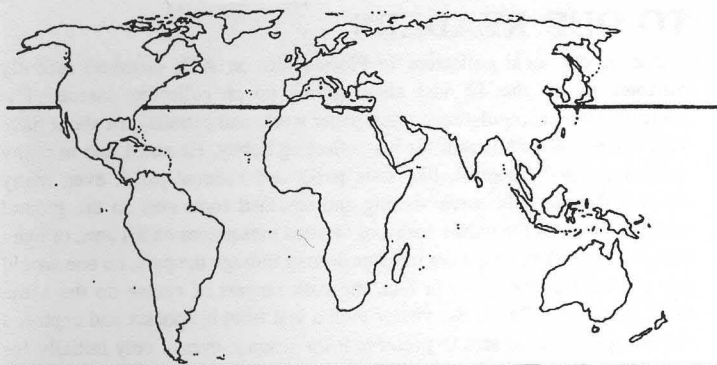




LEPIDOPTERA NEWS

September 1998

No. 3

1998 ATL Awards

HENRY BATES AWARD

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

Dr. Jon D. Turner

The 1998 ATL Henry Bates Award for outstanding original research and noteworthy contributions to the study and conservation of tropical Lepidoptera is presented to Dr. Jon D. Turner, of Huntsville, Alabama.

In the very best traditions established by Henry Bates a century-and-a-half ago, Dr. Turner has worked indefatigably in the tropical rainforests of the Amazon, and elsewhere in the tropics, to discover fascinating new information on the biology and classification of the butterflies, particularly among the metalmarks, family Riodinidae. Simultaneously, he has exerted exceptional efforts towards the conservation of the rainforests in central Rondônia, Brazil, and in eastern Ecuador. The Rondônia site, after several years' work, now encompasses a rainforest reserve of some six thousand acres, protecting one of the world's greatest species diversity for butterflies and moths. The Ecuadorian site is just beginning as a forest reserve. Both reserves were threatened by imminent development until saved through the leadership role and commitment of Dr. Turner. To him, all of the members of the Association for Tropical Lepidoptera express their deepest thanks and their united desire to honor him with this award.

Dr. Turner is a charter member and a life member of ATL, and has been on the Advisory Council since 1994 and on the Board of Directors since 1996.

JACOB HÜBNER AWARD

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

Dr. Eugene G. Munroe

In honoring Dr. Munroe with the ATL Hübner Award for 1998, we recognize a lifetime of research and publication on Lepidoptera, primarily on moths of the family Pyralidae. He graduated from McGill University, Canada, in 1940, then received a Ph.D. from Cornell University, Ithaca, New York, in 1947. Before his retirement, he was long-time curator of Lepidoptera at the Canadian National Collection, Agriculture Canada, in Ottawa. He also was on the scientific advisory council of the Canadian government at various times beginning in the late 1960s.

His studies have resulted in over 200 publications since the late 1940s, and have included papers on species from most faunal regions. His major works have involved Pyralidae from the New World and from east Asia: the most notable works include monographs on the Nearctic Odontiinae (1961), on *Udea* species (1966), Pyraustinae of east Asia (1968-71*), American *Dioryctria* coneworm moths (1969-93*), species of Midilinae (1970), the European corn borer genus *Ostrinia* (1970*), the genus *Nomophila* (1973), the genera *Vitessidia* and *Vitessa* (1980**), and two Pyralidae parts of the *Moths of America North of Mexico* series (1972-73 and 1976). Besides these revisions and monographs, there are dozens of significant papers since 1950 on various smaller genera and new species from all parts of the world. Dr. Munroe also contributed the Lepidoptera section to the McGraw-Hill *Synopsis and Classification of Living Organisms* encyclopedia (1982) and an earlier contribution on Lepidoptera for a summary in *Canada and Its Insect Fauna* (1979), as well as a number of papers on Lepidoptera biogeography. He also worked on some butterfly groups, including a large paper on the classification of Papilionidae (1960).

Dr. Munroe is a charter member of the Lepidopterists' Society and has served in several capacities, including President in 1959, and Vice-President in 1973, and was made an honorary life member in 1972. He also is a charter member of ATL, and has been on the Advisory Council since 1990 and on the Board of Directors since 1993.

(cont. on p. 3).

* co-authored with A. Mutuura

** co-authored with M. Shaffer



Fig. 1. Dr. J. D. Turner (left) receiving the ATL 1998 Henry Bates Award from ATL Chairman, Dr. J. B. Heppner (right), at the Gainesville meeting, April 18, 1998.

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

One of our local collectors in Florida (not an ATL member) recently lamented to me that he was about giving up on collecting insects. The interminable new regulations, rules, paper work, and permits, just about have undermined his enthusiasm for his collecting hobby. He noted that in many areas under strict control, like state parks and national parks, even many national forests, if he were visiting and smashed some ants on the ground with his shoes on the public paths, or swatted mosquitoes on his arm, or even impaled butterflies on his car radiator driving through the park, no one would pay the least attention — in fact, the park rangers of course do the same thing every day! But, if the visitor took a vial from his pocket and captured the mosquito off his arm to preserve it for *science*, even if only initially for his own collection and study of insects, he would be committing a grave "crime," punishable by various fines and prosecution designed to protect native wildlife, no matter if it be a mosquito or roach or bear or bird! This particularly affected our Florida collector as an amateur not connected with a large museum or university. There are similar stories that could be told for any number of countries around the world, some countries having now protected almost everything within their boundaries from the great "peril" of the amateur insect collector, no matter that logging companies can clear-cut any number of national forests, etc., in the interest of profit.

Is there not something wrong with this Alice-in-Wonderland, "1984" mentality (or is it insanity?) that confronts us? Is it the amateur who is to blame for the endangered species due to decimation of forests and wetlands, or is it the large corporation clear-cutting everything for profit (which the government gets a share of!)? This situation is somewhat similar to the simpleton thief who robs a store of \$5 and gets 10 years in jail, while the stock broker who bilks people out of their life savings at the rate of millions of dollars nationwide gets a fine, probation, and possibly house arrest for a year. Not that collecting is stealing, but the scales of retribution are similar in the two examples. Somehow the entire system is upside down; and in most countries *profit* comes before anything else.

Should we not encourage the amateur to study and collect insects? Should we not control rapacious corporations from clear-cutting, particularly in the few remaining ancient forests that they always are most anxious to cut, or the remaining untouched tropical forests?

I hope you will voice your opinions to local and national political leaders and educate them about the conservation laws, written originally for mammals and birds, but often now just having the insects added to them with mindless none-thought about the consequences. Only we have the knowledge to educate these politicians, for no one else will do it. So, do your part and speak out! When a park visitor can step on any number of roaches or ants and be welcomed, but the lowly amateur naturalist who captures one specimen for science without a permit gets fined, or jailed — as if a bear had been shot — or has his catch taken away, then we really are in serious trouble, both mentally and morally, and also in regard to the future of science. And, remember that most permit processes are not simple, but often involve endless red-tape designed for the exacting needs of permits to study endangered mammals or birds, not insects!

Although I write this in personal recognition of our Florida friend's lamentation about collecting, ATL does approve of responsible collecting of insects, as well as knowledgeable conservation. Commercial-scale collecting is not condoned, but the valued amateur naturalist needs to be encouraged, not hindered, and especially regarding insects, where it has never been documented that even localized collecting has done any harm to the local insects. Try exterminating the roaches in your house!

J. B. Heppner
Executive Director

NOTES

1. **1999 Annual Meeting:** April 16-18 in Gainesville.

2. **1999 Annual Photo Contest:** deadline is March 15, 1999.

3. **Address changes:** members are urged to keep their address current for the mailing of journals and the newsletter. With new postal fees, it now costs your society over \$4 to pay the postage on returned journals in the USA and mail them to your new address when we are not notified of address changes ahead of time! This is the kind of thing that can require higher dues to cover costs, so please help us all out and let us know when you move.



ATL 1998 ANNUAL MEETING: More Photos. Fig. 2. Dr. Eugene Munroe (left) receiving the ATL 1998 Jacob Hübner Award from ATL Chairman, Dr. J. B. Heppner (right). Fig. 3. Dr. Philip J. DeVries (left), the 1998 ATL Invitational Speaker, with Dr. and Mrs. J. D. Turner. Fig. 4. Dr. Mark Scriber, of Michigan State University (left) talking with Dr. Eugene Munroe, Ottawa, Canada, and his wife, Isabel Munroe. Fig. 5. Leroy Simon (left) receiving his award for winning 2nd and 3rd prizes for butterflies in the 1998 ATL Annual Photo Contest, from ATL Chairman J. B. Heppner (right). Fig. 6. Left to right: Jane Ruffin (Rosemont, Pennsylvania), and Mark Salvato, Jaret Daniels and Akers Pence (Gainesville, Florida). Fig. 7. Ron Boender (left) and his wife, Grace Boender, of Butterfly World, Coconut Creek, Florida.

NOTES ON THE EFFECT OF THE EL NIÑO PHENOMENON AND FOREST FIRES ON LEPIDOPTERA POPULATIONS OF PALAWAN, THE PHILIPPINES, DURING 1997-98

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During the latter part of 1997 and beginning of 1998, most of Southeast Asia experienced a very severe drought, evidently caused by the natural El Niño phenomenon. Throughout the region widespread and extensive bush and forest fires raged for weeks or even months. The island of Palawan did not avoid its share of destruction and in fact was the hardest affected place in the Philippines in respect to subsequent fires. Some 15,000 hectares of grassland and virgin forests have been reported lost in these blazes, but since many Municipal Forestry Departments have failed to report their respective losses to the Provincial Environment and Natural Resources Office (PENRO), a total assessment is difficult to make. However, it seems fairly reasonable to put the figure at a total of 25,000 hectares, as some of the municipalities not reporting are known to have been severely affected.

Most severely affected by the fires were the Rizal and Quezon Municipalities on the SW coast, where more than fifty uncontrolled fires destroyed vast areas during late March and early April 1998. Unlike previous years, when it was largely grasslands being lost, extensive stretches of virgin forests along the lower flanks of Palawan's highest peak, Mt. Mantalingahan (2085m), went up in smoke. Due to the mentioned failure of reporting to PENRO, I am unfortunately not able to provide more precise information for Palawan as a whole at this point.

On 2 June 1998, I had the opportunity to personally inspect a primary forest area that had been devastated by a fire a few days earlier, just inland of the village of Napsan, west-central Palawan. The environment had been severely damaged, but what had most obviously happened was that the excessive amount of dry foliage on the ground, brought about by the El Niño drought, had caught fire and the trunks of climbing plants, bushes and young trees had been heated to the extent that the plants would wither. This appears to be the most probable cause of the simple fact that the canopy was still green and most secondary growth still present, but in a withered condition.

The rainy season (May to December) of 1997 was quite mild, with the last major rains virtually stopping already as early as October. A dry and relatively cool climate was experienced until late February when temperatures increased rapidly, as is natural for the dry season (March and April).

During December 1997 and January 1998, most of the small and medium-sized rivers in central Palawan dried up and by late February trees growing on thin soil, on rocky ground, in the foothills were withering. At this point, Heterocera populations started to dwindle. December and January is naturally the main low density period of Rhopalocera populations in Palawan. Towards March and April, Rhopalocera populations increase in density, but during the same period of 1998, populations gradually reduced to such an extent that even common, widespread species like *Appias lyncida enaretina* Fruhstorfer (Pieridae) turned into an irregular sight in the foothills. Several other species, like *Troides plateni* Staudinger (Papilionidae), which usually keep unchanged population densities in the foothills during the March/April dry period, had disappeared completely by November 1997.

In the case of Heterocera, an obvious reduction in population densities could also be observed in the foothills. Not only did Heterocera populations decrease in densities, but a very remarkable phenomenon was that moth populations took on very different species compositions. This I have not observed during previous normal dry seasons.

The major change in species compositions of Heterocera could be stated as follows: species that were normally very common maintained their abundance in an estimated 2/3 of the cases. The remaining third was obviously affected, but still fairly numerous. A large bulk of species that can normally be considered fairly common to common were as a great whole affected so much, that they quantitatively were reduced to less than 50% of normal population densities. At the same time, there were species, which are normally quite infrequent visitors at the light trap, that suddenly showed up in either greater quantity or just more frequently.

As an example, three of the *Acosmeryx* spp. (Sphingidae) occurring on Palawan showed interesting trends. *Acosmeryx shervillii* Boisdual and *A. anceus subdentata* Rothschild & Jordan are normally the common species at light traps, with *A. pseudonaga* Butler as a very irregular visitor. During the January to May period of 1998, *A. pseudonaga* was not only more numerous than the two other species, I even could observe more specimens on a single night than I would have done in a one year period under normal climatic conditions! Otherwise, in the case of the Sphingidae, one could see a very strong reduction both in the quantity and variety of species coming to light traps.

Much natural (i.e., drought) and human (i.e., fires) destruction of a wide variety of habitats could be observed, especially during the first five months of 1998: in the case of Lepidoptera, this destruction had a devastating effect, at the very least in the short term. As previously mentioned, March and April is the natural dry season, so the flora and fauna must to some extent have adapted to this yearly cycle. In the case of forest fires, these areas, as a large whole, probably will take quite some time to recover. It would be fairly reasonable to anticipate that the understory within the primary forest, which was lost in the blazes, soon after the first rains would sprout once more, thereby providing fresh food sources for a variety of Lepidoptera, so even an extended dry period as the 1997-98 El Niño should not really threaten the very existence of any Palawan Lepidoptera species, except on a local basis. Furthermore, throughout the El Niño period, the interior hills of Palawan have sustained Rhopalocera populations with the same density as usual, even down to altitudes of around 300m above sea level, which still is within the lowland ecological zone. Some species of Rhopalocera even showed increased population densities in these areas during the El Niño.

Considering that the major part of the Palawan lowland habitats and Lepidoptera population was largely destroyed by the El Niño and fires, it can be expected that, with the onset of the rainy season, large areas of land virtually will turn into "virgin" breeding grounds as lots of potential food sources will sprout and germinate. All in all, I expect a great quantitative come-back for most species of Rhopalocera by then. This prediction still needs to stand its test and as a follow-up to this article, at least one more article is planned as soon as adequate material and observations are at hand.

ACKNOWLEDGMENTS

I would like to thank Stephen K. Hall and David Lees for checking up my English grammar and for useful comments and suggestions on the manuscript. Thanks to Mrs. Melinda R. Felizardo-Amihan, GIS Manager of the Palawan Tropical Forestry Protection Programme (PTFPP), for kind assistance in the attempt to obtain reliable data for this article. Likewise, thanks to Colin G. Treadaway for his continued support and encouragement of my studies of Palawan Lepidoptera.

AN EXOTIC DESTINATION IN THE HEART OF THE JUNGLE: POOK'S HILL NATURE RESERVE, BELIZE

Rimantas Puplėsis¹ and Simon R. Hill²

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As part of a research project (R. Puplėsis and G. S. Robinson, principal investigators), financed by NATO and managed by the Royal Society of London, field work was conducted at a Neotropical site to investigate primitive leafmining Lepidoptera. There usually are problems in finding a convenient place for intensive and successful Lepidoptera collecting: easy access, well-maintained, located within an area of natural diversity, and where sampling is welcome.

During a one month intense field survey in Belize, we discovered a very suitable site of great natural interest: Pook's Hill Nature Reserve. Pook's Hill is a 300-acre private nature preserve of pristine jungle in the foothills of the Maya Mountains of Belize. It is bordered next to the Tapir Mountain Nature Reserve, by the Roaring River, located 12 miles from Belmopan and 21 miles from San Ignacio.

On arrival, we found ourselves in a small hillside clearing closely surrounded on all sides by dense and scenic tropical forest. It is possible to set light traps in the clearing near the visitor lodge or to

select a site in the forest along one of the paths. The owners of the reserve, Vicki and Ray Snaddon, plan to provide as many facilities for research work as possible, with electricity. They are both very hospitable and enthusiastic, so entomologists, amateur collectors, or just tourists who are interested in wildlife, are very welcome. Accommodation is in the form of cozy detached cabanas with private bathroom (hot showers); there even is a bar/restaurant serving European cuisine, with a flavor of the Caribbean added. Pook's Hill Reserve also offers horse riding, mountain biking, birding, etc.

If you go, follow the Western Highway to mile marker 52.5 at Teakettle Village, turn south onto a dirt road for 4 miles, then turn right where the Pook's Hill Reserve entrance is about 3/4 mile along this road, then a further 3/4 mile to the lodge. The route is well posted. You can get in contact with the friendly owners by e-mail to Vicki or Ray Snaddon: pookshill@bit.net. Check their website at: www.belizenet.com/pookshill.html

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FORBES: Lepidoptera of New York. Pt. 1 (1923)	50.00	Plates 1-74, 76-89, 99-111, 111A, 112-117, 117A-D, 118-130, 130A, 131-134, 138-141, 143-158, 180-182, 185.	
FORBES: Lepidoptera of New York. Pt. 2 (1948)	25.00	All in original wrappers as issued in parts (82 pts. present); most wrappers somewhat frayed, but last issues from 1937 are in mint condition. Text and plates are good but with some frayed edges (some sections are not cut on top edge, as originally issued by the publisher)	
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THE PIONEER CENTURY OF AMERICAN ENTOMOLOGY

by H. B. Weiss

Continued from Chapter I-II (see *Lepidoptera News*, June 1998) – J. B. Heppner, Editor

CHAPTER III

THE EARLY YEARS OF THE 19TH CENTURY

(1800 to 1817)

At the beginning of the 19th century, the American Philosophical Society offered a prize "for the best method of preventing the premature decay of peach trees." The amount of the prize was \$60.00 and two of the papers submitted were of such equal merit that the prize was divided equally between the two authors. John Ellis, of New Jersey, was one of the prize winners and his paper was printed in the *Transactions* of the Society in 1802 under the title "Account of a method of preventing the premature decay of peach trees" (vol. 5, appx. No. 1, pp. 325-26). His paper dealt with the peach-tree borer, its type of injury, deposition of the eggs by the "wasp-like" adult, etc. His method of control was to clear away the soil from the base of the tree to a depth of about three inches and to then apply a band of straw, one inch thick and three feet long, binding it around the tree at three places, and having the band extend to the bottom of the hole. The soil was then replaced. Upon the approach of frost the straw was removed. By this method egg deposition was prevented within three feet of the root. Ellis tried this method on numerous trees and found that it worked.

