

LEPIDOPTERA **NEWS**

June 1998

No. 2



ATL 1998 Annual Meeting

The 1998 annual ATL Lepidoptera Symposium and Annual Meeting was held April 17-19 (group photo captions are on p. 2). Our 1998 guest speaker was Dr. Philip J. DeVries, author of the recent books on Costa Rican butterflies, and professor of biology at the University of Oregon, Eugene, Oregon. Other contributions were by Ronald Boender (Butterfly World, Coconut Creek, FL) and Jaret C. Daniels (Univ. of Florida, Gainesville, FL), Thomas C. Emmel (Univ. of Florida, Gainesville, FL) and George T. Austin (Nevada State Museum, Las Vegas, NV), Daniel Petr and Dale L. Clayton (Southwestern Adventist Univ., Keene, TX), Mark H. Salvato (Univ. of Florida, Gainesville, FL), and J. Mark Scriber, Mark D. Deering, et al. (Michigan State Univ., East Lansing, MI) (see paper abstracts on page 5).

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

The 1998 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 \$300 Grand Prize for the overall top point winner: Butterfly World (Coconut Creek, FL), Expedition Travel (Gainesville, FL), and Scientific Publishers (Gainesville, FL) each donated \$100 towards the Grand Prize for the 1998 ATL Photo Contest. Winners of the 1998 ATL Photo Contest were (scores are shown at left):

BUTTERFLIES

First Prize:	Perisama emma (Nymphalidae), Venezuela (V. Suter)	376
Second Prize:	Smyrna blomfildia (Nymphalidae), Ecuador (L. Simon)	366
Cyresti	s acilia (Nymphalidae), Papua New Guinea (G. McWilliams)	366
Third Prize:	Caligo eurilachus (Nymphalidae), Costa Rica (L. Simon)	363
IMMATUR	ES	
First Prize:	Automeris harrisorum (Saturniidae), Bolivia (C. Conlan)	375
Second Prize:	Titaea lemoulti (Saturniidae), Ecuador (K. L. Wolfe)	360
Third Prize:	Caligula thibeta (Saturniidae), India (C. Conlan)	357
MOTHS		
First Prize:	Neoris huttoni naessigi (Saturniidae), Turkey (K. L. Wolfe)	379
G 101		

F Second Prize: Vegetia ducalis (Saturniidae), South Africa (K. L. Wolfe) 378 Third Prize: Copaxa flavina miranda (Saturniidae), Bolivia (C. Conlan) 375

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GRAND PRIZE WINNER

Neoris huttoni naessigi (Saturniidae), Turkey (K. L. Wolfe)

ATL EXPEDITIONS: Jan 1999 – CHILE: deserts, high Andes and the Lake District!

LEPIDOPTERA **NEWS**

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JOURNAL SEPARATES (1990-95 only): \$1 first page, 25¢ each added page. Specify author and citation. Past journal issues: \$10 each (1990-92), \$15 each (1993-95), \$20 each (1996-97). TL News: \$5 per year. CONTENTS for the journals will be issued in 1998. **EXPEDITIONS:**

CHILE (Santiago, Concepción, and Lake District) January 1999 VENEZUELA: cancelled due to lack of progress, or any decision, on the permit process from the Venezuelan government.

TO OUR READERS

Our 1998 ATL Annual Meeting was another highlight for the year. We had a number of interesting papers, particularly from our student members. We also had our first ATL guest speaker, as well as the first presentation of our two ATL awards: the Henry Bates Award to Jon D. Turner, for his extensive efforts in conservation of Lepidoptera habitat in Brazil, and the Jacob Hübner Award to Eugene Munroe, for his many years of work on the Pyralidae and other moths.

The 1998 ATL Photo Contest also was most interesting. Surprisingly, however, even with the higher prize awards and the addition of a valuable Grand Prize, the number of entrants was about the same as last year. Remember, you now have nearly a year to prepare for the 1999 contest!

> J. B. Heppner **Executive Director**

NOTES

1. 1999 Annual Meeting: originally proposed for Venezuela, at the site of the meetings of the Entomological Society of Venezuela and the Florida Entomological Society, in Coro, July 1999, the Florida Ent. Soc. decided instead to meet in Puerto Rico and the ATL Board of Directors, following the member survey results, opted not to have a non-Gainesville meeting. It seems best for most members not to consider the expense of a foreign trip to attend an ATL meeting. Also, the Gainesville venue offers an annual meeting site that is convenient for many; not all members will ever find the meeting time or location perfect. The 1999 meeting will be April 30-May 1 in Gainesville.

2. ATL Trip to Venezuela: this trip had to be cancelled due to the lack of any progress in Caracas with getting the permit situation settled in Venezuela. Individual visitors can still do research in Venezuela, particularly through our friends at the Universidad de Central de Venezuela, in Maracay. A group trip presents more problems unless a specific research project is involved. Those wishing to go on their own, please contact Dr. Heppner in Gainesville, or Dr. José Clavijo in Maracay, Venezuela.

3. 1999 Annual Photo Contest: Do not forget to get your best photos ready for the 1999 ATL Photo Contest! Members are welcome to enter up to 4 photographs (8x10 in) taken in nature in each of three categories: butterflies, moths, and immatures. We now accept photos of temperate or tropical species. Prizes now total \$750 (\$150 first place, \$75 second place, \$25 third place, in each category), plus an added special Grand Prize of \$300 for the overall top point winner.

NOTE: we will not accept computer-generated photos (or scanned photos printed with color printers) as prize entrants or for the 3x5 inch copies.

4. DUES: The dues remain the same for members making timely payment (postmarked before the end of December each year): still \$65 for both journals. Single journal (either Holarctic Lepidoptera or Tropical Lepidoptera) dues remain at \$40 per year. It is \$75 for both (or \$45 for one journal) only as the cover price and for members not paying on time. Please help us out by paying on time!

5. ATL Home Page: see it at http://www.troplep.org.

1997 ATL ELECTION RESULTS

The return of ballots for the 1997 ATL elections was exceptional, with 216 ballots received before the end of December. Results are as follows: President:

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Dr. Boyce A. Drummond, III 131

Dr. Allen M. Young

Congratulations to Dr. Drummond for his election as ATL President for 1998! The Vice-President (Dr. Thomas C. Emmel) and the Secr./Treas. (Dr. John B. Heppner) were re-elected; there were 2 write-ins, as well. No Board members were up for election this time.

GROUP PHOTO: 1998 Annual Meeting (front page)

Front row (kneeling): 1. Milton Taylor (Anderson, SC). 2. Mirian Medina Hay-Roe. 3. Leroy Simon (Belleview, FL). 4. Vanessa Heppner. 5. Boyce Drummond (Florissant, CO). 6. Philip DeVries (Eugene, OR). 7. George Austin (Las Vegas, NV). Front row (standing): 1. Hugo Kons. 2. Dan Petr (Keene, TX). 3/4. Ron & Grace Boender (Ft. Lauderdale, FL). 5. Jaret Daniels. 6. Mark Salvato. 7. Tom Emmel. 8/9. Jon & Nancy Turner (Huntsville, AL). 10. Enis Alsan (St. Petersburg, FL). 11. Jeff Slotten. 12. Jason Hall. 13.-?. 14. Keith Willmott. 15. John Heppner. Back row: 1. Mark Deering (E. Lansing, MI). 2. James Nation. 3. Jane Ruffin (Rosemont, PA). [break] 4. James Adams (Dalton, GA). 5. Paul Milner (Pisgah Forest, NC). 6. Mark Scriber (E. Lansing, MI). 7. Paul Moore (Chicago, IL). 8. Akers Pence. [all from Gainesville unless noted otherwise].



Photographs: 1) Left to right: Patrice Leraut, Dr. Claude Lemaire, and Dr. Joël Minet (upper left photo). 2) Dr. Claude Lemaire in front of the Entomology building of the Museum (photo, upper right). 3) Front view of the Entomology buildings at 45 rue du Buffon, Paris (photo, lower right).

During a short visit to the European Lepidoptera meetings in Malle, Belgium, in March 1998 — the biennial meeting of the Societas Europaea Lepidopterogica (SEL) — a brief stop was made at the entomology collections in Paris, France. The Museum National d'Histoire Naturelle, in Paris, has one of the largest Lepidoptera and insect collections in the world, particularly strong in European, Asian, and African material, as well as considerable New World specimens. Dr. Joël Minet is now head Lepidoptera curator for moths, while Dr. Bourgogne has been curator for butterflies. Mr. Patrice Leraut was met while at the Museum: he is a frequent visitor and "Correspondent" of the Museum. Likewise, Dr. Claude Lemaire, of Gordes, southern France, was in Paris also, as he often does to study types and other specimens of the Saturniidae he works on. Readers will know of his work on New World Saturniidae: he is now finishing the fourth and final volume of his series.

The photos above show some views of the entomology buildings

and the persons just noted. The natural history museum was laid out over 200 years ago in a park on the left bank of the Seine, not too far from the famous University of Paris. Today, the Museum is in a park-like grounds for the main buildings and exhibition rooms. The entomology section is in a later expansion area that faces the Rue du Buffon just opposite the Museum park. The entomology buildings also house an excellent public exhibition on insects, besides the research collections. The Lepidoptera collections are in the older building shown to the right in the photo above (lower right).

ANNUAL REPORT 1997

WEWDERSHIP (Decem	per 31, 1997)			
	Total	USA	Other Nations (77)	
Life Members	86	33	53	
Benefactors	2	2		
Patrons	3	2	1	
Sustaining Members	33	18	15	
Regular Members	901	485	416	
Basic Members	98	64	34	
Exchanges	65	4	61	
Members resigned (removed)	4 (63)	3 (31)	1 (32)	
Died	6	1	5	
TOTAL	1261	643	618	

FINANCIAL SUMMARY

RECEIPTS AND EXPENDITURES

ASSETS		1997	RECEIPTS		1997
Current Assets			Cash (from previous year)	13,809.84	
Net Funds (cash Dec 31)	17,368		Member Dues	34,517.00	
Foreign Currency Dues	1,724		Life Memberships	10,000.00	
Publications Stock ¹	461,495		Newsletter Dues (Basic only)	295.00	
Endowments	27,900		Foreign Currency Dues	1,127.00	
Book Reserves	16,250		Grants	31,124.75	
Computer/Office Equipment	10,056		ATL Expeditions	3,000.00	
Grant remainders	8,325		Contributions	876.00	
Total Current Assets		543,118	Conservation Donations	4,831.50	
Other Assets			Publication Sales	3,630.92	
Memberships Due	66,700		Program Services (page charges)	8,894.50	
Life Memberships Due	5,750		Interest	2,894.64	
Payments Due	16,335		Annual Meeting	204.10	
Page Charges Due	21,316		Advertising	210.00	
Total Other Assets		110,101	Misc.	891.88	
Total Assets		\$ 653,219	TOTAL RECEIPTS		\$ 116,307.13
LIABILITIES			EXPENDITURES		
Current Liabilities			Conservation Projects	5,577.45	
Printing Invoices	15,422		Research Projects	25,944.48	
Supplies/misc.			Research Grants (grant supported)	5,000.00	
Total Current Liabilities		15,422	ATL Expeditions		
Other Liabilities			Journal Printing ²	27,207.75	
Notes Due	3,000		Newsletter Printing ²	3,226.71	
Total Other Liabilities		3,000	Photographic Costs	561.80	
Total Liabilities		18,422	Book Stocks ²	1,671.25	
			Postage ³	10,975.07	
BALANCE		\$ 634,797	Fees	471.10	
		and the second second	Office Equipment	960.61	
The 1997 Annual Report is presented	herewith Membersh	nip growth in 1997	Supplies	4,995.15	

The 1997 Annual Report is presented herewith. Membership growth in 1997 was offset by considerable reductions due to resignations and removal of 63 members in arrears more than 5 years. Conservation donations came in at a lower level in 1997, primarily as special funds dedicated for conservation projects in Brazil (Rondonia) and Florida, but special grants were received (mainly earmarked for Schaus swallowtail conservation research in Florida).

The Society still needs your further added support in contributions for the Publication Fund or General Fund. Also needed are new members, as well as past dues from members in arrears (now amounting to over \$72,000!). Books published included 3 parts of the worldwide *Lepidopterorum Catalogus (new series)*. The overall balance seems very high, but members are reminded that this is primarily in unsold back stocks of books and journals, not cash.

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LEPIDOPTERA NEWS

\$ 88,891.03

\$ 27,416.10

1,549.66

225.00

525.00

J.B.H

Research Equipment/Supplies (grants)

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.

Advertising

Misc.

BALANCE

Interest (notes/debts)

TOTAL EXPENDITURES

3. Includes postage for advertising.

Annual Meeting

ASSOCIATION FOR TROPICAL LEPIDOPTERA 1998 ANNUAL MEETING – April 17-19 ABSTRACTS

1998 INVITATIONAL SPEAKER: Philip J. DeVries (Oregon State University, Eugene, Oregon)

Ecology and Evolution of Butterfly-Ant Symbioses

Butterfly caterpillars in the families Riodinidae and Lycaenidae may form symbiotic associations with ants where caterpillars provide secretions in exchange for protection against invertebrate predators. A summary shows that caterpillars of both these families have morphological and behavioral characters that enhance and maintain ant association, including the widespread ability to produce acoustical calls. Experimental evidence demonstrates the consequences of not producing calls, and the mechanisms by which riodinid caterpillars produce calls. Acoustical characteristics of caterpillar and ant calls suggest a striking level of convergence among these unrelated groups. Finally, fossil evidence demonstrates directly that obligate riodinid-ant symbioses were extant at least 20 million years ago.

Ronald Boender (Butterfly World, Coconut Creek, Florida) and Jaret C. Daniels (University of Florida, Gainesville, Florida)

Seasonal Polyphenism in *Eurema proterpia*: Phenotypic Variation and Climatic Correlation (Lepidoptera: Pieridae)

Changes in forewing length, hindwing tail length, and proboscis length were quantified using individuals from a population of *Eurema proterpia* maintained in south Florida over a 6 month period of seasonal transition. Dry season individuals were significantly larger and displayed longer hindwing tails and proboscis lengths than wet season forms. No significant differences between the sexes were observed. Regression analysis using temperature and rainfall data collected during larval development showed that approximately 35% of the phenotypic variation could be accounted for individually by the temperature and rainfall experienced in the two weeks prior to eclosion.

Mark D. Deering and J. Mark Scriber (Michigan State Univ., East Lansing, Michigan)

Differential Mate Selection by Males of Two Swallowtail Species: Papilio glaucus and Papilio canadensis

The species, *Papilio glaucus* and *P. canadensis*, have a narrow hybrid zone between them. Hybrids of both species are viable, and suitable hostplant is found to either side, therefore no clear reason exists that hybridization should not extend the hybrid zone. Mate preference as a reproductive isolating mechanism may account for the narrowness of the hybrid zone. Research conducted in Florida, Ohio, Kentucky, and Michigan attempted to determine this. In Florida, *P. glaucus* males chose conspecific, yellow morph females for copulation 93% of the time (n=69). However, in northern Michigan *P. canadensis* males did not chose conspecific females. Out of 493 copulations (21 different pairing combinations), the heterospecific *P. glaucus* females were chosen 82.3% of the time.

Thomas C. Emmel (Univ. of Florida, Gainesville, Florida) and George T. Austin (Nevada State Museum, Las Vegas, Nevada) Butterfly Diversity at Fazenda Rancho Grande/FAUTRON Rain Forest Reserve and Conservation Efforts in Rondônia, Brazil

The Fazenda Rancho Grande and FAUTRON Rain Forest Reserve in central Rondônia, Brazil, support the world's greatest biodiversity of butterflies, now totalling approximately 1,800 recorded species. The pressures of development and deforestation in the surrounding area are immense, and there is little doubt that without the Reserve, no sample of this incredible biodiversity would remain today. Current faunal data are compared to other Neotropical and Old World rainforest sites, and an evaluation of future needed conservation measures is made.

Daniel Petr and Dale L. Clayton (Southwestern Adventist Univ., Keene, Texas)

Butterflies and Larval Hostplants of the Hawaiian Islands

The butterfly fauna of the Hawaiian Islands is reviewed. The fauna consists of 15 extant species. Vanessa tameamea (Nymphalidae) and Udara blackburni (Lycaenidae) are the only endemic species in the island chain. Vanessa tameamea feed primarily on the endemic mamaki, Pipturus albidus (Urticaceae). Udara blackburni feeds primarily on the endemic koa, Acacia koa (Fabaceae), at upper elevations, and on the indigenous a'ali'a, Dodonea viscosa (Sapindaceae), in lower elevation woodlands where koa does not grow. The remaining 13 species of butterflies, including two skippers, are not native to the islands. In addition, one nymphalid species (Vanessa indica) has been intercepted in the islands and destroyed. One hesperiid species (Polites sabuleti) is known only from a historical record. The white form of Danaus plexippus is discussed as an interesting feature of the Hawaiian butterfly fauna. Photographs of adults, larvae, and larval hostplants are featured. Discussion includes notes on biology and distribution.

Mark H. Salvato (Univ. of Florida, Gainesville, Florida) Fires, Pinelands and Conservation Biology of Endemic Florida Keys Butterflies

The Florida leafwing, Anaea troglodyta floridalis (Nymphalidae), and the Bartram's hairstreak, Strymon acis bartrami (Lycaenidae), are both endemic to south Florida and the Lower Keys. Their status and that of their shared hostplant, woolly croton (Croton linearis), have been the focus of a year-long study in National Key Deer Refuge, in the Lower Keys, and at the mainland elevated rise, Long Pine Key, in Everglades National Park. The historic ranges, current distributions, and butterfly communities for each species are discussed. Factors influencing current populations are habitat loss and mismanagement, lack of prescribed burns, and effects of pesticides on refuge lands. Possible solutions to these problems, and alternatives to mosquito spraying, are discussed for Little Pine Key.

ACADEMIC DRY-ROT STILL ALIVE AND WELL IN 1998 (Time to Confront the Jackals, Again)

by Noel McFarland

P. O. Box 955, Hereford, AZ 85615

NOTE FROM EDITOR: ATL life member, Noel McFarland, sent this as a letter to the editor. By way of preface, the following explanatory comments are noted from his accompanying letter:

"I am enclosing herewith some observations and quotations that may amuse you no end! If you feel like publishing it, it could go in as a long letter to the Editor, or, perhaps under some other heading. If you feel it is too outspoken, please note the exact wording of the first sentence in the opening paragraph!

"Long ago (4 decades, in fact!), when I was an undergraduate at the University of Kansas, in Lawrence (1958-61), I used to send occasional articles to the *University Daily Kansan* student newspaper, where they would appear under a column entitled 'Sound and Fury.' This present contribution could well be placed under exactly that same heading today; it is certainly in that vein! At Kansas University, I attacked (with great glee) a badly *dry-rot*-infested zoology professor who had a particular dislike for me (the feeling was mutual!); he is now long dead.

"Anyway, as I state in the opening of the enclosed article, this particular topic has long been a personal soap-box of mine. I feel more strongly about it with every passing year (Mellowing? No way, not on this particular subject!). You will find the results of this particular lack-of-mellowing enclosed. I hope you enjoy reading it as much as I enjoyed writing it! I really should have written this 10 or 20 years ago, which might have toned down the present explositon a bit (but I doubt it): sort of like doing periodical prescribed burns in chaparral or forest lands to lessen the impact and intensity of less frequent 'burns'?

"In fact, I have not sent anything like this off for publication since Kansas University days. I will be glad to take full credit for any and all flack this piece may generate, if you decide to run it in full! In any event, I wanted you to see it first and to have the option of a "first refusal." Personally, I would really like to see it printed in full, and especially with no cuts in the priceless quotes from Barbour and Wheeler.

"P.S.- Please do keep up the wonderful 'productions' you have launched (i.e., the 'beauty magazines'), and *the more color and beauty, the better*; that's precisely what it's about ('true science' will not suffer one little tiny bit)! And, for those who *crave* endless graphs, charts, tables, and mathematical formulae — the 'chair-polishing graph-worshippers,' as my dear old friend, Dr. Edmund C. Jaeger, humble and top-class botanist and desert naturalist, used to call them with a sneer! (he was of the Wheeler-mold, not an admirer of snobs and nit-pickers, and far too busy *studying* the denizens of the desert world to waste his time with such people) — they can always turn to the *other* 95+% of the journals out there; they won't be disappointed."

I wish to make clear that the explosion being given vent below has been *steadily building for nearly half a century*, and that it was not solicited by the editor of this (or any other) journal. All of my life I have known exactly where I stand on the topic of this article — which knowing has grown ever-stronger over six decades of studying Lepidoptera (McFarland, 1977, 1988), and even survived intact during a six-year foray into the halls of "higher" learning. Yes, I was once a member of the "Parrot Club" (see Salaman, 1994), but that was long ago. It now seems appropriate to air a few *long-suppressed* conclusions that I *suspect* are shared by many others (see Carr, 1997; Shah, 1987), but that few indeed seem willing to utter in public, let alone commit to print. It is high time that some "vitriol" (Heppner, 1998) from the *opposing camp* got sprayed into this arena.

Over the past few years I have been hearing of the totally predictable reactionary behavior of certain insecure "professionals," mindlessly directing their overflowing sarcasm and condescension at the producers of a journal that dares to commit the twin atrocities of (tsk-tsk, gasp): (1) offering a *larger* format than most (horror-of-horrors, it's magazine-size), and;

(2) using an abundance of quality *color* photographs (What? No mangled specimens in black and white?).

As J. Henri Fabre pointedly observed long, long ago (Teale, 1963):

"They [scientists] fear lest a page that is read without fatigue *should not* be the TRUTH."

This mentality has not altered in the least degree since the day Fabre felt compelled to record the above lucid observation; if anything, it has become steadily worse. Evolution indeed moves slowly (if at all?) in certain quarters of the academic community. One wonders if the *now-incubating* next generation of hapless *dry-rot* victims (Wheeler, 1928) will still be wheezing the same pathetic insinuations and tired refrains far into the 21st Century?

It is transparently clear that these individuals have little else of pressing importance to occupy their small minds, or they simply would not be able (or inclined) to find the *time* to contrive petty attacks aimed at those fellow lepidopterists who wish to celebrate and document the beauty that is so apparent all over this planet we inhabit (see Skutch, 1965) — and most particularly in the Order Lepidoptera! If it is a lack of beauty these unfortunate zombies crave in their lives, then let them seek it in the mass media, which relentlessly fills this apparent need; it's out there in abundance, and the extent to which one can choose to partake of it is limitless.

