United States. Fitch left the party at the western terminus of the expedition and pushed on into the western states, where he collected insects. He returned in 1831 and began the practice of medicine at Fort Miller, New York, in the office of Dr. Taylor Lewis. On November 15, 1832, he married Elizabeth McNeil, of Stillwater, New York, and then moved to Stillwater where he practiced for six years, a profession which he cordially disliked. He gave it up, however, in 1838, and returned to Salem where he managed his fathers business. From then on, he followed agricultural pursuits almost exclusively.

He joined the Washington County Agricultural Society when it was organized and soon began to contribute entomological articles to the local journals. His first formal paper, the one previously mentioned as appearing in 1845, was a thirteen-page article entitled "Insects of the genus *Cecidomyia*, including the Hessian and wheat fly," which was printed in the *American Quarterly Journal of Agriculture and Science* (Vol. 1, No. 2, pp. 255-269, 1 pl., 8 fig., April, 1845). At one time, Fitch was engaged in collecting and naming the insects of New York for the State Cabinet of Natural History. In 1854 he was appointed State Entomologist of New York, a position which he retained for seventeen years. His only freedom from entomological matters was at meal times and an extra half hour he took for reading. He was very religious and the daily prayer and reading of scriptures with his family was a part of his life, interrupted only if a desirable insect came within his reach. His daily correspondence was large and included such foreign entomologists as Westwood and Curtis of London, Signoret of Paris, Gerstäcker of Berlin and Osten-Sacken of St. Petersburg. Doctor Fitch died April 8, 1879, at the age of seventy, at his home at Fitch's Point, New York.

Following Fitch's death, J. A. Lintner was asked by the family to examine and report upon the condition of the Fitch collection. This he did, and after spending two days with it he found that the general collection filled one hundred and six boxes ("cartons lieges of Deyrolle, nearly all of double depth, size 26 x 19.5 cm."), that it was in excellent condition, only fifteen per cent suffering from dry-mold, easily removed, and that Dermestidae were absent. Of approximately 55,000 specimens, only about 50

were broken or otherwise damaged. Fitch's general collection was mainly from the United States, but contained numerous exchange specimens from various parts of the world. The Coleoptera occupied 18 boxes; the Orthoptera, 7; the Peuroptera, 6; the Hymenoptera, 8; the diurnal Lepidoptera, 4; the Heterocera, 17; the Diptera, 5; the Hemiptera, 26, and arachnids and myriapods, etc., 4. Of the 26 boxes of Hemiptera, 12 contained Homoptera, including types of species described in the New York State Agricultural Reports. Fitch was especially interested in this latter group.

In addition to the above, there were two large cases of duplicate specimens estimated as containing about 100,000 specimens of Coleoptera, mostly from New York State, and about 20,000 specimens of other orders. There were also several trunks, boxes, etc., containing exchange specimens not incorporated into the general collection. Some of this material was infested by Dermestidae.

Accompanying the collection were 148 note books, each about 10 x 15 cm., varying in thickness, containing a descriptive catalogue of the collection. Each specimen was numbered and the notes carried a corresponding number, the date of capture, locality, a brief diagnosis. If the specimens were from New York, the descriptions and remarks were usually more extensive.

The collection was valued by Doctor Fitch's family at five thousand dollars. This was based on a minimum rate established by Doctor Fitch himself. In addition to the specimens there was a large and valuable entomological library of books in various languages. Everything was housed in a small frame building or "office" a short distance behind his dwelling. His collection was later broken up and parts were sold to various collectors. The balance was purchased by the United States National Museum. However, parts of his collection including some types are still in the New York State Museum at Albany, New York.

At about the time Doctor Fitch commenced his entomological studies (1840), he set for himself the following goal. He wrote:

"I have undertaken a very great work, and have laid for myself a task both hard in the plan and difficult in the execution. To unite in one very limited body the most essential facts of the history of insects; to classify them with precision and accuracy in a natural series; to delineate the chief traits in their physiognomy; to trace in a laconic and strict manner their distinctive characters, and follow a course which shall correspond with the progress of the science and the eminent men who have contributed to its advancement; to single out the useful and obnoxious species, those which from their manner of living excite our curiosity; to mark the thousand sources where the authors of the original knowledge may be consulted; to render to Entomology that amiable simplicity which she has had in the times of Linnaeus, of Geoffrey, and of the first productions of Fabricius, and yet present her as she is today, with all the richness which she has acquired from observation, but without surcharging her with it; to conform her, in one word, to the model which I have under my eyes, the world of Cuvier — such is the end which I have taken upon myself to attain."

One of the disadvantages of writing about outstanding entomologists in a work like this, is that such men, having contributed so enormously to the science and having written so extensively — really, in order to have justice done them, should be considered by themselves in separate volumes. It is easy to be specific and detailed about the work of an author of one or two short papers. It is difficult when the author has written a hundred lengthy articles, reports, etc., involving hundreds of species, observations, etc. And so it is necessary to be general about the work of Doctor Fitch and to refer those who want more information to the bibliography of Doctor Fitch's entomological writings which J. A. Lintner published in his *First Annual Report of the Injurious and*

*Other Insects of the State of New York* (Albany, 1882).

Mention has been made of Doctor Fitch's first formal paper. This, however, is antedated by his title "Insects Injurious to Vegetation — No. 1," which also appeared in the first issue of the *American Quarterly Journal of Agriculture and Science*, (pp. 250-254, 1845) and in which he described and figured in colors several species of *Saperda*, *Clytus*, *Desmocerus*, etc.

Doctor Fitch's famous and classic reports upon the "Noxious, Beneficial and Other Insects of the State of New York" were the outgrowth of his appointment and instructions by the executive committee of the New York State Agricultural Society in 1854, the legislature of New York providing the funds for the work for many years. Fourteen reports were published in the *Transactions of the New York State Agricultural Society* between the years 1855 and 1872. These reports which varied in length from 27 to 176 pages were devoted to insects injurious to fruits, field crops, vegetable crops, and evergreen and deciduous forest trees, and all were illustrated with plates and woodcuts in the text. They were indispensable to American entomologists and are frequently utilized at present. Much of their information has been reprinted over and over by later authors until the original source has been lost sight of. They are models of Doctor Fitch's untiring and successful study of insects injurious to horticulture and agriculture.

In addition, Doctor Fitch published numerous miscellaneous papers in the *Transactions of the Agricultural Society*, the *Quarterly Journal of Agriculture and Science*; the *Country Gentleman*, the *Cultivator*, the *American Agriculturist*, and in other agricultural and scientific publications from 1845 until about 1870. These papers covered all the important economic species injurious to plants and animals and contained details of life histories and habits, descriptions and remedies. All Fitch's work is characterized by minuteness of observation, fullness of detail and the results of original research. His reports led the way for similar lines of work in other states, and his work was appreciated abroad. He was elected to membership in the Entomological Societies of Russia and of France, and in 1858, in appreciation of his services to science, a gold medal was awarded by the Central Agricultural Society of France. Doctor Fitch will always rank high among the founders of economic entomology in America, and with all his knowledge he was unassuming, modest and generous-hearted.

#### AGRICULTURAL JOURNALS

When *The Horticulturist and Journal of Rural Art and Rural Taste*, edited by A. J. Downing, made its initial appearance from Albany in July, 1846, entomology was one of the reasons for its existence. In fact the journal was devoted to "horticulture, landscape gardening, rural architecture, botany, pomology, entomology, rural economy, &c." Its entomology, such as it was, first appeared under "Foreign Notices" and "Domestic Notices" but finally there were separate articles devoted exclusively to insects. In the first volume (p. 48) under "Foreign Notices" a short item was reprinted from the *Annals of Horticulture* on how to get rid of ants, by making holes in the soil from two to three feet deep with a crowbar, carefully withdrawing it. Millions of ants were supposed to fall into the hole, from which they were supposed not to be able to escape. Boiling water was recommended and also the use of tomato leaves as a deterrent. In the same volume (p. 141) under "Foreign Notices" a more extended account of the tomato leaf remedy was given, and mention was made of a French gardener who watered ant hills several times in two days with sulphate of potash (50 grams to 25 litres of water)

with success and with no injury to the plants. For plant lice on roses tobacco infusion and soapsuds were mentioned, these remedies having been abstracted from the *Gardeners' Chronicle*. Under "Domestic Notices" (vol. 1, p. 241) appeared the following:

"One of the surest means to destroy the borers in apple trees, is to make a solution of potash, two pounds to a gallon of water, which must be injected into the hole, where the borer has entered, by means of a syringe, holding half a pint."

Another statement (vol. 1, p. 204) said that a cultivator of fine fruit in Queens County, New York, had actually succeeded in fencing out the curculio. His orchard of plums, of 50 or 100 trees, was surrounded by a perfectly tight board fence nine feet high, furnished with a tight gate. Very few of his plums were attacked, while fruit on trees twenty feet away was destroyed. Two broods of chickens were kept in the yard, but it was assumed that they were too few in number to be of much help.

Another plum curculio remedy (vol. 1, p. 573) extracted from the *Ohio Cultivator* was the use of a tub with an inch or two of water in the bottom. The inside of the tub was whitewashed and a lighted candle was fastened in the middle. This outfit was set up in each tree near the lower branches for two or three hours each evening. The reflection from the white sides of the trap was supposed to attract the beetles which fell to their destruction in the water.

A two-page article by J. W. Bissell, of Rochester, New York, on "Some Facts About the Curculio" appeared in volume 1, pages 310-311. Mr. Bissell recorded his own observations, among other things, noting that the beetles did not fly high. He said that tobacco water and whale oil soap suds were not effective and recommended jarring the trees as a method that paid, although troublesome.

In volume two, a few notes were published on the apple borer, also an article by J. A. K., Albany, New York, on the "Effects of the seventeen year locust on the roots of trees." J. A. K. referred to his own observations and believed erroneously with Miss Morris (*Proc. Acad. Nat. Sci. Phila.* Nov., Dec., 1846) that the failure of fruit trees over twenty years was mainly owing to the ravages of cicada larvae on the roots. Dr. T. W. Harris published an article in this volume (vol. 2, pp. 365-367) entitled "On the blights of the pear tree," in which he showed that "insect blight" was not the same as "fire blight" and "frozen" and "sap-blights." *Scolytus pyri*, its ravages, etc., are also discussed.