The other prize winner was Thomas Coulter of Bedford County, Pennsylvania. His paper appeared in the same volume of the *Transactions* (appx. No. 2, pp. 327-28) that carried Mr. Ellis' paper, and was entitled "Description of a method of cultivating peach trees, with a view to prevent their premature decay; confirmed by the experience of forty-five years, in Delaware State and the western parts of Pennsylvania." Coulter claimed that the death of young peach trees was due principally to planting, transplanting and pruning the same stock and then gave his observations concerning the culture of the trees, plowing, manuring, etc., but said nothing about insects. Apparently the committee of award was not overbalanced, entomologically.

In 1803 John Drayton, the governor of South Carolina, wrote to the secretary of the American Philosophical Society about the "Destruction of Carolina pine trees by an insect" and this letter was read at the meeting of October 7 (*Proc. Amer. Philos. Soc.* vol. 22, appx. p. 342). The extent of Governor Drayton's interest in entomology is unknown. In 1801, he used his influence for the establishment of South Carolina College. Probably his timber holdings were at the bottom of his interest in insects.

The status of economic entomology at the beginning of the 19th century is perhaps shown by the references to insects and the remedies proposed in *The Domestic Encyclopaedia or A Dictionary of Facts and Useful Knowledge comprehending a concise view of the latest discoveries, inventions, and improvements chiefly applicable to rural and domestic economy*, etc., by A. F. M. Willich, M.D. The first American edition of this encyclopaedia with additions by James Mease, M.D., was published in Philadelphia in 1803 and it is from this edition that the following notes and extracts have been made:

For the control of ants on plantations the following recommendation is made: "A small quantity of human feces, when placed in their hills, will not only destroy great numbers, but expel the rest from their habitations."

As a protection against the "black fly" or plant louse that attacks turnips, cabbages, etc., it was suggested that the seed be impregnated with sulphur. For bed-bugs, the remedy was 1/2 ounce of camphor in 1/2 pint of spirit of wine or turpentine, with which the beds, furniture, etc., were to be anointed. Another remedy was the mixture of 1 ounce of quicksilver and the whites of 6 or 8 eggs. These were beaten together until the quicksilver appeared as a black sediment on the bottom of the vessel. It was then to be applied with a brush to furniture.

The canker-worm is described as "a species of insects particularly destructive to corn, grasses, and every other vegetable in which it can harbour These worms, every fourth year, become flies, when they deposit their spawn in the ground." The canker-worms were supposed to originate from injudicious pruning, "leaving the foot-stalks of fruit on trees after it was gathered; bruises arising from the use of ladders in collecting fruit; nailing trees against walls, with too tight trellises; wet autumns which prevent the young wood from ripening, and are succeeded by severe frosts that kill the shoots; birds and insects devouring the buds," etc. Apple trees particularly were subject to attack.

The caterpillar, or *Eruca*, is "a genus of insects comprehending many species, of which that most generally known is the common, or garden-caterpillar." Then follows several pages devoted to specific caterpillars. *Coccus* is described as "a genus of insects comprising twenty-two species, which are principally denominated from the plants they frequent."

Cockroach, "or *Blatta*, L., a genus of insects, resembling the beetle, and consisting of ten species, the most remarkable of which is the *orientalis* or eastern cockroach. These insects are frequently found in America; they penetrate chests, drawers, &c. and do considerable injury to clothes. They seldom appear till night, when they infest beds, and bite very severely, leaving an unpleasant smell. Their food is bread, meat, whether raw or dressed, linen, books, silkworms, and their cods, &c. According to Sir Hans Sloane, the Indians mix the ashes of the cockroach with sugar, and apply them to ulcers, in order to promote their suppuration."

Cricket, "the Common, or Hearth-cricket, *Gryllus domesticus*, an insect which delights in new built houses, where the moisture and softness of the mortar enable it to penetrate between the joints of the bricks or stones, and thus to open communications to different rooms." An easy method of destroying them was to place phials half full of beer near their holes whence they would crawl in to them and could not escape. Cats, it is stated, were fond of crickets and would eat vast numbers of them.

Dog-Fly, "or *Cynomia*, L. a genus of insects common in woods, and among bushes: they are particularly troublesome to dogs, and usually seize upon their ears; it is believed that they can be prevented only by being killed."

Flea, "or *Pulex*, L. in zoology, a genus of insects requiring no particular description," etc., etc. "Children and females are remarkably liable to the attacks of this little enemy; a circumstance which must be attributed to their more tender skin, their purer blood, longer clothes, and in some individuals, perhaps to a peculiar state of perspiration." Cleanliness was stressed. Rooms

were to be sprinkled with a decoction of wormwood. Dogs and cats were to be anointed with sweet oil.

Grasshoppers, "or *Tettigonia*, L. are a family of insects belonging to the genus of *Gryllus*, and comprising 69 species," etc., etc., etc.

Hornet, "or *Vespa Crabro*, L. a well known insect, which is about one inch in length, and builds its nest in hollow trees," etc., etc.

Various other insects are mentioned, such as the horse-fly, lackey moth, louse, mole cricket, moth, silk-worm, etc., but enough has been quoted to give one an idea of the kind of entomology that circulated in the encyclopedias.

BENJAMIN HENRY LATROBE (1764-1820)

It is a relief to turn from this to a paper that appeared in the *Transactions of the American Philosophical Society* (vol. 6, pt. 1, No. 15, pp. 73-81, 1 pl.) called "On two species of *Sphex*, inhabiting Virginia and Pennsylvania and probably extending through the United States." This was read January 21, 1803, by Benjamin Henry Latrobe and dealt with *Sphex coerulea* Linn., and *Sphex pennsylvanica* Linn. The author states that these "probably" are the species but refers to them as being known commonly as the "blue wasp" and the "mason and dirt-dauber." He then describes them, rather loosely, their method of building cells, their habits and the fact that they fill the cells with spiders of numerous genera, but especially those not building webs. Mr. Latrobe opened cells, counted the spiders, weighed them and weighed the larvae of the wasps. One poorly drawn plate illustrates the wasps, larvae, and cells. Reference is also made to John Bartram's paper in the *Transactions of the Royal Society of London* (vol. 43, No. 476, 1745) referring to these insects. Latrobe's account is an early effort to record interesting things about the domestic economy of wasps. It is readable, not technical. Some of his observations were made at Ripponlodge, in Virginia. The author was inclined to believe that *Sphex pennsylvanica* reasoned, because it had repaired several injuries which he had made to its cells.

Benjamin H. Latrobe was an architect who was born in Yorkshire, England, May 1, 1764. He was educated in a Moravian seminary in Saxony and at the University of Leipzig. In the Prussian army he saw active service. Returning to England, he was made surveyor of the public offices, and engineer of London in 1789. He came to this country in 1796 and was the engineer of the James River and Appomattox canal. In addition, he built the penitentiary in Richmond, Virginia, and many private mansions. In 1798 he moved to Philadelphia, where he designed the old Academy of Art, the Bank of the United States and additional buildings. In 1800 he was the first to supply Philadelphia with water pumped by steam from the Schuylkill River. He was the architect of the Roman Catholic cathedral in Baltimore and in 1803 he was appointed by Thomas Jefferson as surveyor of public buildings. Latrobe was even interested in steamboats and built the "Buffalo" at Pittsburgh, the fourth steamboat to descend the Ohio River. After the burning of the Capitol in 1814, Latrobe was engaged to rebuild it. He resigned in 1817 and went to New Orleans to build a water works. Here he died on September 3, 1820.

CHARLES COTESWORTH PINCKNEY (1746-1825)

The author of the famous phrase, "Millions for defence, but not a cent for tribute," Charles Cotesworth Pinckney, statesman, brigadier-general in the Revolutionary War, Washington's aid-de-camp, lawyer, United States Minister to France, etc., wrote in 1804 to the American Philosophical Society a letter "On the September 1998

worm supposed to destroy the South Carolina pines." This was read on October 5, according to the *Proceedings* (vol. 22, appx, p. 362), but apparently it was never printed. Pinckney was born in Charleston, South Carolina, in 1746, and died there in 1825.

JOHN BARTRAM (1699-1777)

In 1804, a posthumous paper by John Bartram, to whom reference has been made [see Chapter II], appeared in the *Philadelphia Medical and Physical Journal* (vol. 1, pt. 1, Nov. 13, art. 16, pp. 56-9), the manuscript having been in the possession of the editor, B. S. Barton. The title was "Additional observations on the *Cicada septendecim*." Bartram, in his brief paper, records the appearance of the periodical cicada in the vicinity of Philadelphia on May 10, 1749, and describes their positions on grass, bushes, rails, trees, etc., together with a few notes on their habits, egg laying, etc. The editor then appended a note saying that the earliest notice he had been able to find concerning locusts was that by Nathaniel Moreton in his work *New England's Memoriall, &c.*, printed at Cambridge, Massachusetts, 1633, in which Moreton speaks of a sickness in 1633 that carried off many Indians and whites in and near Plymouth. In the spring before this sickness, numerous "Flies" (locusts) appeared and made "such a yelling noise." The Indians said that sickness would follow. Previous to that time, the English had never seen or heard them in this country. Towards winter, the sickness disappeared.

S. WRIGHT (17??-c.1804)

In the same [1804] issue of the *Medical and Physical Journal* (vol. 1, pt. 1, Nov. 13, art. 28, pp. 103-7) appeared a posthumous paper by Mrs. S. Wright, late of Lancaster County, Pennsylvania, on "Directions for the management of silk-worms." This paper covers the care of eggs, young larvae, feeding, care of cocoons, etc., and according to the editor, did not contain much new information, but was published because it was useful. Mrs. Wright's paper was printed from a manuscript account found among the papers of the editor's father, the Rev. Thomas Barton of Lancaster. Mrs. Wright "was a woman of uncommon powers of mind, and directed much of her attention to the management of silk-worms, and to other subjects of public utility, at a time (at least forty years ago) when she stood alone in her exertions in this way."

CHARLES GOTTHOLD REICHEL (1751-1825)

Another paper on the periodical cicada appeared in the first volume of the *Medical and Physical Journal* (vol. 1, pt. 1, Nov. 13, art. 15, pp. 52-6) and was by Charles Reichel. It had been written at Nazareth, Pennsylvania, August 2, 1793, but was not printed until 1804. It is entitled "Some particulars concerning the locust of North America." Mr. Reichel, in his letter to the editor, mentions a Jacob Rubel, of Bethlehem, Pennsylvania, who claimed that the "locusts" in 1727 were far more numerous than in 1793. Reichel cites the opinions and observations of old residents of Nazareth and Bethlehem. His own observations led him to say that apple trees had been injured by egg deposition in the tender branches, and that seven, eight and nine years were perhaps necessary from egg to adult. Because the larvae were found at depths of seven or eight feet below the surface, some persons thought that the eggs, for three or more years, sank deeper and deeper into the mould. He observed that as population and cultivation increased, the cicadas decreased in numbers. A note by the editor calls attention to the fact that although parts of Reichel's article are false, the paper was interesting enough to be

published.

Charles Gotthold Reichel was a Moravian bishop who was born at Hermsdorf, Silesia, July 14, 1751. He came to this country in 1784 and opened a boy's boarding school at Nazareth, Pennaylvania, over which he presided for sixteen years. At one time he lived at Salem, North Carolina, and the University of North Carolina conferred upon him the degree D.D. In 1811 he was made presiding bishop of the northern district of the church, and he moved to Bethlehem, Pennsylvania. In 1818 he returned to Europe and retired from active service, dying April 18, 1825, at Niesky, Prussia.

WILLIAM MASON WALMSLEY (17??-18??)

Apparently the *Philadelphia Medical and Physical Journal* was not averse to publishing entomological observations. In 1805 we find another insect paper, this time by William Mason Walmsley on "Observations relative to the wheat-moth of Pennsylvania, and other parts of the United States" (vol. 1, pt. 2, May, Sect. 1, Art. 20, pp. 119-26). Mr. Walmsley, who lived at Byberry, near Philadelphia, repeats what he heard from a "very respectable old gentlemen" and others and notes the spread of the insect around Philadelphia. Mr. Walmsley knew little about the habits of the species and admitted it. His paper, being made up chiefly of hearsay and suppositions, is of little value entomologically. The editor appended a note stating that the species in question was a species of *Phalaena* of Linnaeus, belonging to the *Tineae*.

THOMAS WALMSLEY (1781-1806)

Mr. W. M. Walmsley had a brother, Thomas, and he too was interested in entomological questions. After his brother's death, W. M. Walmsley found among his effects a paper on "Facts, experiments, and observations, relative to some American species of *Lampyris*, or fireflies . . ." This was sent to the *Medical and Physical Journal* and appeared in 1807 (vol. 2, pt. 1, Nov. 27, Suppl. No. 1, Mar. 7, Sect. 2, Art. 4, pp. 118-23).

Mr. Thomas Walmsley said that when the *Lampyris* was immersed in water, it drowned in fifteen to twenty minutes but it shone with almost as much brilliancy as when in the open air. Immersed in spirit of wine, it lived for five or six minutes, remained "opaque" for two or three minutes, then flashed for three or four times, losing part of its opacity after each flash. In a "perfect Torricellian vacuum" it shone for a short time and then became "opaque". Upon the admission of the least amount of air, it shone again. Walmsley tried carbonic acid gas, hydrogen, oxygenated muriatic acid gas, oxygen and azotic gas and noted their effects upon the luminosity of the beetle. He then describes the part emitting the light and states that he will show that the air taken in by the spiracula has no communication with the luminous part. He does this by cutting what he calls the *scuta*, which is of a pale or whitish straw-color and transparent, and which covers the part emitting light. He believed that the air came into contact with the phosphorescent substance some other way. He then outlines his further cutting and his conclusions.

Dr. Thomas Walmsley was born near Philadelphia in 1781. At the age of nineteen he began the study of medicine and in 1803 he received his M.D. from the University of Pennsylvania. He was a well-liked and competent physician, first in Chambersburg, Pennsylvania, and then in Elizabethtown, Maryland. He died on August 15, in his twenty-fifth year. During the years immediately preceding his death he was much interested in the light of fireflies and in the natural history of such insects.

FREDERICK VALENTINE MELSHEIMER (1749-1814)

Although it may seem far-fetched to connect the first book on insects printed in this country with the American Revolution, yet there is a relation between the two and it may be said, with a degree of truthfulness, that one of the indirect effects of the Revolution was the publication of such a book.

When the Brunswick auxiliaries left Wolfenbuttel [Germany] on February 22, 1776, for Quebec to fight under Burgoyne, the Duke of Brunswick's dragoon regiment included a chaplain named Frederick Valentine Melsheimer. Melsheimer accompanied Burgoyne's expedition from Canada to the Hudson, which started so successfully by taking Fort Ticonderoga and ended so disastrously at Saratoga, and it is recorded that he was present at the battle of Bennington, where Burgoyne met his first defeat, and that he was wounded in the arm and later taken prisoner. According to the *Journal of the Hessian Regiment Von Huyn*, Melsheimer was on parole at Newport October, 1778, with other Brunswick officers. Burgoyne's army, after its surrender to Gates, marched to Boston and later to Virginia. Desertions were frequent and by the end of the war it had disappeared in the American public. Melsheimer was no exception. He, too, stayed in this country to save souls and do pioneer work in entomology.

He was born in Regensburg, in the Dukedom of Brunswick, Germany, on September 25, 1749. During his early youth he attended a school at Holzminden and at the age of twenty entered the University of Helmstaedt, where he prepared for the ministry. He was finally (1775) ordained a clergyman in the Lutheran church and in 1776 received his appointment as chaplain of the Brunswick Dragoons. From his early youth he had been interested in birds, plants and insects, and this interest was, no doubt, encouraged by his father, who was superintendent of forestry for the Duke of Brunswick and who studied botany and the healing properties of herbs. Frederick also was quite friendly with A. W. Knoch, and both collected plants and insects around Regensburg. After Melsheimer came to America he continued his friendship with Knoch by correspondence and by sending him numerous specimens of insects. Doctor Knoch, in a book dedicated to Melsheimer and published in Germany in 1801, acknowledges the receipt of seven hundred specimens of American insects from his friend.

After Melsheimer left the military service he went to the Moravian settlement at Bethlehem, Pennsylvania, where he met friends from Germany. He married Mary Agnes Mann of Bethlehem on June 3, 1779, and during the same year became pastor of five Lutheran churches in the territory now known as Dauphin County. He later moved to Manheim, Lancaster County, and in 1785 to New Holland. It was during this time that he began collecting and studying American insects, which activity furnished some of his parishioners with mild amusement.