The perennial insinuation that needs to be addressed here is an (unspoken) assumption that any inclination or *ability to see and acknowledge beauty* somehow precludes or compromises any ability to observe or *accurately report* facts and phenomena of alleged scientific value: *these abilities are not incompatible!* There seems to be a need to keep re-introducing this concept every few years, whenever (as now) it becomes evident that a *new* infestation of *dry-rot* is proliferating. It is, of course, impossible to totally eradicate this virulent fungus, but that is what I am attempting here — con mucho gusto! (attacking windmills, no doubt).

Several minds far more erudite than mine have humorously addressed this tiresome topic in the past. Four of the more explicit of these were Dr. William Morton Wheeler of Harvard, Henry David Thoreau, J. Henri Fabre (who should need no introduction to any educated entomologist; see Teale, 1962), and the still-living ornithologist and top-notch observer ("naturalist" even, tsk-tsk), Dr. Alexander F. Skutch of Costa Rica. Their thoughts are worth listening to, so let's try to get into a mindset where listening to (even hearing and comprehending?) these thoughtful authors *might* become a possibility. This will be a painless (even hilarious) exercise for all but the near-terminal *dryrot* cases, and they will predictably skip over or "dismiss" all of the relevant passages anyway, *thus feeling no pain*, even if their steel cages do rattle a little.

The humbling experience of reflecting upon Wheeler's humorous insights cannot fail to enlighten anyone labeled "scientist" or "teacher" who has the *wisdom* to permit him/herself to read the *dry-rot* essay in its entirety. Of all the subsets (we need at least one buzz-word in this piece) most in need of this fresh air — if for no other reason than that we must endure their *entirely predictable pomposity* for who knows how many more decades yet to come — are certain fatuous and condescending graduate students and postgraduates, whose brains are often severely compromised by *dry-rot* (invariably unbeknownst to themselves).

Wheeler's recommendations (as quoted at length below) are a potential antidote to all but the very worst strains of *dry-rot*, if LEPIDOPTERA NEWS

only this "medicine" can be effectively administered before the disease has penetrated its host (and/or the entire department) too deeply, at which point the victims become highly infectious and are usually incurable. Not that the offering of these quotations from Wheeler and others will likely do much good (given that there will always be a certain percentage of arrogant, manipulative, and envious pedants amongst us), but it is both amusing *and cathartic* for those who feel exactly as I do on this topic; and, I might add, we are in very good company.

Most of the quoted passages that follow are from Wheeler's famous essay, but they need to be introduced by first quoting from Thomas Barbour (Museum of Comparative Zoology, Cambridge, Massachusetts), who wrote the Foreword to *Essays in Philosophical Biology* (1967), in which book Wheeler's *dry-rot* essay is reproduced for the third time since its original (oral) delivery in 1922. These quoted passages from Barbour are included here specifically for the elucidation of those who know nothing of Wheeler's scientific reputation and exhaustive entomological research, and would thus feel inclined to turn away and remain ignorant.

Now quoting Barbour, to be followed by five selected paragraphs from Wheeler's lengthy *dry-rot* essay (Wheeler 1928, 1967); quoting Barbour (in Wheeler, 1967):

"I suppose that some who pick up this book will ask why these essays have been reprinted. The first reason is, of course, that most of them are out of print and there have been many requests for nonexistent reprints. The second and much more important reason is the fact that these essays are utterly unique in the history of American biology. Unique because Wheeler was unique. No other naturalist born in this country, and but very few born elsewhere, was so versatile, so erudite and, at the same time, so marvelously gifted with a sense of humor which was pungent with gentle but very penetrating ridicule.

Wheeler wrote most of these essays in a spirit of fun and spent extraordinarily little time in their preparation. I do not think that he himself ever really rated them very highly for he was unbelievably modest and ill-equipped to appraise his own intellectual products. In talking of himself, as he often did, for we lunched together no less than 447 times between 1930 and 1937, and how many times before that I have no record, he always made it clear that he considered his taxonomic and ecological work of much more importance than anything else which he did and he rated artistry in taxonomy above all others of his powers. No one who knew him, or his work, can deny that his systematic work will last as long as there are entomologists and insects; on the other hand, still less could one deny that his vast range of varied reading, his penetrating knowledge of the classics, and his extraordinary familiarity with modern foreign languages in their utmost refinements, finds an outlet and expression in these articles which, from the very deathlessness of their quality, demand preservation in a more permanent form than he gave them in their original publication.

Wheeler loathed pedantry, sham, and self-advertisement more than any other of the baser attributes of mankind. How well I remember his delight when he came back from his last trip to Australia with a new word which he often used thereafter. In addition to 'flub-dub,' which he used for these evil qualities, he now had the word 'wowser' for their possessor; the tone of his voice, and the way the pupils of his eyes contracted to very pin points when he used these words, showed how deep and sincere was his abhorrence of what they, to his mind, conveyed.

It is really presumptuous to write an introduction to this little book. It needs none."

- Thomas Barbour

"You beat them and they give out dust like meal sacks. But who could guess that their dust came from corn, and the golden wonder of the summer fields?"

- (Wheeler, quoting Nietzsche)

"The natural enemy of any subject is the professor thereof \ldots . Thus educational systems become the chief enemies of education, and seats of learning the chief obstacles to the growth of knowledge \ldots . The power of the professor is revealed not so much by the things he teaches, as by the things he fails or refuses to teach."

- (Wheeler, quoting F.C.S. Schiller)

Now quoting Wheeler (1928):

"Undoubtedly the best culture medium for the academic *dry-rot* fungus consists of about equal parts of narrow, unsympathetic specialization and normal or precocious senile abstraction; and, as this medium is always present in many personalities that find their optimum environment in our universities, the outlook is depressing. A friend who has long been studying our institutions of learning maintains that our only salvation lies in discharging all of our faculties and burning or thoroughly disinfecting all the buildings every 25 years

"There is another suggestion I should like to make, in order that the freshman course may be preserved from *dry-rot*, which may invade even the most dynamic type of instruction, and that is the utilization by the instructor of competent amateur naturalists as occasional assistants. This seems never to have been tried, except in some of our summer camps and marine laboratories, and the reason is obvious: the typical professor has about the same liking for the amateur that the devil has for holy water, and the amateur habitually thinks of the professor in terms which I should not care to repeat (you will find a choice collection of them in Mencken's writings). The truth is that the amateur naturalist radiates interest and enthusiasm as easily and copiously as the professor radiates *dry-rot*.

"For years I have taken a malicious delight in introducing amateurs to professors, because the behavior of the latter on such occasions yields a precise quantitative test of the amount of Merulius in their timber. Dear, old, mellow, disinfected professors of the type of Louis Agassiz, Asa Gray, Shaler, Hyatt, and Ryder, enter at once into sympathetic rapport with the humblest amateur, but the young or those of middle age are almost invariably more or less priggish, condescending or worse. Now there is an opportunity to develop a mutual understanding and respect in both of these parties, so essential to the development of biological science, if the young instructors would only welcome and encourage the cooperation of the amateur in interesting his freshmen. We have all known amateurs who could make an enthusiastic naturalist out of an indifferent lad in the course of an afternoon's ramble and, alas, professors who could destroy a dozen budding naturalists in the course of an hour's lecture. The instructor who would from time to time call in some of our talented ornithologists, herpetologists, entomologists, or botanists to assist him, both in the laboratory and the field, would himself profit greatly, the significant human contacts of the students would be multiplied, and the amateur be given just the right environment in which to spread the divine fire of his enthusiasm.

"And this brings me in conclusion to what is perhaps the main source of our failure in incubating naturalists, and that is our too highly specialized, or esoteric attitude toward organic nature. Whether we contemplate the whole or only some particular portion of the realm of living things, it eventually tends to become for us merely so much material to be used in the solution of the many tantalizing problems which it suggests. We are, indeed, obsessed by problems. No doubt this is the correct attitude for the seasoned investigator, and no doubt a certain spirit of skeptical inquiry should be cultivated even in freshmen, but surely we should realize, like the amateur, that the organic world is also an inexhaustible source of spiritual and aesthetic delight. And especially in the college we are unfaithful to our trust, if we allow biology to become a colorless, aridly scientific discipline, devoid of living contact with the humanities.

"Our intellects will never be equal to exhausting biological reality. Why animals and plants are as they are, we shall never know, or how they have come to be what they are, our knowledge will always be extremely fragmentary, because we are dealing only with the recent phases of an immense and complicated history, most of the records of which are lost beyond all chance of recovery; but that organisms are as they are, that apart from the members of our own species, they are our only companions in an infinite and unsympathetic waste of electrons, planets, nebulae and suns, is a perennial joy and consolation. We should all be happier if we were less completely obsessed by problems, and somewhat more accessible to the aesthetic and emotional appeal of our materials, and it is doubtful whether, in the end, the growth of biological science would be appreciably retarded. It quite saddens me to think that when I cross the Styx, I may find myself among so many professional biologists, condemned for eternity to keep on trying to solve problems, and that Pluto, or whoever is in charge down there now, may condemn me to sit forever trying to identify specimens from my own specific and generic diagnoses, while the amateur entomologists, who have not been damned professors, are permitted to roam at will amongst the fragrant asphodels of the Elysian meadows, netting gorgeous, ghostly butterflies until the end of time."

- W. M. Wheeler (1928)

Now for a few parting shots from Yours Truly. Out of one side of their mouths they lament (the very lamentable fact of) the ever-diminishing numbers of students who elect to remain in the life sciences as a career; out of the other side, they mindlessly scorn and ridicule the very people (and approaches) that *could recruit and hold* at least some of those disappearing students!! What foresight and intelligence! The mind boggles (do we need a "Duhhh" here!?).

Meanwhile, the natural world that we all (supposedly) love quietly fades away via mass extinctions and a cancerous plague of air pollution, freeways, all-terrain vehicles, shopping malls, suburban breederies, *and all the other* byproducts of overpopulation and so-called development, while the "brilliant," the "clever," and the "witty" amongst us, sitting in their air-conditioned, fluorescent-lit offices, constructively busy themselves by throwing darts at the rare journals that graphically document a few small samplings of the very beauty (tsk-tsk, I said *that word* again) we are losing in the real world outside. Whose "side" are they on? Where is the wisdom and intelligence that is capable of comprehending the whole picture here?

In closing, is it asking too much to hope that these blind and negative *dry-rot* victims, who feel so compelled to ridicule those of us who are able to see and appreciate beauty (and are not afraid to say so), might someday emerge from their diapause in a state of perpetual hidebound cluelessness, out into the sunlight and what's left of the fresh air? Then, if they are *still* incapable of delighting in the beauty that will (unavoidably) be encountered there, they can always avert their eyes, or retreat back into their dreary offices and laboratories. If an effective treatment could be administered, they might even gain one or more of the following salient insights: (1) not all of us are infected with *dry-rot* like themselves; and thus (2) we do not *all* feel the same way they *assume* that we do about the topic of recognizing/documenting beauty in nature; and (3) there are many lepidopterists (even intelligent ones) who have not the least desire to hear anymore about this *pathetic mental hang-up*.

If the *dry-rot* victims cannot abide the "beauty magazines" (Heppner, 1998), then why are they wasting their precious time peeking into them!?

In closing, a quotation from Henry David Thoreau (1863) might not go amiss here (noted by Teale, 1962):

"I hardly know an *intellectual* man, even, who is so broad and truly liberal that I can think aloud in his society. Most with whom you endeavor to talk soon come to stand against some institution in which they appear to hold stock — that is, some particular, not universal, way of viewing things. They will continually thrust their own low roof, with its narrow skylight, between you and the sky, when it is the unobstructed heavens you wish to view."

And then Skutch (1983) felt compelled to remind us yet again, in slightly different words, just 15 years ago:

"To play our proper role in the cosmic order, we must keep our windows open, not only those of our dwellings but, above all, those of our spirits. We must permit no hard dogmas or hoary creeds to narrow our vision or trammel our inquiring minds."

A desire to recognize and celebrate beauty is not excluded from the windows and skylights defined above! Yes, *it is okay* to revel in all the incredible beauty that is regularly encountered during entomological research, even while relentlessly (and everso-seriously) investigating the unending stream of "problems" that can be invented — or while churning out ever-more-impressive graphs, charts, and tables. Lighten up, folks! Dare to permit a *smidgen* of joy and beauty into the process: Serious Science will not come crashing down as a result. *Try letting go of the fear*.

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NEW EDITION NOTICE

BUTTERFLIES OF KENYA, by T. B. Larsen. 1996 edition Following the original publication of this book in 1991, the paperback edition was published in 1996 with little notice given that it is in fact a revised edition. This situation is more than a bibliographic matter because added to the paperback edition is a 10-page supplement updating some species data and adding the descriptions of two new subspecies! This addendum is not in the table of contents, nor are the newly discussed species in the paperback index. The paperback edition is identical in all pages with the cloth edition except for this addendum on the new pages 491-500.

Personally, I find the release of this paperback edition without fully stating that it is really a second edition of the work, to be highly misleading and outside the realm of normal book publishing procedures. Although I blame the publisher most, since Oxford University Press should know better than to do this, the author also must bear some responsibility in adding new species names as an addendum to a book already previously published! The title page of the paperback also does not state that this is a second edition, as should have been done. Many persons probably are not aware that the paperback edition has this addendum and is, thus, a new edition of the work. The author should have published the new names in some scientific journal. His publication of some new names in the original cloth edition already was ill advised, since one does not expect new taxa to be described in popular field guides.

Normally, when a publisher issues a paperback edition of a book previously published as a cloth edition, one knows that the paperback is completely identical with the cloth edition. Thus, one need not buy the paperback either, since there is nothing new in it. So, one does not expect the new paperback edition to have an addendum added to it! The publisher does have a single sentence on the back cover of the paperback edition stating that some new data are added at the end of the book, but it appears that this fact was not well publisized. Consquently, this note to alert readers about the new edition. One hopes that the new taxa names are discovered by the Zoological Record database.

J.B.H.

LARGE COLLECTION OF LEPIDOPTERA

approx. 900 cases, 75,000 specimens, in sets Palearctic and African fauna

Palearctic Fauna: mainly Belgian and surrounding countries (ca. 238 cases). This part of the collection has considerable historical value. It was started before 1930, and contains numerous specimens of species now extinct, or confined to restricted areas. This part of the collection is particularly notable for the families Nymphalidae, Noctuidae and Geometridae. Among the genus *Colias* (Pieridae), many cases attest to the detailed studies of Dr. Fontaine, eminent entomologist, now deceased, which he investigated in Belgium. In particular, it includes the *Colias alfacariensis* biology, of which he gave the description and established the specific status. This part also includes specimens collected during several years in different regions of western Europe: Provence and Aveyron in France, and the Abruzzes in Italy.

African Fauna: generally from the Congo (ex Zaire), Rhopalocera, ca. 676 cases. The African Rhopalocera constitute the basis of the collection, some 40,000 specimens. Among those, three genera were particularly studied, and are well represented: *Cymothoe, Precis* (many types), and *Belenois*.

The collection is in Belgium, the property of Dr. Fontaine's widow. Interested parties should write to Mrs. Maurice Fontaine, 44 rue du Grand Pont, B-6001 Marcinelle, Belgium. Arrangements to view the collection may be made, given a short notice.

FINE BOOKS ON INSECTS WITH COLORED PLATES

ABBOT and SMITH.—Lepidopterous Insects of Georgia. 1797. 2 Vols. Folio. 104 plates. CRAMER and STOLL.—Papillons de l'Asie, de	\$ 85.00
l'Afrique, et de l'Amérique. 4 vols. 1779-82. And Suppl. 1787-91. 442 plates.	\$150.00
FELDER.—Revise der "NOVARA". 4 to. Lepidoptera: Rhopalocera, 1864–75. 74 plates.	\$125.00
FREYER.—Neuere Beitrage zur Schmetterlingskund. 1833–58. 7 vols. 4 to. 700 plates.	\$125.00
GORY and CASTLENAU.—Historie Naturelle et Icono- graphie des Insectes Coléoptères (Buprestides: Clytus).	¢
4 vols. 1837-41. 269 plates. HAHN and HERPICH-SCHAFFFER — Die Wanzenartigen	\$175.00
Insecten (Hemiptera). 9 vols. 1831–53. 324 plates.	\$125.00
HAHN and KOCH.—Die Arachniden. 16 vols. (in 4). 1831–48. 563 plates.	\$125.00
HEWITSON.—Illustrations of Diurnal Lepidoptera Lycae- nidae (including "Specimen")—1862-78 4 to 116	
plates.	\$100.00
OLIVIER.—Entomologie (Coleopteres). 1789–98. Folio. 8 vols. 363 plates.	\$250.00
PALISOT DE BEAUVOIS.—Insects recueillis en Afrique en Amerique, etc. 1805 (-21). Folio. 90 plates.	\$200.00
SAUSSURE.—Etudes sur Vespides. 1852–58. 3 vols. 77 plates (54 colored).	\$100 00
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LARGEST STOCK OF ENTOMOLOGICAL BC	DOKS

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JOHN D. SHERMAN, Jr.

132 Primrose Avenue, Mount Vernon, N. Y.

Savy book collectors and librarians will no doubt salivate at the prices in the above listing of rare books. This ad appeared in a 1931 entomological journal, for books offered for sale by the late John D. Sherman, a well known New York dealer in entomological books. The Abbot and Smith volumes currently would sell for perhaps \$60,000, and the Cramer and Stoll set for about \$25,000; at auction perhaps even higher! Quite a difference from the prices asked for in 1931! Even taking into account the yearly inflation of the US Dollar since 1931, one only comes to about at most a 20-fold increase in the prices listed above. Since most known copies are now in institutional libraries, the rarity of these books on the open market has since driven the prices much higher. If one only had a time machine to go back and buy them, or better yet, back to 1797 for a copy fresh off the press! However, nowadays we have color photocopying, whereby for a modest amount one can also have a copy of Abbot and Smith, as long as you can find a librarian willing to let you handle the original long enough to make the copy!

J.B.H.

DEATH REPORTED

Dr. Horst Seyer (*20 Apr 1914 - †30 Sep 1997), of Saarbrücken, Germany, died in September 1997. He published a few papers on European butterflies, between 1938 and 1985.

NEW HOSTPLANT RECORD FOR THE MONARCH BUTTERFLY (DANAUS PLEXIPPUS) FROM THE GALAPAGOS ISLANDS, ECUADOR (LEPIDOPTERA: NYMPHALIDAE: DANAINAE)

LAZARO ROQUE

Charles Darwin Research Station, Casilla 17-01-3891, Quito, Ecuador

The hostplants of the monarch butterfly, *Danaus plexippus* (Linnaeus), fall mainly within the Asclepiadaceae genera Acerates, Araujia, Asclepias, Calotropis, Gonolobus, Marsdenia, Matelea, Oxypetalum, and Stapelia (Ackery and Vane-Wright, 1984).

In the Galapagos Islands, eggs and mature larvae of the monarch were collected on *Asclepias curassavica* L. between 1995-97. This introduced weed occurs principally along the margins of roads and fields in the agricultural zones of Floreana, San Cristobal, and Santa Cruz islands. In 1997, the caterpillars that were collected on this plant completed development, the adults later emerging being of normal size and maculation as is typical for the species (Roque, in press). This hostplant record has been known for a long time; presumably, it was familiar to Fabricius as early as 1807 when he suggested the Latin binomen *Euploea curassivica* for the monarch!

During April 1997, 4th instar larvae of the monarch were also found eating young leaves of the Galapagos endemic plant, *Sarcostemma angustissima* (Anderss.) (Asclepiadaceae), on Floreana Island (near to Black Beach, 20m asl). These plants grow abundantly in open areas among trees of the *Opuntia-Bursera* forests in the arid zone of the Galapagos Islands (Wiggins and Porter, 1971). The caterpillars collected on this plant were subsequently reared out and normal adults were obtained. This observation is the first record of *D. plexippus* feeding on the milkweed genus *Sarcostemma* for the Galapagos Islands. Earlier, Scott (1986) had reported larval feeding on a related species of *Sarcostemma* in North America, but this was only for the related butterfly, *Danaus gilippus* (Cramer).

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THE PIONEER CENTURY OF AMERICAN ENTOMOLOGY

by H. B. Weiss

EDITORIAL NOTE

The 1936 release of Weiss' book, The Pioneer Century of American Entomology, was as a privately printed mimeographed edition of only 150 copies. It is questionable if his work is a published book, since it was mimeographed with simple typewritten type style, and the 320 original pages have the text on one side only. The author himself lamented in a postface to his work, that no commercial or university press would accept his manuscript in the 1930s and that he hoped his book would some day be published "in a more permanent form." In any case, the work has become scarce: personally, I have never seen it offered for sale in 30 years of book dealer catalogs; only recently has a copy been offered for sale at \$800! Thus, with this in mind, and the fact that his work contains considerable information on early entomology in the United States and Canada not often noted elsewhere, it seems appropriate to re-issue the work in the present revised format.

The work will be presented in issues of *Lepidoptera News*, one or two chapters at a time, then possibly reprinted as a finished book. Although much of the work consists of references to various insects and to entomologists not working with Lepidoptera, enough of it does deal with Lepidoptera to be of some interest to many of our members.

The original text has been followed throughout. The only revisions involve adding as section headings the names of persons discussed (birth and death years are added when known) and adding references by chapter for an enlarged bibliography, with full citations. Texts that Weiss reproduced from various sources have not been checked for accuracy, and are given as Weiss originally quoted them. Likewise, all facts stated by Weiss are given as in the original, and have not been rechecked for accuracy. A few text notations are added as needed, always noted in square brackets.

The original mimeographed version is a rather amazing testimonial to 1930s typing capabilities, in that hardly a single error can be noted, and this before our modern availability of computers to easily make instant corrections to errors in typing. One needs to remember that to make a mimeograph stencil in those days one would have to type the page perfectly; any error would require the re-typing of the entire page, since there was no easy way to correct any error once typed!