It is not necessary to continue in detail about all the entomological articles that appeared in succeeding numbers of the *Horticulturist*. In volume III Mr. C. of New York wrote about "Two Insects that Infest the Native Grape," and "An Old Gardener" of Philadelphia contributed a paper on a "New Mixture to Drive Away Insects," the new mixture being a combination of plaster of Paris and turpentine, to be scattered over plants likely to be attacked. For volume IV, Mr. L. Young, of Kentucky, and Mr. M. H. Simpson, of Massachusetts, wrote on "Whitewashing — The New Remedy for the Curculio," and for volume VI, Mr. J. Van Buren of Clarksville, Georgia, gave, under the title "Notes on the Habits of the Curculio," a record of his own observations illustrated by terrible pictures of the adult and pupa. In future issues various entomological notes and contributions from correspondents appeared, sometimes under the title "Editors Table." For the most part, they were similar to the insect material that was appearing at that time in the farm journals. To volumes XII and XIII, Mr. J. Stauffer of Mount Joy, Pennsylvania, contributed a series of papers, on the leaf-cutting bee, the peach tree borer, the grape-vine caterpillar, plant lice and the enemies

of plant lice. Mr. Stauffer was an accurate observer and made and furnished his own woodcuts for the illustrations. In some cases these were rather crude, but Stauffer's articles were, entomologically, the best in the *Horticulturist* as he was entomologically inclined and familiar with the work of Kirby and Spence, Harris, and other writers.

Before leaving the *Horticulturist* mention should be made of the article "Original Observations on Insects Injurious to Our Fruits" by Margaretta H. Morris, of Germantown, Pennsylvania. This appeared in volume XIV (1859, pp. 506-509) and consisted of her own observations on *Rhynchaenus nenuphar*, accompanied by a colored plate showing plum knot, cherry knot, plum curculio, and a cherry knot cut open exhibiting larvae within the gall. Miss Morris decided that the gall was caused by the plum curculio and that Harris and others were wrong in supposing the trouble to be due to a fungus. Mention has been made previously of Miss Morris, and mention may also be made that her entomological conclusions were not always correct.

Concerning Jacob Stauffer, he was born in Lancaster County, Pennsylvania, and among his numerous avocations he followed natural history consistently. He was a good local botanist; he discovered several new species of fishes; he made extensive studies in entomology and entered his innumerable observations in large manuscript books illustrated by colored drawings made by himself. This amiable naturalist died at Lancaster, Pennsylvania, on March 22, 1880, in the seventy-second year of his life.

#### CALEB GOLDSMITH FORSHEY (1812-1881)

At the meeting of the Boston Society of Natural History held on July 15, 1846, a communication was read from C. G. Forshey "On the *Cicada septendecim* of 1835 in Louisiana." (vol. 2, pp. 162-163). According to the *Proceedings* of the society, Mr. Forshey's account was similar to those given by others.

Caleb Goldsmith Forshey was an engineer. Born in Somerset County, Pennsylvania, July 18, 1812, he attended Kenyon College, Gambler, Ohio, and the United States Military Academy at West Point from 1833 to 1836. He was professor of mathematics and civil engineering at Jefferson College, Mississippi, from 1836 to 1838, and was later employed in various engineering, survey, and bridge projects. He was one of the founders of the New Orleans Academy of Sciences in 1853. He established the Texas military institute in 1855 and directed that institute until the outbreak of the Civil War, when he entered the Confederate army, in which he served in various engineering capacities. In addition to contributing to scientific journals, he helped in the preparation of *The Physics of the Mississippi River* (1861). His death occurred in Carrollton, Louisiana, July 25, 1881.

#### JOSEPH LEIDY (1823-1891)

Few entomologists think of Joseph Leidy, the famed paleontologist and comparative anatomist, in connection with their science, yet during his early years he made several excursions into the entomological field. When only twenty-four years old, he contributed to the *Journal of the Academy of Natural Sciences of Philadelphia* (1847, n.s., vol. 1, pp. 57-67, 15 figs.) a paper on the "History and anatomy of the hemipterous genus *Belostoma*." This included a technical description of the genus, a list of species, notes on their habits and distribution, marks of distinction between *Belostoma* and *Perthostoma*, then a general account of the habits of members of both genera, where found, their prey, eggs, etc. This was followed by a description of the internal anatomy, salivary glands, stomach, ileum, colon, nervous system and organs of reproduction, accompanied by one black and white

plate of anatomical details drawn by Joseph Leidy. Two years later we find him publishing a paper on "Descriptions of some Nematoid Entozoa infesting insects," (*Proc. Acad. Nat. Sci. Phila.*, vol. V, pp. 100-102) which he found in the intestines of the domestic cockroach, cricket, etc. In 1849 he described in the same journal new genera and species of Entophyta from *Julus pusillus* and from the mucous membrane of the ventriculus of *Passalus cornutus*; and in the same year for the same journal he wrote a paper entitled "Observations on the characters and intimate structure of the odoriferous glands of the Invertebra."

Leidy's work was many-sided even in the field of zoology, and his contributions touched upon all the main groups of animals and their biology. They ranged from man down to the lowest protozoa and they dealt with structure, habits, reproduction, distribution and relationships. Living at a time when nearly everyone was rushing to describe new species, Leidy stuck to his researches on habits and anatomical details of various members of the animal kingdom. His descriptive work took place as new species and new genera naturally revealed themselves during the course of his activities, but it was subordinate to his wider interests. Leidy laid the foundation of the paleontology of North American mammals and reptiles. He worked on parasites of termites, on the fauna and flora of living animals, on animals of the land, of the sea, of the air, of fresh water, his zoological masterpiece being *The Fresh-Water Rhizopods of North America*. Really, everything that lived had a fascination for him. In his paper entitled "A Flora and Fauna within Living Animals," published in 1853, he advanced his belief in the origin of the organic from the inorganic and his ideas on the general course which was followed in the development of the animal world. This was really the doctrine of evolution, a theory familiar to various students and current before the publication by Darwin of his *Origin of Species*, in which overwhelming evidence in favor of this theory was presented.

Joseph Leidy was born in Philadelphia, Pennsylvania, September 9, 1823. As a boy he was interested in natural history and in addition he had considerable artistic skill. He attended the University of Pennsylvania, graduating as an M.D. in the spring of 1844, and beginning the practice of medicine in the fall of that year. He continued to practice for two years, at the end of which he took up teaching, becoming in 1845 Prosector to the Chair of Anatomy in the University of Pennsylvania. For a short time he was demonstrator of anatomy in the Franklin Medical College. In 1848 he went to Europe for observation and study. Upon his return he gave a course of lectures on microscopic anatomy and in 1849 he began a course on physiology in the Medical Institute. In 1850 he again visited Europe and in 1853 he was elected Professor of Anatomy in the University of Pennsylvania. During his lifetime he held other professorships and many memberships in scientific societies. His numerous published papers and notes are to be found in the technical journals of his day. Leidy, along with Louis Agassiz, Spencer F. Baird and James D. Dana, was interested in the entire drama of nature. In these days of specialization and extensive laboratories, such men have almost disappeared. Doctor Leidy died in Philadelphia on April 30, 1891. He had sweetness, gentleness, simplicity, and a spirit of helpfulness, and these, united with his greatness, made him an attractive and lovable man.

#### JEFFRIES WYMAN (1814-1874)

Jeffries Wyman, the comparative anatomist, at a meeting of the Boston Society of Natural History on July 19, 1848, read a paper "On ants from gigantic ant-hills of Africa" and exhibited specimens of workers, soldiers, males and the queen which had been

brought from Africa by Dr. T. S. Savage. Doctor Wyman made many contributions to the *Journal and Proceedings of the Boston Society of Natural History*, of which he was president for more than twelve years, and to the *American Journal of Science* and the *Smithsonian Contributions to Knowledge*, but they were not upon entomological subjects. He was born at Chelmsford, Massachusetts, August 11, 1814, graduated from Harvard in 1833, took his medical degree in 1837, studied in Paris for two years, was at one time curator of the Lowell Institute, and occupied chairs of anatomy at Richmond, Virginia, and at Cambridge, Massachusetts. He died at Bethlehem, New Hampshire, in 1874.

#### WALDO IRVING BURNETT (1828-1854)

A man who accomplished much during the short span of his life and who probably would have become distinguished in the entomological world had he lived, was Dr. Waldo Irving Burnett, who was born in Southboro, Massachusetts, July 12, 1828. His father, Dr. Joel Burnett, was also a student of nature, especially of botany and entomology, and apparently the father's interests were transmitted to the son. As a boy, Waldo I. Burnett became interested in medicine and entomology and devoted all his leisure to collecting. He was educated under the direction of Dr. Joseph Sargent, of Worcester, and in the Tremont Medical School, from which he graduated as an M.D. in 1849, at the age of twenty-one. He went to Europe soon afterward and in Paris he studied natural history and microscopy. It was here that he became aware that he suffered from tuberculosis. After an absence of four months he returned to America, where he spent each winter in Carolina, Georgia or Florida. Continually, he was occupied with his investigations. In the winter of 1851 he delivered a course of lectures at the Medical College of Augusta, Georgia, on microscopic anatomy, and in the same year wrote his essay of two hundred pages entitled "The Cell, its physiology, pathology and philosophy, as deduced from original observations: to which is added its history and criticism," which was awarded a prize by the American Medical Association. While a medical student, he joined the Boston Society of Natural History, and shortly afterward he was elected Curator of Entomology. In 1851 he joined the American Academy of Arts and Sciences. His published writings appeared in the *Journal and Proceedings of the Boston Society of Natural History*, the *Proceedings of the Boston Society for Medical Improvement*, the *Proceedings and Memoirs of the American Academy of Arts and Sciences*, the *American Journal of Science*, the *Boston Medical and Surgical Journal* and the *American Journal of Medical Sciences*. In addition to his entomological papers, which will be mentioned, he wrote on geology, climate, climate and tuberculosis, microscopic animals in human spleen, rattlesnake bites and the origin and development of kidneys through vertebrated animals. He died on July 1, 1854, a few days before the end of his twenty-sixth year. His last investigation was devoted to the orange insect so destructive in Florida, and at the time of his death he was engaged in translating from the German, the *Comparative Anatomy of Siebold & Stannius*. His first entomological contribution, entitled "Hibernation of Insects, and its relation to their Metamorphoses," was published in the *Proceedings of the Boston Society of Natural History* (vol. 3, pp. 68-69, 1848). In the *Proceedings of the American Association for the Advancement of Science* (vol. 4, pp. 135-138, 1851) appeared his paper "On the relation of the distribution of lice to different faunas." This he had read at the New Haven meeting on August 21, 1850. He believed that the existence of lice upon the higher animals was a fact that met with no ready accordance with the commonly accepted ideas of the

successive appearance of animals, based upon geological data. Various facts are then cited relative to the specific parasites of various mammals leading Doctor Burnett to the conclusion,

"that the analogous species of animals of the different continents were created as such and therefore have their proper parasites, instead of emanating from parent stocks."