When Franklin College was chartered at Lancaster in 1787, Melsheimer left New Holland to take charge of its German department, and he was also the second president of the college. In 1789 he became pastor of St. Matthew's church at Hanover, Pennsylvania, and here he lived until his death on June 30, 1814. He was the father of eleven children. His eldest son, Johann Friedrich, inherited his father's position, collection, books and manuscripts, and at his death they passed into the hands of another son, Ernest Friedrich, a physician and coleopterist who lived near Dover, a town north of Hanover.

In 1806 Melsheimer published his *Catalogue of Insects of Pennsylvania*, which was the first separate publication on insects to appear in America. Before this time American insects had been described in Europe by Degeer, Linnaeus, Fabricius and others;

John Bartram had published on American insects in the *Philosophical Transactions* (London) and brief accounts had appeared in our own early journals, but up to 1806 there had been no publication devoted exclusively to insects.

Melsheimer's catalogue is a small book, 12mo, vi + 60 pages, the title page of which is as follows: *A Catalogue of Insects of Pennsylvania*, by Fred. Val. Melsheimer, Minister of the Gospel. Part First, Hanover, York County: Printed for the Author, by W. D. Lepper, 1806. In the preface Melsheimer writes,

"I hereby offer to the Friends of Natural History a Catalogue of Insects, in the Collection of which I have spent my Hours of Recreation for some Years past. To the best of my Knowledge, I have but few Predecessors in the United States in this Undertaking. For this Reason I may calculate on the Indulgence of the experienced Naturalist in case some slight Errors should be found in it. It is an undeniable Fact, that Entomology has been considerably extended by American Insects; but yet there are many non-descript Genera and species, to be met with by an observant Naturalist, which fully repay the Trouble of his Exertions. Hence arise the urgent Requests, and Invitations of European Naturalists; hence the ardent Desire to possess American Insects, and this is likewise the strongest Inducement for American Entomologists to make themselves more intimately acquainted with the Production of their Country."

Melsheimer then states that if his catalogue is well received he will continue it, also that he is willing to exchange his duplicate specimens for others that he does not possess, and that he is ready to sell collections of different species at a rate of five dollars per hundred. He also says that in his classification he has followed the system of Fabricius and Doctor Knoch's suggestions.

His catalogue lists 1,363 species of beetles, each page carrying a single column. Dr. H. A. Hagen, writing in 1884, said that only 205 species could be recognized, but Dr. E. A. Schwarz in 1895 was able to identify over 400 species from the names given, many of which had been derived from the names of food plants. Schwarz called attention to the few foot notes in the catalogue referring to the time of appearance, injurious habits and the nature of the damage for some species, indicating that Melsheimer took more than a possessive interest in his specimens. Because of the fact that the catalogue lists manuscript names, it never had a scientific value, but its position in the inception of entomology in this country and its associations make its historical value absolute.

According to Morris, Melsheimer was the author of a book on mineralogy and a journal of a tour in Pennsylvania which were published in Germany. Prowell states that Melsheimer's first book was published at Hanover, Pennsylvania, in 1797, and dealt with a theological controversy which he had with Rev. Father Brosius, pastor of the Church of the Sacred Heart, on the Conewago creek near Hanover. In 1809 he wrote and published a work on *Christian Worship and the Beauty of Holiness*, and at Frederick, Maryland, in 1811, another on the *Truth of the Christian Religion*. These last three books are in German.

Melsheimer also kept a journal of his trip to America which was published at Minden, 1776. In this he described the weather, coast of England, happenings on the boat, and the fortifications, churches, buildings, people, Indians and scenery of Quebec, where he landed.

His *Catalogue of Insects of Pennsylvania* is quite scarce. Mr. William J. Fox has advised me that the library of the Academy of Natural Sciences of Philadelphia has two copies and that there is another copy in the library of the American Entomological Society. Miss Ina L. Hawer states that the library of the National Museum has a copy which was presented to them by Doctor Schwarz. This is probably the copy which Schwarz mentions, in

his account, as having been used by Melsheimer and as containing numerous manuscript corrections and additions by the author and by his son, J. F. Melsheimer, who corresponded with Thomas Say. In Catalogue 24, *Books on Insects* [1935], of Mr. John D. Sherman, Jr. (Mount Vernon, New York), a copy is offered for sale, and Mr. Sherman has written to me that in addition to the one which he has listed he knows of the existence of three other copies. One is in the library of the Museum of Comparative Zoology, another in the library of the New York State College of Agriculture, at Cornell University, and another is in his own library.

EARLY PAPERS

Enoch Perley in 1804 wrote on the injuries by *Mytilaspis pomorum* and the means of preventing them to young apple trees in Maine (*Papers on Agric.* 1804, vol. 2, pp. 103-105; *Mass. Agric. Repos. & Jour.* May, 1814). Mr. T. Parsons in 1807 described an invasion, probably of *Leucania unipuncta*, and suggested the remedies to use against palmer worms (*Mass. Soc. Prom. Agric. Papers*, 1807, pp. 32-33).

A general and entomologically unimportant paper on the periodical cicada, written by Dr. Calvin Jones of Raleigh, North Carolina, under the title "Observations on American locusts" appeared in 1807 in the *Philadelphia Medical and Physical Journal* (Suppl. No. 1, Mar. 7, Sept. 2, art. 13, 1807). Doctor Jones refers to the insects in the middle and western parts of Pennsylvania in May, 1803, describes them, their musical apparatus, egg laying, etc., and quotes other writers. The editor then adds additional facts and observations.

In London in 1804, there was published in twelve volumes *The Wonders of Nature and Art, or a concise account of whatever is most curious and remarkable in the world*, etc., by the Rev. Thomas Smith. This was revised and corrected and improved by James Mease, M.D., and carried a Philadelphia imprint in 1806 and 1807. Volume 14, the last one of the American edition, contains a short chapter on insects which starts off by mentioning the periodical cicada, the years it had appeared in Pennsylvania, its emergence, music, egg deposition, copulation, and ends by stating,

"There are two distinct species of cicada in North America: the one here described being much larger than the other. The smaller species has a black body with golden eyes and remarkably yellow veined wings."

The Hessian fly is then mentioned and following this is a list of various species, each briefly treated. A statement is made that they have been covered by Doctor Barton in a memoir (still unpublished) for which he obtained the Magellanic Premium from the Philosophical Society of Philadelphia. The list includes the pea bruchus, grass caterpillars, a cimex injurious to wheat, Indian corn, etc., *Lytta vittata* Fab., cucumber beetle, rose chafer, blister beetles, etc.

In 1807 the *Medical Repository* carried an anonymous paper, "History of the worm which spread terror, through New York and the neighboring states, in June and July, 1806" (vol. 10, No. 1, July, pp. 98-100). The portion of this paper referring to the newspaper accounts is quoted below in full, as the same criticism is applicable today of "newspaper entomology:"

"There are times when mankind are easily frightened, and readily listen to stories tinged with the marvellous. After the solemnity of the eclipse, on the 16th of June, and before the festivity of the 4th of July, there was a considerable dearth of foreign and domestic news. Nothing occurred either at home or abroad of sufficient moment to satisfy the public appetite. At this

puncture a discovery was alleged to be made of a worm which infested the Lombardy poplars. This was, in fact nothing new, as the creature had been observed years before. However, it passed for a new and hitherto unobserved animal, and was reported to be one of the most poisonous of all reptiles. Tales were propagated and extensively believed, that dozens of men, women, and children had been killed by their bites: and that cats, dogs, and horses had fallen victims to their venom. There was a general panic. The greater part of the citizens were engaged in discussions about the 'asp' (for so they named it) which lived on the poplars, and darted upon passengers; and some persons actually yielded to the delusion so far as to cut down their trees. The newspapers contained various accounts of the animal."

The cause of all this was an active caterpillar which the anonymous author bred through to the adult stage to a species of *Phalaena*.

Articles on silk-worms continued to be popular and sometimes foreign ones were translated and published, such as the one translated by E. Cutbush from an Italian memoir and printed under the title "On the Prevention and Cure of Certain Diseases of the Silk-Worm," in the *Philadelphia Medical and Physical Journal* in 1808 (Part 1, vol. 3, pp. 20-24).

In order to combat the prevailing idea that insect abundance and human disease were not necessarily connected, the *Medical Repository and Review of American Publications on Medicine, Surgery and the Auxiliary Branches of Philosophy*, published in 1810 (Vol. IV, pp. 304-305) in part of its "Medical and Philosophical News," an unsigned statement entitled "Insects in Abundance not Necessarily Connected with Sickly Seasons" from which the following extracts are quoted:

"In describing pestilential seasons, it has been very common to notice the innumerable swarms of insects. Some observers of the phenomena attendant on times of sickness have even been led to an opinion that the growth and multiplication of these tribes of animals is promoted by that condition of the atmosphere and the waters which is unfriendly to the health of man. We suspect however this is by no means correct. The summer & autumn of 1800 was very productive of insects in the states of New York, Jersey & Pennsylvania & still no considerable degree of sickness occurred either in city or country. Locusts were so thick in West Jersey & the eastern parts of Pennsylvania — as to keep up a continuous noise."

Other cases are cited where insects were numerous among forest trees, and no remarkable illnesses prevailed:

"There is therefore no necessary connection between swarms of insects & pestilential seasons. But it is nevertheless true that during some periods of epidemic sickness, there have been great numbers of insects. These however have been merely accidental coincidences & by no means indicate a law of nature on the subject. On the contrary — some insects are killed by pestilential air as has been often observed of common house-flies vast numbers of which died on the approach of the sickness in New York toward the latter part of the summer of 1799. For the future, physicians & others who describe pestilential seasons, should be careful not to use the broad & unqualified term 'insect' — but instead particularize the species which is abundant. This is the safest & will mean more to readers."

JOHN B. DAVIDGE (17??-18??)

The *Philadelphia Medical and Physical Journal*, which printed so many entomological articles at this time, carried an interesting one in 1807, by Dr. John B. Davidge, a physician of Baltimore, on "Experiments and observations on the caterpillar which infests the Lombardy poplar" (Suppl. No. 1, Mar. 7, Sect. 2, art. 6, pp. 139-57). Doctor Davidge starts off as follows:

"In a letter from Dr. Vaughan to you, are sentiments attributed to me which I assure you never had a place in my thoughts. I have written to the Dr. on the subject and he appears from his answer to be really impressed with the idea that the construction given by him was the immediate and natural construction to me and I believe to all who are acquainted with the French authorities on the subject, and these were only alluded to, the letters wholly unsusceptible of the interpretation indulged in by the Dr. And certainly, any opinion formed, by any person whatever, must be subject to the control of the authorities quoted. And further, how a gentleman could permit himself to say publicly that I supposed the poplar caterpillar 'would perish in the chrysalis state because it did not subsequently to this state pass into a butterfly,' when the authorities appealed to determined that if it were spurious it would become a large fly, this to me [is] resolvable only into that haste which too frequently explains itself by errors. It was at least incumbent on the Dr. to have consulted the authorities."

Apparently there had been a dispute concerning the poisonous hairs of a poplar caterpillar. John B. Davidge states that,

"the thing at issue is not whether the caterpillar when raised to its winged state would possess poisonous qualities, but what its properties might be while still a reptile."

The author then quotes authorities by which he determined whether the caterpillar belonged to the real or false caterpillars, based on the number of legs. He finally decides that his reptile is of the "class of caterpillar." Many paragraphs are devoted to this phase. He then mentions several experiments involving the placing of two supposed reptiles on an old cat in perfect health. These reptiles, it appears, "bit the cat;" the following morning the cat possessed her usual character of health. In the afternoon the cat refused to take food. In the evening the physician who performed this experiment was called away from home and did not return until early next morning. Upon his return the cat was dead. From this the author concludes that he did not have definite proof that the reptiles killed the cat, but that the experiment raised the venomous properties of the poplar caterpillar high on the scale of probability. Various European authors are mentioned and the experiences of these authors with stinging or nettling caterpillars are outlined. The poplar caterpillar is then described externally and internally, very sketchily.

AMOS HAMLIN (1766-1843)

Dr. Amos Hamlin, of Durham, Greene County, New York, communicated his thoughts on horse bots to Doctor Mitchill and they duly appeared in 1809 in the *Medical Repository* (vol. 12, No. 1, July, pp. 124-125) entitled "Observations on bots in horses." In May, 1800, one of Doctor Hamlin's horses was troubled with bots and voided a lot of them. Doctor Hamlin collected some, put them in dried horse dung in a tightly stoppered bottle and finally saw them change to pupae in which state they continued for about five weeks, finally hatching into what was called, in the country, a "horse-bee" or "nitter." He obtained eggs and found that they hatched into tiny creatures like the bots. However, in separating the hair in the vicinity of the eggs, he found that the tiny bots appeared to be penetrating the skin so far as to be almost out of sight. How they finally got into the stomach of the horse, he left to more able naturalists. He suggested that the eggs be scraped off every two or three days, and stated that wetting the eggs in common rum or spirits of turpentine, diluted, would prevent hatching. He tried many medicines to dislodge the bots from the "bowels" and was sometimes successful when he gave *Rad. Irid. Palustris*.

Amos Hamlin was born in Sharon, Connecticut, August 8, 1766. As a boy he worked on a farm, "read books by the light of pine knots, became a learned man and a popular physician." He

served in the Revolution and settled in Durham, New York, about 1800. At one time in his life he made a cruise around the world, for two years, with Captain Cook. He was president of a medical college, a whig candidate for Congress and he owned slaves which he liberated from conscientious motives, in advance of the New York act. He died at Durham, April 17, 1843.

NATHANIEL DWIGHT (1770-1831)

Nathaniel Dwight, physician, and one of the brothers of Timothy Dwight, one time president of Yale College, wrote "An account of the American cantharis or *Meloe Americae*" on September 9, 1800, and did not get it published until 1810 when it appeared in the *Memoirs of the Connecticut Academy of Arts and Science* (vol. 1, pt. 1, pp. 99-102). Doctor Dwight refers to Doctor Chapman's account which had appeared in the *Medical Repository* (vol. 2, No. 2, p. 174) and to his own experience in Farmington, Connecticut, in 1800, with the vesicating property of the beetle. The main reason for Dwight's paper was the fact that the beetles he noted answered Chapman's description except in color and he wanted to call attention to the color variations. Some had their elytra margined with a narrow stripe of light dirty brown. He thought the color might change as the season advanced and he observed the black ones and those with margined elytra, copulating.

Nathaniel Dwight was born at Northampton, Massachusetts, January 31, 1770, and studied medicine in Hartford, Connecticut. After practicing there he became assistant surgeon in the United States Army. Later he practiced in Westfield, Massachusetts, and at New London and Withersfield, Connecticut. In 1812 he entered the ministry and settled at Westchester, Connecticut, until 1820, at which time he resumed the practice of medicine at Providence, Rhode Island, and Norwich, Connecticut. As early as 1812, when insane persons were still kept in cellars and 'exhibited like wild beasts,' he proposed, in a communication to the Connecticut Medical Society, the establishment of a "hospital for lunatics." He was, among other things, the author of a school geography and a history of the signers of the Declaration of Independence. His death occurred at Oswego, New York, June 11, 1831.

JOHN BRADBURY (1768-1823)

When John Bradbury was sent to America, to collect specimens, by the Liverpool Botanic Garden, it was supposed that he would make New Orleans the headquarters for his activities. However, upon the suggestion of Thomas Jefferson, St. Louis was selected, because of the more varied topography in the upper reaches of the Mississippi valley. Bradbury arrived in St. Louis, December 31, 1809, and made plans for taking care of the specimens he planned to obtain during the following spring and summer. During 1810 he made frequent trips into the "wilderness," but never more than one hundred miles away from St. Louis. During such excursions he explored, collected specimens and met people. Although his activities were chiefly of a botanical and mineralogical nature, in his "Journal" he did have something to say about bees and the naturalization of the European honey-bee in America, and his remarks are quoted as follows:

"The honey-bees have been introduced into this continent from Europe," he explained, but at what time I have not been able to ascertain. Even if it be admitted that they were brought over soon after the first settlement took place, their increase appears astonishing, as bees are found in all parts of the United States; and since they have entered upon the five countries of Illinois and Upper Louisiana, their progress westward has been surprisingly rapid. It

is generally known in Upper Louisiana that bees leave not been found westward of the Mississippi prior to the year 1797. They relate in St. Louis that a French lady of that place having received a present of honey from Kaskaskias was much delighted with it, and being told that it was produced by a kind of fly, she sent a negro with a small box to Kaskaskias to get a pair of the flies in order that she might obtain the breed. They are now found as high up the Missouri as the Maha nation having moved westward to the distance of 600 miles in 14 years. Bees have spread over this continent in a degree and with a celerity so nearly corresponding to that of the Anglo-Americans that it has given rise to a belief, both amongst the Indians and the Whites, that bees are their precursors, and that to whatever part they go the white people will follow. I am of the opinion that they are right, as I think it as impossible to stop the progress of one as of the other."

When Bradbury returned to England, he found that the plants which he had sent to Liverpool had been looked over by Pursh, who had studied them and published on the new ones. This aroused Bradbury's ire and he refused to have anything further to do with the specimens. Soon afterward he left England permanently and returned to St. Louis where he had previously formed friendships with prominent families. He died at Middletown, Kentucky, March 16, 1823.

WILLIAM SMITH (c.1754-1821)

On October 10, 1810, William Smith wrote a letter from Norwalk, Connecticut, to Doctor Mitchill, editor of the *Medical Repository* about "Observations on the decay of fruit trees, and on lean and shriveled fruit, as caused by insects" which was published in 1811 (vol. 14, No. 4, pp. 350-54).