Harry B. Weiss (1881-1972) worked for many years as an entomologist, later Chief of Entomology, for the New Jersey Dept. of Agriculture, in Trenton, New Jersey. A biographical note of him can be found in the *History of Entomology in the Pennsyl*vania Department of Agriculture (Wheeler and Valley, 1975). Weiss had a great interest in early American entomology, and he published a number of biographical papers on various early entomologists. Perhaps his most notable work, besides the 1936 book, was his biography of Thomas Say.

It is hoped the present readable history of early to pre-1865 entomology in North America will again find an audience of interested readers, especially in a new generation of entomologists and naturalists. There are other histories of entomology, but none has presented this history in the same way as H. B. Weiss.

AUTHOR'S PREFACE

At the outset I may as well confess that the title of this book is not strictly indicative of its contents. I have attempted to cover a longer period than a century, and to trace the record of entomology from its beginnings in this country to the year 1865. The present title, however, has some good features. It is short, which will please bibliographers, and it has a pleasant sound. These were among the chief reasons for its selection.

In order to conform somewhat to the conventional idea of a preface, I suppose I should say something about the contents of the book. Henry Peacham, in his *Compleat Gentleman*, published in London in 1622, said,

"And ere you begin a booke, forget not to read the Epistle, for most commonly they are the best laboured and penned. For as in a garment, whatsoever the stuffe be, the owner (for the most part) affecteth a costly and extraordinary facing; and in the house of a countrey Gentleman, the porch, of a Citizen, the carved gate and painted postes carry away the Glory from the rest; so it is with our common Authors, if they have any wit at all, they set it like Velvet before, though the backe, (like a bankerupts doublet) be but of poldavy or buckram."

Without attempting to uphold Mr. Peacham's standard, I may say that in the following pages I have tried to set forth the facts which show that entomology in this country has a background, a background of observations, attempts, ideas, successes and failures. Some of it seems feeble in comparison with the science as we now know it, nevertheless it is the foundation of our present structure. This background involves the men, their work, their scientific societies and the journals in which their work appeared. Perhaps I have devoted more space to the men than to their work. If I have, the book as least will indicate the types of men who were responsible for the early development of entomology in America.

If we except the work of the early collectors and describers, entomology during the pioneer century showed no particular trend and no particular continuity in any direction. As a matter of fact, it spread in all directions, according to the curiosity and personal interests of its workers. Men who were pioneers in certain lines had no immediate followers who carried on intensively in their footsteps. And it was not until many years later that certain types of research engaged the attention of numerous workers.

I have no apologies to make for failing to mention a few stray contributors whose work was relatively unimportant. I believe that no one of importance has been omitted and I am sure that I have included many who have been buried in obscurity for many years.

Most entomologists are comparatively young. They do not appear to be historically minded. They are interested only in the present and perhaps in the future. Immediate problems engage their attention. But as they become older, as their activity declines or is diverted into channels requiring less exertion, they will begin to look backward. The habit is connected with a certain age, in spite of the fact that some individuals are able to hide it from the world in general. And so this book has been written, if you please, because I have reached a certain age. It was unavoidable.

The Author.

A few references to insects may be found in the accounts of the narrators and historians who accompanied the expeditions which sailed west from the shores of Europe to America during the century of maritime discovery (1492-1600). Although primarily actuated by the hope of discovering gold and even more gold and resorting to trade and barter when such hope was not fulfilled, the members of the fleets unwittingly came into contact with insects, especially species such as were numerous and annoying. Thus Fernandez de Oviedo, official chronicler of the Indies, mentioned in 1526 the numerous and cruel insects of the regions he visited. If one is interested in such stray references to insects, one should consult the works of Hakluyt and the numerous accounts of voyages reprinted in his honor by the Hakluyt Society.

THOMAS HARRIOT (1560-1621)

Although the first scientific explorations of the western continent were made by Spaniards and Frenchmen, the science of North America may be said to have begun with Thomas Harriot, an English mathematician and astronomer, a man of culture, a botanist, a zoologist, an anthropologist, and the author of a treatise upon algebra. Harriot, who was born at Oxford in 1560, graduated B.A. from Oxford in 1580. Soon afterward he entered Raleigh's family as a teacher of mathematics. At the age of twenty-five, he accompanied the expedition which sailed from Plymouth in 1585 under the command of Raleigh's cousin, Sir Richard Grenville, and which resulted in the inauguration of England's first colony in America. However, in addition to plowing and planting and exploring, the settlers quarreled among themselves and with the Indians, and became homesick. And so when Sir Francis Drake, fresh from plundering Cartagena and Santo Domingo, visited the colony on June 10, 1580, on his way to England, the discouraged settlers insisted upon going home with him, which they did en masse on June 19. Most of the colonists blamed their failure on the country, but not so Harriot. He had been commissioned by Raleigh to report upon the natural products of the region and it was he who first tried the Indian habit of smoking, and with immediate success. He was impressed also with the potato and urged its cultivation in England. He was delighted with the fertility of the soil and with the climate. And of the medicinal qualities of tobacco he wrote of its effect upon the Indians:

"And as by sucking it through pipes of clay, they purged all gross humours from the head and stomach, opened all the pores and passages of the body, preserving it from obstructions or breaking them, whereby they notably preserved their health, and knew not many grievous diseases, wherewith we in England are often afflicted."

His defense of the new country was published in London in 1588 under the title *A Briefe and True Report of the New Found Land of Virginia*. This, however, is a short title. In his treatise, Harriot described the Indians, their customs, the fruits, the roots, the birds, mammals, fishes, and alluded to the trees and shrubs. His views on the future of the commerce and industries of the region were broad and advanced. But of more immediate interest are his remarks upon the silkworm and its culture, which are quoted in full [Note: Old English spellings]:

"Worme Silke: In manie of our iourneyes we found silke wormes fayre and great; as bigge as our ordinary walnuttes. Although it hath not beene our happe to have found such plentie as elsewhere to be in the countrey we haue heard of; yet seeing that the countrey doth naturally breede and nourish them, there is no doubt but if art be added in planting of mulberry trees and others fitte for them in commodious places, for their feeding and nourishing; and some of them carefully gathered and husbanded in that sort as by men of skill is knowne to be necessarie; there will rise as great profite in time to the Virginians, as thereof doth now to the Persians, Turkes, Italians and Spaniards."

This appears to be his only observation concerning insects, but many entomologists may like to remember him in connection with his successful adoption of smoking and for his glowing testimonial of tobacco.

THOMAS MOUFET (1553-1604)

Dr. W. J. Holland, in the Scientific Monthly for July, 1929, wrote entertainingly of "The First Picture of an American butterfly" and of its historical connection with the Virginia colony. The picture in question, which is in the library of the British Museum, is of the male Tiger Swallowtail (Papilio turnus). It was painted by John White, commander of Sir Walter Raleigh's third expedition to Virginia in 1587 and a woodcut of the painting appeared in Thomas Moufet's Insectorum sive Minimorum Animalium Theatrum. The painting bears the inscription in Latin "Candidus the Painter, brought this to me from American Virginia, 1587" and Doctor Holland is of the opinion that the author of the inscription was Sir Edward Wotton, who gave it to Doctor Moufet who pasted it in the manuscript where it remains today. Wotton was one of the authors of Moufet's book, which was not printed until 1634.

Dr. W. T. M. Forbes, who wrote in 1928 under the title, "The First Insect Described from North America," (*Ent. News*, vol. 39, pp. 126-7) mentioned this same butterfly as being figured on page 98 of Moufet's work and referred to it as the large southern form of the Tiger Swallowtail (*Papilio glaucus australis*).

JOSEPH De ACOSTA (c.1539-1600)

At about the same time that Harriot's book appeared in London, Joseph de Acosta's *Natural and Moral History of the Indies* was published in Latin at Salamanca (1588): Acosta was a Jesuit father who had charge of the missionary stations in Peru from 1570 on. He went to Mexico in 1583 and finally to Spain in 1587. His book proved to be quite popular and was translated into Spanish, Italian, Dutch, French, German and English. Acosta discusses many things in his book— quadrupeds, trade-winds, humming birds, bananas, flying-fishes, how America became peopled and how he observed monkeys on the isthmus of Panama tie themselves together by their tails so they could cross a river. Of cochineal, silkworms and bees, he wrote as follows, according to the English translation (1604) of his work [Note: Old English spellings]:

Cochineal

"There is another sorte of Tunalls (thistles) which they esteeme much more, although it yeeldes no fruit, yet it beares an other commoditie and profit, for certayne small wormes breede in the leaves of this tree, when it is well husbanded, and are "hereunto fastned, covered with a certaine small fine web, which doth compasse them in daintily; and this is that Indian Cochinille so famous, and wherewith they dye. They let it drie, and being dried, carry it into Spaine, which is a great and rich marchandise. The arroba of this Cochinille or graine is worth many ducats. In the fleets, the yeare 1587, they did bring five thousand sixe hundred seventy seven arrobas, which amounted to two hundred four score three thousand seven hundred and fifty peeces, and commonly there comes every yeare as great a wealth.

Silkworms

"There were no mulberrie trees In the Indies, but such as were brought from Spaine, and they grow well, especially in the province which they call Misteca, nowhere there are silkewormes, and they put to worke the silks they gather, whereof they make very good taffetas.

Bees

"There are few swarmes of bees, for that their honniecombes are found in trees or under the ground, and not in hives as in Castille. The honny combes which I have seene in the Province of Charcas, which they call Lechiguanas, are of a gray colour, having little iuyce, and are more like unto sweete strawe, than to hony combs. They say the bees are little, like unto flies, and that they swarme under the earth. The hony is sharp and black, yet in some places there is better, and the combes better fashioned, as in the province of Tucuman in Chille, and in Carthagena."

JESUIT MISSIONARIES

In 1611, before the landing of the Pilgrims at Plymouth, the wandering missionaries of the Society of Jesus came to Nova Scotia and spread throughout New France, exploring the wilderness, undergoing hardships, and meeting everywhere with primitive conditions, and savages. The letters of these missionaries constitute a valuable supply of material for ethnologists, historians, and geographers, and to such workers The Jesuit Relations and Allied Documents, Travels and Explorations of the Jesuit Missionaries in New France, 1610-1791 is well known. To entomologists it is not so well known and it is hardly to be expected that the primitive entomological observations made by the missionaries and recorded by them in their letters will be of burning interest at present except to entomologists with antiquarian leanings. Nevertheless, it is necessary to call some attention to the fact that The Jesuit Relations contains numerous and for the most part brief references to insects, principally those injurious to garden products, mosquitoes, flies, fleas, fireflies, wasps, etc., many of them being troublesome to the Indians as well as to the missionaries.

RALPH HAMOR (15??-1626)

The English made many efforts to interest the Virginia colonists in the planting of mulberry trees and in the rearing of silkworms. And the possibilities of silk culture were uppermost in the minds of many settlers. Harriot, previously mentioned, was of course impressed with the native silkworms, probably the so-called giant silkworms of the family Saturniidae, embracing such species as the Io-moth, the Polyphemus-moth, the Luna moth, the Promethea moth and the Cecropia moth. The true Chinese silkworm *Bombyx mori* does not so far as is known and did not then exist in a wild state. Moreover, Harriot was not aware that the silk from the cocoons which he observed could not be reeled. However, he was correct in thinking that the climate was suitable because climatic conditions in the southern states are favorable for the culture of silk, regardless of other disadvantages.

Silk culture spread from China to Corea, Japan, to Constantinople in A.D. 555 and from there to Europe, Asia Minor and America. James I tried to introduce sericulture in England but the climate was not favorable and so in 1609 he attempted to develop the industry in Virginia, sending eggs and mulberry-trees, which however were lost by shipwreck. Later, the attempt was renewed and in 1615 we find Ralphe Hamor, Secretary of the Colony, in his book, A True Discourse of the Present Estate of Virginia and the success of the affaires there till 18 of Iune, 1614, which was published in London, telling about the successful introduction of silkworm eggs. He wrote [Note: Old English spellings],

"The silke wormes sent thither from England, in seeds the last winter, came foorth many of them the beginning of March, others in Aprill, Maye, and Iune, thousands of them grown to great bigness, and a spinning, and the rest well thriuing of their increase, and commodity well knowne to be reaped by them, we haue all most assurance (since sure I am) no Country affoordeth more store of Mulberry trees, or a kind with whose leafe they more delight, or thriue better."

JOHN BONOIEL (15??-16??)

At this time the rearing of silkworms was commanded by law and stipulated by bounties. In 1620 there was printed by Felix Kyngston at London Observations to be followed, for the making of fit roomes, to keepe silk-wormes in: etc. a 28-page book, and according to the opening paragraph, the directions were preliminary to a book which was going to be published exclusively to teach the "exact vsage and ordering of the Silk-wormes." The author of this treatise was John Bonoeil, master of the Royal Silkworks at Oatland. Bonoeil's original treatise in French was translated under an order of the Virginia Company and many copies were sent to Virginia. In order that no time might be lost, the present work dealt mainly with the lodgings for the caterpillars and with the planting of mulberry trees:

"The Chambers for to lodge and bring vp the Silk-worms in, must be made spacious, lightsome, pleasant, neate, and wholesome, farre from ill sents, damps, fogs, and humidities: warme in cold, and cold in hot weather," and so on.

Then follows more definite information relative to the distance from the ground, size of room, the necessity for air circulation, light, and a constriction tight enough to keep out mice, rats, lizards, crickets and other enemies of the silkworm.

Detailed directions are given for the growing of mulberry trees, the various kinds, the best kind to plant, time of planting, types of soil adapted to their growth, etc., and among other things it is stated that "A thousand weight of Mulbery leaues is sufficient to feed an ounce of seed in Silk-worms," and that an ounce of seed, if all conditions were ideal, would result in five or six pounds of silk. In France the cost of producing silk was rated at a fourth of the total receipts leaving a clear profit of 75 per cent to the owner. And in addition, the bark of the mulberry tree made good linen and cordage; the wood could be used for barrel hoops; the boughs were excellent for conies, the berries for poultry and the fallen leaves could be collected, boiled, and given to swine to keep them healthy. Such were the advantages dangled before the colonists, who were urged to plant mulberry trees extensively.

In the midst of such good advice, the unknown author repeats a recipe for making silkworms, which belonged to a former age. His directions are quoted as follows [Note: Old English spellings]:

"To this abouesaid shall be added and taught the way how to make Silk-wormes, which is reported by some, the experiment whereof is so much the more necessary to bee tryed, because there is great danger in carrying of the Silkwormes seed, so long a iourney by Sea to Virginia. For the Sea is much conttary (sic) to the nature of the Silk-worme seed and easily corrupts it, by reason of the moysture, and cold rawnesse, especially carried in winter time; and therefore it is very hard to send it by Sea in his perfection. Now then, besides the gathering together of the naturall Silk-wormes, said to bee in Virginia, (which out of all question must needs bee the best, both for worke, and for to haue good race of seed from them) you shall doe well to try this experiment commended by some Authors.

"In the Spring time, shut vp a young Calfe in a little Darlene and dry stable, and there feed it onely with Mulbery leaues some twenty dayes, meane while let it not drinke at all, nor eate any other thing; at the end of this time, kill it by strangling, and put it whole into a tub, to rot there, and couer it all ouer With Mulbery leaues: out of the corruption of this carcass, come forth abundance of Silkwormes, which you may take vp with the Mulbery leaues, they fastening themselves vnto them; these fed and handled according to art and common fashion, in their due time bring forth both silks and seed, as others. Some, to lessen this charge, take onely the leg of a sucking Calfe, and cut out of it as much flesh as weighes seuen or eight pounds, and putting it in some woodden vessell with Mulbery leaues about it, leauing it to rot, take the wormes comming out of the flesh, from the Mulbery leaues to which they cleaue, and so vse them in like manner as others. Considering, that Bees are made but of the rottennesse of a young Bull or Heifer, and according to the Scripture of the Lion, and that wee see daily many creatures come of putrifaction: this is no improbable thing, and therefore is worth the triall, to save the labor and danger of sending silk-worme seed by Sea-which to do well should be changed every four years."

The generation of silkworms from the flesh of a calf is a survival of the ancient belief in the generation of bees from the flesh of oxen. Pliny thought that the silkworm was generated from fallen flowers and Aristotle did not venture an, opinion on its origin. However, Olivier de Serres in his *Theatre d'Agriculture* which was published in 1600 mentions the spontaneous generation of silkworms from a calf and, although he found nothing improbable in the method, he thought that experimental proof should be forthcoming. After all, it is not strange to find this story appearing in the books of the period. One wonders if any of the settlers in Virginia had enough curiosity to try the experiment.

In 1622 there appeared in London, printed by Felix Kyngston, a hundred-page book which perhaps was the one referred to in the opening paragraph of Observations to be Followed, etc. This was entitled His Maiesties Graciovs Letter to the Earle of Sovth-Hampton Treasurer and to the Councell and Company of Virginia heere: commanding the present setting up of Silk-works, and planting of Vines in Virginia, etc., by John Bonoeil.

This letter, which occupies two and one-half pages, is addressed to "our cousin" and "Councellour, Henry, Earle of Southhampton, Treasurer of our Plantation in Virginia, and to our trusty and welbeloved, the Deputy, and others of our said Plantation" and is signed by Sir Francis Windebank, the English statesman and at one time Secretary of State.

The next two and a half pages are devoted to a letter from Henry, Southampton, to the "Treasvrovr Covncell and Company of Virginia, to the Gouernour and Councell of State in Virginia residing." This letter approves of and orders the wine and silk industry to be advanced. It was believed that the growing of grapes and silkworms would be profitable for the colony and for the kingdom, and any person who willfully omitted the planting of vines and mulberry trees was to be severely censured and punished. All favor and assistance was to be given to those who obeyed his Highness' commands. The letter goes on to state that formerly French experts in vine raising had been sent to instruct the colonists and that the present book was commended to them for the same purpose. The book was to be distributed over the whole colony, one to each master of a family. "Silk seed" came over on the same ship, sufficient for every one, so that nothing was lacking except industry, which the settlers were supposed to supply.

Following the two letters, John Bonoeil's treatise occupies the balance of the book. It covers the best site for a silk house—a place where the air comes from the dry, sweet earth—; the type of building in which to feed the worms—a long house in the form of a bowling alley—directions about the walls, windows, etc., the building of silk houses in greenhouses, the care of the silkworm eggs, young caterpillars, their feeding, the killing of the caterpillars by hot water, reeling the silk from the cocoons, and the care of mulberry tree. Directions are also given for separating male and female worms [Note: Old English spellings]:

"Now to know the male Worme from the female, (which cannot be well discerned till the Wormes bee growne great) you shall distinguish them by their heads, because the male Worme hath his head more wrinkled, having eyes, as a man would think; whereas the female hath her head round, with small appearance of eyes."

From page 36 on, Bonoeil's book deals with the planting and care of grape vines, the manufacture of wine, various phases of fruit growing, the agriculture of various countries and the profits to be made in silk culture. At one place he wants to know why mulberry trees and grapes are so neglected—all for a "smoakie Witch"—meaning tobacco.

EDWARD WILLIAMS

Another silkworm item is Virginia More especially the South part thereof, Richly and truly valued: viz. The fertile Carolana, and no lesse excellent Isle of Roanoak, of Latitude from 31. to 37. Degr. relating the meanes of raysing infinite profits to the Adventurers and Planters. The Second Edition, with Addition of the Discovery of Silkworms, with their benefit. And Implanting of Mulberry Trees. Also the dressing of Vines, the rich Trade making Wines in Virginia . . . , by Edward Williams. This was published in London in 1650. And according to Catalogue 3945, the Lothian Collection, of the American Art Association Anderson Galleries, Inc., in which the title page is reproduced, although Williams' name appears as author, the book was written by John Ferrar, of Geding.

JOHN FERRAR

Still another example of silkworm propaganda was published in London in 1655, This is The Reformed Commonwealth of Bees. Presented in severall Letters and Observations to Samuel Hartlib. Esq. With the Reformed Virginian Silkworm. Containing Many Excellent and Choice Secrets, Experiments, and Discoveries for attaining of National and Private Profits and Riches. The first part of this smaller quarto is taken up with accounts by ancient and modern authors of bee husbandry, bee hives, bee foods. honey, etc. The second part, extending through forty pages, is entitled, The Reformed Virginian Silk-Worm; Or, a Rare and New Discovery of A speedy way, and easie means, found out by a young lady in England she having made full proof thereof in May, Anno 1652. For the feeding of Silk-worms in the Woods, on the Mulberry-Tree-leaves in Virginia: Who after fourty dayes time, present their most rich golden-coloured silken Fleece, to the instant wonderful enriching of all the Planters there, requiring from them neither cost, labour, or hindrance in any of their other employments whatsoever. And also to the good hopes, that the Indians seeing and finding that there is neither Art, Skill, or Pains in the thing, they will readily set upon it, being by the benefit Thereof inabled to buy of the English (in way of Truck for their Silk-bottoms) all those things that they most desire (London, 1655).

The second part is addressed more or less to the planters of Virginia urging the cultivation of silkworms and calling attention to the larger profits in such an industry as compared with those in the growing of tobacco. Instructions are given for the planting and care of mulberry trees, the feeding of silkworms, reeling the silk, etc.

The last portion of the second part consists of letters and extracts advising Virginia planters to grow silkworms. One such letter, dated June 21, 1654, is from Edward Diggs in Virginia to his friend, John Ferrar, of Huntingtonshire. Diggs speaks of the difficulty of collecting enough mulberry leaves in the neighborhood of his plantation and of the falling off, due thereto, of his production to but 400 pounds of silk "bottomes" which yielded 7 or 8 pounds of silk in a day. Diggs wrote that he approved of Ferrar's last communication to the colony, advising a trial of the natural silkworm, but he said he could not find any such cocoons. Diggs thought that silk culture would not interfere too much with the planters' "too much beloved Tobacco" and that they could proceed with both.

Other letters all bear on silkworms, the feeding of them, etc., and all are enthusiastic. One in particular is from John Ferrar describing his daughter's experiments in feeding silkworms. Several poems close the account and from reading them one is impressed with the fact that the native silkworms were highly regarded as possible silk producers.

Several years later, Francesco Redi, in his *Esperienze Intorno* alla Generazione degl' Insette (1668) experimentally disproved the generation of animals in dead matter and wrote,

"But as I have not been able to observe, as stated, that the mulberry tree engenders silkworms, still less can I expect to see them breed in the decayed flesh of a mule, fed for twenty days on mulberry leaves . . . I do know by experiment, that the flesh of a kid, which had been fed on mulberry leaves alone, for twenty days, did not produce anything but worms, that were transformed into gnats."