He thought that the creation or appearance of the parasites was subsequent to the creation of the animals on which they lived.

Doctor Burnett wrote other articles on parasites, as for example, his paper "On the external parasites of warm-blooded animals" (*Proc. Bost. Soc. Nat. Hist.* vol. 3, p. 240, 1850) in which he found that although there are single species peculiar to particular animals, there are others found on different species of the same genus. In this paper Burnett also covered the parasites of the human body. At the August 7, 1850, meeting of the Boston Society of Natural History, he read his "Observations on the relations of an order of Parasites (Lice) to the different faunae" as bearing on the distinct creation of types on animals and on the local creation of these types wherever they are found. The ideas expressed in this paper were substantially the same as those advanced by him two weeks later at the New Haven meeting to which reference has been made. In the *Proceedings of the Boston Society of Natural History* in 1850 he wrote "On the fire-fly from Cuba, *Pyrophorus phosphorus*." (vol. 3, pp. 290-291) giving an account of the insects light-producing structure. He said that it was found to be made up of fat globules permeated by trachea and showing no signs of nerves or blood vessels, and that the light was probably caused by the action of the air, introduced through the trachea, upon the fat — a slow combustion as suggested by Matteucci.

Doctor Burnett, as well as many of his contemporaries at that time, was vitally interested in the origin of species. At the Albany 1851 meeting of the American Association for the Advancement of Science, Doctor Burnett read a paper called "Points in the economy of the seventeen year locust (*Cicada septendecim*), bearing upon the plural origin and special local creation of the species," (*Proc. Amer. Assoc. A. S.* Vol. 6, pp. 307-312). In view of the close relations existing between animals and their outboard conditions of life, he believed that faith in the adaptability of animals was lessened. He mentioned the belief, in some quarters, in the special creation of the separate faunas in the localities in which they are found and said that Agassiz had treated various phases of the question in which were found excellent reasons for the particular creation of each fauna in its immutability through any period of time. Embryology and other sciences were called in and the general trend of such inquiries showed that the number of species must have been quite near that which is found in a natural and undisturbed state, instead of a single pair, as held by some. Doctor Burnett cited the seventeen-year locust as an example of the plural origin of species, recording the observations of some who had noted their appearance in about the same numbers each time. From the facts that the female matures about 500 eggs and that during the seventeen years only two appear certain of life and appearance as adults, he also deduces evidence of design in nature in balancing numbers against chances of mortality for the preservation of the species.

Doctor Burnett was interested in Infusoria inhabiting the intestines of insects and other animals and published on this subject in the *Journal of the Boston Society of Natural History*. In 1852 he read before this society a paper entitled "On some of the peculiarities of the economy of reproduction in certain insects" (vol. 4, pp. 226-228), in which he raised the question of the size of the spermatazoa in relation to the sizes of various

animals and of their numbers in proportion to their size. He found that the size did not materially change with the size of the animal; that they were as large in the smallest lizard as in the largest alligator. He counted them in mites and found from twenty down to ten and even fewer, and after other investigations concluded that the procreative capacity of a species is not necessarily, as is generally supposed, in a direct ratio but rather in an inverse ratio to its numbers. In the case of the mites, he believed that his findings tended to sustain the opinion of the plural origin of mites. In the same paper he made some observations on the males of some insects dying in the autumn, leaving the females to continue the species.

During 1853 Burnett made various communications to the Boston Society of Natural History on the cotton worm of the southern states, on Infusoria found in the intestines of ants, on the canker worm, and on the development of viviparous aphids. These communications may all be found in volume 4 of the proceedings of the society. During the same year, two other papers by him on the development of aphids appeared, one in the *Proceedings of the American Academy of Arts and Sciences* (vol. 3, pp. 55-59) and the other in *Proceedings of the American Association for the Advancement of Science* (vol. 7, pp. 202-223, pub. 1856). These papers contain the results of his work with *Aphis caryae*, so identified at that time and with embryological studies made by him.

It may be noted, in bringing this account of his activities to a close, that his interests and scientific curiosity reached out into fields not usually explored by his contemporaries in entomology.

#### J. LOUIS R. AGASSIZ (1807-1873)

Entomologists do not claim Agassiz as one of their own, nor is it pretended here that he could be designated as an entomologist. However, he made entomological contributions even though his fame resided elsewhere. On September 22, 1848, at the Philadelphia meeting of the American Association for the Advancement of Science, he read a paper "On the phonetic apparatus of the cricket" that was published in its *Proceedings* (vol. 1, pp. 41-42). In this talk Agassiz gave an account of the structure of sound organs of insects of the order Orthoptera, particularly of the crickets, demonstrating the structures on the blackboard. At the October 18, 1848, meeting of the Boston Society of Natural History, both he and Doctor Gould spoke of the necessity of a thorough revision of the system of classification in zoology and agreed that a more perfect system than Cuvier's was called for, based on the embryonic development of animals and the order of their appearance in the various geological epochs. At the meeting of the Boston Society on November 21, 1849, Agassiz spoke on the "Metamorphoses of Lepidoptera" (vol. 3, pp. 199-200) and called attention to a stage in the transformation of Lepidoptera not usually described, but which had been observed by Burmeister, who, however, had not made use of the hint it gave for a natural classification of insects. Agassiz then referred to a swelling in the thoracic region of the caterpillar at certain periods. Upon dissection, these swellings were found to be the rudiments of four wings which appeared before the caterpillar entered the chrysalis state. Agassiz, on the basis of his observations, believed that the chewing insects, such as the Coleoptera, should not be placed above the sucking insects, but below them.

At the Cambridge meeting of the American Association for the Advancement of Science, in 1849, Agassiz presented his essay "The classification of insects from embryological data," later printed as article 6, volume 2, of *Smithsonian Contributions to*

*Knowledge* (1851, 28 pp. illus.). He reviewed the various classifications of insects, proposed by zoologists, based on external characters, form, in part internal structures, development from the egg, number and structure of wings, etc., and mentions the new views of Fabricius dividing insects according to the structure of their mouth parts. He also mentioned metamorphosis as a foundation of classification, but doubted that either that or jaw structure were characters prominent enough on which to form primary divisions. He believed that chewing insects and sucking insects should be separated into two groups, that each group should be subdivided according to its metamorphosis, that this might lead to as natural an arrangement as one based on metamorphosis alone. He thought that perhaps biting mouth parts indicated among insects a condition of existence lower than that of sucking insects. On this basis he proposed an arrangement that seemed to him not only natural, but more fully in accord with embryological data. His group "chewing insects" included the Neuroptera, Coleoptera, Orthoptera and Hymenoptera, in the order named and his "sucking insects" included the Hemiptera, Diptera and Lepidoptera. The rank of each order was then discussed and Agassiz came to the conclusion that the Lepidoptera was the highest of all groups. His system was founded upon the nature of the metamorphic changes, upon embryological changes, and upon additional evidence of a similar kind. As a basis for supporting his views more fully, he went into considerable detail concerning the metamorphosis of *Eudamus tityrus* in part II of his paper. Part III was devoted to a special classification of the Lepidoptera; part IV to the metamorphosis of some dipterous insects; and part V to the relative positions of the classes of Articulata. One plate of twenty-three figures accompanied his essay.

With others, Agassiz was one of the authors of *Nomenclator Zoologicus* (1842-1846; 936 pp.), an alphabetical list of genera, with references to places of description, an important work. And in 1848 the Ray Society published in London *Bibliographia Zoologiae et Geologiae, a General Catalogue of all Books Tracts, and Memoirs on Zoology and Geology* by Prof. Louis Agassiz, corrected, enlarged and edited by H. E. Strickland. In this Agassiz endeavored to list the title of every paper on zoology, including those only remotely connected with scientific zoology and geology.

In 1850, there was published in Boston, *Lake Superior; its physical character, vegetation, and animals, compared with those of other and smaller regions. With a narrative of the tour by J. Elliott Cabot and contributions by other scientific gentlemen*, by Agassiz and Cabot, a book of some four hundred pages. Chapter IV was written by John L. LeConte and is entitled "General Remarks upon the Coleoptera of Lake Superior." The entire chapter is really a catalogue of the Coleoptera of the region around the circumference of the lake, based on LeConte's three trips to Lake Superior, and his new species are described in various footnotes. Chapter IX, "Descriptions of some species of Lepidoptera from the northern shores of Lake Superior," was contributed by T. W. Harris, and includes a list of Lepidoptera collected by Agassiz. The insects of other orders were not identified in time to include them in the book.

At the 1850 meeting of the American Association for the Advancement of Science, Agassiz read a paper on the "Comparison between the young caterpillars of Lepidoptera and the adult larvae of mosquitoes and the mode of formation of stigmata." This paper was never received for publication. In the Graham Lectures which Agassiz delivered at the Brooklyn Academy of Music, in January and February, 1862, on the structure of animal life (printed by Scribner, New York, 1862), insects are occasion-

ally mentioned, along with other animals. His Lowell Institute lectures, published by Ticknor and Fields, Boston, 1863, as *Methods of study in natural history*, were popular elaborations of the views expressed in his "Essay on Classification." In these lectures he protested against the transmutation theory, then being revived, and said that scientists were chasing a phantom in their search for some material gradation by which the entire animal kingdom may have been derived by successive development from a single or from a few germs.

Louis Agassiz was born in Switzerland, May 28, 1807. At the age of thirty-nine, or in 1846, he came to America with a reputation made by his monographs on glaciers and fossil fishes. In Europe he was a student and investigator. In America his activities as a teacher began a new era in American education. In his first class of advanced students at Harvard, were many famous scientists, and his motto was, "Study nature, not books." Opposing the Darwinian theory of evolution by natural selection, he regarded his investigations of animals and plants as "glimpses into the divine plans of which their structures are the expression." Much has been written about him, his pioneer work in education, his love for his adopted land, his sympathy and understanding, and his qualities of "attractiveness, eloquence, strength, energy and helpfulness." Professor Burt G. Wilder has said,

"From highest to lowest, every teacher of natural science in this country is indebted to Agassiz for improvements in methods, for elevation of public respect, and for increase in compensation."

Professor Agassiz died December 14, 1873.