It appears that some peaches on exhibition in New York were destitute of pulp, juice and flavor. Some resemblance was traced between their external form and that of hickory nuts, and this led to a belief that they represented a mongrel production. The Rev. William Smith inquired into the facts, found that the orchard from which they came belonged to Moses Hanford, of Canaan, and concluded that the trouble was caused as follows:

"some fly to which the apricot and nectarine trees are more accessible than others, injects its eggs or semina, which contaminate the juices of the tree so powerfully as to stop the fructification, at an earlier or later stage, according to the strength of the trees."

It is also stated that the tree in question showed exudations of gum and numerous insect incisions. The fruit was dried and shrivelled like walnuts. Probably the trouble was due to the shot-hole borer or to the disease known as "little peach," or perhaps to a combination of both.

Dr. William Smith, who took such an interest in fruit, wrote a good deal on various subjects, for the press. He was a native of Scotland, born about 1754, and came to this country as an ordained minister in 1785. Shortly after his arrival, he was located in Maryland. After two years he went to Narragansett, Rhode Island, then in 1790 to Newport, and in 1797 to Norwalk, Connecticut, always as a minister to various churches. About 1800 he opened a grammar school in New York City and earned a high reputation as a teacher. In 1802 he became principal of the Episcopal Academy at Cheshire, but in 1806 he returned to New York and gave private classical instruction, until his health failed, upon which he returned to Connecticut where he officiated in one or two small congregations. He died in New York, April, 1821. It has been recorded, that when scholarship was at a low ebb in this country, Doctor Smith left a lasting monument in the *American Common Prayer Book in the Office for the Induction of Ministers*, of which he was the sole author or compiler, and also in his works on *Church Vocal Music*.

EARLY WEST COAST ENTOMOLOGY

Fort Ross, established in 1812 by the Russians seventy-five miles north of San Francisco on the northern California coast, the surroundings of which interested them as a fur-trading, hunting and farming area, was visited by many naturalists from Russia, who were the first to study the plants and animals of the region. In 1816, Johann Friedrich Eschscholtz, as physician on the ship *Rurik* of the Russian Imperial Navy, arrived in San Francisco Bay and stayed a month. Eight years later, or in 1824, on the ship *Predpriatie*, he paid another visit to California and during short excursions, visited Fort Ross and other places. On both trips he was a member of the party under Otto von Kotzebue in his two voyages around the world. Many insects were collected and described by Eschscholtz, and after his death by Dejean.

During the few years previous to the abandonment of Fort Ross, in 1841, by the Russians, a number of collectors and entomologists visited the place, and as a result the museums of St. Petersburg, Moscow and other Russian cities were enriched by the addition of American specimens.

At various times, the fur trading and semi-military posts in California afforded collecting opportunities for such men as Chamisso, Mannerheim, Maeklin and Motschulsky, all particularly interested in beetles.

Dr. J. L. LeConte, in his paper on the Coleoptera collected during the explorations for a route for a Pacific railroad near the 47th and 49th parallels of north latitude, stated that Eschscholtz in his Zoological Atlas had made known, as early as 1829, many Coleoptera of the western coast of North America. Eschscholtz's death prevented the completion of his work and his collections remained undescribed for several years. In the meantime Mannerheim published a coleopterous fauna of California and Russian America, which contained descriptions of 300 species. This was followed, at intervals, by three supplements devoted to the Coleoptera of Russian America, and the last one, published in 1853, brought the total number of species known from those parts up to 540 species. When LeConte made up his report (published in 1860), he had before him a series of more than 200 species from Russian America, named by Count Mannerheim and sent to LeConte by Baron Chaudois, a smaller series sent to him by Colonel Motschulsky, fifty species collected by the late J. K. Townsend, M.D., in Oregon, a collection made at Fort Vancouver by Colonel McCall, the collections of Doctor Cooper, made at various places in Oregon, but chiefly at Vancouver and Shoalwater Bay, the collections of Doctor Suckley and of George Gibbs, made principally at Steilacoon, his own collection made at San Francisco and San Jose, two collections made in the Sacramento Valley by J. Wittick and presented to LeConte by S. S. Rathvon of Lancaster, Pennsylvania, two collections (one made in the Sacramento Valley and the other at San Francisco) by Mr. J. Child and given to LeConte by Rathvon, and a small collection from the vicinity of San Francisco, given to LeConte by Mr. J. P. Wild, of Baltimore. LeConte said that the beetle fauna of Washington and Oregon territories was still imperfectly known. He held that California constituted a peculiar zoological district with sufficient relation to other American districts to prove that it belonged to the same continental system and that the California district was divided into several sharply defined sub-districts each having a close resemblance to the other, furthermore that the local distribution of a small number of species was characteristic of the eastern Pacific region.

Edward L. Blaschke, a colonial physician employed by the Russian American Company in Alaska and California, collected many interesting insects about Ross and Sitka. Another early

collector of California insects was Tschernikh, also a member of the Russian American Company. Many Coleoptera, later described, for the most part, by Mannerheim, were collected by him at Ross and Sitka. He was at Ross during 1833-35 and again around 1841. In 1840 and 1841 Ilya Gavrilovich Vosnesensky, of the Zoological Museum of the Academy of Natural Sciences, St. Petersburg, was at Ross and he made an extensive collection of insects from the San Francisco Bay region. Baron von Wrangell, Governor of Russian America, who lived at Sitka, also visited Ross in 1833 and again in 1835. A number of beetles collected by him and sent to the Museum at Moscow were subsequently described by Mannerheim.

EARLY JUVENILE LITERATURE ON INSECTS

It is doubtful if many entomologists are familiar with the elementary entomology found in the *Orbis Pictus*, the first children's picture book, written by Comenius, the eminent educator of the seventeenth century, and published in 1657. For a hundred years and more, this was a popular text-book in Europe and mothers instructed their children from its text and pictures. The first edition was published at Nuremberg, and a little later (1658) it was translated into English by Charles Hoole. In 1812 it was republished in America.

The author had very definite aims in mind when he wrote his book. He wanted to please the children with the pictures so that they would be happy to go to school. He wanted to arouse their attention and to take "especially flickering wits and prepare them for deeper studies." In his preface, he dwells at some length on how his book should be used in schools and it is evident from his remarks and advice that his practices contained the beginnings of systems later connected with the names of Pestalozzi and Stow.

The scope of the book is indicated by the title of the 1728 London edition, *Orbis Sensualium Pictus*. The chief things of the world include animals, plants, minerals, fishes, the heavens, air, water, etc., and the employments of men cover hunting, fishing, cooking, merchandising, the tormenting of malefactors, fencing, and so many more that Comenius' *Orbis Sensualium Pictus* is indeed "a world of things obvious to the senses drawn in pictures."

Two chapters or parts are devoted to entomology — such as it is — XXV, to "Flying Vermin" and XXXII to "Crawling Vermin." A woodcut at the head of each chapter illustrates the flying and crawling vermin. The flying vermin include such insects as the bee, wasp, hornet, gnat, cricket, butterfly, beetle, glow-worm, etc., and the crawling vermin such species as the earthworm, caterpillar, grasshopper, moths, roaches, lice, ticks, silkworm, etc. Only a word, or two, accompanies each mention of the insects and the pictures of the insects are worse than those of any other objects in the book. I am sure that the illustrations of the "skipping flea," the "lowse" and other "crawling-vermin" did not entice witty children to them, nor did they "serve to stir up the attention."

Regardless of the lack of technical skill of the artist, if we except the entomological drawings which are meaningless, the illustrations are quaint and entertaining and no doubt amused and instructed the children.

Among the numerous titles which circulated in the American nursery of long ago, we find certain ones on natural history. Many such books appeared after Goldsmith's *Animated Nature* had paved the way and made nature stories popular. In fact Goldsmith is supposed to have written, at the request of Newbery, such books as the anonymous *Jacky Dandy's Delight; or the History of Birds and Beasts in Verse and Prose* and *Tommy*

Trip's History of Beasts and Birds.

Gradually the number of natural history books increased; many were reprints of English accounts, and the publishers in America showed little or no originality. The same texts and illustrations in some instances were used over and over, the only changes being in the title pages and imprints. It may be of interest to mention some of the titles of these nature books, such as the *Children's History of Birds and Beasts* from the Sandbornton Press (1836); the *Natural History of Animals*, published by Boyd and White, Concord, N.H. (1839), and by S. H. Colesworthy, of Portland, Maine; *Trip's History of Beasts; being a trifle for a good boy* printed by E. & E. Hosford, Albany, New York (1818); *A History of Birds for the use of children*, published by Rufus Merrill, Concord, New Hampshire (1843); *The History of Animals*, published by J. Babcock and Son, New Haven, Connecticut (1824), these being toy-books of from 8 to 32 pages and about 2 1/4" x 3 1/2" in size. Then there were the more ambitious ones such as *The Child's Book of Nature*, published by Carter, Andrews, & Company, of Lancaster, Pennsylvania, with its colored plates; the *Book of Birds* published by R. Merrill, Concord, New Hampshire (1851), running to 24 pages and of almost pamphlet size, 4 x 6 inches, and *A Concise Natural History of Birds*, of 36 pages (3 1/2" x 5 3/4"), published in Boston, Massachusetts, by Thomas B. Wait and Company, and Charles Williams about 1817. Nor should Bewick's *Quadrupeds* be forgotten.

As a rule the natural history books were generously illustrated, sometimes with engravings verging on the grotesque, but more often just dowdy. The smaller ones frequently carried a page devoted to the alphabet, and many were encased in colored wrappers, blue, yellow and green seeming to predominate.

One branch of natural history, however, was somewhat neglected. This was entomology. Toy-books about insects were, apparently, not numerous, probably because of the specialized nature of the subject and probably because of the little public interest in that particular branch of natural history. Nevertheless, a few toy-books on insects managed to circulate along with their more popular neighbors, those on birds and mammals. In 1816 Samuel Wood & Sons printed and sold at their juvenile book store 357 Pearl Street, New York, a toy-book of 28 pages (4" x 2 1/2") entitled *The History of Insects*. After a quotation from Barbauld and a short introduction designed to impress one with the wonders of insects, fourteen examples are treated graphically and textually. Included therein are such common insects as the grass-hopper, the cricket, the flea, the louse, the honey-bee, the dragon-fly and ants, and such uncommon ones, at least in this climate, as the elephant beetle, and the scorpion, which latter creature, of course, is not an insect. In the accounts, there is an attempt to supply facts of an interesting kind, but from an entomological view-point the statements are frightfully elementary and not always correct. However, this perhaps did not detract from the pleasure which the youthful readers obtained from handling the tiny books, and reading the accounts of something which perhaps they had already noted in the fields. The accounts are didactic in the extreme and have none of the unconscious humor which is so apparent in the text of some of our early toy-books.

The number of editions of the Samuel Wood & Sons' *History of Insects* is not known, nor is it known if the *History* appeared before 1816. However, in 1821 Samuel Wood & Sons, of 261 Pearl Street, and Samuel S. Wood & Co., No. 212 Market Street, Baltimore, published a *History of Insects* which, except for the changed imprint on the title page and the addition of covers (including various alphabets on page 2 of the cover), is identical

with the 1816 edition. Perhaps the 1816 edition at one time had covers, in which event the two editions differ but slightly.

About 1860 Bailey & Noyes, of Portland, Maine, published *The History of Insects* as one of a series of twelve titles. This is a little sixteen-page, paper-covered book measuring 3 5/8 x 2 1/2 inches. It contains fewer accounts than the Wood *History of Insects*, but the text of these is the same as the text in the Wood editions. The illustrations are different and much weaker than the Wood illustrations.

These nursery books on insects were both crude and elementary, and sometimes misleading, but perhaps they served a purpose in amusing and instructing the children and in stimulating their interest in natural history. As for their mistakes, most of us carry through life an amazing amount of misinformation on various topics, picked up through diverse channels and from various sources.

EARLY ECONOMIC ENTOMOLOGY

In the *Massachusetts Agricultural Repository and Journal* for May, 1814, Mr. C. Edwards described and figured a bellows for blowing tobacco dust through sheep's wool in order to kill *Melophagus ovinus*.

In 1815 the canker-worm came in for some attention from Mr. J. Lowell, (perhaps John Lowell, who was active in the Massachusetts Agricultural Society and editor of its *Journal*) whose article in the *Massachusetts Agricultural Repository and Journal* (vol. 3, p. 316, 18), "Remarks on the cankerworm," called attention to the fact that after being free from infestation for nearly twenty years, the orchards, due to a frost on May 17, 1794, were again overrun with them. He claimed that the expense of tarring an orchard for several years was too great and in addition there was injury to the trees from the tar. He was in favor of the improvement, introduced by Mr. Parsons and others, of surrounding the trees with canvass and rope yarn, and of stopping the descent of the tar by a bandage of coarse hemp, together with a mixture of tar and oil which remained soft. These improvements, he stated, had diminished the evils of the old practice, but much remained to be desired. He was in favor of more effective, more simple, and less expensive remedies, and also in favor of constant experiments. He, himself, had the turf dug in around sixty of his apple trees and the soil laid smooth. Then three hogsheads of air-slaked lime were applied. This resulted in a layer, one inch thick, on the ground, extending from two to three feet away from the base of each tree. In addition, the trees were tarred. Where the trees were limed, he did not catch a single "grub." Although satisfied with these results, he hoped others would try his remedy.

Mr. Lowell also wrote "Some remarks on the destructive powers of the rose bug" (*Mass. Agric. Repos. Jour.*, 1826); and "Cankerworms & Slug worm" (*N. E. Farmer*, 1828).

As early as 1816 there was apparently some slight interest in foreign insects, for at the April meeting of the Boston Society of Natural History in that year Judge Davis gave an "Account of several insects from China." Unfortunately no record of his remarks appears to have been preserved. John Davis was a jurist, a graduate of Harvard, 1781, and held many public offices. He was president of the Massachusetts Historical Society from 1818 until 1843 and was especially noted for his knowledge of the history and antiquities of New England.

A new insect now makes its appearance in our literature, the bee moth, and Mr. G. W. Van Schaick in 1816 had his letter on "Observations on the worm which of late has proved so destructive to bees . . .," published in the *Transactions of the Society for*

the Promotion of Useful Arts (Albany, vol. 4, pt. 1, pp. 145-50). Mr. Van Schaick describes the caterpillar as having sixteen legs and gives many details of its habits and life history, much of which was probably taken from the writings of European authors. The moth is described as having "granulated horns and a crooked proboscis." Mr. Van Schaick first noted the bee moth in Greene County, New York, in 1813, where it did considerable damage. And he stated that it was moving north. In 1815 he noted it in Rensselaer and Saratoga counties and believed its rate of spread in that direction to be about twenty miles per year.

For control, he recommended raising the hive about one inch above the floor. This would allow the bees to discover and kill their enemy. Furthermore, the stand and the rim of the hive should be made of such material as would afford no place of concealment for the moth or its eggs. If all expedients should fail, the author states that some consolation may be drawn from the fact that the Hessian fly (which he has not found described by naturalists and which he is inclined to think is a species of *Phalaena*) was once a scourge of a portion of the vegetable kingdom, but has long since discontinued its ravages. Whether it has disappeared or migrated to more palatable food, the author leaves for naturalists to determine. And he suggests that the bee moth may, after a short time, cease to be a pest of beehives. Mr. Van Schaick was probably a descendant of the family of the same name which furnished Albany with Mayor Sybrant Van Schaick from 1756 to 1761, and the French and Indian War and the Revolutionary Army with a soldier who eventually became Brigadier-General Gozen Van Schaick.

In 1816 and 1817, sheep insects began to attract attention. At a meeting of the New York Lyceum of Natural History on November 10, 1817, James Clements read a,

"highly interesting and important paper on the *Oestrus ovis* of Linnaeus, describing it in its various stages, accompanied by specimens in all its forms, and exhibiting a recent head of the sheep, showing the effects produced by its attacks on the frontal and maxillary sinuses, &c."

This was published in *The American Monthly Magazine & Critical Review* (vol. 2, No. 4, pp. 249-250, Feb. 1818), under the title "Description of the *Oestrus ovis*, or the Bots of Sheep." In this paper which Clements had sent to the editors, the habits of the insect, effect of infestation, description of the larvae, the adult fly, and general life history are all outlined, but no remedies are suggested. James Clements was a veterinary surgeon, whose name appeared in the New York City directories from 1805 to 1819. His will, dated November 26, 1819, proved January 8, 1820, in New York City, mentioned a wife, two sons and two daughters.

On April 1, 1816, Mr. H. B. Brown wrote from Woodstock to John Prince, Jun., on "Further information on the prevalence of the worm in the head of sheep" and in this communication he describes the symptoms, death of the sheep, etc. Mr. Brown syringed the nostrils of the sheep with vinegar and a small quantity of camphorated spirits and this caused some of the worms to be voided. From the head of a dead buck, he obtained twenty maggots from a cavity in and below the horn. He attributed the increase of the fly to the practice of allowing dead carcasses to remain, unburied, in the neighborhood of large flocks, and he suggested that heads should be buried.

Other papers on the same subject, all appearing in the *Massachusetts Agricultural Repository and Journal* in 1816, were written by E. Ticknor, D. Humphrey, and H. B. Brown. In addition, Mr. Humphrey wrote on sheep ticks.

For the control of the canker-worm, John Kendrick (*Mass. Agric. Jour.* 1816, vol. 4, pp. 168-170) proposed that the soil

surrounding the trees be removed and replaced with rich soil and manure taken from an uninfested locality.