In spite of all propaganda and in spite of all efforts, the colonists found tobacco to be a more profitable crop than silk. Attempts were made in the Carolinas and in Georgia, and considerable amounts of raw silks were exported to England from these colonies between 1735 and 1766, but from 1760 on, the industry declined. About this time silk culture was introduced into Connecticut and continued there for many years, the silk being used locally. In 1830 an effort was made to introduce the mulberry *Morus multicaulis* into this country and a craze developed over this tree and the supposed profits to be made from silk culture. Many people invested all their small savings, but in 1839 or 1840 the boom was over and the investors were poorer, and wiser.

JOHN SMITH (1580-1631)

While still on the subject of early Virginia, mention may be made of the entomological observations of that dashing adventurer, Captain John Smith — not in Virginia, however, but in the Bermudas, or, as he called them, the "Summer Isles." Although there are some who do not class John Smith with the truthful chroniclers, we are glad to set down what he wrote about mosquitoes, flies, cockroaches, ants and spiders in his *Generall Historie of Virginia, New-England and the Summer Isles*, published in London in 1624. The following quotation appears under a sub-heading "Generall Historie of the Bermudas, Now called the Summer Iles, from their beginning in the yeere of our Lord 1593 to this present 1624" [Note: Old English spellings]:

"Concerning vermine and noisome creatures, there are not many, but onely Rats and Cats there increased since the Plantation, but how they agree together you Shall hears hereafter. The

Musketas and Flies are also too busie, with a certaine India Bug, called by the Spaniards a Cacarootch, the which creeping into Chests they eat and defile with their ill-sented dung. Also the little Ants in summer time are so troublesome, they are forced to dry their figs upon high frames, and annoint their feet with tar, wherein they sticke, else they would spoile them all ore they could be dryed. Wormes in the earth also there are but too many, so that to keepe them from destroying their Corne and Tobacco, they are forced to worme them euery morning, which is a great labour, else all would be destroyed Certaine Spiders also of very large size are found hanging vpon trees, but instead of being any way dangerous as in other places, they are here of a most pleasing aspect, all over drest, as it were with Silver, Gold, and Pearle: and their Webs in the Summer wouen from tree to tree, are generally a perfect raw silke, and that as well in regard of substance as colour; and so strong withall, that divers Birds bigger than Black-birds, being like Snipes, are often taken and snared in them as a Net. Then what would the Silke-worme doe were shee there to feeds vpon the continuall greene Mulberry?"

WILLIAM WOOD (1629-1671)

Nine years after the "Mayflower" reached the New England coast, or in 1629, William Wood and his father and several other men settled in what in nor known as Lynn, Massachusetts. William Wood, although only twenty-three at the time, was apparently commissioned to explore and report upon the New England settlements, then in existence, for the information and guidance of the Puritans in England. His backers were thought to be Sir William Armyne, Lord Brooke and other aristocratic English puritans. Wood visited some twenty settlements, or all that were known at that time, and then returned to London where he published his findings under the title New Englands Prospect in 1634. In 1635 he was back in Lynn, which settlement he represented in the Massachusetts legislature in 1636. In 1637 he led a colony of fifty to Sandwich, Mass., and then vanished from the records. His book contains the first descriptive account of the settlements of the Massachusetts Bay Colony at a time when its important towns were located. Almost half of his book deals with the Indians. Nevertheless he was bitten by mosquitoes and he observed other insects too, of which he wrote as follows under the title, "Of the evills, and such things as are hurtfull in the Plantation" [Note: Old English spellings]:

"I never saw any Wormes or Moles, but pismires and spiders be there. There are likewise troublesome flies. First there is a wilde Bee or Waspe, which commonly guards the grape, building her cobweb habitation amongst the leaves: secondly a great greene flye, not much unlike our horse flyes in England: they will nippe so sore that they wil fetch blood either of man or beast, and be most troublesome where most Cattle be, which brings them from out of the woods to the houses: this flye continues for the Moneth of Iune. The third is a Gurnipper which is a small blacke fly no bigger than a flea; her biting causeth an itching upon the hands or face which provoketh scratching which is troublesome to some: this fly is busie but in close mornings or evenings, and continues not above three weekes, the least winde or heate expells them. The fourth is a Musketoe which is not unlike to our gnats in England; In places where there is no thicke woods or Swampes, there is none or very few. In new Plantations they be troublesome for the first yeare, but the wood decaying they vanish: these Flies cannot endure winde, heate or cold, so that these are onely troublesome in close thicke weather, and against raine many that be bitten will fall a scratching whereupon their faces and hands swell. Others are never troubled with them at all: those likewise that swell with their biting the first yere, never swell the second: for my owne part I have bin troubled as much with them or some like them in the Fen country of England as ever I was there: Here be the flies that are called Chantharides, so mush esteemed of Chirurgions, with divers kinds of Butterflies."

JOHN JOSSELYN (c.1608-c.1675?)

While the Puritans were passing laws prohibiting the use of tobacco within the Colony and forbidding the wearing of lace and gold and silver buttons and fineing and putting trivial Sabbath breakers in the stocks, John Josselyn, second son of Sir Thomas Josselyn, paid the Colony two visits, one in 1638 and another in 1663. Upon his first arrival at Boston he called upon John Winthrop and John Cotton. Then he visited his brother at Black Point, Scarborough, Maine, and stayed until October, 1639, when he returned to England. In 1663 he paid another visit to Boston and then went to Scarborough, remaining there almost eight and one-half years. Upon returning home in December, 1671, he published his impressions in a book, New-England's Rarities Discovered in Birds, Beasts, Fishes, Serpents, and Plants of that Country which appeared the following year in London. He also wrote An Account of Two Voyages to New-England, Made during the years 1638, 1663 (London, 1674). The entomology of his New Englands Rarities Discovered is quoted below [Note: Old English spellings]:

A Bug

"There is a certain kind of bug like a beetle, but of a glistening brass colour, with four strong tinsel wings.

"Their bodies are full of corruption, or white matter like a maggot. Being dead, and kept awhile, they will stench odiously. They beat the humming-birds from the flowers.

The wasp

"The wasps in this countrey are pied; black and white; breed in hives made like a great pine-apple. Their entrance is at the lower end. Tho whole hive is of an ash colour; but of what matter it's made, no man knows. Wax it is not; neither will it melt nor fry; but will take fire suddenly, like tinder. This they fasten to a bow, or build it round about a low bush. a foot from the ground.

The Flying Gloworm

"The flying gloworm; flying, in dark summer nights, like sparks of fire in great number. They are common, likewise, in Palestina."

In his later book while on the subject of his second voyage, Josselyn said there were no beetles nor maple bugs, but a stinking black and red bug called a "Cacarooch" and a little black bug like a "Lady-cow" that bred in skins and furs, He mentioned also infinite numbers of "Tikes" which hung upon the bushes in summer and cleaved to a man's garments and in a short time into the very flesh. He spoke of red ants, black ants, palmer worms in orchards, bed bugs, grasshoppers and crickets, all very briefly. Of mosquitoes, he wrote [Note: Old English spellings]:

"The Countrey is strangely incommodated with flyes, which the English call Musketoes, they are like our gnats, they will sting so fiercely in summer as to make the faces of the English swell'd and scabby, as if the small pox for the first year. Likewise there is a small black fly no bigger than a flea, so numerous up in the Countrey, that a man cannot draw his breath, but he will suck of them in: they continue about thirty dayes say some, but I say three moneths, and are not only a pesterment but a plague to the Countrey. There is another sort of fly called a Gurnipper that are like our horse-flyes, and will bite desperately making the bloud to spurt out in great quantity: these trouble our English Cattle very much, raising swellings as big as an egg in their hides."

Butterflies of several sorts are mentioned in his account. These, like dragonflies, were larger than English ones.

NATHANIEL MORETON (1613-1685), PETER COLLINSON (c.1694-1768), and CHARLES REICHEL (1751-1825)

The first brood of the periodical cicada to be noted by the New England colonists was the swarm recorded about Plymouth and Cape Cod in eastern Massachusetts for 1634. This was noted in

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the Philosophical Transactions (London, Vol. 1, No. 8, p. 137) under the title "Some observations of Swarms of Strange Insects and the Mischiefs done by them." Several years later, or in 1669, in New England's Memorial (Cambridge, 1669) by Nathaniel Moreton, reference was made to a "kinde of pestilent fever" fatal to Indians and whites during 1634, attributed by the Indians to the "flies" (cicadas) which had appeared that year. Peter Collinson in 1764 wrote "Some observations on the Cicadas of North America (Philos. Trans. London, vol. 54, pp. 65-69) and the Rev. Charles Reichel in 1804, wrote "Some particulars concerning the locust of North America" for Barton's Medical and Physical Journal, (vol. 1, p. 52).

JOHN (ALEXANDER OLIVIER) ESQUEMELIN(G) (c.1645-

1707)

It is perhaps unusual to find a pirate making observations about insects, But blood-sucking insects do not distinguish between pirates and ordinary mortals, and so we have John Esquemeling, buccaneer, complaining about mosquitoes on the island of Hispaniola in 1666. Esquemeling was supported to be a Dutchman, born in Flanders, and according to his own account, published originally in Amsterdam in 1678 under the title De Americaenische Zeerovers [The American Buccaneers], he sailed from Havre de Grace, France, on May 2, 1666, in the service of the West India Company of France, and on July 7 reached Tortuga, a small island on the north side of Hispaniola or Haiti. After a brief description of some of the plants of this island and of the quarrels between the Spaniards and the French for possession, Esquemeling tells how he was sold twice, once as a servant of the West India Company when they disposed of their holdings and again while sick, to a surgeon for seventy pieces-ofeight. Upon recovering, he was given his liberty with the understanding that he was to pay his late master one hundred pieces-of-eight when able to do so. Following this, he joined "the wicked order of the Pirates, or Robbers at Sea" and continued with them until 1672. Previous to his recital dealing with their thieving and bloodthirsty activities, he described some of the fruits, trees and animals found at Hispaniola and the following portions relating to insects are quoted on account of their general historic interest:

"As to the insects which this island produces, I shall only take notice of three sorts of flies, which excessively torment all human bodies, but more especially such as never before, or but a little while, were acquainted with these countries. The first sort of these flies is as big as our common horse-flies in Europe. And these, darting themselves upon men's bodies, there stick and suck their blood till they can no longer fly. Their importunity obliges to make almost continual use of branches of trees wherewith to fan them away. The Spaniards in those parts call them mosquitoes or gnats, but the French give them the name of maranguines. The second sort of these insects is no bigger than a grain of sand. These make no buzzing noise, as the preceding species does, for which reason it is less avoidable, as being able also through its smallness to penetrate the finest linen or cloth. The hunters are forced to annoint their faces with hog's grease, thereby to defend themselves from the stings of these little animals. By night in their huts or cottages, they constantly for the same purpose burn the leaves of tobacco, without which smoke they were not able to rest. True it is that in the daytime they are not very troublesome, in case any wind be stirring, for this though never so little, causes them to dissipate. The gnats of the third species exceed not the bigness of a grain of mustard. The colour is red. These sting not at all, but do bite so sharply upon the flesh as to create little ulcers therein. Whence it often comes that the face swells and is rendered hideous to the view, through this inconvenience. These are chiefly troublesome by day, even from the beginning of the

morning until sun-setting, after which time they take up their rest, and permit human bodies to do the same. The Spaniards gave these insects the name of *rojados*, and the French that of *calarodes*.*

"The insects which the Spaniards call cochinillas, and the English glow-worms, are also to be found in these parts. They are very like unto such as we have in Europe, unless that they are somewhat bigger and longer than ours. They have two little specks on their heads, which by night give so much light that three or four of these animals, being together upon a tree, it is not discernible at a distance from a bright shining fire. I had on a certain time at once three of these cochinillas in my cottage, which there continued until past midnight, shining so brightly that without any other light I could easily read in any book, although of never so small a print. I attempted to bring some of the insects into Europe when I came from those parts, but as soon as they came into a colder climate they died by the way. They lost also their shining upon the change of air, even before their death. This shining is so great, according to what I have related, that the Spaniards with great reason may well call them from their luminous quality moscas de fuego, that is to say fire-flies.

"There be also in Hispaniola an excessive number of *grillones* or crickets. These are of extraordinary magnitude, if compared to ours, and so full of noise that they are ready to burst themselves with singing, if any person comes near them."

JOHN BANISTER (1650-1689)

Although pirates and clergymen should, perhaps, be separated by many pages, it is necessary to mention here the entomological writings of an unknown person [John Banister?], about 1680, supposed to have been a clergyman, stationed in Virginia. The Manuscript Division of the Library of Congress possesses a facsimile of an old notebook, written in Virginia, entitled Collectio insectorum et aliarum rerum naturalium in Virginia. In addition to including a list of trees and plants of Virginia, a discussion of shells, suggested regulations for governing the conduct of clergymen sent out to Virginia, etc., it contains also some miscellaneous biological notes on various insects, listed by genera. The writer mentions "dirt wasps," bees, "who eat their way into hard wood," cockroaches which overrun the larders, fire flies, butterflies, flies, cicadas, beetles, etc. The handwriting of the notebook is small and cramped, and up to the present time it has not been completely translated.

Another Virginia clergyman interested in natural history was John Banister. Born at Tvigworth, Gloucestershire, England, in 1650, he graduated from Magdalen College, Oxford (B.A. 1671; M.A. 1674). After serving several years as a clerk and chaplain he visited the West Indies, probably as a missionary of the Church of England. By 1678 he was settled in Charles City County, Virginia, where he applied himself to science, and studied the plants. He corresponded with Sloane, Compton, Ray, Martin Lister, etc., and furnished them with specimens or drawings of the local flora and fauna. He enjoyed a good reputation with his fellow scientists and correspondents. The Virginia Council nominated him as an original trustee of William and Mary. Ray, in his *Historia Plantarum* referred to him as *eradissimus vir et consummatissimus* and Lister said that he was "a very learned and sagacious naturalist."

Banister was apparently the first to make intelligent observations upon the insects and mollusks of North America. Some of his entomological and botanical articles appeared in the *Philosophical Transactions*. His lists of Virginia plants were published in Ray's *Historia Plantarum* (London, 1686), and his insects of Virginia in Petiver's *Memoirs*. In 1680, Banister sent to Petiver a collection of 52 species of insects with his observations and notes, and these appeared in the *Philosophical Transactions* (volume 22, pp. 807-14) in 1701 under the title "Some Observations Concerning Insects Made by John Banister in Virginia, A.D. 1680; with remarks on them by James Petiver, Apothecary and Fellow of the Royal-Society." Banister's notes were concerned with mud-wasps and their nest-building habits, wood-boring bees, *Musca carnivore vivipera*, a small broken fly that extruded live maggots, cicadas, grasshoppers, mantids, roaches, tiger beetles, scarabaeids, blister beetles, etc., with a few words about their appearance and color. Another of his publications in the *Philosophical Transactions of the Royal Society* was entitled "Observations on the *Musca Lupus* of Mouffet in Virginia." These observations dealt with the halteres of Diptera.

It would not be surprising if the Latin notebook by the unknown clergyman mentioned previously proved to be written by John Banister.

Banister was accidentally shot by companions while on a botanical expedition along the Roanoke River. His papers were forwarded to Bishop Compton and his herbarium was given to Sir Hans Sloane.

JOHN LAWSON (16??-1711)

In 1700 John Lawson, a Scotchman, was sent to America as surveyor-general of North Carolina. He explored the Carolinas with a party of five white men and four Indians, traveling on foot and by canoe and accumulating much knowledge about the Indians and the natural history of the area in connection with his duties as a surveyor. It is stated that the natives eventually became suspicious of his operations and that he was put to death in 1712 by the Tuscarora Indians. Goode states that he was burnt at the stake in 1709. A Swiss Baron de Graffenreid, seized at the same time, was permitted to ransom himself. William Byrd, in his *History of the Dividing Line between Virginia and Carolina* (ed. 1866, p. 174, 214), said that Lawson "was waylaid and had his Throat cut from Ear to Ear."

Lawson's impressions and observations were recorded first by him under the title Journal of 1000 Miles: Travel among the Indians, with a Description of North Carolina. This appeared, according to Allibone, in quarto form in London in 1700. Then it appeared under the title, A New Voyage to Carolina; Containing the Exact Description and Natural History of that Country; Together with the Present State thereof and a Journal of a Thousand Miles Travel'd thro' several Nations of Indians. Giving a particular Account of their Customs, Manners, &c. (London, 1709). It was also issued in numbers in 1708 as a part of Stevens' Collection of Voyages. Other London editions with slightly different title pages appeared in 1711, 1714, and 1718, and in this country it was reprinted in 1860 and in 1903. A German translation was printed in Hamburg in 1722.

JOHN BRICKELL (16??-1745)

In 1723, Dr. John Brickell appeared on the scene as the author of a work entitled *The Natural History of North Carolina, with an Account of the Trade, Planners and Customs of the Christian and Indian Inhabitants. Illustrated with Copper-Plates, whereon are curiously Engraved the Map of the Country, several strange Beasts, Birds, Fishes, Snakes, Insects, Trees, and Plants, &c.* This was published in Dublin and later editions appeared from the same city in 1737, 1739, and 1743. Of the 1737 edition of Brickell's work, Coues said, "The material for this work was stolen from Lawson with scarcely the disguise of change of form." The fact that it was stolen four times is proof that

^{*}Dr. F. M. Root of the Department of Medical Zoology, The Johns Hopkins University, is of the opinion that Esquemeling's "first sort" of flies probably refers to true mosquitoes, perhaps especially to the coastal species *Aedes taeniorhynchus* form *niger*. His "second sort" are evidently *Culicoides*, of which *C. furens* is the commonest coastal form throughout the Greater Antilles. The "third species" may be some species of *Simulium*.

THE ENTOMOLOGY OF EARLY BOOKS AND PAPERS (1731 to 1800)

MARK CATESBY (c.1679-1749)

Mark Catesby, who was probably the first illustrator of North American insects, if we except the drawing of the swallowtail butterfly previously mentioned as having been made by John White, lived for some time in Carolina, where he hunted with the Indians, and collected and painted specimens of natural history.

Born in England, probably in London, about 1679 or 1680, he came to America in 1712, landing in Virginia April 23 of that year. Catesby had relatives in Virginia, but in addition he wanted to explore the natural history of countries other than his own. He stayed seven years or until 1719, and according to his own statement, did little but observe and admire the fauna and flora. However, he took back to England with him, a collection of plants and specimens which excited the interest of Sir Hans Sloane and Doctor Sherard.

During the next several years he arranged and named his specimens, a number of which found their way into Sloane's museum. Dr. William Sherard, with whom Catesby became friendly through their mutual botanical interests, advised him to undertake a more serious study of the fauna and flora of Carolina and the neighboring areas with the idea of publishing his findings. And so after getting financial help from twelve "noble Persons and Gentlemen," including Sir Hans Sloane, Richard Mead, M.D., His Grace the Duke of Chandois, and the Honorable Colonel Francis Nicholson, Catesby, with this idea, left England in 1722 and landed in Carolina May 23 of the same year. Upon his arrival at Charles Town he immediately called upon General Nicholson, who was then governor of South Carolina. From then on until 1726 he was busy with his observations and explorations.

Upon his return to England in 1726, he found his work so favorably received that he was advised to publish it, but on account of the expense of engravings, this did not seem possible. However, Mr. Joseph Goupy advised Catesby to study etching and do the work himself. This he did and as a result there finally appeared, The Natural History of Carolina, Florida and the Bahama Islands: Containing the Figures of Birds, Beasts, Fishes, Serpents, Insects and Plants: particularly, the Forest-Trees, Shrubs, and other Plants, not hitherto described, or very incorrectly figured by Authors. Together with their Descriptions in English and French. To which, are added Observations on the Air. Soil and Waters: With Remarks upon Agriculture, Grain, Pulse, Roots, &c. To the whole, Is Prefixed a new and correct Map of the Countries Treated of, by Mark Catesby, F.R.S. Vol. I, London, Printed at the Expence of the Author, and sold by W. Innys and R. Manby, at the West End of St. Paul's, by Mr. Hauksbee, at the Royal Society House, and by the Author, at Mr. Bacon's in Haxton. MDCCXXXI."

This is an imperial folio occupied almost entirely by plates of birds resting on trees and shrubs, with brief descriptive text, in English and French. Catesby gave the plants English and Indian names, and Doctor Sherard supplied the Latin ones, As for the birds he called most of them "after European Birds of the same Genus, with an additional Epithet to distinguish them."

Volume II, which appeared in 1743, covers fishes, crabs, turtles, snakes, plants, lizards, frogs, squirrels, rabbits, trees, etc., and the last part is devoted to the soil, weather, agriculture, the Indians and their manufactures and arts. Catesby was too busy with plants and birds to pay much attention to insects, concerning which he says,

"As for Insects these Countries abound in numerous kinds, but I was not able to delineate a great Number of them."

However, he did manage to figure twenty-six, all but three appearing in the last volume and almost half of them being lepidopterous. The insects appear only incidentally on the plates, sometimes associated with the plants, and the entomological text is quite brief, dealing with colors and markings and sometimes the caterpillars and cocoons.

Allibone refers to Catesby's work as having been published in numbers from 1731 to 1748 and in Pulteney's *Sketches of Botany* it is noticed as follows:

"In this splendid performance the curious are gratified with the figures of many of the most beautiful trees, shrubs, and herbaceous plants that adorn the gardens of the present time."

According to Hagen (*Bibliotheca Entomologia*), a second edition revised by Edwards appeared in London in 1754, and a third edition with a Linnaean index in 1771. A German translation was published at Nuremberg in 1756. There also appeared at Nuremberg in 1750 and in 1777 his *Piscium Serpentum*, *Insectorum aliorumque nonnullorum Animalium nec non Plantarum quarundam Imagines*.

Of Catesby's insect illustrations, Walton states that his work is,

"rather crude as compared with that of contemporaneous illustrators of the better class, and does not approach the excellence of the artists of a slightly later period, such as that of Abbot, William Food, Jr., or Peale."

Of his own work Catesby says,

"As I was not bred a Painter hope some faults in Perspective, and other Niceties, may be more readily excused, for I humbly conceive Plants, and other Things done in a Flat tho' exact manner, may serve the Purpose of Natural History, better in some Measure than in a more bold and Painter like Way."