#### JOSIAH CLARK NOTT (1804-1874)

In 1848 Dr. Josiah Nott, of Mobile, Alabama, published an article on the cause of yellow fever and gave "reasons for supposing its specific cause to exist in some form of insect life." His paper was a denial of the supposition of the "malarial" origin of hot climate fevers, but his use of the term "insect" was such as to mean a low form of life. If he had any ideas relative to insects and yellow fever, his expression of them was quite vague. Dr. Josiah Clark Nott was born March 31, 1804, in Columbia, Richland District, South Carolina, and died in Mobile, Alabama, March 31, 1873. He attended lectures at the College of Physicians and Surgeons, New York, in 1825 and 1826 and graduated from the University of Pennsylvania in April, 1827. During his life he held various medical positions, practiced medicine, visited Europe, contributed many papers to medical journals, and published several ethnological works. In 1858 he founded a medical school in Mobile, which closed on account of the Civil War, in which he served.

#### T. S. SAVAGE

Mr. T. S. Savage, at the meeting of the Academy of Natural Sciences of Philadelphia on September 4, 1849, read a paper entitled "Observations on the species of Termitidae of west Africa, described by Smeathman as *Termes bellicosus*, by Linnaeus as *T. fatalis* (*Proc. Acad. Nat. Sci. Phila.*, vol. 4, pp. 211-221). Savage had lived for a time in Africa and became interested in termites from reading Doctor Smeathman's communications to the Philosophical Society of London. Savage's interesting paper deals with the economy and habits of termites and confirms some of Smeathman's observations. In the same volume of the *Proceedings* (vol. 4, pp. 195-200), Savage had another article on "The Driver Ants of Western Africa."

#### GEORGE WHITE

*Statistics of Georgia: including an account of its Natural, Civil,*

and Ecclesiastical History; together with a particular description of each county, notices of the manners and customs of its aboriginal tribes, and a correct map of the state, by George White. Savannah: W. Thorne Williams, 1849. At first glance this publication does not appear to be entomological, but of its 624 + 77 pages, the seventy-seven pages consist of a "Catalogue of the Fauna and Flora of the State of Georgia, prepared by "Eminent Naturalists," "comprising Mammals, Birds, Reptiles, Fishes, Insects, Crustacea, Shells, and Plants." The insect portion occupies pages 25 to 36, but covers only "Coleopterous Insects." Over 1,100 names are listed, minus localities, dates and notes. The brief prologue by John LeConte states,

"The following catalogue of Coleopterous Insects is by no means to be considered as complete. Entomology has been too little studied in this country to render anything of the kind possible. It however may give some idea of what was known in the science when it was drawn up. As for the other classes of Insects, they have been so entirely neglected that it cannot be said anything is known about them."

Dr. E. A. Schwarz was of the opinion that the list certainly was not written by Major John LeConte, who would not have neglected to mention Abbot and Smith's famous work on the lepidopterous insects of Georgia, nor by his brother, Dr. Joseph LeConte, of Macon, Georgia, so the author must have been Dr. John LeConte, his nephew, of Athens, and a cousin of Dr. John L. LeConte, who probably collected the beetles, which surely must have been submitted by Major John LeConte to Dejean, in Europe, for determination.

#### THE ANNUAL OF SCIENTIFIC DISCOVERY

There was started in Boston, in 1850, *The Annual of Scientific Discovery*, edited by David A. Wells and George Bliss, Jr. This publication was designed to record the most important discoveries and improvements in mechanics, natural philosophy, chemistry, zoology, botany, geology, etc., etc., etc. In the preface to the first volume (1850) credit is given to Professors Agassiz, Wyman, A. A. Gould and Harris. The entomological notes in this volume refer briefly to Agassiz's remarks on "Metamorphoses of the Lepidoptera," which he made at a meeting of the Boston Society of Natural History, and to "Diseases of Silk-Worms" from a paper by M. Guérin-Méneville, previously published in *Comptes Rendus*. The frontispiece of volume 1 is a portrait of Agassiz.

The *Annual* for 1851, which is adorned by a frontispiece portrait of Benjamin Silliman, contains a statement from the *London Journal of Arts* relative to electroplating insects, flowers, etc., so as to preserve them. The insects were first steeped in a solution of phosphorus and then in a solution of nitrate of silver; the phosphorus caused the silver to precipitate upon the insect and to form a very thin metallic coating over every part of it. Upon this, a thicker deposit of metal was obtained by the "electrotype" process, after which two or three small holes were made through the coating and the specimen heated so as to drive off the moisture.

The 1852 *Annual* contains a statement about the seventeen-year locust, its appearance in Pennsylvania and Maryland in 1851, by Doctor Smith of Baltimore and two references to papers upon the same insect by Dr. W. I. Burnett. In the 1853 issue there is a notice of a new cochineal insect as reported by Westwood at a meeting of the British Entomological Society.

In the succeeding *Annuals* up to 1865, there are a few notes relating to entomological happenings as reported at the meetings of the Boston Society of Natural History, and at several foreign entomological gatherings. One refers to the use of powdered

proto-sulphate of iron, sprinkled on the ground around the bases of trees, for killing insects through the evolution of sulphuretted hydrogen. Another refers to a meeting of the Academy of Sciences at Paris where Marshal Valliant noted that a number of balls in the cartridges brought from the Crimea had been pierced by an insect belonging apparently to the Hymenoptera. However, the French entomologists said that this was unlikely. Another mentions several articles on the vision and sleep of insects by the Hon. Richard Hill of Jamaica, and still another deals with a butterfly vivarium. As a rule, entomology did not occupy much space in the *Annuals* and was apparently overshadowed by its sister sciences.

#### PIERRE JOSEPH MICHEL LORQUIN (1797-1873)

Pierre Joseph Michel Lorquin, French lawyer, naturalist and traveler, attracted by the discovery of gold in California, left Algiers, where he was stationed, and arrived in California around 1850, his family coming two years later. However, the idea of gold was probably not so uppermost in his mind as the possibility of being able to explore first the virgin fields toward which he was heading. Lorquin stayed until 1859, and during his stay he collected over the whole length of California in search of butterflies and moths which he sent to his friend J. A. Boisduval, the distinguished French Lepidopterist and physician to the Lorquins. While in the state, he became acquainted with the scientists of the California Academy of Sciences, and especially H. H. Behr, who became his close friend following their meeting in 1852. Lorquin's love of collecting led him to the Philippine Islands, China, and other Asiatic places. At Java he contracted a fever and upon his recovery he returned to Paris, France, in 1865. After more travels in southern France and Spain, he returned to Paris in 1872 and died there on February 8, 1873. He was born in Valenciennes, France, July 2, 1797, and graduated from the University of Douay. Lorquin's activities added much to the sparse knowledge of the Lepidoptera of California. A few of his specimens went to H. H. Behr, A. Guenée, and to A. R. Grote and C. T. Robinson, but most of them to Boisduval.

#### POPULAR ENTOMOLOGY

The first half of the nineteenth century in America was unproductive with respect to popular entomology in the magazines, and it was not until after 1850, at which time *Harper's New Monthly Magazine* was established, that we find popular articles on insects taking their places in the increasing number of magazines and newspapers. In the first thirty-two volumes of *Harper's*, numerous accounts of insects appeared, sometimes illustrated by grotesque woodcut figures. Nearly all the more important insects were written about and their entomology was generally sound. Ants, bedbugs, bees, cicadas, cockroaches, cotton insects, crickets, mosquitoes, silkworms, termites, thrips, wasps, fleas, fireflies, Hessian fly, locusts, katydids, and others parade through the pages usually under straightforward titles, but sometimes under titles designed to arouse the interest of readers, such as "Musicians of Field and Meadows," "The Musicians of Our Woods," etc. Many of the articles are unsigned. A few are signed Alanson J. Prime and others, C. Taylor. Mr. Prime, in addition to his insect articles, contributed on other subjects such as "Fortune Telling" and "Why Our Minister Didn't Marry."

#### CHARLOTTE DE BERNIER TAYLOR (1806-1861)

Charlotte de Bernier Taylor was undoubtedly the author of many more than those bearing her name, because many of the papers exhibit a similarity of treatment. This lady was born at

Savannah, Georgia, in 1806. She came of distinguished English ancestry, her father, a merchant and planter, having been the first to send a steamship across the Atlantic. She was educated at Madame Binze's fashionable New York school and was married to James Taylor in Savannah, April 27, 1829, after she had completed her education by a tour of Europe. She became quite skilled in writing entomological articles and in making observations upon insects, and her papers were always acceptable to several leading journals. She illustrated them herself and was at times assisted by her daughters. Her first published efforts were printed in 1853-54, in *School Fellows*, a Boston magazine for boys and girls. In 1858-59 she wrote "Microscopic Views of the Insect World" for Orange Judd's New York *American Agriculturist* and in 1858 she became a contributor to *Harper's Magazine*. Her papers were not always confined to entomology but embraced other subjects. She died November, 1861.

#### MICHAEL H. SIMPSON (1809-18??)

Michael H. Simpson, of Saxonville, Massachusetts, contributed to the codling moth and plum curculio literature of the time by his paper in the *Magazine of Horticulture and Botany* (vol. 16, No. 6, June, pp. 256-261, 1850) entitled "The curculio and codling moth; their habits, and the best means of preventing their ravages upon fruits." To control the curculio, he jarred the trees after he had placed cotton cloth, on a frame, beneath the tree. He also placed a frame over the tree and covered it with worsted netting, but this was expensive. Reporting on his experimental work he wrote,

"I showered the trees before the buds broke with white wash with a hand engine, covering the branches entirely . . . If this does not answer the purpose, I shall syringe the fruit when but little larger than a common white bean. My experiments have convinced me that this latter method is a sure preventive."

When it came to the codling moth, he saved a number of apples by placing a piece of beeswax over the "eye" of the apple, but a better plan was to syringe the fruit with whitewash so that the "eye" was filled with it. He believed that this prevented the female moth from depositing eggs. In addition he wrote that he had discovered a trap for the larvae. Noticing two or three larvae crawling upon a piece of cotton cloth that had been thrown accidentally into the crotch of an apple tree, his curiosity led him to look further and to his surprise he found thirty larvae which had spun their cocoons. He advised placing the cloth in the tree about June 28 and examining it every three weeks.

Michael H. Simpson, a manufacturer, was born at Newburyport, Massachusetts, on November 15, 1809. As a boy he worked in the counting house of Adams and Amory, Boston, later going into business for himself and becoming interested in trade with China, India, and South America, a large proportion of which involved wool. He invented a machine for separating the burrs from the wool, and also one for combing the fibers. In 1837 he and other Boston merchants formed the New England Worsted Company. In 1839, with machinery adapted by him, the company engaged in the manufacture of bunting and the first flag of American bunting was made at Saxonville, near Framingham, where their mills were established.