Apparently nearly every one had something to say about the Hessian Fly. At the New York Lyceum of Natural History "sitting of June 30, 1817," Dr. S. L. Mitchill the president, made a report on the character of the Hessian Fly which had been brought to the meeting by Mr. Clements in both the pupal and adult stages. Doctor Mitchill believed the insect to be a *Tipula* and as it was attached to green and vegetating wheat, he had given it the specific name *tritici*.

A quite orderly and scientific paper, for its time, was read before the New York Lyceum of Natural History on April 21, 1823, by Doctor Mitchill and published in the *New York Medical and Physical Journal* (vol. 2, pp. 336-59, Sept. 1823). Its title was "A Methodical enumeration of the principal Parasitical Animals; read to the New York Lyceum of Natural History, as the Zoological Lecture, on the 21st of April, 1823. By Samuel L. Mitchill, M.D. President of the Society, Professor of Botany and Materia Medica, in the University of New York, &c." This is a general paper confined to parasites that live in the bodies or animals all of during a part of their lives. It does not include gnats, flies, spiders, leeches, etc., which occasionally extract blood. Various classes are enumerated, the characters of each class are described and specific parasites and their hosts are discussed. Among the insects he treats are lice, fleas, bot flies, Hymenopterous parasites of insects, etc.

David Thomas, an early pomologist and traveler, was impressed by the numerous bedbugs in Indiana taverns and also by the destructiveness of army worms in the vicinity of Shakertown, Indiana, in 1816. Some protection was afforded to corn and timothy fields "by deep furrows, in which logs were constantly drawn by horses," so long as the caterpillars continued to approach. Thomas also described in his account (1816) a mechanical "fly-flapper" for use over a table. Other travelers at this time wrote about fleas and mosquitoes. William Cobbett, for instance, writing in 1828 from near Princeton, Indiana, said,

"Our horses were very much tormented with flies, some as large as the English horsefly and some as large as the wasp; these flies infest the prairies that are unimproved about three months in the year, but go away altogether as soon as cultivation begins."

While on the subject of Indiana, it may be just as well to mention that beginning with the first report of the Indiana State Board of Agriculture in 1851, references were made to the injuriousness of such species as horse bots, wireworms, chinch bugs, Hessian fly, cut worms, etc.

JAMES TILTON (1745-1822)

In the *Transactions of the Society for the Promotion of Useful Arts* published in 1816 (vol. 4, pt. 1, pp. 70-78, Albany), there appeared a paper by James Tilton entitled "Remarks on a species of *Curculio*, remarkably destructive to fruit." This paper had been extracted from the first volume of the *Memoirs of the Philadelphia Society for Promoting Agriculture* and was republished because the curculio was doing extensive damage in Albany and in the adjacent county.

The author tells how the curculios come from the earth in swarms, how they crawl up the trees and puncture the fruit, how the grub lives in the fruit, how the fruit falls to the earth, how the grubs escape into the soil where they remain all winter, changing to beetles in the spring, how the curculio is reluctant to use its wings and how it delights in fruits such as nectarines, plums, apricots, etc. As for remedies, hogs are useful in eating fallen fruit, horned cattle and others are useful in trampling the insects

to death or in packing the soil so firmly that the curculio larvae cannot penetrate it, after leaving the fruit. Jarring the trees also has a place in the control methods,

"Col. T. Forest of Germantown having a fine plum tree near his pump, tied a rope from the tree to his pump handle, so that the tree was gently agitated every time there was occasion to pump water. The consequence was, that the fruit on this tree was preserved in the greatest perfection."

Little pieces of board, dipped in tar, three to five strips hung in the tree, were said to act as repellents. Turpentine could be used instead of tar. A sure protection was a pavement around a tree, of flat stones, cemented. Plums, cherries, etc., should be planted in lanes and "hard beaten yards." Other peach insects are discussed also, the accounts having been taken from Doctor Mease's edition of the *Domestic Encyclopaedia*. For example, boiling water applied to the roots in the fall, after the earth had been removed, was useful against the peach-tree borer. In the spring the soil was replaced in the form of a mound.

For destroying insects generally, two methods were looked upon favorably. One was boring a hole in the tree and filling it with mercurial ointment and then corking it. The other was boring a hole in the north side of a tree, filling it with spirits of turpentine and corking it.

Dr. James Tilton was born June 1, 1745, in Kent County, then one of the lower counties of the province of Pennsylvania, but now of the state of Delaware. He obtained his M.D., from the Philadelphia School of Medicine and as a practitioner in Dover, Delaware, he entered the army in 1776 as a surgeon of the Delaware regiment. He saw much active service until his appointment in 1778 to the grade of hospital surgeon. While having charge of hospitals in Trenton and New Windsor, he introduced the hut system. In 1780, the medical department was reorganized and he was appointed senior hospital physician and surgeon and he worked hard to obtain reforms in the medical organization of the army. After the close of the war, he served a term in Congress, and later many terms in the state legislature, during which time he practiced medicine and indulged in horticultural pursuits as a recreation. He served several times as president of his state medical society and published on military hospitals. He died at the age of seventy-six, on May 14, 1822. Tilton never married. He drank neither tea nor coffee and he had no cups or saucers in his home. Furthermore, he believed that a farmer should live on the produce of his own land.

JOHN PIERCE BRACE (1793-1872)

At a meeting of the New York Lyceum of Natural History on November 3, 1817, Mr. Pearce read a communication from Mr. J. P. Brace, a corresponding member, on the nature and habits of the cutworm. At this meeting, Mr. Rafinesque was present and read a memoir on the new species, *Xanthium maculatum*. Mr. Brace's paper was published in the *American Journal of Science and Arts* (vol. 1, No. 2, Nov., art. 13, pp. 154-155) under the title "Description of the *Phalaena devastator*, (the insect that produces the cutworm)." In it he described the specific characters of the moth and detailed the feeding habits of the larva, which was injurious to all kinds of vegetables. He stated that pupae exposed to the sun died and recommended plowing about the first of July so as to expose the pupae to the sun's rays. He was aware that a good method of control was lacking.

John Pierce Brace, of Litchfield, Connecticut, was a teacher, editor, author and an amateur in natural history. In addition he was well informed on heraldry, astrology, the deciphering of cyphers and the composition of music. He was born in Litchfield,

February 10, 1793. His aunts, who ran the Litchfield Female Academy, sent him to Williams College, from which he graduated in 1812. For some years he taught at the Academy. In 1820 he married the sister of the second Mrs. Lyman Beecher, Miss Lucy Porter. He moved to Hartford in 1833, becoming the principal of the Hartford Female Seminary, one of his pupils being Harriet Beecher Stowe. In 1850 he was the editor of the *Hartford Courant*. Although his botanical interest was only one of many, he published the earliest local flora of any part of Connecticut, in *Silliman's Journal* in 1822. He died on October 18, 1872.

TIMOTHY PICKERING (1745-1829)

Timothy Pickering supplied the *Massachusetts Agricultural Repository & Journal* (July, 1817, vol. 4, pp. 326-328) with a "Description of a brush for destroying caterpillars' nests," which dealt with the adaptation of a common bottle brush fastened to a pole. In 1823 the same thing appeared in the *New England Farmer* (vol. 1, p. 308). Pickering also wrote on the control of *Bruchus pisi*, by the late sowing of peas (*Mass. Agric. Repos. & Jour.*, June, 1822, vol. 7, pp. 122-7) and this too appeared in the *New England Farmer* (1822, vol. 1, p. 2).

Timothy Pickering was a graduate of Harvard, a Massachusetts lawyer, a Judge of the court of common pleas for Essex County, Massachusetts, a quartermaster general in Washington's army, postmaster general of the United States, then secretary of war, and secretary of state, and finally United States Senator. Toward the latter part of his life he settled on a farm in Danvers, Massachusetts, and later in Wenthams, Massachusetts. He was born in Salem, Massachusetts, July 17, 1745, and died there January 29, 1829.

JOHN TORREY (1796-1873)

John Torrey, who later became the foremost American botanist of his day, dipped into entomology in his early years. A note in the *American Monthly Magazine and Critical Review* (vol. 1, No. 5, p. 377, Sept. 1817) under the subtitle "Transactions of Learned Societies" reads that at a meeting of the New York Lyceum of Natural History on August 4, Doctor Mitchill, the president, stated that "Mr. Torrey, the lecturer on Entomology, reported that the insect presented by Mr. Bigelow is the *Curculio Imperialis* of Linnaeus." The characters of the genus and species were then given and it was designated as an inhabitant of South America. Rafinesque was present at this meeting. Several years later, as reported in the *American Journal of Science and Arts* (vol. 6, No. 2, p. 364, May, 1823), at a meeting of the New York Lyceum of Natural History,

"Dr. Torrey read a report on the *Ceraphron destructor*, a parasitic animal that preys upon the *Cecidomyia destructor*, and which has been supposed erroneously to be injurious to wheat."

SAMUEL AKERLY (17??-18??)

Dr. Samuel Akerly, a brother-in-law to Dr. S. L. Mitchill, a large contributor to medical and scientific journals, founder and supporter of institutions for the deaf and dumb and for the blind, author of an *Essay on the Geology of the Hudson River* (1820), *Observations on Deafness* (1821) and other papers, contributed in 1817 "An account of the wheat insects of America, or the *Tipula vaginalis tritici* commonly called the Hessian Fly," to the *American Monthly Magazine and Critical Review* (vol. 1, pp. 275-279). This is a general account intermixed with observations on insects in general. Reference is made to Judge Havens' observations published in the *Transactions of the Agricultural*

Society of New York (vol. 1, p. 96), entitled "Havens on Hessian Fly." In a footnote the author states that Doctor Mitchill, in naming the insect *Tipula tritici*, was aware that one of the same name inhabited Europe and fed upon wheat, but it was so different a creature that he called it *Tipula vaginalis tritici* so as to distinguish it from the European one. Akerly mentions various remedies, such as late sowing, cultivating bearded wheat, "upon which it is fallacious to rely," heavy manuring to stimulate growth, the use of the roller upon young grain in the autumn or spring, ploughing up stubble, and burning stubble. The illustrations accompanying the article are terrible.

CONSTANTINE SAMUEL RAFINESQUE (1783-1840)

A picturesque figure in scientific circles at this time was Constantine Samuel Rafinesque. His ideas were often in advance of his time. He was a pioneer in many fields. He was industrious and enthusiastic. He was careless of established customs. He accomplished much and made many mistakes. He was admired by a few and misunderstood by many. His work on botany, zoology, his explorations, travels, his activities as a college professor, editor, founder, his literary and archaeologic work, his inventions and writings, should be treated anew, by someone with knowledge, sympathy and understanding and perhaps with as great a versatility as that of Rafinesque. The temptation to continue about Rafinesque is considerable, but as there are many short accounts about him and as his contributions to entomology were so few, a lengthy discussion of his work and peculiarities would be out of place here.

In 1817 he contributed to the *American Monthly Magazine and Critical Review* (vol. 1, pp. 360-361) a paper on "Specimens of several new American species of the genus *Aphis*," and in 1818, a second paper (vol. 3, pp. 15-18, 1818) entitled "Second memoir on the genus *Aphis*, containing the description of 24 new American species." Mr. F. C. Hottes, in the *Proceedings of the Biological Society of Washington* (vol. 44, pp. 61-70, June 29, 1931), has recently evaluated Rafinesque's species.

In the *American Monthly Magazine and Critical Review* for December, 1817 (vol. 2, No. 2, p. 143), Rafinesque reviewed the first part of Say's *American Entomology* of which more will be said later, and because of its interest as a piece of contemporary criticism, the review is quoted in full:

American Entomology or Descriptions of the Insects of North America, illustrated by coloured figures from drawings executed from nature, by Thomas Say. Philadelphia, Mitchell and Ames, 8vo first number pp. 40. with six plates and an engraved frontispiece.

"The United States can at last boast of having a learned and enlightened Entomologist in Mr. Say. Those who have preceded him, such as Catesby, Abbot, Melsheimer, Muhlenberg, Barton, Escher, Leconte, Torrey, &c. have merely been collectors, or painters, or nomenclators; but the author of this work shows himself acquainted with the details and improvements of the science; he is at the same time an acute observer and an able painter. This increases our regret that instead of aiming at the glorious title of the American Fabricius, his utmost ambition is to tread in the steps of Donovan! and imitate his uncouth arrangements, desultory style, pompous publications, and costly performances. We regret exceedingly to see those defective modes introduced by the author of this work, and are sorry to foresee that they are not likely to promote his views. This was not the manner in which the labours of Linn[aeus], Fabricius, and Latreille have been published, yet they are the classical authors of the science. It is true that we are offered an elegant specimen of typography; but the price of it is two dollars. For that sum we have forty pages (of which twelve are quite blank!) printed on beautiful paper and type, and six fine coloured plates, containing only eight species (whereof

five are new) of insects, while they might have included sixty! Therefore at this rate, as there are at least eight thousand species of insects in North America, the sum of two thousand dollars will be requisite in order to admire the insects on this new plan! while on the plan of Linn[aeus], &c. ten dollars might be quite sufficient. It would be well if this style was left for the use of the princes and lords of Europe. When this work shall proceed, we may endeavour to review it at length. C.S.R."

In 1817 there appeared in the December issue of the *American Monthly Magazine and Critical Review* a lengthy article by C. S. Rafinesque entitled, "Survey of the progress and actual state of Natural Sciences in the United States of America, from the beginning of this century to the present time." In this article Rafinesque surveyed every branch of natural history and its outstanding workers, and noted the increase in societies, in professorships of natural history, in private collections and collectors, in botanic gardens, in public museums, and in public lectures. In addition, he mentioned the outstanding works of many naturalists, and of physicians. Of entomology, however, there is only the bare mention of Say and several of his contemporaries.

In 1821 Rafinesque contributed to the *Kentucky Gazette* (new series, vol. 7, No. 28, p. (2) Lexington, July 12), a popular essay on the periodical cicada, then prevalent in Kentucky, and in it references are made to the "locusts" of other countries. The title of his article is "Essay on the natural history of the chirper, or locust, which appears every seventeen years in the United States."

Some eleven years later, we find Rafinesque contributing an article to the *Atlantic Monthly* (vol. 1, No. 1, pp. 13-14, Phila. 1832) that does him no credit. It is called "Confirmation of the Important Discovery of the property of Sulphur in Trees, to destroy all Insects preying on them." And to make matters worse, Rafinesque claims the honor of being the first "tree plugger" in America. His article is quoted below, and from this account the idea apparently originated in France:

"9. Confirmation of the Important Discovery of the property of Sulphur in Trees, to destroy all Insects preying on them."

"Farmers and Gardeners ought to hail with rapture a safe, certain, easy and unfailing mode of driving away or destroying all the insects, bugs, caterpillars, lice, ants, which prey upon trees and often kill them.

"Numberless have been the means proposed or devised to get rid of these troublesome guests, most of which are dirty, costly, or unavailing. Our farmers appear to have given up in despair the hope of preventing the deadly attacks of curculios on the roots of peach trees, and the fruits of the plumb tree. Yet an efficacious mode is said to have been found several years ago in France, perfectly efficacious and applicable to all cases and all trees. The man who discovered it, deserved a splendid reward, yet his name has not even reached us. But we claim the honor to have been the first to make known the process in America, in 1823 in Kentucky, and in 1827 in Philadelphia. Yet the most useful knowledge is so slow to spread, that the fact is hardly known yet, or doubted by those who know of it.

"We are happy to be able to publish two direct experiments in support of the fact and discovery.

"First. We bored and plugged with sulphur in the usual way, a plumb tree which commonly dropped every year all the plumbs before becoming ripe, the curculios lodging eggs in their germs. This was done when the tree was in blossom. On that year hardly any fruit fell,, and the tree produced quite well.

"Second. We find in the *Genesee Farmer* of January 28, 1832, that a young willow nearly killed by aphid or lice, and pissmires feeding on their honey, was quite revived in three days, and all the lice and ants driven off by boring the tree with an augur five feet from the ground and three-fourths through the diameter, filling with brimstone and plugging tight. The tree has thrived ever since.

"The modus operandi of this singular process is very easy to explain. The vital energy of the tree and sap, dissolves the sulphur,

carries it into circulation, and evolves it in sulphuric gas evaporating through all the pores of branches, leaves and fruits. This gas is a deadly poison to insects and all animals, it suffocates them or drives them away as soon as they begin to smell it; but no injury whatever results to the tree.

"We have never heard yet of any direct experiment on peach trees; but we are sure it will answer quite as well. If the sulphuric emanation could not reach quick enough the roots of the trees which are commonly attacked; the plugging must be done near the root or at the time of the descending sap, when it will sooner reach the roots. Let it be tried and the results made known. C.S.R."

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CHAPTER IV

THOMAS SAY AND HIS CONTEMPORARIES (1817 to 1831)

Philadelphia at the beginning of the nineteenth century was the literary and scientific center of the country. Scientific societies were few in number, however. The American Philosophical Society, founded many years before, had an established position. In 1806 the Philadelphia Botanical Society was organized. In 1807 its name was changed to the Philadelphia Linnaean Society, but with the founding of the Academy of Natural Sciences in 1812 it became inactive and gradually disappeared. However, various individual scientists were active during and before the beginning of the nineteenth century, and books on the natural history of America had been published abroad. The first American botanical work was Humphrey Marshall's *Arbustum Americanum* published in Philadelphia in 1785. William Bartram's *Travels* appeared in 1791, and later, in 1801, Michaux's *Oaks of North America*, although this was published in Paris. In 1803 Prof. B. S. Barton published his *Elements of Botany*, in Philadelphia, and there were other publications by Muhlenberg in 1813, Pursh in 1814, Barton and Nuttall in 1818, all relating to American botany.