Catesby in 1747 read a paper "On the Migration of Birds," before the Royal Society, which was supposed to contain new facts on the subject, and under his authorship there was produced in London in 1737 (?) or 1767 (posth.), *Hortus Brittanno-Americanus, or a Collection of 85 curious Trees and Shrubs, the production of North America, adapted to the Climate and Soil of Great Britain*, with seventeen colored plates. He died at the age of seventy in his home on Old Street, London, December 23, 1749.

In volume II of his *Natural History of Carolina*, Catesby printed a "List of the Encouragers" of his work, numbering about 158 subscribers, some of whom took two and three books. This list embodies,

"Her late Majesty Queen Carolina, Her Majesty the Queen of Sweden, Sir Hans Sloane, Henry Trelawney Esq., The Right Hon. the Lord Carteret, Richard Mead . . . ,"

and many others including the following who were identified with the colonial life of this country [Note: Old English spellings]:

"Mr. John Bertram of Pennsilvania, Alexander Hume, Esq., of Carolina, The Hon. Rob. Johnson, Gov. of S. Carolina, Hon. Lieut. Gen. F. Nicholson, Gov. of S. Carolina, Thomas Pen, Esq., Proprietor of Pennsilvania, Sir John Randolph of Virginia, Benj. Whitaker Esq., of Virginia, and The Hon. Alex. Skene of S. Carolina."

"John Bertram of Pennsilvania" is of course the Pennsylvania Quaker, John Bartram, first to describe the plants of the New World. Robert Johnson was governor of South Carolina under the Proprietors and again in 1730 under the first regular Royal administration. In 1718 he had been active in putting down piracy. He died in 1735 and never saw the second volume of Catesby's work. General Sir Francis Nicholson was industrious and experienced in colonial affairs. In 1689 he was Lieutenant Governor of the Dominion of New York; in 1690, Lieutenant Governor of Virginia; in 1694 Governor of Maryland; then again to Virginia where he succeeded Andris; then Governor of Nova Scotia, ending as Governor of South Carolina in 1720. Nicholson waa a strong friend and patron of the Church and education. He was instrumental in starting churches from Rhode Island to Virginia, in the foundation of William and Mary College, and had a reputation for quarreling and mixing his love affairs with business. Thomas Penn, one of the sons of William Penn, founder of Pennsylvania, succeeded to the share in the proprietary formerly held by his brother John, who died in 1746. He was interested in the college at Philadelphia, the hospital, library and various literary, charitable and religious societies. Benjamin Whitaker was a lawyer and one time Attorney General and Chief Justice of South Carolina, and Alexander Skene was a member of the Council about 1731, and interested in political affairs.

With the exception of John Bartram, it is doubtful if the other colonial subscribers took more than a passing interest in natural history, or more than a gentleman was supposed to take at that time. Nevertheless, credit should be given them for their support, when the settlers were busy subduing the land and the Indians.

PAUL DUDLEY (1675-1751)

The Philosophical Transactions, which was the vehicle for scientific information transmitted to the Royal Society, carried the findings of Colonial observers in all branches of natural history until our own publications were under way. In this journal, Paul Dudley published twelve articles in volumes 31, 34 and 39. Dudley was born in Roxbury, Mass., September 3, 1675, and graduated from Harvard College in 1690. After leaving college, he studied law and then went to London to complete his education. In 1702 he returned with a commission from Queen Anne as Attorney General of the Province. He represented Roxbury in the Legislature for some years and was chosen Speaker of the House in 1739. Upon the death of Benjamin Lynde he became, in 1745, Chief Justice of the Supreme Court, which position he held until his death in 1751 at the age of seventy-five. He was much interested in natural history and was a member of the Royal Society of London. The subjects of his articles included an account of making maple sugar, an earthquake, rattlesnake cures by sweating in hot turf, Indian hothouses, description of moose deer, the natural history of whales, the "merchandize of slaves," and a method of discovering hives of bees in the woods. In 1735 he erected a series of milestones on the main road from Boston to Dedham, on which he had placed the initials P.D. He died in Roxbury, Mass., January 21, 1751.

His paper entitled "An Account of a Method Lately Found out in New England for Discovering where Bees Hive in the Woods in Order to Get Their Honey" appeared in the *Philosophical Transactions* in 1723 (vol. 31, pp. 148-50) and described how a hunter on a sunny day might take a plate containing a little sugar, honey or molasses and place it on a rock or stump in the woods. After the bees had come to it and fed, the hunter would then catch one and after a little while release it, observing its course carefully, because after it rose, it flew in a straight path to its hive in the tree. With a pocket compass, rule and other implements, the course was set down on a sheet of paper. Then the hunter walked a certain distance in another direction, taking care that the angle of the new line was not acute. Another bee was then released and its course noted. The bee tree would be found where the courses intersected—so wrote Mr. Dudley.

Dudley then described the successful trial of this method and while on the subject of bees expressed his belief that the bees then in their gardens and woods had been introduced from England about one hundred years previous. The first planters in New England never observed bees in the woods until many years after the country had been settled. And the Indians having no word for "bee" in their language, called it the "English Man's Fly."

RICHARD LEWIS (?-17??)

Entomology, earthquakes and explosions sometimes rubbed shoulders in the same article. Thus, Mr. Richard Lewis, in the *Philosophical Transactions* (vol. 38, pp. 119-21) in 1735, was the author of "A Letter Containing the Account of a remarkable Generation of Insects; of an Earthquake and of an Explosion in the Air." This was written from Annapolis, Maryland, October 27, 1732, to Mr. Collinson, F.R.S.

Mr. Lewis said,

"Sir, I send you herewith some Leaves of a Fly-Tree (so it is call'd by some People) from whence vast Swarms of Flies have been observed to issue."

He then described the little bags, as large as filberts, attached to the leaves, and his discovery of red grubs and flies therein when he cut some open. He had read Redi's work on the generation of insects, but this did not help him in explaining the phenomenon. Entomologists will, of course, recognize this account as referring to a species of gall insect.

The remainder of Mr. Lewis's account refers to an earthquake which was felt at 11:00 a.m., on September 5, 1732, in various parts of Maryland. Mr. Chew's house was shaken, the pendulum of his clock stopped, a rumbling noise was heard in the air, and many persons complained of a dizziness in their heads and a sickness at their stomachs. The "explosion in the air" was accompanied by an extraordinary brightness in the Zenith.

WILLIAM BYRD (1674-1744)

In William Byrd's History of the Dividing Line betwixt Virginia and North Carolina, which contains descriptions of the territory covered by the surveying expedition, its animals and plants, the customs of the Indians and pioneer life, mention is made of mosquitoes and flies and the means adopted by the Indians in protecting themselves from the attacks of such annoying creatures. William Byrd was born in the colony of Virginia in 1674 and was educated under tutors, his guide in England being Sir Robert Southwell. After spending some time on the Continent and studying law at the Middle Temple, he returned, after an absence of twelve years, to Virginia. He occupied various public offices in Virginia and was involved in numerous controversies with Governor Spotswood. During his life he increased the Byrd possessions from 26,000 acres to over 179,000. But he was interested in other things besides property and public affairs. His library, numbering four thousand books, was the largest in all the colonies, and his home at Westover was adorned with paintings. His *History of the Dividing Line*, which was written between 1732 and 1740, probably 1738, and not published until 1841, was written from a journal which Byrd made in the woods. Peter Collison in England heard of it and asked to see a copy of the history of the survey. In 1736 Byrd wrote that he could not send him the history until it was finished, but that he would send him the journal — furthermore, he was not to allow it to go out of his hands unless Sir Charles Wager wanted to see it. In some way, however, Mark Catesby saw it and wrote Byrd a complimentary note. This note was acknowledged by Byrd in 1737, and in his reply Byrd stated that his account had not been finished. In another letter to Collison in July, 1737, he said he expected to finish it the following winter. The entomology of the *History* is quoted in full. Speaking of the curing of deer skins, by the Indians, Byrd wrote:

"The Indians dress them with Deer's Brains, and so do the English here by their example. For Expedition's Sake they often Stretch their Skins over Smoak in order to dry them, which makes them smell so disagreeably that a Rat must have a good Stomach to gnaw them in that condition; nay, 'tis said, while that Perfume continues in a Pair of Leather Breeches, the person who wears them will be in no Danger of that Villainous little insect the French call Morpion. And now I am upon the subject of Insects, it may not be improper to mention some few Remedies against those that are most Vexatious in this Climate. There are two Sorts without Doors, that are great Nuisances, the Tykes, and the Horse Flies. The Tikes are either Deer-tikes, or those that annoy the Cattle. The first kind are long, and take a very Strong Gripe, being most in remote Woods, above the inhabitants.

"The other are round, and more generally insinuate themselves into the Flesh, being in all places where Cattle are frequent. Both these Sorts are apt to be troublesome during the Warm Season, but have such an aversion to Penny Royal, that they will attack no part that is rubb'd with the Juice of that fragrant Vegetable. And a Strong Decoction of this is likewise the most effectual Remedy against Seed-tikes, which bury themselves in your Legs, when they are so small you can hardly discern them without a MICROSCOPE.

"The Horse Flies are not only a great Grievance to Horses, but likewise to those that ride them. These little Vixons confine themselves chiefly to the Woods, and are most in moist Places. Tho' this Insect be no bigger than an Ordinary Fly, it bites very Smartly, darting its little Proboscis into the Skin the instant it lights upon it. These are offensive only in the hot months, and in the Day time, when they are a great Nuisance to Travellers; insomuch that it is no Wonder they were formerly employed for one of the Plagues of Egypt. But Dittany, which is to be had in the Woods all the while those Insects remain in Vigor, is a Sure Defense against them. For this purpose, if you stick a Bunch of it on the Head-Stall of your Bridle, they will be sure to keep a respectful Distance."

"Bears' Oyl is used by the Indians as a General Defense, against every Species of Vermin. Among the rest, they say it keeps both Bugs and Musquetas from assaulting their Persons, which wou'd otherwise devour Such Uncleanly People. Yet Bears' Grease has no strong Smell, as that Plant had which the Egyptians formerly us'd against musquetas, resembling our palma Christi, the Juice of which smelled so disagreeably, that the Remedy was worse than the Disease."

JOHN BARTRAM (1699-1777)

Among the earliest and most notable colonists whose interests were those of making collections and explorations in natural history was John Bartram. Little is on record of his early years. His grandfather came from England to Pennsylvania in 1682 and settled near Darby in what was then Chester county. John Bartram was born on March 13, 1699, and was educated in the country school. He was encouraged to study systematically by James Logan, who gave him several books on botany, and so that the cost of his explorations would not fall entirely on his shoulders, he was advised to seek the patronage of some wealthy and influential person in England. In accordance with such suggestions, he sent a quantity of botanical specimens and a record of same to Peter Collinson, a Ouaker merchant of England. This action led to a correspondence which endured nearly fifty years. And Collinson sent to Bartram seeds, cuttings, roots, etc., which were grown in England, and paper for preserving plants. and in addition, packages of cloth and articles for the use of Bartram or his family. But he did even more than this. He aroused the interest of wealthy men in England and secured contributions of money to finance Bartram's collecting trips. Collinson, in addition to his desire for botanical specimens, also wanted insects, birds, snakes, wasps' nests, fossils, etc.

The first botanic garden in America was laid out on the west bank of the Schuylkill River at Kingsessing, near Gray's Ferry, now within the limits of Philadelphia. Bartram purchased the land in 1728, built himself,

"a large and comfortable house of hewn stone and laid out a garden containing about five acres."

Here, he lived with his large family, He made many collecting trips and corresponded with Sir Hans Sloane, Dr. John Fothergill, Prof. John Hope and others, and although it would be of interest to go into his life in more detail, much fuller accounts are readily available and it is with his entomology that we are here concerned.

Bartram's interest in science was largely practical. Relative to zoology, he said,

"As for the animals and insects, it is very few that I touch of choice, and most with uneasiness. Neither can I behold any of them, that have not done me a manifest injury, in their agonizing mortal pains without pity."

Bartram's entomological observations dealt mainly with wasps and his notes, which were communicated in letters to Mr. Peter Collinson, appeared in the *Philosophical Transactions*. The first of such papers entitled "An Account of some very curious Wasps Nests made of Clay in Pensilvania" (*Philos. Trans.* vol. 43, pp. 363-66, illus. 1746) dealt with a description of the clay nests, their manufacture by the wasps, one kind of which was a small black species and another a purplish-black one. The storing of the nests with "disabled" spiders was noted also. His next insect paper (*Philos. Trans.* vol. 46, pp. 278-79, 1750) was on the "Great Black Wasp,"

"It supplies itself with Food, by roving about the Meadows, catching Grasshoppers, and other Insects; on these it feeds, and not on Fruits, as other Wasps do."

Its nesting habits in the soil and its sting were then described.

The next two papers, which Collinson communicated to the *Philosophical Transactions* (vol. 46, pp. 323-25; pp. 400-402, 1750) based on Bartram's letters, were about the mayflies of Pennsylvania, their emergence and egg-laying habits. Collinson expressed the opinion that there were no remarkable differences between the mayflies of Pennsylvania and those of England. In his *Observations on the Inhabitants, Climate, Soil, Rivers, Productions, Animals, and other matters worthy of Notice, Made by Mr. John Bartram in his Travels from Pensilvania to . . . Canada* (London, 1751), Bartram refers only sparingly to insects, mentioning the abundance of yellow wasps in certain parts of Pennsylvania where the soil was loose and spongy, the troublesomeness of worms on grass and corn for two summers

(probably "army worms") and the annoyance which he suffered from mosquitoes. His last entomological notes (*Philos. Trans.* vol. 53, pp. 37-9) appeared in 1764, and like their predecessors, were communicated to Mr. Collinson in letters. These dealt with a yellowish wasp in Pennsylvania which provisioned its nest in the ground with a "large fly." Bartram found, among other things, that the nest was six inches in the ground and that the larva of the wasp visas one inch long and as thick as a small goose quill.

PETER KALM (1715-1779)

When Peter Kalm, professor in the University of Aobo, was sent to America in 1748 by the Swedish government for the purpose of finding a species of mulberry adapted to the climate of Sweden, he used the occasion for other observations, of a more scientific character. His botanical collections were of great importance and his *Travels into North America*, three volumes, are full of interesting observations on plants, animals and men. He traveled through Canada, New York, New Jersey and Pennsylvania from 1748 to 1751, and a few extracts, mainly about insects, will be quoted from his books.

On October 1, 1748, speaking of Philadelphia, he said,

"The gnats which are very troublesome at night here, are called Musquetoes. They are exactly like the gnats in Sweden, only somewhat less, and the description which is to be met with in Dr. Linnaeus's *Systema Naturae*, and *Fauna Suecica*, fully agrees with them, and they are called by him *Culex pipiens*."

He then describes how they inhabit houses, day and night, how they begin their humming when people are in bed, how they suck so much blood that they can hardly get away, how they become numerous after a rain and scarce during a cool period, how they abound near swamps and how red spots and blisters appear after their attacks.

During a journey to Wilmington on October 5, 1748, Kalm observed "*Chermes Alni*" on alder. On October 9, 1748, while around Philadelphia, he spoke of the cultivation of peas in New Jersey, Pennsylvania, and the southern parts of New York, saying that in New Jersey and New York,

"a little despicable insect has obliged the people to give up so useful a part of agriculture. This little insect was formerly little known, but a few years ago, it multiplied excessively. It couples in the summer, about the time when the pease are in blossom, and then deposited an egg into almost every one of the little pease."

He then continues, describing its habits and distribution, and tells how he nearly introduced "these vermin" into Europe without knowing it. He brought back with him some sweet peas and when he opened the package in Stockholm on August 1, 1751, he found the peas hollow and the head of an insect peeping out of each pea. He made haste to close the package and he sent some to Linnaeus. This insect, of course, is the well known *Bruchus pisi*, and Kalm need not have been so worried, because it was already in southern Europe.

In December, 1748, while at Raccoon, New Jersey, he mentions "Locusts" which appear about every seventeenth year, caterpillars which feed on trees, grass worms and their extensive damage to meadows and cornfields, moths which eat clothes and furs, fleas on gray squirrels, rabbits, dogs and in the beds of the Indians, black crickets in the fields, the plentifulness of bed-bugs, although he was not sure if they were native or introduced, and the abundance of cockroaches or "Mill beetles" in North America and especially in almost every house in New York City.

Again at Raccoon, New Jersey, February 13, 1749, he made the following observations:

"Formica nigra, or the black ant, were pretty numerous, and somewhat lively. They lay about ten inches below the surface." (He had been digging a hole and that is how he found them).

"Carabus latus. Some of these lay at the same depth with the ants. This is a very common insect in all North America.

"*Scarabaeus*: chestnut-coloured, with a hairy thorax; the elytrae shorter than the abdomen, with several longitudinal lines, beset with hair. It is something similar to the cockchaffer, but differs in many respects. I found it abundant in the ground.

"Gryllus campestris, or the field cricket: They lay ten inches deep; they were quite torpid, but as soon as they came into a warm place they revived and were quite lively. In summer I have found these Crickets in great plenty in all parts of North America where I have been. They leaped about on the fields, and made a noise like that of our common house-crickets, so that it would be difficult to distinguish them by their chirping . . . ," and much more.

"The red ants (*Formica rufa*) which in Sweden make the great ant-hills, I likewise found to-day and the following day."

Still at Raccoon, New Jersey, on March 24, 1749, he wrote, while on the subject of cornfields:

"*Meloe majalis*, a species of oil-beetle, crept about on the hills. "*Papilio Antiopa*, or willow butterfly, flew in the woods to-day, and was the first butterfly which I saw this year."

Under the date of April 4, 1749, at Raccoon, he mentions a *Cicindela* as being common in North America, *Cimex lacustris*, "a kind of Water-bug," and *Dytiscus piceus*, or the great waterbeetle. On April 12, he visited Mr. Bartram and observed the nests of wasps high in a maple tree. He described them and told of Mr. Bartram's observations. On June 28, 1749, while at Fort Anne, he dwelt upon "Wood lice (*Acarus Americanus* Linn)" as follows:

"Scarcely any one of us sat down but a whole army of them crept upon his clothes. They caused us as much inconvenience as the gnats, during the last night, and the short time we stayed here. Their bite is very disagreeable, and they would prove very dangerous, if any one of them should creep into a man's ear, from whence it is difficult to extract them. There are examples of people whose ears were swelled to the size of the fist, on account of one of these insects creeping into them and biting them. More is said about them in the description which I have given to the Royal Swedish Academy of Sciences."

After Kalm returned to Sweden, he published several papers relating to the insects of North America in *Kongl. Vetenskaps Academiens*; flying insects (ticks) in volume 15 (pp. 19-31, 1754), grasshoppers in volume 17 (pp. 101-116, 1756), and fruit parasites in volume 25 (pp. 124-139, 1764).

ISRAEL ACRELIUS (1714-1800)

Professor Kalm was not the only Swedish naturalist to collect American insects. Several Swedish pastors took much interest in the animals, plants and minerals of the new country, and one in particular, Israel Acrelius, who was commisaary to the Swedish congregations on the Delaware and who was here from 1749 until 1756, collected many and perhaps most of the insects described by DeGeer. Upon his return to Sweden, he wrote A History of New Sweden or the Settlements on the River Delaware, which was published at Stockholm in 1759. According to the translation by William M. Reynolds, published in 1874 by the Historical Society of Pennsylvania, Acrelius in the preface said that although his recreation consisted largely in the collection of "insects, birds, fish, quadrupeds, plants, ores, gravels, clay, etc.," which he gathered at the expense of his Excellency the Chamberlain, Mr. Charles de Geer, for his valuable cabinet, he refrained from publishing anything because Professor Kalm had visited the same region "for this special object." Acrelius in his *History* had very little to say about natural history. While on the subject of vegetable gardens, he mentioned a worm which developed in dry peas and "which comes out a fly in the spring." He was of the opinion that although the peas seemed to be destrayed, germination took place as usual. In his day, Delaware was a part of the Province of Pennsylvania.

ANDREAE HESSELIUS (16??-17??)

Another Swedish pastor, in part entomologically inclined, was Magr. Andreae Hesselius, who had charge of Christine Parish (Wilmington, Delaware) in 1713. He kept a journal in which he recorded the observations which he made, on his journey to America, his residence there and on his voyage back to Sweden, in all from 1711 to 1724. A copy of the translation of this 80page manuscript, which apparently has never been published, is in the library of the Pennsylvania Historical Society. It is not a consecutive day-by-day record. Sometimes Hesselius made no entries for weeks or months. At other times the records cover birds, snakes, plants, Indians, the singing frog, insects, descriptions of places, etc.

Under the date, May 10, 1712, he wrote of fire flies which he likened to "Spanish-flies." On May 13, 1715, he mentioned, as he called it, "the most peculiar insects" he believed to exist in the whole world and which had not been seen for fifteen years. He described the emergence of these insects, how he poured water down their channels and could not reach the bottom of them and how he watched the adults emerge and their noise, the roasting and eating of them by the Indians, their destruction by squirrels, etc. Although he did not mention its name, there can be no doubt that he was watching the periodical cicada.

On October 17, 1717, he wrote of two white oaks about a half mile from his house under which it was said to have rained for some days, although the sky had been clear. He speculated upon this and cited his own observations, how he found a "fine and fair rain falling from the trees." The ground beneath the trees and the fallen leaves were quite moist. He tasted the moisture and found it to be "like water in general." Twigs gathered from the tree showed nothing to account for the mystery. A neighbor finally climbed the tree and reported that there were "millions of little worms in the black flakes of the bark." This satisfied Hesselius but he could not figure out why such a phenomenon did not happen to other oaks. The "little worms" were undoubtedly a species of oak *Lecanium*.

It is recorded that during the year 1749 there was an outbreak of "grasshoppers at Nahant, Massachusetts, so severe that the inhabitants "formed a line and with bushes drove the grasshoppers into the sea by millions." And in 1770 there was a widespread outbreak of the army worm from Langston, New Hampshire, to Northfield, Massachusetts. Corn and wheat disappeared in short order, and in spite of trenches and holes dug by the farmers, only a few were able to save enough seed corn for the next year. During these early years, apparently such outbreaks were not uncommon.