#### AUGUSTUS ADDISON GOULD (1805-1866)

Under the editorship of A. A. Gould, M.A., there was published in Boston in 1851 by Griffith and Richardson a book entitled *The Naturalist's Library; containing scientific and popular descriptions of man, quadrupeds, birds, fishes, reptiles and insects: compiled from the works of Cuvier, Griffith and*

*Richardson, Geoffroy, Lacepede, Buffon, Goldsmith, Shaw, Montague, Wilson, Lewis and Clark, Audubon, and other writers on natural history.* Pages 801 to 867 are devoted to insects, their classification, habits, anatomy, external and internal, metamorphosis, with individual treatment for many species. These individual treatments are short except for such popular species as the grasshopper, bee, ant, etc. The information is general and somewhat disconnected. As usual, some popular misinformation occurs at intervals. The book was intended for the general reader and was inspired by the appearance in Europe of several good popular works.

At the December 6, 1854, meeting of the Boston Society of Natural History, Mr. A. A. Gould presented "A paper on the Orange insect" drawn up from notes made by the late Dr. W. I. Burnett. Burnett had spent the winter of 1853 and 1854, the last of his winters, in Florida, and while there he had investigated a species of *Coccus*, its natural history, structure, and its damage to orange. He also described the males and females. Under Gould's editorship, Burnett's notes appeared in the proceedings of the society (*Proc. Bost. Soc. Nat. Hist.*, vol. 5, pp. 108-110).

#### JOHN CASSIN (1813-1870)

In 1851 the periodical cicada made its appearance in the vicinity of Philadelphia, and a committee of the Academy of Natural Sciences of Philadelphia was appointed to study its habits and history. Mr. John Cassin called to their attention the fact that two species had been confused and that the one regarded as a smaller variety was a distinct species. Dr. J. C. Fisher described the new species as *Cicada cassinii* (*Proc. Acad. Nat. Sci. Phila.*, vol. 5, pp. 272-275) in a paper read on August 12, 1851, before the Academy, and written in cooperation with Mr. Cassin, who supplied notes on the new species and on *Cicada septendecim* L.

John Cassin was an eminent ornithologist who was closely identified with the Academy and with Philadelphia. Born at Chester, Pennsylvania, September 6, 1813, he moved to Philadelphia when twenty-one and eventually became the head of a lithographing firm. For more than thirty years he devoted all his leisure time to the study of birds. In September, 1842, he joined the Academy and became interested in its management. From 1849 to 1852 he was corresponding secretary; in 1842 he was elected curator and in 1864, vice president, holding both positions until his death. He wrote over fifty papers of a descriptive, analytic and synoptical nature, including a volume on the birds of California and Texas and papers on ornithology of various exploring expeditions. He was familiar with Old World forms and described new species from Africa as readily as those from America. Many of the plates illustrating his new birds were made in his lithographing and engraving establishment, in which he first worked under Mr. Bowen, a noted Philadelphia engraver. He died in Philadelphia on January 10, in his fifty-seventh year.

#### JAMES C. FISHER

In 1859, James C. Fisher, M.D., published a paper, "Descriptions of a New Species of *Argynnis*" (*Proc. Acad. Nat. Sci. Phila.*, vol. 10, pp. 179-180) which had been taken near Schooley's Mountain, Morris County, New Jersey, and which he named *Argynnis astarte*.

#### C. J. SPRAGUE

Before the Boston Society of Natural History on September 1, 1852, Mr. C. J. Sprague read a paper on "*Araujia sericifera* and a description of the structure by which this plant captures insects that feed on its honey" (*Proc. Bost. Soc. Nat. Hist.*, vol. 4, pp. 250-251).

## GEORGE HENRY PERKINS

At the April 21, 1852, meeting of the Essex Institute, Dr. G. H. Perkins gave an interesting account of several species of ants whose habits he had observed in tropical Africa. He mentioned their destructiveness, but not their names (*Proc. Essex Inst.*, vol. 1, pp. 20-21). Doctor Perkins was also the author of *The Family of John Perkins of Ipswich, Massachusetts*, printed in 1837. George Henry Perkins, the educator and naturalist, one time (1886) state entomologist of Vermont and author of reports on the injurious insects of Vermont, was also a descendant of John Perkins, who came to Boston from England in the same ship with Roger Williams in 1630.

## SPENCER FULLERTON BAIRD (1823-1887)

When Spencer F. Baird, one time Secretary of the Smithsonian Institution, Commissioner of Fish and Fisheries and prolific and outstanding author of scientific papers on mammals, birds, reptiles, fishes, geology, mineralogy, paleontology, anthropology, exploration, etc., etc., etc., was twenty-nine years of age, he wrote in cooperation with others (not named) "Directions for collecting, preserving and transporting specimens of natural history prepared for the use of the Smithsonian Institution." This was published in the *Smithsonian Institution Miscellaneous Contributions* (vol. 2, art. 7, 40 pp. illus.) in 1859.

Among the directions for skinning, preserving and stuffing birds, mammals, reptiles, etc., and methods for preserving vertebrates, invertebrates, nests, the preparation of skeletons, marine life, fossils, minerals, etc., insects receive a comparatively small amount of space. The apparatus for the collector of such specimens was supposed to consist of a pocket vial, bottles of ether for killing, insect pins, apparatus for capturing insects, cork-lined boxes, and a pocket note book:

"The harder kinds may be put in liquor, but the vessel or bottle should not be very large. Butterflies, wasps, flies, &c., should be pinned in boxes, or packed in layers with soft paper or cotton. Minute species should be carefully sought under stones, bark, dung, or flowers, or swept with a small net from grass or leaves. They may be put into quills, small cones of paper, or in glass vials. They can be readily killed by immersing the bottles, &c., in which they are collected, in hot water, or exposing them to the vapor of ether. Large beetles, however, can generally only be killed by piercing with some poisonous solution, as strychnine.

"When possible, a number of oz. or 2oz. vials, with very wide mouths, well stopped by corks, should be procured, in which to place the more delicate invertebrates, as small, crustacea, worms, mollusca, &c."

Boxes, with their bottoms lined with cork or soft wood, were to be used in transporting insects. To kill insects the use of a broad-mouthed vial containing a piece of camphor was recommended, or better, a sponge soaked in ether. Specimens were to be transferred to other bottles after killing. If not hairy, the insects could be killed by immersion in alcohol. Against dermestids the use of camphor or a few drops of creosote was recommended. Wingless insects, such as spiders, scorpions, centipedes and earth worms, were to be preserved in "alcoholic liquor."

## COLLECTING TECHNIQUES

At the January 8, 1852, meeting of the Essex Institute (*Proc.* vol. 1, p. 17) Dr. Henry Wheatland exhibited specimens of Goliath beetles from the cabinet of the Institute and made some observations on their history, habits and commercial value. These specimens had been presented previously to the Institute by Dr. George H. Perkins. Doctor Wheatland organized the Institute and was its secretary for twenty years before his presidency of twenty-five years began.

In the early days, killing one's captured insects was somewhat laborious for the collector, although at the time he probably did not so consider it. J. P. Kirtland in the *American Journal of Science and Arts* in 1852 (vol. 63, No. 38, March, pp. 286-287) gave "An improved method of killing and preparing lepidopterous insects for cabinet specimens," in which he said that compressing the thorax, puncturing the thorax with a needle dipped into oxalic acid, killing with ether, chloroform, or sulphur fumes, were all objectionable because they impaired the beauty of the specimens and mutilated them as well. His improved method was to puncture the thorax once or twice with a needle, dipped previously in a strong solution of potassium cyanide. He advised also that, in order to prevent oily exudations and to preserve colors, the abdominal contents should be removed and replaced by cotton. Detailed directions were given for the dissection, stuffing and sewing-up of the body.

## JARED POTTER KIRTLAND (1793-1877)

In the same year, 1852, Kirtland described and figured the two lepidopterous species, *Libythea bachmanii* and *Macroglossa balteata*, from Ohio, in the *American Journal of Science* (vol. XIII, Ser. 2, pp. 336-338). Two years later, in the same journal (vol. XVII, Ser. 2, p. 444) he gave additional information about the same species. Other papers by him on Lepidoptera appeared in the *Proceedings of the Cleveland Academy of Natural Sciences*. In 1857 he wrote "On the larvae of *Thyreus abbottii*" (*Proc. Acad. Nat. Sci. Phila.*, vol. 9, p. 148), which he had reared, and took occasion to say that, with all respect to Harris and to Swainson, neither their figures nor descriptions of *T. abbottii* (Lep. Sping.) bore the least resemblance to the true larva.

In *Cincinnati* (Vol. 2, No. 7, pp. 305-308) there is an illustrated article by him on "*Aegeria exitiosa*, or peach tree worm," from the *Western Farmer & Gardener*. The life-history of the borer is given, then Say's original description and finally remedies. Aromatic oils, tobacco, sulphur, coal ashes and coal tar were used, with partial success, to repel the moths, but they needed replacement often. Another adult deterrent was tansy and wormwood. A half-dozen sprouts of these plants were to be planted in the spring, nearly in contact with the trunk of the peach tree and so as to surround it. During the summer, they were supposed to be cultivated and they were also supposed to form a permanent protection. At the end of his article is a statement, probably from the pen of the editor, saying that worming twice a year, with a knife, followed by the application of strong soapsuds or coal tar, was the best remedy.

Jared Potter Kirtland was born at Wallingford, Connecticut, November 10, 1793, receiving his early education in the academy there, and at Cheshire. As a young man he was interested in horticulture and as a result his scientific interests developed. While helping his cousins in rearing silk worms, he discovered that the female moths isolated from males were capable of depositing fertile eggs. Fifty years later the work of Siebold and Steenstrup demonstrated parthenogenesis in insects. In 1810 Kirtland went to Poland, Ohio, to which place his father had moved in 1803, Kirtland remaining with his grandfather, Dr. Jared Potter, a distinguished physician of Wallingford, Connecticut. On his way to Poland, he stopped at Buffalo and studied the fish fauna of Lake Erie, which work finally developed into his monograph on the freshwater fishes of the west. During his year's stay at Poland, he taught school, studied the botany of the region and experimented with bees, an avocation which he pursued for some sixty years. Returning to Wallingford, he continued his interest in natural history and entered the medical school of Yale

College. On account of poor health he left at the end of a year and enrolled in the medical school of the University of Pennsylvania. However, in 1815 he returned to Yale and was graduated there. He practiced medicine at Wallingford for two and half years and in Durham, Connecticut, to which place he moved in 1818, for five years. In 1823 he moved to Poland, Ohio, where he found a more extensive field and where he practiced until 1837, when he became professor of the theory and practice of medicine in the Ohio Medical College at Cincinnati. In the meantime he served three terms in the state legislature. In 1837 he also was appointed as assistant on the Geological Survey of Ohio and later he prepared a report on the geology of the state and a catalogue of fishes, reptiles, mollusks and birds of Ohio. In 1837 he also purchased a fruit farm at Rockport, west of Cleveland, where he built a home.