The first important original work on American geology was Maclure's *Observations on the Geology of the United States*, published in 1809 and revised in 1817. Vertebrate paleontology began with the activities of Thomas Jefferson and with Rembrandt Peale's account of the skeleton of the mastodon published in 1802. William Peck in 1794 published the first paper on systematic zoology in America, a description of new species of fishes. Eastern birds were being described and written about by Alexander Wilson from 1808 to 1813, followed by Bonaparte's continuation of Wilson's work, and then by the work of Audubon and Nuttall. On mammals, Bewick's *General History of Quadrupeds*, 1804, contained descriptions and illustrations of some American species, and in 1815 there was George Ord's contribution to Guthrie's *Geography*.

The grouping of the scientists of America early in the century into societies led to the establishment of journals. There were the *Transactions of the American Philosophical Society*, the *Journal of the Philadelphia Academy of Natural Sciences*, the *Annals of the New York Lyceum of Natural History*, the *American Journal of Science*, the *Medical Repository*, the *Philadelphia Medical and Physical Journal*, the *American Mineralogical Journal*, the *Boston Journal of Philosophy and the Arts*, the *Transylvania Journal of Medicine*, and as late as 1834 the *Journal of the Boston Society of Natural History*. To the pages of these journals were contributed the writings of Lesueur, Rafinesque, Storer and others on fishes; the papers of Green, Barton, Harlan, Say, etc., on reptiles; the work of Wilson, Audubon, Nuttall, Ord, etc., on birds; the work of Ord, Godman, Richardson, etc., on mammals; and writings on the crustacea, insects and shells by Say, Hentz, Harris, Lea, Peck and others.

THOMAS SAY (1787-1834)

During the year 1817, a young man, destined to become the leading descriptive entomologist of his time, appeared on the entomological horizon. This was Thomas Say, whose first efforts appeared in print in the shape of six colored plates with descriptive letter press, under the title, *American Entomology or Descriptions of the Insects of North America, Illustrated by Coloured Figures from Drawings Executed from Nature*. This was

published in 1817 by Mitchell and Ames, of Philadelphia, and Say hoped that it would excite enough public interest and support for its continuance. But he was disappointed. His second article, published in the *Journal of the Academy of Natural Sciences of Philadelphia* (vol. 1, No. 2, pp. 19-23, June, 1817), was entitled "Descriptions of several new species of North American insects" and in this he made references to his 1817 *American Entomology*. His second paper contains descriptions of seven new species of Coleoptera in the genera *Cicindela*, *Nemognatha* and *Zonitis* and of one new species of Diptera in the genus *Diopsis*. Say's third paper appeared during the same year, also in the *Journal of the Academy of Natural Sciences of Philadelphia* (vol. 1, No. 3, pp. 45-48, 1 pl.). The title was "Some account of the insect known by the name of the Hessian Fly, and of a parasitic insect that feeds on it." In this paper Say describes *Cecidomyia destructor*, adults, egg, larva and pupa, and states that it is unknown in Europe and was not imported in straw brought over by the Hessian troops during the Revolutionary war. Later, as will be noted, several persons took issue in print with some of Say's statements. Say also gives the life-history of the so-called Hessian fly and describes *Ceraphron destructor* as a larval parasite.

It would be possible to continue, over many pages, listing the species which Say described, but no useful purpose would be served and page after page of scientific names is not particularly readable. Although some time and space could be saved by listing the genera in which Say worked, even a list of this sort has disadvantages. *The Complete Writings of Thomas Say on the Entomology of North America*, edited by John L. LeConte, M.D., was published in two volumes in New York, 1859 by Bailliere Brothers and is available to students of Say's work (reprinted in 1869, 1885 and 1891). According to John G. Morris, Say described 1,150 species of Coleoptera, 225 species of Diptera, 100 species of Hemiptera and 100 species of other groups. His numerous descriptive papers on entomology appeared in the early numbers of the *Journal of the Academy of Natural Sciences of Philadelphia*, in the *Transactions of the American Philosophical Society*, the *Western Quarterly Reporter*, *Contributions of the Maclurian Lyceum to the Arts and Sciences*, *Annals of the Lyceum of Natural History of New York*, the *Appendix to the Narrative of an Expedition to the source of St. Peter's River, &c., under the command of Stephen H. Long*, and some were printed at New Harmony, Indiana. Several posthumous papers appeared in the first volume of the *Boston Journal of Natural History* (1835) and the *Transactions of the American Philosophical Society* (1839).

Say's *American Entomology*, in which it was his design "to exemplify the genera and species of the insects of the United States, by means of coloured engravings," did not extend beyond three volumes, all published by Samuel A. Mitchell, Philadelphia. The first one appeared in 1824 and included the plates and text published in 1817, the second in 1825, and the third in 1828, while Say was living in New Harmony. It is dedicated to William Maclure and was upon its appearance characterized as the "most beautiful publication of the kind" ever issued from an American press. That it did not continue beyond the third volume was due probably to the indifference of the public on account of its high price, and to the distance which separated the author and the

publisher.

Say was a prolific author in other fields, his numerous descriptions of fresh-water, marine and land shells were published in Nicholson's *Cyclopaedia*, the *Journal of the Academy of Natural Sciences of Philadelphia*, the "Appendix" to volume two of Long's second expedition, the *New Harmony Disseminator of Useful Knowledge*, the *Transylvania Journal of Medicine*, published at Lexington, Kentucky, and the *American Conchology*. His paleontological writings were published in the first volume of the *American Journal of Science*, and the fourth volume of the *Journal of the Academy of Natural Sciences of Philadelphia*.

On the Mammalia, Say published three papers, two of which were joint ones with George Ord, in the *Journal of the Academy of Natural Sciences of Philadelphia* volumes II and IV. In the footnotes of the *Report of the Long Expedition to the Rocky Mountains* occur his descriptions of such mammals as squirrels, shrews, rats, and a mule deer. In the same place will be found descriptions of the five birds which Say described, most of which still retain his names. And in addition, these footnotes include descriptions of a few species of rattlesnakes, lizards, bats, a tick, a toad, an arachnid, and a species of newt. The early volume of the *American Journal of Science* and the *Contributions of the Maclurian Lyceum* include Say's five papers on the Reptilia, and in the first volume of the *Journal of the Academy of Natural Sciences of Philadelphia* are his ten papers on the Crustacea.

As to Say's work on the Crustacea, Dr. Henry W. Fowler, in "The Crustacea of New Jersey" (*Reps. N. J. State Museum*, 1911), wrote:

"The history of the Crustacea of New Jersey, and in fact of North America generally, may be said to begin with the labors of that distinguished veteran naturalist Thomas Say. These are combined in the modest little paper, extending in several parts through the first volume of the *Journal of the Academy of Natural Sciences of Philadelphia*, published in 1818, and entitled 'An Account of the Crustacea of the United States.' This work is the very foundation of North American carcinology. While embracing but a few of the more conspicuous forms now known to occur, in the present instance the work is particularly pertinent, inasmuch as many, if not most, of the species were described from the Great Egg Harbor Bay region in the State of New Jersey. The figures accompanying were made with the characteristic daintiness of C. A. Le Sueur, another distinguished colleague of Say's."

In addition to everything which has been mentioned, one must not forget the ethnological writings of Say, in the accounts of his western travels.

Thomas Say was born in Philadelphia on July 27, 1787. Little is known — in fact nothing is known — of his childhood. Whether he received his earliest education in Friends' schools or from his parents at home is not known. We do know that he escaped the yellow fever epidemics which prevailed in Philadelphia from 1793 to 1796, and that in May, 1799, when he was twelve years old, he enrolled in the Westtown Boarding School as its seventeenth pupil. In 1794 a committee of the Philadelphia Yearly Meeting of Friends had purchased the property at Westtown for the purpose of establishing a Friends' boarding and day school, and Thomas Say was among the first to enter when it was opened. At that time the price of tuition and board was sixteen dollars a quarter, payable in advance, and no child was admitted for less than twelve months.

Say's younger brother, Benjamin, entered the Westtown School about a year later, or in April, 1800, and among other Philadelphia boys enrolled there were George Bartram and Reuben Haines, the former probably a relative of Say's and the latter his life-long friend.

Thomas Say did not care either for his teachers or for what they taught, a not unusual attitude on the part of many pupils, and he acquired a strong dislike of ordinary branches of study, another not unusual attitude on the part of youth, which it is customary and perhaps truthfully so in many cases, to attribute to the incompetency of instructors. Although Say in after years showed a desire for knowledge which was unrestrained, it was for a different type from that offered to him at Westtown, and he was older.

After leaving the school, which must have occurred in a comparatively short time since boys were not allowed to remain after they were fifteen years old, Say helped in his father's apothecary shop, read extensively and collected extracts from poems, which he arranged alphabetically. Later he became interested in natural history and collected beetles and butterflies. In this he was encouraged by William Bartram, of Kingsessing, his great uncle, who induced him and several of his young companions to contribute their findings to his collection of natural history specimens. From that time until he died, natural history occupied his interest almost to the exclusion of everything else.

Although Philadelphia at this time was the principal city in the Union, naturalists were scarce. There were the Bartrams, Muhlenbergs and Bartons, outstanding botanists, Alexander Wilson, who was studying birds, Peale's museum in the State House, and a small, very small, number of amateurs who met in each others' homes. John Speakman, apothecary, and Jacob Gilliams, a leading dentist of the city, were devotees of natural history. Gilliams, Say and Alexander Wilson used to visit William Bartram at Kingsessing, and sometimes some of them and others of their friends would get together in John Speakman's store at the northwest corner of Second and Market streets and discuss their hobbies. At one of these gatherings Speakman made the suggestion of meeting at stated times for the exchange of ideas, and Mr. Gilliams proposed an association. With this idea in mind they met at Speakman's house on Saturday night, January 25, 1812. Dr. Gerard Troost, John Speakman, Dr. C. M. Mann, Jacob Gilliams, John Shinn, Jr., a native of New Jersey and a manufacturing chemist, and Nicholas S. Parmentier, a distiller and manufacturer of spermaceti oil, were present. Speakman acted as chairman and Mann as secretary. This was the origin of the Philadelphia Academy of Natural Sciences.

The next two or three meetings were held at Mercer's Cake Shop, a public house on High or Market street, near the corner of Franklin Place. At the meeting of March 17, 1812, Dr. Samuel Jackson, of the University of Pennsylvania, suggested the title "Academy of Natural Sciences," and it was the decision then that the origin of the association should date from that time.

In the minutes of the meeting of January 25, 1812, mention was made of the absence of Thomas Say, but he is recorded as signing a resolution which was passed at that first meeting. The date of Say's first attendance at a meeting of the Academy is given by one authority as April 16, 1812, but the minutes of the meeting held on March 17, 1812, record Say as being present and mentions all present as being founders.

After Say had acquired some knowledge of the drug business, his father established him in a partnership with John Speakman, the firm being known as Speakman and Say. Speakman very generously assumed the active management of the shop so that Say's time could be devoted to natural history. It is not known when the partnership was formed, although it did not last very long. Speakman and Say endorsed notes for friends, and when they became due the firm had to stand the losses which were so great that the business was wiped out. Even the loose change in

Say's pockets, so one account states, was used in satisfying the creditors. After this unfortunate happening, Say, who was about twenty-five years old, made no effort to recover his losses, but gave himself up entirely to natural history, living in the rooms of the Academy, on the plainest food, usually bread and milk, with an occasional chop or an egg which he himself cooked, and sleeping, so it is said, under the skeleton of a horse. He continued in this style of living for several years, and at times his food did not cost him more than an average of twelve cents a day.

Say's Academy activities were interrupted by the War of 1812-15, during which Philadelphia was intensely patriotic. During these times Thomas Say joined the First City Troop, being elected to membership on September 4, 1814. About this time several friends and relatives enlisted also. General Bloomfield's order of August 27 called only thirty of Captain Ross's men into service, but on October 3 an order from the same General commanded that "Captain Ross will call out as many of the First City Troop as will be sufficient to discharge the duties of videttes, conformably to the order of 27th August last." As Say was not a member when the first thirty started out he probably did not begin service until this time. He is listed among the fifty-four privates who served in this campaign. The Philadelphia Committee of Defence conferred with Major-General Edmund P. Gaines, who commanded the Fourth Military District, and as a result the videttes were placed in the service of the United States. The Troop returned to Philadelphia on December 12 and was discharged.

Following his service at Mount Bull, Say resumed his studies and activities at the Academy, and in 1816, encouraged by his friend Alexander Wilson, who promised to help him, he projected his work on *American Entomology*, already mentioned.

In the autumn of 1817, an expedition to the south was organized and the winter saw Say, Maclure, George Ord and Titian R. Peale visiting the sea islands and adjoining coast of Georgia and penetrating into eastern Florida for the purpose of studying the fauna and collecting specimens. This trip, although productive, was cut short by the bad feeling which existed between the neighboring inhabitants of the United States and the tribes of Florida, which was still under the control of Spain.

In the year 1819, Say was appointed as zoologist on Long's expedition to the Rocky mountains. With a view to establishing military posts on the upper Missouri for the purpose of protecting the growing fur trade, controlling the Indian tribes and lessening the influence of British trading companies on the Indians, a "Yellowstone expedition" was planned by Secretary of War John C. Calhoun. Major Stephen H. Long was placed in command of the scientific observations, which proved to be the only valuable result of the expedition.

After this expedition, once more back in Philadelphia, Say resumed his activities at the Academy, drawing up descriptions of insects, fossil and other shells which he had collected on his southern and western trips and also of those which he had received from many friends and correspondents. Numerous descriptive papers by Say on these subjects began to appear in the pages of the *Journal of the Academy of Natural Sciences of Philadelphia* and in other publications.

In 1821, Say was made curator of the American Philosophical Society, holding this office until 1827. In 1822 he was appointed as professor of natural history in the University of Pennsylvania.

At the instance of Hon. J. C. Calhoun, Secretary of War, an expedition was sent in 1823 to the source of St. Peter's river under the command of Stephen H. Long, Major, United States Topographical Engineers. The other members of the party were Thomas Say, Zoologist and Antiquary; William H. Keating,

"Mineralist" and Geologist; Samuel Seymour, Landscape Painter and Designer. James Edward Colhoun joined the party at Columbus, Ohio, on May 20 as astronomer and assistant topographer. Dr. Edwin James, botanist on the expedition to the Rocky mountains, was to have accompanied the party as botanist, geologist and physician, but received his instructions too late to join the party at Wheeling or Columbus. Say therefore undertook the collection of plants that appeared to him interesting, and these were turned over to the Rev. Lewis D. de Schweinitz, whose descriptions of them are in the appendix to the report of the expedition, made to President James Monroe in a two-volume book "compiled from the notes of Major Long, Messrs. Say, Keating, and Colhoun, by William H. Keating, A.M. &c. Professor of Mineralogy and Chemistry as Applied to the Arts, in the University of Pennsylvania; Geologist and Historiographer to the Expedition."

During the early part of the nineteenth century, or while Say was immersed in his descriptions of new species, here and there over America were groups of people dissatisfied with the existing social order, or if not dissatisfied at least idealistically inclined and willing enough to subject their ideals, religious and economic, to practical tests. In fact, long before Say's time, and afterward too for that matter, America was a vast laboratory in which all sorts of sectarian and economic eccentricities were tested, at first unrestricted, but later hampered by the conventions of the rapidly growing industrial age. Although some were primarily sectarian and others economic, the former usually included the economic practice of common ownership. Following the Reformation, various sects, to escape persecution, emigrated from Germany and founded their communities in this country. More numerous, however, were the altruistic economic communities made up almost entirely, of Americans, and we are here concerned with one of these, New Harmony, because of Thomas Say's connection with it.

New Harmony, located on the Wabash River, in Indiana, was settled in 1815 by George Rapp and his disciples, who sold the entire property in 1825 to Robert Owen, a Scotch social reformer and cotton manufacturer, who planned to establish an ideal community where man would be given a new existence "by surrounding him with superior circumstances only."

On May 1, 1825, the "Preliminary Society of New Harmony" was formed and a constitution adopted. The purpose of this preliminary organization was to "improve the character and conditions of its own members and to prepare them to become associates in independent communities, having common property." Owen realized the necessity of educating and training the new members before his ideal community could be attained, and so he enlisted the support of William Maclure, wealthy Philadelphia geologist and principal patron of the Philadelphia Academy of Natural Sciences, who had excellent ideas on education but hazy ones on political economy. Maclure, who invested \$150,000 in the scheme but limited his liability to \$10,000, believed that he could make New Harmony the center of education in America. Between them they brought to New Harmony such celebrities as Thomas Say, Charles Alexander Lesueur, artist and naturalist; Dr. Gerard Troost, geologist; John Chappellsmith, artist and engraver; Professor Joseph Neef, a Pestalozzian educator; Owen's four sons, trained for teaching and chemistry, and others of lesser fame.

On January 25, 1826, it was decided at a meeting of the Preliminary Society to organize a community of equality from among the members, and so a constitution was drawn up which among other things provided that,

"All members of the community shall be considered as one family,

and no one shall be held in higher or lower estimation on account of occupation. There shall be similar food, clothing and education, as near as can be furnished, for all, according to their ages: and, as soon as practicable, all shall live in similar houses, and in all respects be accommodated alike. Every member shall render his or her best services for the good of the whole, according to the rules and regulations that may be hereafter adopted by the community. It shall always remain a primary object of the community to give the best physical, moral and intellectual education to all its members."