GRIFFITH HUGHES (c.1707-17??)

About ninety or a hundred years after Sir Henry Morgan landed at Barbados, from which he went later to Jamaica and started his career as a pirate, the fauna and flora of the island were being studied under a scorching sun by Griffith Hughes, rector of St. Lucy's parish, whose perscrutation culminated in a folio of 314 pages, a map and twenty-nine plates, entitled *The* *Natural History of Barbados in Ten Books.* This was published by subscription in London in 1750, and according to the title page, the author was an A.M., and a Fellow of the Royal Society. The work was dedicated to "His Grace Thomas, By Divine Permission, Lord Archbishop of Canterbury."

The "ten books," so called, are really ten parts, book I dealing with the air, soil, climate, etc.; book II, with the diseases peculiar to Barbados and other West Indian Islands, the qualities of the water, etc.; book III, with the land, animals, quadrupeds, snakes, insects; books IV to VIII, with trees, shrubs, and plants; book IX, of the shores and shells of the island, and book X of fishes, marine animals, etc. All of the accounts are general, brief and of little scientific value. Even in 1750, Hughes's book apparently did not receive any commendation in scientific circles. One writer in the *London Monthly Review* for July, 1750, criticized it as follows:

"Instead of the crude, irregular descriptions of this author, the naturalist is to be punctual, exact and express . . . As to his talents for natural history, it was an unlucky mistake in him to suppose them such as could enable him to go through so arduous a task as the history of the products of a whole island, though a very small one."

The following account of what Hughes called the "Pope-fly" is typical of many of the descriptions of the book:

"This Insect is better known to the Inhabitants, by the great Destruction it causes in almost every sort of Grain than by its Shape; for it spares neither Pulse nor Grain of any kind, if they have been for any considerable time gathered in. However, in general, they resemble a Weevil in their Make."

Such rambling accounts now are only of historical interest. Not having such interest at the time they appeared and being devoid of technical value, they must have been rather disappointing to at least some of Hughes's numerous subscribers.

The colored plates, mainly of plants, and dedicated to various members of the nobility, were drawn and engraved for the most part by George Dionysius Ehret, a German botanical artist and engraver who settled in England in 1740 and who supplied the illustrations for Trew's *Plantae Selectae* and Brown's *History of Jamaica*. He also painted an extensive botanical collection for the Duchess of Portland, patroness of natural history.

The list of the nausea of subscribers in Hughes's work is a long one and runs well over eight hundred, many of them being down for two copies. It is headed by the King and includes the Prince of Wales, the Duke of Cumberland, the Duke of Orleans, the Duchess of Portland, Sir Hans Sloane, the Duke of Rutland, the Earl of Sandwich, the Earl of Leicester, the Duke of Richmond, the Duke of Leeds and many ministers, merchants, etc. From Virginia, the names of thirty-three subscribers are listed. Included therein is the Hon. and Rev. William Dawson, D.D., "one of his Majesty's most Hon. Council and President of the College of William and Mary," and also the head of the Church of England in Virginia. Down to the time of the Revolution, the presidency of the college and the primacy of the church were vested in the same man. Other Virginia subscribers were John Robinson, President of the Council, the Hon. William Fairfax, Col. George Lee, Maj., Andrew Monroe, John Lee, George Webb, Col. William Fitz-Hugh, Col. Joshua Fry, Col. Richard Blund, Col. George Braxton, Col. Charles Carter, Col. William Beverly, Edward Pendleton, etc.

In the Calendar of Virginia State Papers, it is recorded that a William Fitzhugh was named as County Lieutenant for Stafford County on August 19, 1752. The Col. Richard "Blund," may have been Col. Richard Bland, author of An Inquiry into the Rights of

the British Colonies published in 1766, member of the House of Burgesses for thirty years and expert on questions touching the rights and privileges of the colony, whom Thomas Jefferson regarded as "the wisest man south of James River." Concerning Col. Joshua Fry, another of the subscribers, in 1729 a Joshua Fry was, according to the history of William and Mary College, appointed master of the grammar school and afterward advanced to the chair of mathematics. While professor of mathematics, he worked with the father of Thomas Jefferson, a practical surveyor, in continuing a boundary line between Virginia and North Carolina, and both collaborated in making the first map of Virginia. In the History of Virginia, by Campbell, mention is made of a Colonel Fry in connection with a regiment of 300 men that was raised about 1752 for the purpose of expelling the French, who were encroaching in the northwest. George Washington, then a youth of 19 or 20, assisted Colonel Fry in the capacity of lieutenant-colonel.

At the time Hughes's Natural History of Barbados made its appearance in Virginia, the colony was well established and in communication with neighboring colonies and the mother country. Ten years later the white population was approximately 200,000. Books, for the most part, were found only in the homes of doctors, ministers, lawyers, and wealthy merchants and planters. The population worked the farm and in the shop, and the small farmer read only the almanac, the hymn books, printed sermons and the Bible. The intellectual life of the colony consisted of the college of William and Mary, boarding schools and imported private tutors for those who could afford them. The planters were occupied with tobacco raising, horse racing, cock fighting, drinking and gambling. Negroes were sold in bunches to local merchants, who disposed of them singly for cash or exchanged them for tobacco, rice, etc. Girls married early and divorces were rare, being forbidden by crown and church, but unhappy wives ran away. Both sexes gave themselves up to rich costumes and frills, and barbers, doctors and druggists pulled teeth. Quantities of cherry rum, cherry fling and peach and apple brandy were made and consumed freely at house raising, meetings, baptisms, weddings and funerals, and the Church of England was dominant.

By the upper levels of this society, thirty-three copies of Hughes's *Natural History* were absorbed, probably not so much by reason of the supposed merits of the work or the popularity of natural history as on account of Hughes's respectable vocation and his ecclesiastical connections. Little is known of Hughes's life, and his only other contribution to natural history was a paper entitled "Of a Zoopryton resembling the Flower of the Marigold" which was printed in the *Philosophical Transactions* for 1743. According to the *Dictionary of National Biography*, Hughes was born about 1707, entered St. John's College, Oxford, in 1725, graduated B.A., and M.A., in 1748.

PETER ELLIS (c.1710-1776)

In 1762 there was published in the *Philosophical Transactions* (vol. 52, pp. 661-67) an illustrated letter from John Ellis to Peter Wych on "An Account of the Male and Female Cochineal Insects that breed on the *Cactus opuntia* or Indian fig in South Carolina and Georgia." The illustrations consist of one large folding plate showing adults and early stages.

Ellis had heard that the insect bred abundantly on *Cactus* opuntia of Linnaeus's Species Plantorum, in South Carolina and Georgia, and so he wrote to Dr. Alexander Garden of Charles Town for some of the joints of the plant, containing insects. After receiving them he exhibited the specimens at a meeting of the Royal Society and later to the Society for Encouraging Arts,

Manufactures and Commerce. He then examined the specimens under a microscope and wrote descriptions and made drawings all of which were published under the above title.

John Ellis, who was born in Ireland about 1710, was for a time in business as a merchant in London. He was not very successful, however, until in 1764 he obtained the position of agent for West Florida and in 1770 the agency for Dominica. In 1754 he was made a Fellow of the Royal Society and in 1755 he published a paper entitled "An Essay towards the Natural History of the Corallines" which was well received and translated into French. He established by this paper, the animal nature of this group. The Copley Medal of the Royal Society was awarded him in 1768. His position enabled him to obtain many specimens and he corresponded with many persons who were interested in natural history. He was on friendly terms with Dr. Stephen Hales, Peter Collinson, John Fothergill, Daniel C. Solander and others and he had enemies too who stole his work, one of them supposedly being Dr. John Hill.

Ellis was interested also in the introduction of seeds and plants from the West Indies and his published papers were on such topics as directions for shipping seeds and plants, the description of a new sensitive insectivorous plant, the description of new genera of plants, etc. Linnaeus called him a "bright star of natural history" and said that he was the main support of natural history in England. He died in London, October 15, 1776.

PETER COLLINSON (c.1694-1768)

Peter Collinson, of whom brief mention has been made previously, was the author of a paper, "Some Observations on the Cicada or Locust of North America" which was published in the *Philosophical Transactions* (vol. 52, pp. 65-8) in 1765. Collinson stated that although the cicada was seen annually in Pennsylvania, at certain times, fourteen or fifteen years apart, they came in swarms. He then described their emergency from the soil, the singing of the males, egg deposition, the supposed absence of feeding on the part of the adults, their enemies including the Indians who ate them, boiled and with wings removed. Collinson said in conclusion,

"There are two distinct species of Cicadae in North America; the one here described being much larger than the other. The lesser species has a black body, with golden eyes, and remarkable yellow veined wings."

The species which Collinson figured is not the periodical cicada, but, according to Mr. W. T. Davis, probably a species of *Tibicen*, perhaps *Tibicen chloromera*.

Peter Collinson was born January 14, 1693-4 near Windermere. His father was a producer of men's mercery and Peter in partnership with his brother increased the business by opening up trade with the American colonies. As a youth he was interested in natural history and in such studies he was encouraged by Sir Hans Sloane and the Earl of Bute. He communicated papers to the *Philosophical Transactions* and the relations of his firm with the colonies led to intercourse with the scientific men of America. He was friendly with Franklin and Linnaeus, he was consulted in connection with building up the Philadelphia Library in 1730, he was a Fellow of the Royal Society, he had a good reputation as a botanist and founded a botanical garden at Mill Hill, he contributed thirteen papers to the *Gentlemen's Magazine* and he died peacefully on August 11, 1768.

MOSES BARTRAM (17??-?)

Moses Bartram, a native of Philadelphia, read before the American Philosophical Society on March 11, 1768, a paper on

"Observations on the native Silks (sic) Worms of North America" which was printed in the Transactions, (vol. 1, Sect. 2, pp. 224-30, 1771). According to his statements, he had long been interested in the possibility of native silk-worms as a source of silk. And so in March 1766, he made an excursion along the banks of the Schuylkill River in search of cocoons. He found five good ones which he placed in his garret opposite a window facing the rising sun. He was anxious to hurry the emergence of the moths. On May 10, one "fly" emerged-but escaped through a window which had been left open. On May 13, one of his "pods" produced a "large brown fly beautifully spotted." On May 14, two more "pods" produced "flies." On May 17, one of the "butterflies" which emerged from a large, loose "pod" began to lay eggs, but they were not fertile. In the spring of 1767 he made another trip for cocoons and was lucky in finding them on alder, wild crabtree and the viburnum. These he placed as he had the first ones, but this time he darkened the room by covering the windows. Then in the shape of a diary, he records under each date what happened. Some emerged. Some died, etc. But he finally obtained eggs that hatched. Some of the larvae became parasitized and others became full grown and transformed. He then gives directions for raising the caterpillars, and states that they appear to be easier to care for than Italian or foreign silkworms, also that their cocoons weigh more than four of the foreign ones.

LANDON CARTER (1710-1778)

Another entomological paper which was read before the American Philosophical Society in 1768 (Trans. vol. 1, Sect. 2, pp. 205-17) was entitled "Observations concerning the Fly-Weevil that destroys the wheat, with some useful discoveries and conclusions, concerning the propagation and progress of that pernicious insect, and the methods to be used to prevent the destruction of the grain by it." This was by Colonel Landon Carter of Sabine-Hall, Virginia. Colonel Carter gives his personal experiences with the "fly-weevil" which he describes as a pale brownish moth. He speculated more or less in his paper on the food of the young caterpillars and claimed to have seen the eggs at the upper end of the grains, beneath the skin, and he thought that eggs were deposited in soft grains. He includes the observations of others which are sometimes at variance with his own views and advances the idea that heat might kill the eggs-but that its application was not practical. He found that by excluding the air he reduced the amount of injury-but he could not trust his servants to do this efficiently. He wrote,

"Villainy and negligence are such concomitants in servitude that I have been again destroyed."

He reaped as early as possible. At least for two feet around the mow he left a vacancy which was well trodden with soft hay or beaten straw. When the wheat reached the eaves of his barn, he put on a covering of hay or straw and kept this covering down by weights. By excluding the air in this manner, the eggs were killed.

The Committee on Husbandry of the American Philosophical Society, whose report followed Colonel Carter's paper, stated that the injury started in North Carolina forty years before and extended into Virginia, Maryland and the lower part of Delaware. Pennsylvania was uninfested. The committee called attention to the similarity of the American insect, and its injury to wheat, to an insect which a gentleman of Angumois described in Europe. The committee suggested keeping the grain cool to prevent the hatching of the eggs—or the heating of the grain to kill the eggs, after experiments had been conducted to determine the degree of heat necessary. Excluding the air was also suggested, in an June 1998 experimental way, as was fumigation with sulphur. If the moth attacked soft grain, a change of seed was recommended. The committee's report is quite sound, and although Colonel Carter's paper is interesting he was frequently puzzled by the adaptability of the insect and its ability to survive under certain conditions.

Colonel Landon Carter was born in Virginia August 18, 1710. He lived at "Sabine Hall" on the Rappahannock in Richmond County. From February, 1752, until March, 1768, he represented his county in the House of Burgesses. He was married three times and died in 1778.

CHARLES THOMSON (17??-?)

In the Transactions of the American Philosophical Society, 1769-1771 (vol. 7, p. 243), there is an "Extract of a Letter from Mr. Peter Miller of Ephratah, [Pa] to Mr. Charles Thomson, on the time of sowing pease, so as to preserve the Crop from being Worm-eaten."

JOSEPH COOPER (17??-?)

At the July 19, 1771, meeting of the American Philosophical Society there was read a statement by one Joseph Cooper "On the nature of the worms so prejudicial to the peach trees for some years past, and a method for preventing the damage in future, in a letter . . . to Mr. Clifford." This was ordered to be published in the *Pennsylvania Gazette and Journal*.

At this time [in 1799] the Hessian fly again appeared in the literature of entomology. In the *Papers of the Massachusetts Society for Promoting Agriculture* (1799, pp. 26-28) there is a "Letter from Mr. Joseph Cooper to William Russell, Esq., on the Hessian Fly and the Early White Wheat," This was written from Cooper's Point, New Jersey, December 30, 1796. Mr. Cooper mentions his observations on the injury to wheat in his neighborhood by the Hessian fly and recommends late sowing and the planting of "white wheat."

JOHN MORGAN (1735-1789)

On July 27, 1774, and February 24, 1775, Messrs. Hare and Skinner, silk merchants of London, wrote to John Morgan, a Philadelphia physician, a description of the silk industry, as practiced in Italy, involving the eggs, larvae, cocoons, unwinding, etc. The account was obtained by Hare and Skinner from one of the best houses in Italy and was supposed to be the most improved Italian method of making raw silk. John Morgan, like many other citizens, was interested in silk culture and the London merchants advised him to reel his silk of the fineness of five to six cocoons, no coarser. The letter of Hare and Skinner found its way into the *Transactions of the American Philosophical Society* (vol. 2, No. 41, pp. 347-66), under the title, "The whole process of the silk worm, from the egg to the cocoon . . . in 2 letters . . to Dr. John Morgan."

JOSEPH CRUKSHANK (1746-1836)

In 1790 there was printed and sold in Philadelphia, Pa., by Joseph Crukshank, an eight-page pamphlet entitled An Essay on the Culture of Silk, and Raising White Mulberry Trees the leaves of which are the only Proper Food of the Silk-Worm, by a "Citizen of Philadelphia."

TIMOTHY MATLACK (1730-1829)

Another entomological contributor to the meetings of the American Philosophical Society about this time was Timothy Matlack with his "Essay on insects noxious to young chickens," read November 17, 1780. Mr. Matlack, an active patriot in the Revolution, was born at Haddonfield, New Jersey, in 1730. He was a member of the General Committee of Safety and a colonel of a Pennsylvania battalion. From 1780 to 1781 he was a delegate to the Continental Congress and for many years Master of the Rolls. For a long time he lived at Lancaster, Pa. Later he became Register of one of the Philadelphia courts. His death took place at Holmsburg, Pa., April 15, 1829, at the age of ninety-nine years.

P. MUHLENBERG (17??-?)

All the entomology at this time, however, was not confined to the proceedings of learned societies. Mr. William T. Davis lately unearthed in an old book of records, of the town of Northfield, Staten Island, labeled "Town Records, 1783 to 1823," the following recipes:

"1. Tanse boiled and Cabich or other Plants Weterd with the Decoction prevents flys &c, Eating them.

"2. Soft Cow Dung put in Water and Eder [elder?] Sprouts bruised and Steepd in the Water put over any plant prevents any insects injuring them."

In Mathew Carey's *American Museum*, for September, 1788, vol. 4, p. 244, one of the successful, if short-lived, magazines of the period, there was printed a letter from P. Muhlenberg relative to the Hessian fly and its habits and ravages.

JONATHAN CARVER (1710-1780)

In 1784 there appeared, with a Philadelphia imprint, *Three* Years Travels through the Interior parts of North America for more than Five Thousand Miles" by Captain Jonathan Carver, of the Provincial Troops in America. Chapter XVIII is concerned with the beasts, birds, fishes, serpents, lizards, and insects, but only one and one-third pages are devoted to insects. The silk worm gets two lines and is said to be nearly the same as the silk worms in France and Italy, but producing less silk. The tobacco-worm gets three lines and its color and "horn" are noted. Four lines are devoted to the "water-bug," eight to the stag beetle, five to the "locust" which in said to appear every seven years. The fire-fly, however, has thirty-three lines devoted to its color, habitat, and the wonder of it.

Carver's entomology is not much good and more need not be said. His book was first published in London in 1778. A third London edition appeared in 1781, edited by John Coakley Lettsom, who, it is suggested, may have composed the book from Carver's personal narrative and from the works of earlier writers.

WILLIAM BARTRAM (1739-1823)

In 1791, there was first published in Philadelphia what has now become a rather famous travel book. This was by William Bartram, son of John Bartram of Philadelphia, and the great uncle and encourager of Thomas Say. It was entitled *Travels Through North and South Carolina, Georgia, East and West Florida*, and intermingled with its sometimes eloquent passages on botany and ethnology we find, of course, references to insects.

While in the neighborhood of the Flint River, his party was annoyed by biting flies, especially the horses, and in addition he wrote of three or four species of *Asilus* and described them, but all too briefly. He mentions the presence of honey bees in East Florida and their absence in West Florida, on the basis of conversations with traders and others. On the banks of the Musquitoe River he records two or three species of beautiful butterflies and gives enough of a description to enable a Lepidopterist to recognize them. The cochineal insect also was noted by him on cactus, and to the Ephemera he devotes three pages.

William Bartram made his southern travels at the expense and request of Doctor Fothergill, a physician who owned property at Upton in Essex, which he was laying out as a garden. William's journal, his collection of dried plants and his drawings and paintings of various plants are preserved in the Department of Botany of the British Museum. Bartram had considerable ability as an artist, although his delineations leaned toward a balanced picture rather than to showing relative sizes of his botanical and zoological subjects. As early as 1768 William began to send drawings and descriptions to Doctor Fothergill, and in 1772 he began his explorations in Florida, Carolina and Georgia, the expense of which, for nearly five years, was borne by Doctor Fothergill. WIlliam Bartram died July 22, 1823, at the age of eighty-five. In addition to his Travels he wrote Anecdotes of a Crow, and Description of Certhia. His "Observations on the Creek and Cherokee Indians," written in 1789, was published in 1851 in the Transactions of the American Ethnological Society (vol. III).

JONATHAN N. HAVENS (17??-?)

One of the early papers on the Hessian fly appeared in 1792 in the *Transactions of the Society for the Promotion of Agriculture*, *Arts and Manufactures*" (N.Y.C. and Albany, pt. 1, pp. 89-107). This was entitled "Observations on the Hessian Fly" by Jonathan N. Havens. Mr. Havens wrote a rather lengthy, but on the whole sensible and sound, article outlining his observations and including a history of the insects' appearance on Shelter Island and adjacent parts of Long Island a short time before harvest in 1786. He stated that it anpeared to come from the west end of Long Island. For control, he recommended the destruction of stubble soon after harvest on account of the presence of puparia in the stubble at that time.

THADDEUS MASON HARRIS (1768-1842)

The year 1793 saw the publication in Boston of The Natural History of the Bible: or a Description of all the Beasts, Birds, Fishes, Insects, Reptiles, Trees, Plants, Metals, Precious Stones, &c. Mentioned in the Sacred Scriptures. Collected from the best Authorities, by Thaddeus M. Harris, A.M., Librarian of Harvard University.

Thaddeas Mason Harris was born in Charlestown, Mass., in 1768. At the Battle of Bunker Hill, his family were driven from their home and three years later his father died from exposure during his enlistment in the Revolutionary army. Thaddeus boarded around among neighboring farmers, one of whom fitted him for college. Later he came into some money, for which he was so thankful that he decided to enter the ministry. He graduated from Harvard in 1787, taught a year at Worcester and was offered the post of private secretary to the newly chosen President Washington, but was prevented from accepting by an attack of smallpox. In 1790 he received his A.M. degree and for the next two years he served as librarian to Harvard University. In 1792 he was elected a member of the Massachusetts Historical Society, and in 1793 he was installed as pastor of the first church of Dorchester, which pastorate he held faithfully for over forty years. He aided in the founding of the American Antiquarian Society, the Massachusetts Humane Society, the American Peace Society, the American Academy of Arts and Sciences and the Archaeological Society at Athens, and he was one of a liberal group of ministers who occupied pulpits in New England during the early part of the nineteenth century. After an attack of yellow fever in 1802, he made a western trip and later wrote an account of it under the title, Journal of a Tour into the Territory Northwest of the Alleghany Mountains. After a second illness in 1833 he visited Georgia and wrote a biography of Oglethorpe. He resigned his pastorate in 1838 and devoted himself to literary pursuits. He died on April 3, 1842. During his late years he was described as a "little quaint old man," indescribably bent, but still wearing a hale aspect, who used to haunt the alcoves of the library at Harvard. In 1813 Harvard conferred upon him the degree of doctor of divinity. His published addresses and sermons amount to nearly sixty, exclusive of his books. His son, T. W. Harris, became a distinguished entomologist.