He was one of the founders of the Cleveland Medical College, where he taught for twenty years, and the first and only president of the Cleveland Academy of Sciences, founded in 1845 and continued as such until 1865, when its name was changed to the Kirtland Society of Natural History. To this organization he donated his collections, including a very fine one on birds. He was active as an officer in medical and horticultural organizations and contributed much to the periodical literature of his time. His first papers, illustrated by himself, were published in the *Journal of the Boston Society of Natural History*. He was married thrice, and died in December, 1877, at the age of eighty-four. His entomological paper that attracted the most attention was "Notes on the Diurnal Lepidoptera of western Ohio." He corresponded with Harris about entomological matters and in the *Proceedings of the Cleveland Academy of Natural Science*, 1845 to 1859 [1874], pages 189-194 are two letters from Harris to Kirtland.

#### CHARLES GIRARD (1822-1895)

The first annual scientific bibliography published in the United States was issued in 1852 by the Smithsonian Institution as *American zoological, botanical, and geological bibliography for the year 1851* by Charles Girard. Fifteen of its sixty-five pages are given to entomology and included are such authors of entomological papers as Agassiz, Burnett, Cassin, Hill, Fisher, Kirtland and LeConte.

Dr. Charles Girard was a physician who graduated from Georgetown College in 1856. In connection with his medical studies he made scientific studies at the Smithsonian Institution, where he remained until 1860 when he visited Paris. The Civil War delayed his return to Washington and he was commissioned to supply the Confederate army with drugs and surgical instruments. In 1863 he toured the southern states and in 1865 he returned to Paris where he practiced medicine for fifteen years, living at Neuilly-sur-Seine, near Paris. He was born at Mulhouse, France, March 9, 1822, and was educated in Switzerland. Then he was the assistant and student of Professor Agassiz until the fall of 1850, when he went to the Smithsonian Institution as assistant to Professor Baird. In 1854 he became a naturalized citizen. He was especially interested in the herpetology and ichthyology of North America and in 1861 he received the Cuvier Prize from the Institute of France. He wrote some eighty papers mainly on herpetology, ichthyology and helminthology, and he also described four species of orthopterous insects collected during the *Exploration of the Red River of Louisiana in the year 1852* by Randolph B. Marcy assisted by George B. McClellan, Washington, 1853. (U.S. 32nd Cong. 2nd sess. Sen. Ex. Doc. vol. 8, No. 54). He died in France, January 29, 1895.

#### JOHN LEWIS RUSSELL (1808-1873)

At the meetings of the Essex Institute, held on, December 3, 1853, January 19 and March 30, 1854, the Rev. John Lewis Russell read a paper "On the science and progress of entomology" in which he paid tribute to Say, Harris, Peck, etc., and in which he outlined the internal structure of various larvae and their activities. Mr. Russell was born in Salem, Massachusetts, December 2, 1808. He graduated from Harvard in 1828 and from the Theological School in Cambridge in 1831. He occupied pulpits in Chelmsford, Hingham, Brattleboro and various other places. He was an able botanist, being particularly familiar with cryptogamic flora. From 1845 to 1848 he was president of the Essex County Natural History Society and from 1848 to 1861, vice-president of the Essex Institute. For the last twenty years of his life he lived at Salem, where he occasionally preached. He died June 7, 1873.

#### R. HOWELL

In the *Proceedings of the American Association for the Advancement of Sciences* (vol. 7, pp. 179-181) published in 1856, Mr. R. Howell, of Nichols, New York, had a paper "On the wheat-fly and its ravages." This was a brief account of the first appearance of *Cecidomyia tritici* at Nichols, Tioga County, New York, in 1850 and its subsequent increase. Some life-history notes were given and an appeal was made to the members of the Association to study its periods of appearance and disappearance and its ravages.

#### BENEDICT JAEGER (1789-1869)

From the pen of Professor Benedict Jaeger, there appeared in 1854 his book *The Life of North American Insects*, characterized not long ago, in print, as "famous as the most worthless of all American insect books."

Professor Jaeger was born in Vienna, Austria, in 1789 and was educated in the University of Vienna. He entered the service of Alexander of Russia, who conferred on him the rank of Lieutenant-Colonel and placed had in charge of valuable collections in the Natural History Museum of the University of St. Petersburg. Upon the accession of Nicholas he was sent to explore the Crimea and embodied his researches in *Travels from St. Petersburg to the Crimea and countries of the Caucasus*. He subsequently visited Santo Domingo to collect specimens for the Imperial Cabinet of Natural History at St. Petersburg. References to his travels in these countries are found scattered throughout the pages of his book, *The Life of North American Insects* (1854), and the following extracts from this book enable one to secure glimpses of his entomological activities at that time. Writing about grasshoppers, he states:

"In 1825 the Russian empire was again alarmed by the appearance of an innumerable quantity of grasshoppers, of which I had the pleasure (if pleasure it may be called) of being an eye-witness.\* I left the city of Moscow in the beginning of the month of April, 1825, in order to visit the Crimea, the Caucasus and the countries lying between the Black and Caspian Seas. Passing through the well-cultivated States of Moscow, Orel, Rasan, Charkow, Kiew and Woronesch, the whole population of these States expressed in a lamentable manner their fear of perishing by famine on account of the enormous quantity of the then wingless grasshoppers which inundated the desert prairies between Kiew and Odessa and between the Don and the Volga towards Astrachan and the Caucasus." (p. 146).

"But the more majestic view of one of their flying swarms presented itself to me in Asia, in the Island of Phanagoria, after having crossed the Black Sea at Panticapacum, the modern city of Kertsch, on the Bosphorus." (p. 148)

[Description of the Natural Riches, Extent and Population of the Russian Provinces beyond the Caucasus. By B. Jaeger, Member of several Learned Societies, Leipzig, 1830.]

During his discussion of the Carabidae he says:

"The splendid, blue-colored, large Carabus (*Procrustes violaceus*) still brings to my mind the most pleasing recollections of the disinterested hospitality and affectionate kindness of the Tartars who dwell in the lovely Peninsula of the Crimea. It was in the month of June, 1825, that I visited that delightful country. The romantic valley of Baidary, covered with luxuriant and variegated flowers and a great variety of the most beautiful insects, offered me an immense field for collecting plants and insects, a catalogue of which I published in St. Petersburg in 1827." (p. 29).

While still on the subject of beetles he mentions the fact that,

"General Count Dejean, Aide-de-camp to Napoleon Bonaparte, was so anxious to increase the number of specimens in his entomological cabinet, that he even availed himself of his military campaigns for this purpose and was continually occupied in collecting insects and fastening them with pins on the outside of his hat, which was always covered with them."

After relating how General Dejean was struck in the head and knocked senseless from his horse and his specimens ruined by an enemy shot in the battle of Wagram in 1809, Professor Jaeger writes:

"Six years after this, in 1815, I met Count Dejean at Fiume on the Adriatic, and made several entomological excursions with him." (p. 49).

Further along he relates:

"The celebrated Prince Paul, of Wurtemberg, another passionate naturalist, whom I met in 1829 at Port-au-Prince, being one day at my house, shed tears of envy when I showed him the gigantic beetle *Actaeon*, which, only a short time before, had been presented to me by the Haitian Admiral Banajotti, he having found it at the foot of a cocoanut palm-tree on his plantation." (p. 49).

"During our frequent nature-historical excursions in the interior of St. Domingo, he often spoke of his prospect of being elected King of Greece, for which office he was a candidate, but, then he afterwards learned that the Emperors of Russia and Austria had rejected him on account of his radical principles, he became very low-spirited and even melancholy. So great, however, was his passion for entomological specimens, that a collection of one hundred species of splendid insects, made in one day, forever expelled all thoughts of the Grecian royal crown from his mind, and restored his former cheerfulness." (p. 50)

Professor Jaeger also traveled in Denmark as indicated by the following:

"In Altona, in Denmark, I became acquainted with a gentleman who raised in his conservatory several species of the large moths, natives of North America, as the *Cecropia*, *Luna*, *Polypheus* and *Promethea*, which he sold readily at two dollars apiece, and of which he raised on an average a thousand specimens a year." (p. 181)

In 1831 Professor Jaeger visited the United States, and in 1832 was engaged by the College of New Jersey, now Princeton University, to put the Zoological Museum in good order. In June of that year the College conferred on him the honorary degree of Master of Arts. In the following September he was appointed curator of the Museum and Lecturer on Natural History at a salary of \$200 per year. He was also appointed Professor of German and Italian to give instruction to such students as desired it. In 1836 he was appointed to teach French. In April, 1839, he offered the College his private cabinet of Natural History, consisting of about,

"150 specimens of mammalia, reptiles and birds, and a scientifically arranged entomological collection of about 2,000 specimens

which he had procured at considerable expense of time and money" (Minutes of Board of Trustees),

asking in return that his salary be paid in advance. His proposal was accepted. He resigned in September, 1841, and his account with the College seems to have been left in confusion, for in December, 1846, a committee of the Board was appointed to settle the controversy.

Following his resignation he was, according to his obituary in the *Brooklyn Eagle* (Aug. 18, 1869), invited by Hon. Joel R. Poinsett, Secretary of War, to go to Washington to assist in planning the Smithsonian Institution. This statement is probably not entirely correct for, upon requesting the Smithsonian Institution for information concerning Professor Jaeger's activities along this line, the following reply was received from Mr. H. W. Dorsey, Chief Clerk:

"Referring to your letter of November 8, I am authorized to say that, after careful search, no record can be found of Professor Jaeger's activities in connection with the inception of the Smithsonian Institution. The Institution was not established until 1846 but, in 1840, the Honorable Joel R. Poinsett organized the National Institution, and Professor Jaeger may have been associated with Mr. Poinsett in that work."