Provision was made for dividing the community into six departments: agriculture; manufactures and mechanics; literature, science and education; domestic economy; general economy, and commerce. Each department was divided into occupations, and each department headed by a superintendent. After the adoption of the constitution, members of the Preliminary Society, it was decided, who signed the constitution within three days could become members. Most of them signed. And on February 15, only a month after he had arrived at New Harmony, Thomas Say was elected by the parent community as Superintendent of Literature, Science and Education. Other superintendents were chosen to head up the other departments.

About this time dissensions arose, new communities were formed by members who were not in sympathy with Owen's liberal religious views, and eventually the movement collapsed. After the disintegration of the communities during the middle of 1827, Maclure remained in New Harmony organizing his educational interests, and during the fall of that year he went to Mexico on account of failing health, taking Say with him. Here they remained until the approach of the summer of 1828, when they returned to the United States.

Say continued to live at New Harmony, looking after Maclure's interests, and continuing his taxonomic work, until his death on October 10, 1834. According to Dr. Benjamin H. Coates, Say died during a season of unusual mortality. Coates believed that Say's habit of going for long periods without food or very little of it, together with the loss of sleep, paved the way long before his death for the repeated attacks of fever and dysentery to which he was subject. Coates also states that when Say visited Philadelphia in 1833, a visit which could not be substantiated by the location of contemporary records, his poor health was apparent at once to his friends. He recovered from one attack only to be prostrated by another, each beginning with bilious symptoms and ending with symptoms of typhus fever and dysentery. New Harmony at that time was malarious, and this may have contributed to or have been the cause of his illness, although Say was not in perfect health during his western travels. Ord said that before going to New Harmony, both Say and Maclure lived frugally and carried their habits of abstinence from food too far.

Say was tall and spare but apparently muscular and strong before his period of ill health, otherwise he could not have withstood the hardships of his western travels. His complexion was dark and his hair black. Friends and acquaintances all liked Say because of his amiable disposition, his modesty, his sincerity, his conciliatory manner, his readiness to trust others, his willingness to help everybody whenever possible, his honesty and his love of truth. Some, however, thought that his modesty was so excessive as to result in an absence of self-confidence which reacted against his own interests. Nevertheless his refusal to take advantage of certain offers which might have increased his worldly possessions may have been due to his dislike or lack of interest, and he was too honest to feign interest where it did not exist. Certainly Say's work does not exhibit any lack of confidence in his ability in his chosen field, and his standards of usefulness or advancement may have differed from those of his

friends.

Say had many friends and numerous correspondents, both in this country and abroad.

Thomas Say was easily the leader in descriptive studies during the early part of the century. His article in Nicholson's *Cyclopaedia* was the foundation of conchology in America. A contemporary said,

"This work ought to be in the possession of every American lover of natural science. It has been quoted by M. Lamarck and adopted by M. Ferrusac, and has thus taken its place in the scientific world."

Parts one to five of Say's *American Conchology* printed at New Harmony were translated into French by J. C. Chenu and published in Paris in 1845. Some of Say's entomological writings too were translated into French and published by M. A. Gory in 1837. It was Gory's intention to collect, translate and publish all of Say's insect writings, but the work never went beyond three thin livraisons. When Say began to describe shells there were no other conchologists in the country, but from about 1820 on they increased in number. Among his contemporaries were Rafinesque, Barnes, Hildreth and later Isaac Lea. Dr. Henry A. Pilsbry has said that Say's "descriptions of shells are excellently worded, very few of them being in any way ambiguous," and that "all his species have been identified and very few of them fall into synonymy."

The first paper published in America on fossil invertebrates was from the pen of Say and appeared in volume 1 of *Silliman's Journal*. He was the first in America to call attention to the chronogenetic value of fossils. Therein he said that the progress of geology "must be in part founded on a knowledge of the different genera and species of reliquia, which the various accessible strata of the earth present," and he was aware too of the difficulties of studying fossils because of their fragmentary character and realized that their interpretation necessitated a knowledge of similar living animals. Dr. G. D. Harris collected Say's paleontological writings and reprinted them in the *Bulletin of American Paleontology*, 8 No. 5 (Dec. 7, 1896), under the title "A Reprint of the Paleontological Writings of Thomas Say." Doctor Harris considers Thomas Say one of America's greatest naturalists, and in his introduction he said that more than once European co-workers have overlooked Say's original description of *Exogyra* and credited the genus to Sowerby, and that too often has Say's work on Crinoidea been forgotten.

Say's abilities were recognized abroad. According to the title-page of his *American Entomology*, he was in 1824 a correspondent of the Philomathique Society of Paris. On May 5, 1829, he was elected a Foreign Member of the Linnaean Society of London, his certificate being signed by Dr. Francis Boott, Edward Adolphus Duke of Somerset, F.R.S., A. B. Lambert, Edward J. Bennett, Walter Buchanan, Edward Forster, Robert Brown, Thomas Bell, Rev. F. A. Hope, John Morgan, Richard Taylor and William Yarrell. Say was not, as stated in some accounts, a member of the Zoological Society of London.

LeConte, writing of Say's coleopterological descriptions, said, "His descriptions are so clear as to leave scarcely a doubt as to the objects designated," an opinion still shared by most present-day entomologists.

Say belonged to the descriptive period of American natural history. Specimens had to be named and described before further studies on habits and life histories could be advanced. He was not vitally interested in relationships and classification. His acute perception, his powers of observation and his industry were devoted to a single purpose, the description of new species, and

in this he was eminently successful. His ability to express the salient characters of a species in a few words was remarkable.

The bulk of the work that he accomplished was done before his removal to New Harmony, where he went, no doubt, because of his friendship for Maclure but also because he believed in Owen's plans for the betterment of humanity. Say's friendship for Maclure was unusually close, and this being so, Say was undoubtedly influenced by it to the extent that he disregarded the advice and suggestions of lesser friends who were concerned with his poor health and lack of finances. However, Say did what he wanted to do — describe new species — at a time when pioneers in such work were not even rewarded as poorly as they are now. As Coates has said, Say opened the shafts and galleries and pointed out the veins. And the success of his activities is attested by his numerous successors.

TIMOTHY DWIGHT (1752-1817)

Timothy Dwight, educator, pioneer of higher education for women, and president of Yale College from 1795 until his death in 1817, whose published works fill thirteen volumes, incorporated some entomology in his *Travels in New England and New York*, which was published in New Haven in 1821, and in London in 1823. In the first volume of this work (p. 56) he states,

"I know not, that the Insects of New England, are remarkable either for their variety, numbers, or malignity. The *Hornet*, *Wasp* and *Humble Bee*, are natives of many countries. They exist, but do not abound here. The *Honey Bee* I consider as a native of this country; since it was found in the forests too early, and at too great distances from European settlements, to have been derived from importation."

On page 57, he talks about the mosquito, saying in part that such insects were not numerous in most parts of New England:

"Such maritime towns, as have salt marshes in their neighborhood, are not unfrequently troubled with them in hot and moist seasons; particularly when the wind blows directly from the marshes."

He speaks of living in New Haven for more than thirty years and during that time they gave the inhabitants no trouble, except in three or four instances. Of the "locust," he states that it appears regularly every seventeenth year and sometimes does a little mischief to the forest trees.

In volume II (p. 403) we read,

"Bennington [N.H.], and its neighbourhood, have for some time past been infested by grasshoppers of a kind, with which I had before been wholly unacquainted. At least their history, as given by respectable persons, is in a great measure novel."

They appeared at different periods in different years, and in the year 1798 they came four weeks earlier than in 1797 and disappeared four weeks sooner. He could not describe their form nor size — not having seen them. Their favorite food was clover and corn, and they fed upon the silk of corn. But they also ate almost all vegetables, and fed on the garments of laborers hung up in the field. And in addition, they ate pine sawdust. At times, particularly a little before their disappearance, they collected in clouds, rose high in air and took extensive flights, the cause and direction of which had never been discovered. They customarily returned and perished on the very grounds which they had ravaged.

In volume III (pp. 300-302) he has considerable to say about the Hessian fly being discovered near Brooklyn in 1784, near the Hessian encampment. From here it spread at the rate of about twenty miles each year, through most parts of the northern and middle states, "faster with, and slower against, the South-West wind."

He then briefly describes larva, pupa, eggs, work of the larva in the stalk, and the injury to wheat, its favorite food. When sown late, wheat generally escapes. While on this subject, he wrote,

"Nothing can more strongly exhibit the dependence, or the littleness, of man, than the destruction of his valuable interests by such minute, helpless beings: nor can anything more forcibly display the ease, with which his Maker punishes his transgressions."

Of canker-worms, he said,

"The Canker-worm has never made any considerable depredations at the distance of more than forty or fifty miles from the shore; although it has existed in this country more than one hundred and fifty years."

MISCELLANEOUS EARLY PAPERS

J. P. Brace in 1818 wrote on the cutworm *Phalaena devastator* (*Amer. Jour. Sci. & Arts*, vol. 1, pp. 154-155); Joseph Tufts in 1819 wrote on the codling moth (*Mass. Agric. Repos. & Jour.* July 1819); and John Prince, the same year, described the habits and ravages of *Chrysobothris femorata* (*Mass. Agric. Repos. & Jour.*, July, 1819, vol 5, pp. 360-361).

"A memoir on the honey-bees of America . . ." was read before the New York Lyceum of Natural History on September 25, 1820, by Mr. J. C. Vanden Heuvel and printed later in the *American Journal of Science*, (vol. 3, No. 1, pp. 79-85, Feb. 1821). Vanden Heuvel presented a group of twenty bees to the collection of the Lyceum, which he had obtained from Dr. George Schmidt, an entomologist who collected in Guiana and whom Vanden Heuvel had met while there on a recent visit. He regretted that he did not have the names of the bees, but he did have the common names current among the natives. Doctor Schmidt had assured him of the honey producing qualities of all. Several pages of the paper are devoted to the native origin of the bee in America and various accounts of travelers are quoted.

Dr. Gerard Troost, first president of the Academy of Natural Sciences of Philadelphia, whose entire life was devoted to geology and related sciences, who came to this country from Holland and who was professor of chemistry, geology and mineralogy in the University of Nashville for twenty-two years and state geologist of Tennessee for nine years, and whose published writings established his reputation at home and abroad, wrote, so far as could be determined, only one paper of entomological interest. This was entitled "Description of a variety of amber and of a fossil substance supposed to be the nest of an insect discovered at Cape Sable, Magothy River, Ann-Arundel County, Md." (*Amer. Jour. Sci. & Arts*, vol. 3, No. 1, February [8] + p. [1]-199, art. 3, p. 8-15, 1821) and was written from Baltimore.

In a stratum of lignite, Troost found a substance which appeared to be "a kind of comb or nidus made by some insects around the twigs and extremities of the succulent branches of a tree." The sizes of the nests varied from one to three inches long and the diameter was about one inch. The shape was irregular and the surface rough, resembling the unripe fruit of the bitter orange. The surface was also marked with pin holes and these led to interior oval cells. It appeared that the holes were made by insects for egg-laying purposes. These nests were of a resinous nature and possessed the same chemical properties as amber.

NICHOLAS MARCELLUS HENTZ (1797-1856)

In 1821, an educator and scientist who later became an authority on American spiders, published his first spider paper in the *Journal of the Academy of Natural Sciences of Philadelphia*

(vol. 2, pt. 1, pp. 53-55). The title was "A notice concerning the spider, whose web, is used in medicine" and the author was Nicholas Marcellus Hentz. In this paper Hentz gave the spider the manuscript name, *Tegeneria medicinalis*, and mentioned briefly its color and markings. He gave more space to a description of the genus *Tegeneria* of Walckenaer. The spider in question was an inhabitant of cellars in this country and its web was supposed to possess narcotic powers and had been used apparently with success in certain cases of fevers. A plate accompanies the paper, figuring the spider and some details.

Hentz published a few papers on insects, but most of his work dealt with spiders. One of his insect papers was "Descriptions of some new species of North American insects," published in 1826 (*Jour. Acad. Nat. Sci. Phila.*, vol. 5, pt. 2, pp. 373-75, 1 pl.). In this Hentz described several beetles from Massachusetts and also included a description of *Elater vernalis* from Pennsylvania, by Say. The following year, 1827, saw the publication of another insect paper by Hentz, this time involving the descriptions of eleven beetles, three species of *Cicindela*, received from T. W. Harris, three species of *Lebia*, two species of *Melolontha*, two species of *Pyrochroa* and one species of *Nemognatha*. Most of the specimens were from Massachusetts. The descriptions are brief and sometimes there is a note or two about their habits or food plants.

Another insect paper written by Hentz, in 1828, was entitled "Remarks on the use of the maxillae in coleopterous insects, with an account of two species of the family Telemorphidae, and of three of the family Mordellidae, which ought to be the type of two distinct genera" (*Trans. Amer. Philos. Soc.*, n.s., vol. 3, No. 14, pp. 458-463, 1 pl.). Hentz believed that the maxillae, in many insects, were appendages to the tongue, that their use was to assist in the deglutition of food, and that they seldom served to grind food except in the Melolonthidae, Rutelidae and a few other families. He mentioned Latreille, Degeer and their observations. Hentz's article was designed to bring out the idea that the maxillae, in most beetles, may not have as much use in masticating food as was commonly supposed and his observations on *Cantharis marginata* Fab., and *Cantharis bimaculata* Fab., corroborated his opinion. In this paper he also erected the genera *Chauliognathus* and *Macrodiagon*.

With one exception, Hentz's remaining eleven papers are all devoted to spiders, mainly the descriptions of new species. The exception is his article entitled "The Locust" published in 1834 in *The Western Journal of the Medical and Physical Sciences*, Cincinnati (vol. 8 [2d hexede, vol. 2], No. 1, June, pp. 160-163). This is on the cicada and about half is given over to the uses of the words "locust" and "cicada," the writings of the Greeks, Pliny, etc., habits of the cicada, the various species, and the 17-year cicada. After seeing the pupae of the periodical cicada near the surface of the ground and after hearing various accounts, he wrote,

"but the writer is not yet convinced by any printed account of their appearance, that seventeen, or eight, or seven are the number of years which are necessary to complete the subterranean existence."

Hentz's remaining spider papers appeared in the *American Journal of Science*, and the *Journal of the Boston Society of Natural History*, mainly in the latter. In 1841, he claimed in twenty years to have described 147 species and his estimate of the number throughout the world was 2,000. Nearly all his papers were illustrated by his own drawings.

Hentz was born in Versailles, July 25, 1797. His father fled there from Paris, because of his unwelcome political activities, and assumed the name of Arnold. Nicholas, while young, became

quite skilled in miniature painting. In 1813 he entered the Hospital Val de Grace as a medical student and remained there until the fall of Napoleon, when his father was proscribed and was obliged to flee to America. The family, after arriving in America, spent a few weeks in New York City and "Elizabeth Town," New Jersey, and then moved to "Wilkesburg," Pennsylvania, in April, 1816. Hentz, for some years, taught Friends, and gave lessons in miniature drawing in Philadelphia and Boston. While teaching at Round Hill, Northampton, Massachusetts, in a school for boys, he met and married Miss Caroline Lee Whiting, who later became known as a novelist and poet. Shortly after marrying, he moved to Chapel Hill, North Carolina, where he taught modern languages in the State University there, until 1830. Then he moved to Covington, Kentucky, to take charge of a female seminary, then to Florence, Alabama, where for eight years he ran a flourishing school called Locust Hill Female Academy. In 1842 he went to Tuscaloosa and in 1846 to Tuskegee, both in Alabama, and in the following year to Columbus, Georgia, all the time engaged in teaching. All his leisure was given to the study of spiders, their habits, etc., and to collecting and describing them. He corresponded with and was one of Say's friends, and he was a great friend of T. W. Harris. In fact, one of Hentz's sons was named T. W. Hentz. While in Philadelphia he became acquainted with Lesueur, who was accustomed to etch his own plates, and having the use of Lesueur's equipment, Hentz made etchings of some of his own spider plates. In the winter of 1820-21 he attended a course of medical lectures at Harvard, but finally abandoned them for teaching.

While living in Columbus, Georgia, his health began to fail in 1849 and his nervous condition was such that he became a regular user of morphine. He gradually became more infirm and finally moved to Mariana, Florida, to the home of his son, where he died November 4, 1856.

In Boston, 1875, his collected writings were published under the title, *The Spiders of the United States. A Collection of the Arachnological Writings of N. M. Hentz*, edited by Edward Burgess with notes and descriptions by James H. Emerton. In this book, it is stated that Hentz was physically small and spare, about five and a half feet high and weighing only about one hundred and ten or one hundred and fifteen pounds. His disposition was genial, affectionate and generous, although at times his nervousness made him morbidly sensitive and suspicious and a prey to imaginary fears. He was very religious and all his life he had the habit of suddenly resorting to prayer. Regardless of circumstances, he would either drop to his knees or remove his hat, and pray. For amusement he took pleasure in fishing and gunning and in walks in the woods with his sons.

JOSEPH DORFEUILLE (1790-1840)

The Western Quarterly Reporter of Medical, Surgical and Natural Science, of Cincinnati, printed in 1822 (vol. 1, No. 3, Aug. p. 342) a folding plate containing a circular chart by J. Dorfeuille. This chart or table, as it is called, had originally been prepared to accompany an essay on American Entomology, but the essay was missing. A note accompanying the table reads as follows:

"it contains the genera established by the most celebrated entomologists in Europe. Their relations to the Linnean system in nearly the same as that published in the *Encyclopaedia Britannica* and in the *Edinburgh Encyclopaedia* by Brewster with the exception of foreign genera."