In his *Natural History of the Bible*, the accounts are arranged alphabetically and the entomology includes such insects as the ant, the bee, the beetle, the cankerworm, the caterpillar, the flea, flies, the grasshopper, the hornet, the locust, the louse, the palmer worm and worm. The following quotations referring to the cankerworm and the louse are typical of his treatment:

"Canker-worm. The hedge chafer; a species of locust: So called from its gnawing of herbage and trees. The Hebrew word is by our translators sometimes rendered cankerworm, and sometimes caterpillars.

"Louse. It would be needless to describe this little contemptible insect. Various as are the antipathies of mankind; all seem to unite in their dislike to this animal, and to regard it as their natural and most nauseous enemy. Wherever wretchedness, disease, and hunger, seize upon man, the louse seldom fails to add itself to the tribe, and to increase in proportion to the number of his calamities.

"Lice were sent into Egypt to humble the pride of Pharaoh. For when Moses found the king inflexible, notwithstanding three miracles had already been wrought to convince and humble him, he touched the dust with his rod, which was immediately turned into lice; or, as some thinks into gnats, which small insect is more common, and the sting more tormenting in Egypt than any where else. But our version seems more agreeable to the original, and to the generosity of ancient and modern translations and expositions. These infected men and beasts in such quantities that one would have imagined that all the dust of Egypt had been converted into lice. Pharaoh sent for his magicians, and bid them try their skill, in vain; for either their powers proved too short, or was curtailed by a superior hand: So that they were forced to acknowledge that the finger of God did plainly display itself in this miracle."

BENJAMIN SMITH BARTON (1766-1815)

Dr. Benjamin Smith Barton, one of America's early leading botanists, at a time when scientific research was an avocation, contributed several entomological papers to the literature of the time. In 1793 the American Philosophical Society printed in its Transactions (vol. 5, No. 31, pp. 241-61) his contribution "An inquiry into the question, whether the Apis mellifica, or true honey bee, is a native of America." At the beginning of his account he mentions various introduced plants and says that within three hundred years many animals could have been introduced into this country. It is doubtful, according to him, whether the rat, mouse, clothes moth, flea and bed bug there known in America before the arrival of Europeans. He is of the opinion that Apis mellifica of Linnaeus is not a native of America but apparently he went into the subject again because of the opposite opinion expressed by the Rev. Dr. Belknap at the end of his paper entitled A discourse intended to commemorate the discovery of America by Christopher Columbus (Boston, 1792). Doctor Barton's account in quite interesting and he cites Mr. Jefferson's opinion, that the honey bee is not a native of this country, expressed in his work, Notes on the State of Virginia, as well as the accounts of Columbus, Purchas, Joseph Acosta, the buccaneer Lionel Wafer, and other explorers and travelers. To prove his point, Barton calls attention to the absence of any mention of the honey bee by the writers about Virginia and to the fact that there were no words for honey and wax in the language of New England Indians. The same was true of the vocabulary of the Delaware Indians, although they did have a word which meant "wasp" and which was used to cover bees when they were introduced. Other similar evidence is presented, both positive and negative. William Penn in his account of the natural productions of Pennsylvania in 1633 fails to include the honey bee. Barton concluded that we were indebted to Europe for the honey bee and thought that the importation happened soon after 1683 because a Quaker preacher who had lived in Pennsylvania from 1681 to 1696 spoke of them as follows: "Bees thrive and multiply exceedingly in those parts," etc.

In another, somewhat related, paper which bristles with references and footnotes, Barton discourses on "Some account of the poisonous and injurious honey of North America" (*Amer. Philos. Soc. Trans.* vol. 5, No. 7, pp. 51-70, 1802). Again various authorities including the ancients are brought forth to have their say. The honey which Barton called poisonous or deleterious produced the following symptoms:

"viz. in the beginning a dimness of sight or vertigo, succeeded by a delirium, which is sometimes mild and pleasant, and sometimes ferocious; ebriety, pain in the stomach and intestines, convulsions, profuse perspiration, foaming at the mouth, vomiting, and purging; and, in a few instances, death."

Barton dwells upon the supposed color of the poisonous honey, and the difficulty of determining from any of its external qualities whether it is "poisonous or innocent"; whether the bees are ever injured by the nectar of poisonous flowers, and then he mentions the poisonous properties of various plants such as *Kalmia angustifolia, Kalmia latifolia, Andromeda mariana*, certain species of rhododendron, azalea, and *Datura*. Of *Kalmia angustifolia* and *latifolia* he relates the following:

"About twenty years since, a party of young men, solicited by the prospect of gain, moved, with a few hives of bees, from Pennsylvania, into the Jerseys. They were induced to believe that the savannas of this latter country were very favourable to the increase of their bees, and, consequently, to the making of honey. They accordingly, placed their hives in the midst of these savannas, which were finely painted with the flowers of the Kalmia angustifolia. The bees encreased prodigiously, and it was evident that the principal part of the honey which they made was obtained from the flowers of the plant which I have just mentioned. I cannot learn that there was any thing uncommon in the appearance of the honey; but all the adventurers, who eat it, became intoxicated, to a great degree. From this experiment, they were sensible that it would not be prudent to sell their honey; but, unwilling to lose all their labour, they made the honey into the drink well known by the name of metheglin. In this respect, however, they were mistaken. The drink also intoxicated them, after which they removed their hives."

Barton's paper, although interesting, is not very conclusive and his parting advice is:

"Let him carefully remove from about the habitations of his bees every fetid or poisonous vegetable, however comely its colour or its form. In particular, let him be careful to remove those vegetables which are noxious to himself. In place of these, let him spread the 'marjoram and thyme,' and other plants, 'the love of bees,' and his labours will be rewarded."

Still another of Barton's papers containing references to insects is Fragments of the Natural History of Pennsylvania, Part First. This was printed for the author in 1799 by Way and Groff, 48 North 3rd St., Philadelphia. In this article Barton devoted much space to the birds of Pennsylvania and to tables of observations relative to "spring and summer birds of passage," dates and the blooming time of various plants. His miscellaneous observations covered weather, temperatures and many notes about various insects, their appearance, the noise they made, their food plants and the damage they did. Scientific names are rarely mentioned. Some of his notes are herewith reproduced:

April 27-28.

"A species of *Scarabaeus*, called the Spring Beetle, now appears. In the evening, millions of them swarm over orchards and forests, performing their amours. They occasion at this time, a noise not unlike distant thunder. It is a reddish-brown Beetle, 3/4 of an inch in length, and of proportionable thickness.

May 15.

"A species of *Chrysomela*? called Cucumber Fly, now begins its ravages upon the vines of the Cucumbers, Musk-Melon, Water-Melon, Pompion, &c. but especially upon the Cucumber. They scrape off the rind, and suck out the juice. Against the depredations of this insect (which has an extensive range through North America) nothing has been found so beneficial as a mixture of tobacco and capsicum (Red-Pepper) sprinkled over the vines."

May 25.

"A species of *Curculio* (Frult-devouring Weavel) is now busy, at night-time, in darting and depositing its eggs in the young fruit of Plumbs, Cherries, Peaches, Appies, Pears, *Mespilus, Juglans, &c*".

In an appendix, also devoted mainly to birds, are found a few more remarks about insects. Barton believed that birds were useful in destroying insects but he did not place undue value upon them. He said,

"Many of the pernicious insects of the United States seem to be increasing, instead of diminishing. Some of these insects which originally confined their ravages to the native or wild vegetables, have since begun their depredations upon the foreign vegetables, which are often more agreeable to their palates."

He advocated watching the migrations of insects from the native to the introduced vegetables and remarked upon the little progress that had been made in controlling injurious species. He apparently did not regard the remedies of his day highly because he said that although the manuring of wheat land had lessened Hessian fly damage (by increasing the vigor of the plants), and that although tow, impregnated with a mixture of brimstone and train-oil, suspended from apple and other trees would frighten away the periodical cicada, much remained to be done.

In the *Philadelphia Medical and Physical Journal* (vol. 1, pt. 2, May, Sect. 1, Art. 20, pp. 127-31, 1805), there is a notice referring to an extensive "Memoir on a number of Pernicious Insects of the United States" which Barton wrote and for which he was honored with the "Megellanic Medal of the American Philosophical Society." Barton mentions the names of the principal insects of which he gave an account in his memoir and they include a species of *Cimex* destructive to wheat, corn, vegetables in Virginia and other parts of the United States; two species of *Bruchus* on peas; striped potato beetle; *Phalaena* on apple leaves, wild cherry, etc.; curculio on peach, plum; periodical cicada, cucumber fly, squash bug, rose chafer, tobacco worm, and different species of grasshoppers. It will be noted that many of these still concern entomologists at the present day.

The same Journal (Part II, Vol. II, Phila. 1806, pp. 90-99) contains "A Memoir on the Treatment of the Silk-Worm. Communicated to Mr. Jefferson, President of the United-States, and of the American Philosophical Society, by Mr. Robert Lowry,

of Siena; transmitted by Mr. Jefferson to the Society; and by the Society to the Editor of this Journal."

On December 4, 1812, Doctor Barton read before the American Philosophical Society Mr. Jonathan Williams' paper entitled "Observations on *Phalaeana tinea*, etc., the beehive insect, with additional observations by Mr. Barton."

Benjamin Smith Barton was born at Lancaster, Pennsylvania, February 10, 1766. His mother was a sister of David Rittenhouse, the astronomer, and his father was Rev. Thomas Barton, Episcopal minister. Benjamin received his early education in an academy at York, Pennsylvania, and in the family of his elder brother in Philadelphia, For a time he attended the College of Philadelphia and at the beginning of his eighteenth year he started the study of medicine under Dr. William Shippen. In the summer of 1785 he accompanied the commission, of which his uncle, Mr. Rittenhouse, was a member, engaged in running the western boundary line of Pennsylvania. In 1786 he sailed for Edinburgh where he studied medicine for two years, leaving there to take his degree at Göttingen in 1789 and returning to America at the end of that year. He began to practice in Philadelphia and was regarded as a rising young physician. When only twenty-four he was appointed to the chair of natural history and botany in the College of Philadelphia. He was thus the first instructor in natural history in Philadelphia and when the college united with the University of Pennsylvania his appointment was continued and was held by him for the balance of his life. Later he occupied the professorship of materia medica in the university. From 1798 until his death, he was one of the physicians of the Pennsylvania Hospital, and when Dr. Benjamin Rush died in 1813 Barton became professor of the theory and practice of medicine in the University of Pennsylvania.

From early life he was subject to haemorrhages and attacks of gout. In the spring of 1815 he sailed for France, thinking the sea voyage would be helpful, but he did not benefit as he had hoped and on December 19, 1815, shortly after his return in November, he was found dead in bed.

He contributed many papers to the transactions of the American Philosophical Society and to the *Medical and Physical Journal* which he published beginning in 1805, and his works also included books on zoology, botany, medical botany, origins of American Indian tribes, etc. In addition, he was a member of many foreign learned societies.

HUGH WILLIAMSON (17??-18??)

Another physician interested in entomology was Dr. Hugh Williamson, whose contribution on the mayfly appeared in the *Transactions of the American Philosophical Society* in 1802 (vol. 5, No. 8, pp. 71-73). Because it is so short and because it will serve as an example of early American entomological contributions, it is herewith presented in full. The Passaic River is in northern New Jersey:

> On the *Ephoron Leukon*, usually called the White Fly of Passaic River. By Dr. Williamson.

"Read Feb. 1, 1799. These insects are of the order called neuroptera. Lin. Sys. Nat.

The eyes are large and prominent.

The stemmata are wanting.

The wings are plain, patent, membranaceous, reticulated. The under wings shorter and narrower than the upper wings by more than one half. They are attached to the body a little behind and below the upper wings and are nearly covered by them.

The antennae are cetaceous, half an inch long, having six articulations besides the base.

From the tail there are two cetaceous appendices about one inch and a half long. They diverge making an angle of 12 or 14 degrees. Each of them contains 15 or 20 small knots resembling articulations.

The tail, perhaps of the males, is furnished with two small crooked filaments hardly one-tenth of an inch in length, that are inserted below the cetaceous appendices, their points turn inward so as to form pincers.

The length of the insect is half an inch.

The trunk is not thicker than a grain of rye. The abdomen is much smaller.

The wings, abdomen and legs are perfectly white.

The eyes black; the trunk of a brownish colour.

Their flight in speed is nearly equal to that of the dragon flies. Neither mouth nor feet could be described from the want of a microscope.

They begin to rise out of the river 35 or 40 minutes after the sun sets and continue rising about fifteen minutes.

We have no information concerning the larvae of those insects. The crysalis, in which form they rise to the surface of the water, is not distinguishable from the perfect insect in shape or colour.

The crysalis deposits a thin white pellicle or skin on the surface of the water and rises a perfect insect. It continues on the wing about an hour and perishes.

Some of them, not one in a hundred, rise from the water in the form of a crysalis. They fly immediately to the shore and in less than a minute they creep through the white pellicle that covered the trunk, abdomen and appendices, and rejoin their companions on the wing.

In their flight they seldom rise more than six or eight feet above the water, but they usually skim or play near the surface.

The female drops two clusters of eggs upon the water and perishes immediately.

The eggs are yellow. Each cluster is nearly one quarter of an inch in length and the thickness of a common pin, resembling the roe of a fish and containing about 100 eggs. They sink in the water.

As those insects are not seen to couple on the wing it is presumed that the male fecundates the eggs when they drop on the water.

These flies are so numerous that they appear some evenings like thick driven snow in a cloud that is hardly transparent.

These insects, who differ in many particulars from the ephemera, are not easily reduced to any genus described by Linnaeus, Geoffroy or Schaffer. They must be of the order called neuroptera, but an eighth genus is to be added to that order.

They are natives of the river Passaick, but their utmost range on that river is not above two miles and a half. They rise about three quarters of a mile below the bridge at Belville and one mile and a half above that bridge. Within those limits they rise without number, but no where else in the river, though there is a regular tide nine miles above the bridge and there is not any salt water within three miles of it. They are not found, as we are told, in any of the neighbouring rivers.

Their first appearance every year is about the 20th of July, and they continue rising every evening more or less about three weeks.

They seek the light, for they fly in crouds to a lamp or candle, but they are supposed to be the only genus of winged insects that never see the sun.

The insect of an hour, that is never at rest, might serve for a strong figure in the hands of a peevish philosopher.

ISSAC WELD (1774-1856)

Returning for a short time to our traveling observers we find Isaac Weld, Junior, in his Travels through the states of North America and the provinces of Upper and Lower Canada during the years 1795, 1796 and 1797 (London, 1799), stating that behind the Blue Ridge Mountains, the, "weevil" is unknown, the "weevil" being,

"a small insect of the moth kind, which deposits its eggs in the cavity of the grain, and particularly in that of wheat; and if the crops are stacked or laid up in the barn in sheaves, these eggs are there hatched, and the grain is in consequence totally destroyed."

Weld further states that to guard against this, in the lower parts of Virginia, the grain is threshed as soon as the crop is brought in and left in the chaff which creates enough heat to destroy the insects without injuring the grain. According to Weld, the Angoumois grain moth had been known in America only a few years and general opinion placed its origin on the Eastern Shore of Maryland where a grower, in expectation of a large increase in the price of wheat, had kept all his crops for six years, when at the end of that time they were badly infested. From this center of infestation the insect was supposed to have gradually spread over the surrounding country. Weld also mentions the Hessian fly, but the account seems to be all hearsay, as I suspect the above is also.

Isaac Weld was born in Fleet Street, Dublin, March 4, 1774. After a sixty-day voyage from Dublin, he arrived in America in November, 1795, and spent a little over two years here. Accompanied by a servant he made his way through forests and along rivers, sometimes on foot, sometimes on horseback, and sometimes guided by the Indians. He had all the adventures and hardships incidental to traveling in an unsettled country. On Lake Erie he narrowly escaped shipwreck. He visited George Washington at Mt. Vernon and returned home at the end of 1795, "without entertaining the slightest wish to revisit" the American continent. His book was received with favor by the public and was translated into French and German. He died August 4, 1856, at Ravenswell, near Bray.

ANDREW BURNABY (1734-1812)

Another traveler who noted insects was the Rev. Andrew Burnaby, son of a well-to-do clergyman of the Church of England. In 1754 he took the degree B.A. at Queen's College, Cambridge, and in 1757, his M.A. In 1759 and 1760 he made a tour through the American colonies and later wrote a book. In *Burnaby's Travels through North America* reprinted from the third edition of 1798 and edited by Rufus R. Wilson (New York, 1904) we find Burnaby saying, in reference to Virginia,

"Insects and reptiles are almost innumerable. The variety of butterflies is not greater than is that of the rich and vivid colors with which each particular species is distinguished and beautified; and such is the number and appearance of fire-flies, that on a summer's evening the whole air seems to glow and to be enlightened by them."

In an appendix, he includes a catalogue of trees, plants, birds, animals, etc., mentioned in the course of his work—with their common names and the names given to them by Catesby and Linnaeus. Only two insects are listed, the fire-fly *Lampyris* and the mosquito *Culex pipiens*.

Burnaby's *Travels* cover observations upon the state of the colonies, vegetation, animals, weather, character of the inhabitants, buildings, etc., and observations such as a man interested in economics of the colonies would make. He thought, in view of the approaching trouble and rupture between Great Britain and her American Colonies, that the publication of his book might be instrumental in helping to effect a reconciliation. In the preface to the third edition of 1798, Burnaby predicted that the present union of the American states would not last for any considerable length of time and that the extensive country must

necessarily be divided into separate states and kingdoms and that America, at least for many ages, would not become formidable to Europe. His predictions made at that time are now more interesting than his entomology.

WILLIAM DANDRIDGE PECK (1763-1822)

In 1795 there appeared an entomological contribution from our first American entomologist worthy of the name. This was printed in the Massachusetts Magazine (vol. 7, Sept., pp. 323-327, Oct., pp. 415-416, 1 pl.) under the title "The description and history of the cankerworm" and the author was William Dandridge Peck. In 1796 it was reprinted under the title "Natural History of the Cankerworm" in Rules and Regulations of the Massachusetts Society for Promoting Agriculture (pp. 34-45) and still later in the New England Farmer (vol. 5, pp. 393-94, July, 1827). For this essay Peck obtained a prize of fifty dollars. Peck begins his account with a general introduction involving the work of the silk-worm, honey-bee, carrion beetle, dragon-fly and other beneficial insects. This is followed by an account of the appletree tent caterpillar and finally by a description of the cankerworm, its eggs, larvae, adults, habits, etc. Peck describes it as a near species, Phalaena vernata, from its early appearance in the spring. Apparently apple and plum trees suffered considerably from its depredations. One poor plate accompanies the article and no remedies are suggested. Two birds are mentioned as being important and also a disease called "deliquium" which caused the entire internal structure to become liquid.

Another prize-winning essay on the canker-worm was written in 1796 and published in the *Rules and Regulations of the Massachusetts Society for Promoting Agriculture* (1796, pp. 45-50). This time the author was the Rev. Noah Atwater, who received a premium of twenty-five dollars. Atwater's paper followed Peck's fifty dollar prize winner and was entitled "Another on the same Subject." Atwater kept close to his subject, the canker-worm, describing its appearance, habits, stages, etc., and it is a good account of his own observations. No remedies are suggested. Of the two articles, Peck's is undoubtedly the better, being more rounded and complete.

In passing, it may be noted that the *Rules and Regulations of* the Massachusetts Society for Promoting Agriculture was printed by an early Boston printer, Thomas Fleet.

In 1799, Peck won another prize, this time fifty dollars and a gold medal for his "Natural History of the Slug Worm" which appeared in the *Massachusetts Society for Promoting Agriculture, Papers* (1799, pp. 9-22). This article, a lengthy one, contains Peck's own observations on the life history and habits of the "slugs" that he had found on white birch and willow. He observed them in cages, beginning his work in 1796 and finally writing his article in August, 1798. After describing the adult he placed it near *Tenthredo cerasi* of Linnaeus. In his own garden, the cherry suffered more than the plum from its attacks. Peck also went into a description of the ovipositor of the female and he mentions the presence of an egg parasite. It is a good account and it is accompanied by a carefully drawn plate containing some seventeen figures.

Peck made other entomological contributions, mainly to the *Massachusetts Agricultural Repository and Journal*. In 1816 (vol. 4, No. 1, pp. 89-92, Jan.) there appeared his observations on the life-history and control of the cankerworm. In 1817 (vol. 4, pp. 205-11, Jan.) he wrote "On the insects which destroy the young branches of the pear tree and the leading shoot of the Weymouth pine." In this paper he describes *Scolytus pyri, Scolytus strobi* and *Rynchaenus strobi*, going also into their life histories, habits,

parasites, mouth parts, etc. Two plates, both apparently by Peck, accompany the text.

Other titles by Peck in the *Repository and Journal* are "Some notice of the insect which destroys the locust tree" (vol. 5, No. 1, pp. 67-73, 1 pl. Jan. 1818), in which he described and figured *Cossus robiniae* and *Clytus robiniae*; and "Insects which affect the oak and cherries" (vol. 5, No. 3, pp. 307-313, Jan. 1819) in which he described and figured *Rhynchaenus cerasi* (= *Conotrachelus nenuphar*) and *Stenocorus putator* (= *Hypermallus villosus* Fab.).

William Dandridge Peck was born in Boston, Massachusetts, May 8, 1763. His father, John, was a shipbuilder during the Revolution. Peck graduated B.A. from Harvard in 1782 and later spent some time in a Boston counting house. However, business was not to his liking and so he retired to a farm at Kittery on the coast of Maine, where he lived more or less secluded for twenty years. By his own efforts, he became an authority on plants. fishes, birds, and insects. In addition he was mechanically inclined and made a microscope and other delicate instruments. On March 27, 1805, he was elected the first professor of natural history at Harvard, a position that he held until his death. For three years he traveled in Europe, visiting scientific institutions, collecting books and specimens, and studying botany, with the idea of establishing a botanic garden. At this time he visited England, France and Sweden. In addition to his papers on insects, he wrote on plants and fishes. He was one of the founders of the American Antiquarian Society in 1812 and held various offices in scientific societies. At the time he a member of the Massachusetts Society for Promoting Agriculture, two of his fellow members were Samuel Henshaw of Northampton and David Henshaw of Leicester.