It was impossible to find anything showing how active Professor Jaeger had been in connection with the National Institution, but in the *Bulletin* of the Institution containing its constitution and list of officers and members, Professor Jaeger's name is mentioned in the list of corresponding members and his address is given as Princeton, New Jersey. According to the proceedings of the meeting of June 14, 1841, Professor Jaeger presented the library of the Institution with a copy of his *Analytical Table of a Course of Lectures on Zoology*.

According to the publication, "The Genesis of the U. S. National Museum," by G. Brown Goode (*Reps. U. S. Nat. Mus.*, 1891), the National Institution for the Promotion of Science organized in Washington May 15, 1840, "was for some years the most prominent exponent of the idea of a National Museum." For nearly eighteen years (1841 to 1858) the National Institution was the official custodian of the Smithsonian bequest and other museum materials belonging to the nation. On July 2-7, 1842, it was incorporated as the National Institute. On the occasion of the first annual meeting of the National Institute, April, 1844, members of the American Philosophical Society and the Association of American Geologists and Naturalists were present. The work of the Institute was highly commended and President Tyler held out the hope that the Government could "continue to it a fostering care" and expressed in a general way the hope that it should be identified in some way with the future National Museum and Smithsonian Institution. However, Congress adjourned without appropriating any money for its needs. This was a death blow from which the Institute never recovered. Mr. Poinsett declined reelection as President, publications were discontinued, and the list of 350 resident and 1,250 corresponding members grew shorter. An effort was made to revive it in 1847 and in 1855 it came into existence as a local scientific society.

In 1857 the Smithsonian Institution took over the collections which had been deposited with the National Institute except some objects directly under the control of the Institute. All of this material was housed in the Patent Office. In 1861, shortly before the Institute's charter expired, the remnants of the collection (much had been destroyed or stolen, having received no care while in the Patent Office) were turned over to the Smithsonian Institution by the Secretary of the Interior.

This ended the National Institute in which Professor Jaeger was

undoubtedly interested. From 1841 to 1845 he resided in Alexandria, D.C. [Va.], and this period included the stormy days of the Institute. For the next few years it is recorded that he was engaged in preparing a *Class Book of Zoology*. In 1849 he went to Providence, Rhode Island, where he resided over six years.

His *Class Book of Zoology* was printed in New York in 1849 and a third edition appeared in 1860. The complete title of this book is, *Class Book of Zoology, Designed to Afford to Pupils in Common Schools and Academies a Knowledge of the Animal Kingdom, with a List of the Different Species Found in the State of New York*. This work covers such subjects as mammals, birds, snakes, worms, insects, etc., and includes lists of the species designated by their common names. In his "List of some Insects" found in New York, 119 species in various orders are mentioned, and some of them, especially in the Coleoptera, can be recognized now. At the end of the book are various testimonials from his former associates and friends at the College of New Jersey, Alexandria, Washington, Trenton, New York and Brooklyn, testifying to his knowledge of natural history, to his ability as a linguist, to his gentlemanly deportment, his amiable disposition and his sober and industrious habits. From one of such testimonials it appears that Professor Jaeger once gave a course of lectures at the Rutgers Female Institution of New York, or Brooklyn. The *New York Tribune* of October 23, 1848, announcing a lecture by him before the New York Historical Society, speaks very flatteringly about him.

His book, *The Life of North American Insects*, in the preparation of which he was assisted by H. C. Preston, M.D., was first issued in parts, six in all, each with a colored plate. The title page of the bound volume, which was printed at Providence by Sayles, Miller and Simons in 1854, bears the statement, "Published for the Author." This edition contains an account of the life of Sir Hans Sloane, M.D., founder of the British Museum, which is missing from later editions. The colored plates accompanying the first edition were, according to Professor Jaeger, "drawn and painted from nature" by his friend Washington Hoppin, M.D., "who occasionally relieved the monotony of professional life by this display of his native talent." (p. 41).

In the introduction Jaeger states that he is,

"about to lay before the North American public the fruits of my entomological investigations pursued for many years during my extensive travels in Europe, Asia and on this Continent."

He also states that at that time there were no general works on North American insects, except a few numbers of the *American Entomology* by Thomas Say; Major Leconte's *Iconography of some Genera of Butterflies* and Doctor Harris's elaborate report on the injurious insects of Massachusetts. He further remarks that it is his design "to make this work a valuable ornament for the parlor table as well as an instructive and amusing companion."

The entire book is written in a style which reminds one very much of the popular books on natural history published in England about 1830, in which natural history is sandwiched between anecdotes, personal reminiscences and semi-philosophical meanderings. Professor Jaeger's book, as he states in the introduction, is a very general work on insects, intended to be instructive and amusing. Nothing additional is claimed, and that it succeeded in this aim is indicated by the fact that three editions were published. It will not bear comparison at all with Harris's *Insects Injurious to Vegetation*, published in 1841, but it is believed that Professor Jaeger intended and was satisfied to reach a different class of readers. It was his idea to popularize entomology. The title of the book is rather misleading, because very little information is given about the life histories of North American insects.

Mistakes are evident, a few of which were apparently copied by later writers.

Returning to Professor Jaeger's movements particularly in the United States — on page 82 he writes:

"I had the pleasure of spending a week last summer at Bristol, at the residence of my esteemed friend Mr. Dimond, the President Governor of Rhode Island, whose acquaintance I made twenty-five years ago in Port-au-Prince when he was United States Consul for the Republic of Hayti [sic]."

Writing of the silkworm and expressing regret that the people of the United States were not more persevering and successful in raising their own silk, he says:

"I was happy to be able to purchase some fine silk handkerchiefs at Rapp's Economy, eighteen miles below Pittsburgh on the Ohio, which were manufactured there out of silk of their own raising." (p. 199)

While on the subject of dermestids, he says:

"The late General Andrew Jackson, President of the United States, presented me in 1834 with two large boxes of splendid beetles and butterflies, but, much to my regret, an opening them found the largest and handsomest specimens destroyed by this little enemy of naturalists." (p. 65)

On the subject of metamorphosis he writes entertainingly as follows:

"Such changes, however, are not confined to insects, but are also common throughout the animal kingdom, as well in the highest as the lowest classes, and would seem to be something more than a mere freak of nature. The daughter of a hairdresser in Paris, on account of her extraordinary merits, was made, by Louis XV, Duchess of Dubarry, with an annual income of a hundred thousand dollars, and the same individual, when eighty years old, was brought on a butcher's cart, clad in rags, to the scaffold, where she was beheaded." (p. 178).

Regretting "that in our so-called halls of learning so little attention is paid to the study of the objects of Nature," he writes:

"The fact that the study of Nature tends directly to the civilization of a nation was well understood more than a century and a half ago by that ingenious self-made man, Peter the Great of Russia. He conceived the idea that a love for this department of science would contribute much towards the civilization of his barbarian subjects, and accordingly he established, at an enormous expense, a large museum of Natural History at St. Petersburg; and in order to induce his whisky-loving subjects to go there, he ordered a glass of brandy to be presented to every visitor." (p. 71)

Writing of the periodical cicada, we find this statement:

"Now it is a fact that during my twenty-two years' residence in this country not a single summer has passed without my seeing some of these red-eyed Cicadas in one or other of the States, and hence I must maintain that the name 'Seventeen-years Locust' is neither correct nor proper." (p. 95)

In the 1859 and 1864 editions of his book (published by Harper and Bros., New York) he still sticks to this statement, but includes a letter from Doctor Harris, dated January 10, 1855, in which it is explained that, while the periodical cicada appears only once in seventeen years in the same place, it may occur in other places during other years.

Both the 1859 and 1864 editions, while written in the same style as the first, contain much additional matter, the portion on economic insects having been taken from Doctor Harris's *Insects Injurious to Vegetation*, to which due credit is given. Both of these editions lacked colored plates and the less said about all of the illustrations the better. In the introduction, Professor Jaeger omits the statement appearing in the first edition, that it is his design to make the book a "valuable ornament for the parlor table,"

etc.

Professor Jaeger died from heart disease on August 17, 1869, at the residence of his daughter, Mrs. A. Haasis, Bedford Avenue, Brooklyn, New York, with whom he had resided for some time previous to his death. He was buried in Evergreen Cemetery.

In the library of Princeton University there is his *Analytical Table of a Course of Lectures on Zoology, Including Comparative Anatomy*, printed at Princeton in 1835, by R. E. Hornor; also his manuscript "Museum Neo-Caesariensis," dated Princeton, 1832. His *Analytical Table, etc.*, is a 48-page book, containing twenty-seven outlines of lectures on mammals, birds, insects, etc. About sixteen pages are devoted to insects. Each outline is a bare skeleton of suggestions on which the lecture is to be built, and is followed by a list of some of the species of animals found in the United States as examples for a discussion of their natural history. According to this book, Professor Jaeger was a member of the "Imper. Academy Naturae Curiosorum" at Moscow and of the Albany Institute. According to the *Proceedings of the Albany Institute*, Jaeger joined in 1833 as a corresponding member from Princeton.

The manuscript, "Museum Neo-Caesariensis," is a catalogue of the natural history specimens in the College museum. It consists of 32 pages (foolscap size), written in longhand, dated September 25, 1832, and signed by Professor Jaeger. Both scientific and common names are used except for the insects, and some items are followed by the names of the contributors. Eight hundred and forty-five items are listed. This number includes 63 species of mammals, 207 species of birds, 87 species of reptiles, 77 species of fishes, 108 specimens of shells, 51 specimens of starfish and 252 species of insects. The insects are listed as follows: Coleoptera, 34 species; Hemiptera, 14 species; Lepidoptera, 85 species; Neuroptera, 8 species; Hymenoptera, 13 species; Diptera, 3 species; Aptera, 6 species; 4 wasp nests and 85 species (probably various orders); all collected at Princeton by B. Jaeger and presented to the College. An effort to locate some of this material and also the Jaeger collection acquired by the College about 1839 was not very successful. It was suggested that probably these collections perished when the entire interior of Nassau Hall was destroyed by fire for the second time on March 10, 1855. However, Dr. Walter M. Rankin of the Department of Biology very kindly offered to try to locate some of this material and, under date of December 1, 1921, wrote in part as follows:

"I am quite positive that 19 of the 25 turtles are in our present museum, also 2 anteaters. These specimens would naturally be more likely to survive than alcoholic specimens or than the birds. It is probable that I may be able to locate other material after further examination. . . . I understand that these collections were probably housed in what is now known as Stanhope Hall, or in what was known as Philosophy Hall, now no longer in existence. I am inclined to doubt the probability of their having been placed in Nassau Hall and destroyed in the fire of 1855."

In the library of the New York Botanical Garden are six letters written by Jaeger to Dr. John Torrey, bearing dates from 1837 to 1842. In the one dated November 21, 1837, from Princeton, Jaeger proposes to send to Torrey a collection of his duplicate plants for the purpose of furnishing Torrey with material which could be exchanged with European correspondents. Jaeger states that his material was carefully prepared and that a large number of his specimens bear roots and fruits. He asks Doctor Torrey for an immediate answer if his proposal is accepted as he (Jaeger) has the duplicates packed and ready. This letter is signed "Your devoted friend, B. Jaeger," and is accompanied by a list of duplicates containing the names of 183 species and a list of desiderata numbering 186 species. In the letter dated September

13, 1838, from Princeton, Jaeger thanks Torrey for some plants and promises to send him a list of plants collected in Virginia, the western part of Pennsylvania and the vicinity of Princeton. Under date of November 3, 1838, Jaeger writes from Hopewell, New Jersey, referring mainly to one of Torrey's publications and regretting that he was unable to collect the money for subscriptions.

Under date of September 21, 1840, Jaeger mentions that, at the beginning of the vacation period, he sent Torrey a few tortoises for his little daughter and also a letter containing \$30 for his flora. In this letter (September 21, 1840) Jaeger enclosed \$3 which he had received from Professor Moffat at Lafayette College as a subscription. The remainder is devoted to plants and parts of Torrey's work which Jaeger wanted. Writing from Princeton, September 25, 1840, Jaeger acknowledges Torrey's letter of September 4 and also the receipt of a beautiful doll which one of Torrey's daughters had sent for Professor Jaeger's daughter, Fanny. In this letter Jaeger promises to send some tortoises and other articles to Torrey for his daughters cabinet of natural history. Among other matters, he acknowledges with thanks the invitation for him to consider Torrey's house his own if he should visit New York. The last letter is dated November 12, 1842, at Alexandria, D.C. [Va.], and informs Torrey that he (Jaeger) had advised a Lieutenant Fremont, who had collected plants in the vicinity of the Rocky Mountains, to send his collection of several hundred specimens to him to be named. Jaeger states that he examined a few specimens thought worthy of being looked at by Doctor Torrey and Doctor Gray. All of the letters are in the hand writing of Professor Jaeger and are signed by him.

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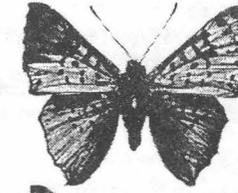
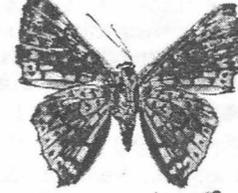
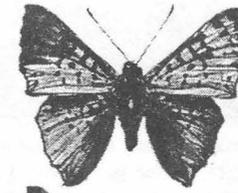
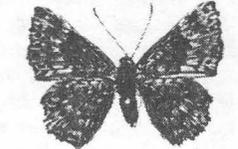
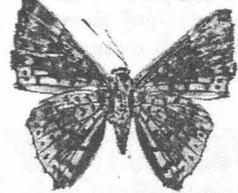
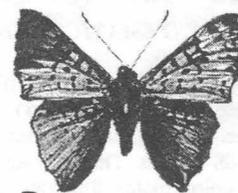
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# BOOK NEWS

## **A REVISION OF THE GENUS *Theope*: ITS SYSTEMATICS AND BIOLOGY (Lepidoptera: Riodinidae: Nymphidiini)**

by Jason P. W. Hall. 1999. 127pp (10 color pl.) (21 x 28cm). Scientific Publishers, Gainesville, FL. \$32.50 paper (\$20 for ATL members).

A thorough modern treatment of the complex Neotropical metalmark butterfly genus *Theope* is presented, covering 68 species. There are keys to species and notes on biologies. The 10 color plates illustrate all species. Two new species and two new subspecies are described; 15 lectotypes are designated. There are descriptions of all species, distribution maps and illustrations of genital characters.

## **THE BUTTERFLIES OF HONG KONG**

by M. Bascombe, G. Johnston, and F. Bascombe. 1999. 422pp, 222 color pl. (21 x 28cm). Academic Press, San Diego. \$239.95 cloth.

This large work covers 219 species of butterflies and skippers known for Hong Kong. As a reference, it will be useful for much of southeastern China. The color plates illustrate all species and most of their immature stages. Color figures are also interspersed throughout the text, photographed in the field. Genitalia are also figured. The text treats each species in considerable detail, and the introductory section covers all aspects of butterflies in south China.

## **GUIDE TO THE BUTTERFLIES OF THE PALEARCTIC REGION**

### ***Satyridae Part I. Subfamily Elymniinae: Tribe Lethini***

by G. C. Bozano. 1999. 58pp (21 x 29cm). Omnes Artes, Milan.

\$50.00 paper. Available from Flora & Fauna Books, Gainesville, FL. This first part of a planned series on Palearctic butterflies treats the Satyrinae as a family. In this part, the genera *Lasiommata*, *Pararge*, *Lopinga*, *Kirinia*, *Chonala*, *Tatinga*, *Rhaphicera*, *Ninguta*, *Neope*, *Lethe*, and *Neorina* are included. Each of the 73 species treated is illustrated in color in the text, with text notes on diagnostic characters, range and distribution map, and references. Biologies and hostplants are not mentioned. Each genus begins a new page, with diagnostic characters and a list of Palearctic known species. Genitalia of all species are illustrated. Palearctic regions of China and Nepal are included.

## **DIE LARVEN DER EUROPÄISCHEN NOCTUIDAE**

by H. Beck. 1999. 2 vol. (864 + 448pp) (21 x 30cm). Verlag Eitschberger, Marktleuthen, Germany. DM 560 (ca. \$329.00) (cloth).

The two volumes of the present work will be added to shortly with a third part with over 200 color plates showing larvae in nature, and another part with an English summary. All European Noctuidae are treated. The text describes the larva of each species and provides diagnostic line drawings of the larvae. Text is in German.

## **INSECTS OF KOREA**

### **2. Illustrated Catalogue of Tortricidae in Korea**

by B. K. Byun, Y. S. Bae, and K. T. Park. 1998. 317pp (8 color pl.) (19 x 26cm). Ctr. Syst. Ent., Chuncheon. \$60.00 (cloth).

A complete revision of Korean leafroller moths, treating 350 species. Genitalia of all are illustrated. Text is in English, with species diagnoses, distributions and hostplants.

### **3. Illustrated Catalogue of Noctuidae in Korea**

by V. S. Kononenko, S. B. Ahn, and L. Ronkay. 1998. 507pp (38 color pl.) (19 x 26cm). Ctr. Syst. Ent., Chuncheon. \$80.00 (cloth).

This part covers 961 species of owl moths of Korea. There are 14 new species described, plus numerous taxonomic changes. The text only gives distributions, synonymies, and some taxonomic notes.

## **MARIPOSAS DE CANARIAS**

by M. Báez. 1998. 216pp (15 x 21cm). Edit. Rueda, Madrid. Price ca. \$34 (paper).

This is the first color guidebook to the Lepidoptera fauna of the Canary Islands. Moths, with enlarged figures of micros, are included. There are life history photos for each family, followed by the text and color figures for 323 species of moths and butterflies.

## **MARIPOSAS DIURNAS Y NOCTURNES DE ANDALUCÍA**

by M. Díaz. 1998. 344pp (70 color pl.) (15 x 22cm). Centro Andaluz del Libro, Sevilla. Price ca. \$34 (cloth).

This field guide treats the butterflies and moths of the province of Andalucía, Spain. Text is in Spanish. There are 100 pages of general introduction on Lepidoptera. The faunal section treats about 500 species, each with a brief text opposite one of the 70 painted color plates.

## **PAPILIONIDAE Y PIERIDAE DE MÉXICO: DISTRIBUCIÓN GEOGRÁFICA E ILUSTRACIÓN**

by J. E. Llorente-B., L. Oñate-O., A. Luis-M., and I. Vargas-F. [1998]. 229pp (28 color pl.) (21 x 28cm). Univ. Nacional Autónoma México, Mexico City. Price? (paper).

This book is a distribution compendium of all records of Mexican butterflies of Papilionidae and Pieridae, plus distribution maps. There are 28 color plates of exceptional paintings of the species treated. There is no identification text or notes. Text is in Spanish.

## **HANDBOOK OF ZOOLOGY. IV. ARTHROPODS: INSECTA.**

### **LEPIDOPTERA, MOTHS AND BUTTERFLIES. 1: Evolution, Systematics, and Biogeography**

edited by N. P. Kristensen. 1999. 487pp (21 x 30cm) (Series Pt. 35). W. de Gruyter, Berlin. DM398.00 (ca. \$249.00) (cloth).

This new volume in the famous *Handbuch* series is written in English instead of German, and covers the classification of Lepidoptera, with chapters on Lepidoptera evolution and biogeography. Volume 2 will cover Lepidoptera morphology, physiology and development. The text covers the classification, major characters, and biodiversity of each family and superfamily in detail, and with many figures. The work is the product of cladistics by a team of 29 specialists, resulting in some unusual new arrangements and a host of monobasic superfamilies.

## **BUTTERFLIES IN MACAU**

by E. R. Easton and W. W. Pun. 1999. 36pp (15 x 22cm). Univ. Macau, Macau. Price? (paper).

This color booklet is the first guidebook specifically on the butterflies of Macau, the small former Portuguese island near Hong Kong. Text is in English and Chinese. Various color photos are interspersed in the text for each family discussion. At the end, there is an annotated catalog to all species known for Macau, 85 species, with notes on hostplants.

## **ATLAS DES GENITALIA MÂLES DES LÉPIDOPTÈRES.**

### **TORTRICIDAE DE FRANCE ET BELGIQUE**

by J.-P. Chambon. 1999. 400pp (20 x 28cm). Inst. National Recherche Agronomique, Paris. Ffr. 570 (ca. \$105.00) (paper).

This new work treats the male genitalia of leafroller moths from France and Belgium, a total of 643 species. There are 2,554 enlarged figures. There is no accompanying text except for a short introduction in French, covering genital morphology, and keys to genera for the region.

## MEETINGS

- 1999 Lepidopterists' Society, August 4-8, Sierra Vista, Arizona, USA  
2nd International Conference on African Lepidoptera, November 4-5, Cape Town, South Africa
- 2000 Association for Tropical Lepidoptera: April 14-16, Gainesville, Florida, USA  
Societas Europaea Lepidopterologica, May 28 - June 1, Białowieża Forest, eastern Poland  
XXI International Congress of Entomology, August 20-26, Iguazu Falls, Brazil

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