LOUIS NARCISSE BAUDRY DES LOZIERES (1761-1841)

Occasionally translations of foreign papers found their way into the pages of our early scientific journals. This was the case with "A memoir on animal cotton, or the insect fly carrier," read before the American Philosophical Society in 1797 (Trans. vol. 5, No. 18, pp. 150-159). This was written by [Louis N.] Baudry des Lozieres, a member of several academies and the founder of the Society of Sciences and Arts at Cape Francois. The author, in this paper, records his observations while he lived at Santo Domingo and thinks they are important because they may introduce a new branch of commerce with the West Indian colonies and make useful an animal previously known only for the trouble it causes. He refers to the worm that destroys indigo and cassava plantations. He describes briefly the caterpillar, its food, natural enemies, mating of the adults, eggs, etc., and is particularly interested in the activities of an ichneumon parasite. Parasitized caterpillars change color, increase in size and assume, as he calls it, a state of "factitious pregnancy." He describes the cocoons which the parasitic larvae spin but does not seem to be aware that the larvae have been feeding within the body of the host, for he says as soon as the "worms" are hatched, without moving from the spot where the eggs were laid, they yield a liquid which hardens upon contact with air and then finally spin their cocoons. The author saved the cocoons and noted the emergence of the parasites. The cocoons fascinated him. He said they were made of the finest cotton and he calls the material cotton because it is "idio-electric" and is pervious to the electric fluid. He claims that as soon as the parasites have left, the cocoons may be carded and spun. In less than two hours he could collect one hundred pints of cocoons and they were always abundant. Such animal cotton, as he calls it, had an additional use. It could be used in hospitals, where it did not inflame wounds, as did silk and vegetable cotton.

But Baudry des Lozieres' new branch of commerce with the West Indies never developed. Other early entomological observers, also, sometimes saw commercial possibilities as a result of their discoveries. At that time commerce was uppermost in the minds of most persons and it is likely that proposals involving any increase in trade always received the most attention.

JAMES EDWARD SMITH (1759-1828)

During the year 1797 the first illustrated work on American insects appeared, in two beautiful folios, in London, under the title The Natural History of the rarer Lepidopterous Insects of Georgia including their systematic charactors, the particulars of their several metamorphoses, and the plants on which they feed. Collected from the observations of Mr. John Abbot, many years resident in that country, by James Edward Smith, M.D., F.R.S., London, 1797 (text in English and French). This work, which contains figures and short descriptions of 103 Lepidoptera, was favorably received and praised by contemporary naturalists. The plates were engraved by Moses Harris, who combined artistic skill with a knowledge and appreciation of entomology. In fact, Moses Harris was an entomologist himself and an author of some standing. The original water-color drawings with the manuscript are in the British Museum together with seventeen quarto volumes of drawings, by Abbot, similar to those in the Smith and Abbot publication.

Doctor Smith was a distinguished naturalist and the author of many botanical works. He purchased from John Francillon, a London silversmith, enough drawings to make one hundred and four plates, and published these at his own expense under the title above mentioned. Francillon was a collector of insects, mainly Lepidoptera. He bought and exchanged specimens. He sold watercolor drawings not only of insects but of their food plants as well, and with the drawings came manuscript notes. One of his correspondents was John Abbot of Georgia and the drawings and descriptions that Smith purchased and published were those of Abbot. Smith, it has been said, never saw Abbot nor heard directly from him. And Abbot knew nothing of the book until long after it had been published. The plates of this work show the larva, pupa and adult of each species associated with its favorite food plant. In most cases the figures are natural size or slightly enlarged.

JOHN ABBOT (1751-1840)

Little is known about the life of John Abbot. Apparently an Englishman born about 1750, it is supposed that he was engaged at about the age of thirty by English naturalists to collect in America. After some traveling in America, he settled in Georgia, living at or near Jacksonburgh for nearly twenty years. A miniature portrait supposed to be of John Abbot is extant, in the British Museum. On August 30, 1835, John Abbot wrote a letter to Dr. T. W. Harris advising him about his charges for insects and drawings and from it we learn that Abbot supplied Major John E. LeConte with drawings. Abbot was a remarkable breeder and delineator of insects and Doctor Smith gives him full credit for his share of the work which was written around the drawings, the taxonomic notes being supplied by Smith. For many years the work of Smith and Abbot received the praise it deserved and even yet it is an artistic, entomological classic.

The first recorded evidence of the forest tent caterpillar in North America is given by Abbot in this work. He presents good figures of the larva and adult, and writes,

"This kind is sometimes so plentiful in Virginia as to strip the oak trees bare, but it is rather rare in Georgia."

Abbot sketched birds also, and his bird plates have been described as being "accurately drawn and skllfully colored." Many of his unpublished insect drawings and many of his bird drawings are in the possession of the Boston Society of Natural History. He corresponded with Alexander Wilson, George Ord and other naturalists of his day.

ISAAC CHAPMAN (17??-18??)

Concerning the earliest insect descriptions printed in America, Isaac Chapman published in the *Medical Repository*, which flourished from 1797 to 1824, under the senior editorship of Samuel Latham Mitchill, "An Account of a Species of *Cantharis*, found in Bucks County, Pennsylvania; including observations on its Medical Qualities" (vol. 2, No. 2, pp. 174-177, 1798). In part, Doctor Chapman states:

"Two or three years ago, William Smith, an intelligent person in my neighborhood, informed me, that one day, as he was at work, he accidentally mashed an insect on his shoulder, which in a short time, produced a complete vesication; and it appearing to be the insect here described, I was determined to gather some of them, and give them a trial in my practice; which, however, I neglected doing until last summer.

"This insect has a very near resemblance, in outward form, to the *Meloe* (*vesicatorius*) *alatus viridissimus nitens, antennis nigris* (Linn.) or Spanish Flies, as they are commonly called; but is rather smaller than even those brought from Spain, and of a very different colour: the head is of a very light red, with black antennae; the elytra, or wing cases, are black, margined with pale yellow, and a stripe of the same colour extends along the middle of each of them; the tarsi have five articulations, the mouth is armed with jaws and furnished with palpi"

Chapman then tells how he found them in potato patches, on beets, garden purslane, etc., doing considerable damage, and describes his experiments in powdering the beetles and applying the powder to some of his patients, with the results that "good blisters" were always raised. He was of the opinion, as a result of his investigations, that "every part of the insect is endowed with an equal, or nearly equal, degree of their quality." He concludes by discoursing on the methods of collecting the beetles and the advantages, to this country, of collecting them here instead of importing them.

In 1826, Isaac Chapman's paper entitled "Some observations on the Hessian Fly written in the year 1797" was published in the *Memoirs of the Philadelphia Society for Promoting Agriculture* (Vol. 5, pp. 143-53). This was a historical account of *Cecidomyia destructor* in Bucks County, Pennsylvania, from 1786 to 1790, including a description of all its stages, and methods of control.

JAMES WOODHOUSE (17??- 1809)

In volume three of the *Medical Repository* (pp. 213-214, 1800), under the title "Chemical News; communicated in a letter to Samuel L. Mitchill, M.D., Professor of Chemistry in Columbia College, New York, by James Woodhouse, M.D., Professor of Chemistry in the University of Pennsylvania, etc., dated Philadelphia, August 22, 1799," Doctor Woodhouse, in addition to submitting notes on various chemical matters, has the following to say under "Of American Blistering Flies":

"I have discovered two other blistering meloes besides that described in the Medical Repository. The one I would call *Meloe clematides*, as it is particularly fond of several species of this plant.

It is larger than the one described by Doctor Chapman, And the female is nearly twice the size of the male. The head, thorax, elytra and antennae are black: the elytra only edged with white. The abdomen is of a light ash-colour. The upper part of the abdomen, under the wings, is marked by two longitudinal streaks of a bright clay-colour. The asters are sometimes black with these flies, and the leaves are entirely destroyed by them.

"The other I would call *Meloe nigra*, the *Pennsylvanica* of Linnaeus. It is not more than half the size of Chapman's fly. The whole of it is black. It feeds upon the *Prunella vulgaris*, or self-heal, and *Ambrosia trifida*, or stick weed.

"I applied a small blister of these flies to my skin, and lost the plaister in half an hour. In twelve hours after, a fine blister was produced. A watery extract of the flies blistered in six hours. Distilled in a retort, they yield an acid, whose properties have not yet been examined.

"Besides these three kinds of meloe, there is another found in this country, mentioned by Calm, and called by Linnaeus *Meloe majalis*; but it is not yet known whether it will blister; for Shoepf expressly asks the question, 'An mel. vesicatorio (cantharid. officinal.) substituendus?'

"We then know for certainty of three kinds of indigenous blistering flies—*Meloe Chapmani, Meloe clematidis*, and *Meloe nigra. Meloe majalis*, doubtfully."

According to Leng's *Catalogue*, Woodhouse's *chapmani* is a synonym of *Epicauta vittata* Fab., his *clematides* a synonym of *Epicauta cinerea* (Forst.) and his *nigra*, a synonym of *Epicauta pennsylvanica* (DeG.). Another early paper on these insects was "An account of the American cantharis or *Meloe Americae*" by Nathaniel Dwight, which appeared in the *Memoirs of the Connecticut Academy of Arts and Sciences* (M. V. 1, pt. 1, pp. 99-102, 1800).

Woodhouse was a chemist and a physician and apparently not particularly interested in insects. He was professor of chemistry in the University of Pennsylvania from 1795 until his death in 1809, and was appointed to that chair when Joseph Priestly declined to accept it. As a surgeon in the United States Army, he accompanied General St. Clair's expedition against the western Indians in 1791. He was also the author of various books on chemistry and contributed to the scientific and medical journals of his time. According to one account, he was apparently the first to demonstrate "the superiority of the Lehigh anthracite coal in Northampton County, Pennsylvania, over the bituminous coals of Virginia for intensity and regularity of heating power."

SAMUEL LATHAM MITCHILL (1764-1831)

In 1799, Dr. Samuel Latham Mitchill, secretary of the Society for the Promotion of Agriculture Arts and Manufactures, published in their *Transactions* (New York City & Albany, Part 4, pp. 33-41) an article entitled "Observations on cankerworms, and the means of preventing their effects," which he had written March 30, 1795. The article is a general one and includes his own observations. He recommends that all lifeless fragments of bark be scraped off so as to make it difficult for the females to ascend, so as to do away with places of concealment, so as to expose the females to blasts of wind, so as to destroy overwintering places if by chance overwintering takes place under bark, and so as to expose the females to their bird enemies.

Doctor Mitchill was born in Hempstead, Long Island, August 20, 1764, and died in New York, September 7, 1831. Dr. J. W. Francis called him "the Nestor of American Science" and "the pioneer philosopher in the promotion of natural science and medicine in America." He graduated from the University of Edinburgh in 1786, studied law with Robert Yates, Chief Justice of the State of New York, and was one of the Indian

commissioners representing New York in its dealings with the Five Nations. He was elected to the New York legislature in 1790 and appointed professor of chemistry, natural history and philosophy in Columbia College in 1792.

In the geologic sciences, he was a pioneer, preceding Maclure by several years. In conjunction with Doctors Edward Miller and Elihu H. Smith, he started a quarterly, *The Medical Repository*, in 1797 and continued it for more than sixteen years. In 1801 he was elected to the national House of Representatives and in 1804 was appointed to the Senate to fill the place of John Armstrong who resigned. Following the expiration of his term in the Senate, he served in the House until 1813. He served in numerous other capacities and held other offices, and was the author of chemical, medical and other papers. His knowledge of science, letters, politics and social life made him extremely popular; and he lived a diversified civic and scientific life.

Doctor Mitchill's contribution to entomology was, of course, very slight. Nevertheless, it is mentioned because it shows the type of men who made such contributions in the early days.

In 1827 he wrote notes on *Melolontha* infested with *Cordyceps*, for the *American Journal of Science & Arts* (vol. 12, pp. 21-8) under the title "Views of the process by which, under particular circumstances, vegetables grow on bodies of living animals."

ANDREW BILLINGS (17??-18??)

Insects injurious to animals came in for some attention at this time as shown in a paper by Andrew Billings of Poughkeepsie, N. Y., entitled "Observations on Bots." This was printed in the *Transactions of the Society for the Promotion of Agriculture, Arts and Manufactures*, (N. Y. City & Albany, part 4, pp. 176-178, 1799) and includes the observations of Mr. Billings, who had lost a valuable horse from bots during the spring of 1798. He observed the eggs, glued to the hair of the horse's legs and shoulder and saw an egg hatching into a maggot. He then connected the eggs with the species responsible for it. His recommendation was to scrape off the eggs with a knife.

PETER De La BIGARRRE (17??-18??)

Following Mr. Billings' article in the same volume of *Transactions*, there was printed "A Treatise on Silk Worms: In two parts. The first on their management within Doors, and the second concerning their treatment in open Air upon Hedges." (pp. 394-418). This was by Peter De La Bigarre, and it is written in the form of questions and answers.

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- 1604. Natural and Moral History of the Indies. London. (Engl. transl. of 1588 Latin ed.) 2 vol.
- Anon.
- 1792. The Jesuit Relations and Allied Documents, Travels and Explorations of the Jesuit Missionaries in New France, 1610-1791. 73 vol.
- [?Banister, J.]
- 1680? Collectio insectorum et aliarum rerum naturaliium in Virginia.

Banister, J. (1650-1689)

- 16??. Observations on the Musca Lupus of Mouffet in Virginia. Philosoph. Trans. (London), ??:
- Some observations concerning insects made in Virginia, anno D. 1680, with remarks on them by J. Petiver. *Philosoph. Trans.* (London), 22:807-814.
- Bonoeil, J. (15??-16??)
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- Brickell, J. (16??-1745)
- 1723. The Natural History of North Carolina, with an Account of the Trade, Planners and Customs of the Christian and Indian Inhabitants. Illustrated with Copper-Plates, whereon are curiously Engraved the Map of the Country, several strange Beasts, Birds, Fishes, Snakes, Insects, Trees, and Plants, &c. Dublin. 408pp.

Byrd, W. (1674-1744)

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- Churchill, A. (16??-1728)
- 1704. A Collection of Voyages and Travels, some now first printed from original manuscripts, Others translated out of foreign languages, and now first published in English, to which are added some few that have formerly appear'd in English, but do now for their excellency and scarceness deserve to be reprinted. In four volumes. With a general preface, giving an account of the progress of navigation, from its first beginning . . . the whole illustrated with a great number of useful maps, and cuts, all engraven on copper. London. 4 vol.

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- Hamor, R. (15??-1626)
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Harriot, T. (1560-1621)

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- Holland, W. J. (1848-1931)
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- 1674. An Account of Two Voyages to New-England, Made during the years 1638, 1663. London. 279pp.
- Lawson, J. (16??-1711)
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- 1709. A New Voyage to Carolina; Containing the Exact Description and Natural History of that Country; Together with the Present State thereof and a Journal of a Thousand Miles Travel'd thro' several Nations of Indians. Giving a particular Account of their Customs, Manners, &c. London. 258pp.

Moreton, N. (1613-1685)

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- Ray [Wray], J. (c.1627-1705)
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Atwater, N.

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- Bartram, J. (1699-1777)
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BOOK NEWS

THE NATURAL HISTORY OF MOTHS

by M. Young. 1997. 271pp, 16 pl. (16 x 23cm). T. & A. D. Poyser, London. £33, or US \$49.95 cloth.

An excellent monographic treatment of moth biology, life history, behavior, ecology, and related subjects. The title is misleading, however, since the work deals only with species from the British Isles, thus "in Great Britain" should be added to the title. Yet, much of the general subject matter of the book applies to moths worldwide.

SCHMETTERLINGE UND IHRE LEBENSRÄUME: Arten - Gefährdung -Schutz. Band 2. Hesperiidae, Psychidae, Heterogynidae, Zygaenidae, Syntomidae, Limacodidae, Drepanidae, Thyatiridae, Sphingidae.

by Lepidopterologen-Arbeitsgruppe. 1997. 679pp (21 x 29cm). Pro Natura-Schweizerischer Bund für Naturschutz, Basel. SFr 110 (ca. \$80) cloth.

This second volume in this Swiss conservation and bionomics series covers several families of moths historically grouped in "Bombyces," plus the skippers. The first part from 1987 covered true butterflies. This series is one of the most extensively illustrated works on any Lepidoptera fauna to date. There are 100s of color photographs from nature, often many for each species, including the immature stages and life history sequences. At the end of the book are 18 color plates of museum specimens of the species treated.

DIE ZÜNSLERARTIGEN (PYRALOIDEA) MITTELEUROPAS

by F. Slamka. 1997 (rev. ed., from 1995). 112pp (13 color pl.) (16 x 23cm). F. Slamka, Bratislava, Slovakia. \$26.50 cloth.

This small work covers the pyralid moths of central Europe, about 400 species of the more than 850 species known for western Europe. There are 13 color plates and 55 plates of genitalia drawings.

MOTHS OF THAILAND. 2. SPHINGIDAE

by H. Inoue, R. D. Kennett, and I. J. Kitching. 1997. 149pp, 44 color pl. (18 x 26cm). Brothers of St. Gabriel in Thailand, Bangkok. \$35 cloth. This work continues the series since the first part on Saturniidae published in 1990. The present work treats the 176 hawkmoth species known for Thailand, all illustrated in color. There also are some genitalia photographs. There is a checklist and brief bibliography. Each species has a brief diagnosis, plus notes on distribution, flight period, and known hostplants.

THE MOTHS OF BORNEO. 10. Geometridae: Sterrhinae and Larentiinae

by J. D. Holloway. 1997. 242pp, 12 color pl., 608 genitalia fig. (17 x 25cm). Malayan Nature J., Kuala Lumpur, Malaysia. \$42 paper. This series on macro-moths of the Bornean part of Malaysia continues with

another section of the large family Geometridae. The text treats 275 species, including 55 new species and 9 new genera.

NEPTICULIDAE MITTELEUROPAS, ein illustrierter Begleiter

by A. Laštůvka and Z. Laštůvka. 1997. 229pp (15 x 21cm). Konvoj Publ., Brno, Czech Republic. \$47 cloth.

This new work on Central European Nepticulidae treats 184 species: 4 new species are described. Each species is illustrated in fine line drawings: habitus, genitalia, and leaf mine. Hostplants are noted for each species and also listed in a table.

BUTTERFLIES AND MOTHS OF THE WORLD

by A. Eid and M. Viard. 1997. 192pp (23 x 29cm). Chartwell Books, Edison, New Jersey (originally published in French in 1996). \$24.50 cloth. A full-color picture book of the most interesting and exotic butterflies and moths from around the world. Some of the photographs show a single specimen across two pages! There is only minimal text. An excellent "coffeetable" book of the most colorful and unusual species.

THE COLOUR IDENTIFICATION GUIDE TO CATERPILLARS OF THE BRITISH ISLES.

by J. Porter. 1997. 275pp (49 color pl.) (19 x 23cm). Viking, London. £45, or US \$72 cloth.

In this lavishly illustrated new work, 49 color plates illustrate caterpillars of over 850 species of Lepidoptera from the British Isles, all photographed in nature. The text gives diagnostic characters for each species, plus hostplants and bionomics. There are no keys.

EUPHAEDRA

by J. Hecq. 1997. 120pp, 48 color pl. (21 x 29cm). J. Hecq, Turvuren, Belgium. Bfr.4000 (ca. \$112) cloth.

Long-time student of the nymphalid genus *Euphaedra*, J. Hecq has produced a beautifully illustrated monograph of these African butterflies, treating 180 species. The plates are taken in part from those previously published since 1974 in the journal *Lambillionea*. The work is entirely in French: lacking are abstract, keys, and bibliography.

THE BUTTERFLIES OF PAMIR

by V. V. Tshikolovets. 1997. 282pp (40 color pl.) (16 x 23cm). F. Slamka, Bratislava. \$75 cloth.

The Pamirs are a high mountain range of Kirghizia, northwest of the Himalayas and the Hindu Kush ranges. These isolated and high elevations harbor a rare flora and fauna. This new book is the first work to illustrate in color the many rare butterflies from this far-off local. The text treats 115 species of butterflies and skippers.

MOTH FAUNA (Lepidoptera: Heterocera) OF THE CHERNIGOV REGION. 1. OWLETS (Noctuidae)

by Z. T. Klyuchko et al. 1997. 192pp (14 x 20cm). Academy Press, Kiev. Price: ? cloth.

The present volume treats the Noctuidae of this part of the Ukraine. The text is an annotated catalog, but with extensive notes for each species. 306 species are listed, along with distribution maps for all species.

MICROLEPIDOPTERA OF EUROPE. 2. SCYTHRIDIDAE

by B. A. Bengtsson. 1997. 301pp, 14 color pl. (17 x 24cm). Apollo Books, Stenstrup, Denmark. DKK 500 (ca. \$72) cloth.

This part is the second release in this new series. It compares with the monographic series, *Microlepidoptera Palaearctica*, but treats only Europe and is less expensive. The present work treats 237 species, mainly in the genus *Scythris*; 40 new species are described. The work is well done and the color plates are finely reproduced. There are also 419 genitalia figures.

PYRALOIDEA STUDIES: Festschrift for Michael Shaffer

edited by M. A. Solis and M. Horak. 1998. 291pp (17 x 23cm). Apollo Books, Stenstrup, Denmark (reprint from *Entomologica Scandinavica*, Vol. 28, No. 4:361-551). DKK 400 (ca. \$59) paper.

A compendium of several papers on Pyralidae and related groups in honor of the retirement from the British Museum (Natural History) of pyralid curator, Michael Shaffer. Authors include E. Arenberger, P. Gentili, M. Horak, O. Karsholt, B. Landry, K. V. N. Maes, M. Meyer, H. H. Neunzig, M. Nuss, J. C. Shaffer, and M. A. Solis. There is no table of contents.

A WORLD CLASSIFICATION OF THE HARMACLONINAE, A NEW SUBFAMILY OF TINEIDAE (Lepidoptera: Tineoidea)

by D. R. Davis. 1998. 81pp (21 x 28cm). Smithsonian Inst., Washington, DC (SCZ 597). Paper.

A monographic review of an unusual group of two pantropical genera, sometimes previously placed in the family Arrhenophanidae. Included are 22 species, 13 of which are newly described.

MEETINGS

 1998 Lepidopterists' Society: July 31-August 2, Eureka, Illinois, USA Southern Lepidopterists' Society, October 3-4, Gainesville, Florida, USA (also field meeting: Aug 21-23, Caprock Canyons, Texas)
 1999 Association for Tropical Lepidoptera: April 30-May 1, Gainesville, Florida, USA