The chart is harder to read than it would have been had it been made oblong. As it stands, it consists of concentric circles. At the

circumference of the last circle, are the genera. As the center of the chart is approached, the groups become larger, such as family, order, legion, subclass, with "class" at the center.

In the same journal (vol. 1, No. 4, [Nov.] pp. 398-400) the editor prints a notice from Dorfeuille relating to what is called "an insect plant" found at Natchitoches, Louisiana. Dorfeuille, in part, describes this "insect plants" as being composed of two parts, animal and vegetable. The animal part is three lines in length and four in breadth. The vegetable part is ten lines in length and is divided into branches, etc. In 1803 he examined an insect from which grew a kind of fungus. It seemed to him that the animal was about to be changed into a plant. The fungus came from the head of the insect and filled the cavities of the larval or pupal skin left in the soil. Dorfeuille thought that the skin had belonged to a species of cicada peculiar to Natchitoches.

JAMES WORTH (17??-18??)

James Worth, on July 29, 1822, in a paper read before the Agricultural Society of Bucks County, Pennsylvania, called attention to several wheat-infesting insects, and confused *Isosoma hordei*, the joint worm (and possibly *tritici*) and *Meromyza americana* and possibly a species of *Oscinis*. He also described the injury due to *Meromyza* and this antedated "the discovery and description of the species by Fitch about 34 years." Mr. Worth's observations were printed in the *American Farmer*, (vol. 4, p. 394).

The peach-tree borer, *Aegeria exitiosa*, was described in 1823 by Thomas Say in a paper by James Worth, published in the *Journal of the Academy of Natural Sciences of Philadelphia* (vol. 3, pt. 1, pp. 216-221). Worth had sent specimens of both sexes to Say and upon receiving the descriptions, had incorporated them in a paper of his own dealing with the life history and habits of the insect. Worth states that most generally recommended remedies are worthless and that the best method of control is to examine the trees in July and destroy them, one person being able to remove the soil and examine over one hundred trees in a half day. The cutting out of the borers was to be supplemented by tying "some swindling tow, a piece of hairy hide, or some other coarse thing of six or more inches in width" around the trunk, the lower edge to be covered with earth. This was to be done from the middle to the first of August, and about the middle of September the bandage was to be removed and the trunk coated with soft soap or lime wash well brushed in. Worth mentions "yellows" as a cause of peach tree decline and says that his trees have suffered from it.

JAMES E. DeKAY (17??-1851)

Dr. James E. DeKay, one of the leading zoologists of his day and author of works dealing with the reptiles, amphibia, mollusca and crustacea of New York, etc., official zoologist of the New York State Survey upon the Geology and Natural History of the State, presented at the January 24, 1823, meeting of the New York Lyceum of Natural History a paper on two worms inhabiting the body of the common cricket. According to the abstract, published in the *American Journal of Science* (vol. 7, No. 1, p. 172, Nov. 1823), Doctor DeKay "offered drawings and descriptions of two of them supposed to be new species of intestinal worms" and they were described as *Ascaris grylli*, and *Fissula grylli*.

Doctor DeKay joined the Lyceum of Natural History in 1819 and in 1837 he was elected a corresponding member of the Boston Society of Natural History. He died in Oyster Bay, Long Island, in 1851.

JACOB CIST (1782-1825)

In 1824 the *American Journal of Science and Arts* published an article entitled "Notice of the *Melolontha*, or May Bug" (vol. 8, No. 2, pp. 269-71), by Jacob Cist, an early entomologist of whom little has been recorded. According to Cist, the May bug was common in Pennsylvania. He describes the adult and larva in general terms and notes the damage by the grubs, during a dry season, to grass and corn. In moist seasons, the plants recover. According to his observations, sometimes one-third of a corn crop would be destroyed by them. He states that most of the grub damage is done in July and August, describes the cell in the soil, notes the pale color of the adults before emergence and the fact that the grubs are the favorite food of blackbirds. He mentions a belief among farmers that the grubs change to briars, due probably to the fact that in meadows, where the grubs are plentiful, sprouts sometimes proceed from them, arising from between the head and the ventral surface of the thorax. Sometimes the sprouts are three inches long, generally one to each grub. However, he believed this to be a fungous growth.

Jacob Cist was born in Philadelphia, Pa., March 13, 1782. At the age of fifteen, he entered his father's printing establishment, after attending the public schools of Philadelphia and Nazareth Hall, at Nazareth, Pennsylvania. At the age of eighteen or nineteen, he became manager of his father's business, newly established at Washington, D. C. However, a few months later the plant was closed and Cist entered the United States Post Office Department, in which he served as a clerk for eight years, when he resigned to move to Wilkes-Barre, Pennsylvania, where he was appointed to the postmastership. This position he held for the remainder of his life.

He became interested in the natural sciences, particularly geology, and he was clever at sketching and writing. As a result, his essays on various subjects, poetry, etc., appeared in various magazines and newspapers. Between 1813 and 1815, he undertook, with friends, the mining and marketing of anthracite coal, but his company like that of his predecessor was not successful in convincing the public of the value of this fuel.

Between 1815 and 1821, he collected and distributed in this country and in France specimens of plants, fossil plants, and corresponded with various scientists. Most of his observations appeared in the *American Journal of Science and Arts*. He had many interests, such as agriculture and the organization of glass and iron works, and he spent many years in the preparation of a work on American entomology, making hundreds of drawings and numerous notes. At his death, December 30, 1825, this remained uncompleted. In addition, he invented an artist's paint mixing mill, a printer's ink from anthracite coal, and a stove in which to burn anthracite coal. He was the first cashier of the first bank in Wilkes-Barre in 1817, treasurer of Luzerne County in 1816, and a founder and treasurer of the Wilkes-Barre Bridge Company, 1816-1818.

Mr. Gilbert S. McClintock, of Wilkes-Barre, Pennsylvania, is the fortunate possessor of a large collection of beautifully executed drawings of insects and books of field notes made by Jacob Cist, who was his great grandfather. Mr. McClintock states that according to letters in his possession, Jacob Cist corresponded with Thomas Say and with scientists in England, France, Germany, etc. It is apparent that he was an interesting and versatile individual of whom more should be made available.

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Abraham Halsey, an exact student, an early botanist, member of the Lyceum of Natural History in 1818, author of a "Synopsis

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Abraham Halsey, an exact student, an early botanist, member of the Lyceum of Natural History in 1818, author of a "Synopsis

of the Lichens of the vicinity of New York" (*Annals of the Lyceum*, 1823), cashier and accountant for the foundry of James P. Allaire at Corlear's Hook, later cashier of a Brooklyn or New York bank, published in 1824 "Remarks on certain entozoical fulgi" (*Annals Lyc. Nat. Hist. N. Y.*, vol. 1, pt. 1, pp. 125-6). In this paper he stated that,

"in the warm climate of South America, a fungus is frequently met with, growing from dead insects of the *Vespae* and *Grylli* tribes."

Dickson, who first detected this fungus, in England, described it as *Sphaeria entomorphiza*. Then follows a general account of the fungus and a related species and also an account of another genus, *Isaria*. Halsey's short paper of two pages was called forth because specimens of *Sphaeria entomorphiza* attached to insects had recently been presented to the Lyceum by Doctor Madianna, from Guadeloupe.

THADDEUS WILLIAM HARRIS (1795-1856)

An outstanding figure in entomological and natural history circles in this country during the first half of the 19th century was Thaddeus William Harris, M.D., who was second only to Say as a pioneer in entomology. Shortly after Say had begun in Philadelphia, Harris became active in Massachusetts, and continued until the middle of the century. His first published article, on entomology, appears to be the one entitled "The natural history of the salt-marsh caterpillar" which was printed in 1823 in the *Massachusetts Agricultural Repository and Journal* (vol. 7, pp. 322-31, 1 pl. 9 figs.). In this he gives the life history of the salt marsh caterpillar as he observed it on the salt marshes bordering the Charles River near Cambridge. At that time, salt hay was important to the farmers in that vicinity. He describes the larva in some detail, its feeding periods, its habit of rolling itself up into a ball and floating on the surface when the hay is covered by the tide, its food, the cocoon, and the adults of both sexes. He also described the male and the female moth and its varieties. Peck said the moth was undescribed and so Harris describes it in Latin, giving it the name *Arctia pseuderminae*, a name suggested by Peck. Harris succeeded in getting eggs from females in confinement, but could not locate them in the field. For control, he recommended cutting the grass early in July and burning over the marshes in March. Harris's observations and his interest in seemingly unimportant details, show that he was a good entomologist and a good student of insect economy.

In 1824 Harris wrote a "Description of four native species of the genus *Cantharis*" for the *Boston Journal of Philosophy and the Arts* (vol. 1, No. 5, Jan. art. 58, pp. 494-502). The same paper was republished in the *New England Journal of Medicine and Surgery* in 1824 (vol. 13, pp. 243-5, July, 1824). The first part deals with the general history of the beetles, but nothing is said of the habits of the larvae. There are short descriptions of *Cantharis vittata*, *cinerea*, *marginata* and *strata*, all of which had been described previously by others. Accompanying those descriptions are notes on the medicinal properties of the beetles, their food, common names, synonymy, etc.

In 1825, Harris described, in the *Boston Journal of Philosophy and the Arts* (vol. 2, No. 6, May, art. 63, pp. 580-83), *Condylura prasinata* from Maine, an animal related to the mole or shrew-mouse. In 1827, he published "Descriptions of three species of the genus *Cremastochilus*" in the *Journal of the Academy of Natural Sciences of Philadelphia* (vol. 5, pt. 2, pp. 381-89), all of which were from Massachusetts.

Harris's paper, "Minutes towards a history of some American species of *Melolonthus* particularly injurious to vegetation," which

was printed in the *Massachusetts Agricultural Repository and Journal* in 1827 (vol. 10, pp. 1-12, July), was written with a view to the premium offered by the Massachusetts Society for Promoting Agriculture for the best essay on the natural history of the rose bug. His professional duties prevented him from getting it in on time, and he resolved not to submit it. This information, however, came to the ears of the president of the society, who urged Harris to submit it. This he did and the trustees awarded him the premium. The paper begins with the Linnean definition of the genus *Scarabaeus*, its characters and general habits and injury of the species in Europe. Harris consulted the works of Latreille, Olivier, and Kirby and Spence. He also mentions the natural enemies. All of which leads up to the American species which he discusses, finally coming to *Melolontha subspinosus* described by Fabricius. Then he gives its life history and his observations and experience, all based upon field observations, in which of course there are some gaps. He states that if young chickens suffer from eating them alive, sweet oil should be poured down their throats. Harris was not impressed by most of the remedies proposed by French authors, and for his own part he recommended "a general pursuit" of them. Applications of air-slaked lime to grape vines were found to be useful as deterrents. Fires by night did not attract them. Severe winters and coldness and moisture did not always decrease their numbers by killing the larvae in the soil. He cites French authors who recommended hand collecting and killing for several years in succession. He believed that a warm, fertile and rather dry soil, which was not disturbed by the plow or spade, was favorable toward an increase in numbers. The entire paper is good. The entomological observations are sound and Harris thought straight and did not jump to conclusions.

In 1835 Harris wrote "Upon the economy of some American species of *Hispa*" (*Jour. Bost. Soc. Nat. Hist.* vol. 1, No. 2, art. 9, pp. 141-151) and also upon "Characteristics of some previously described North American coleopterous insects and descriptions of others which appear to be new, in the collection of Mr. Abraham Halsey" (*Trans. Nat. Hist. Soc. of Hartford [Conn.]* pp. 65-91, 1 pl.). Twenty-seven species are mentioned in this paper and the plate is a colored one. Halsey, at this time, was corresponding secretary of the Natural History Society of Hartford.

Descriptive papers by Harris are not numerous. In 1838 he published "Remarks upon the North American insects belonging to the genus *Cychnus* of Fabricius; with descriptions of some newly detected species" (*Jour. Bost. Soc. Nat. Hist.*, vol. 2, No. 3, art. 8, pp. 189-204) which was abstracted in the *American Journal of Science and Arts* (vol. 36, pp. 391-92, July 1839). His paper "Descriptive catalogue of the North American insects belonging to the Linnaean genus *Sphinx*," based upon his own collection, appeared in the *American Journal of Science and Arts* (vol. 36, No. 2, July, art. 3, pp. 282-320) in 1839. Not until 1853 did another technical paper appear, when he described *Rhinosia pometella* in the *Proceedings of the Boston Society of Natural History* (vol. 4, pp. 349-351). And in 1859, three years after his death, the Boston Society published in their *Proceedings* his remarks "On *Cicindela hentzii*; On the synonymy of three North American butterflies" (vol. 7, pp. 185-88; 189-90). In the same volume is another posthumous paper entitled "Observations on the transformations of the Cecidomyiidae" (vol. 7, pp. 179-83), in which he says that although, in most insects, a new membrane or skin is formed beneath the outer skin, whether the latter is cast off or retained, this is not true for the larvae of *Cecidomyia salicia* and *Cecidomyia tritici*. These species overwinter as full-grown larvae. Then they change color; the body swells and

rudimentary legs, wings, and antennae bud forth and grow to pupal dimensions; thus they transform to pupae, without shedding their larval skins.

In 1839, the *Journal of the Essex County Natural History Society* (Salem, Mass., vol. 1, No. 2, pp. 101-7) printed Harris's paper entitled "Remarks upon *Scarabaeus goliatus* and other African beetles allied to it," in which he traces the earliest accounts and reviews previously written papers. At the end he says,

"it is much to be regretted that Dr. Lamarck's numerous and unwarrantable innovations in nomenclature should still be retained. Specific names are the property of the first describer who makes use of them, and should not be altered or removed."

Doctor Harris published some descriptions of new species in the *New England Farmer*. In 1837 Harris had been appointed, by the legislature of Massachusetts, as one of a commission for a scientific survey of the state, and in this connection he wrote his *Report on the Insects of Massachusetts Injurious to Vegetation*, "published agreeably to an order of the legislature by the Commissioner on the Zoological and Botanical Survey of the states" (Cambridge, Mass., Folsom, Wells, Thurston, 8 + 459 pp.), which was published in 1841. In 1842, a small impression, with slight alteration, was printed. In 1852 a revised edition was published. And in 1862 an enlarged and illustrated edition was published under the editorship of Charles L. Flint, then secretary of the State Board of Agriculture. Other editions appeared in Philadelphia, 1869, and New York, 1880.

Harris's *Report* was well received and favorably reviewed. As a popular treatise on injurious insects, it was without a rival for many years and it was of value to every student of entomology. Today most of the remedies, involving as they do, hand picking, or the use of uncertain chemical combinations, seem quite old-fashioned, but the book will always remain one of the classics of economic entomology. In its pages are recorded the names of many of Harris's correspondents, and of authors of papers, long since forgotten.

It is impossible to present here a detailed list of Harris's writings. In 1843, he described an African beetle "allied to *Scarabaeus polyphemus*." In 1847, his account of the seventeen-year locust, which had appeared in his *Report on the Insects of Massachusetts* (1841) was reprinted in the *American Journal of Science and Arts* (vol. 53). In 1851 he wrote on the currant stem borer, *Aegeria tipuliformis*, as it was then called, for the *Magazine of Horticulture and Botany* (vol. 17 [2nd ser. vol. 7] No. 6, June, pp. 241-44) and in the same magazine in 1855 (vol. 21, No. 9, Sept., pp. 418-23) was printed an article entitled "The measure-worm," which Harris identified as the snow-white silky geometer, *Geometra niveosericeana*. At that time the larvae were troublesome in New York City upon elm, willow, linden, maple, poplar and horse-chestnut trees. The species is now known as *Ennomos subsignaria* Hubn., the snow-white linden moth.

Doctor Harris was born in Dorchester, Massachusetts, November 12, 1795, being the eldest child of Thaddeus Mason Harris, to whom reference has been made [see Chap. II]. In 1811, in his sixteenth year, he entered Harvard College and graduated in 1815. Following this, he studied medicine at the same institution, received his medical degree in 1820 and began his medical practice with Dr. Amos Holbrook in Milton. In 1824 he married Catherine, the youngest daughter of Doctor Holbrook. Apparently the practice of medicine was distasteful to him or his success for one reason or another was not assured, for in 1831 he accepted the position of librarian in Harvard University, which he retained until his death.

All his leisure time was given to the study of natural history and to illustration for his articles. In 1831 he prepared the Catalogue of Insects included in Hitchcock's *Report on the Geology, Mineralogy, Botany and Zoology of Massachusetts*. This was the first attempt in this country to enumerate and classify American insects on a large scale, and it included some 2,300 species. From 1837 until 1842 he was professor of natural history in the university, and in 1840 he published a list of the native plants found around Boston. All his life he was interested in botany, and correspondents sent to him seeds from all parts of the world. Doctor Harris had antiquarian interests also, and looked into and made notes upon historical subjects, but many were never written up and published. In 1847 there was published in the *Boston Courier* of July 29, an article on Stephen Daye, the Cambridge printer, which Harris wrote, and a few of his genealogical writings appeared in the *New England Historical and Genealogical Register*.

Dr. Samuel H. Scudder edited the *Entomological Correspondence of Thaddeus William Harris, M.D.*, which was published by the Boston Society of Natural History in 1869. This contains the correspondence of Harris with Hentz, F. E. Melsheimer, Doubleday, Herrick, J. L. LeConte, Miss M. H. Morris, Say, Zimmermann, Darling, Le Baron and Colonel Higginson, also descriptions of larvae, and life history notes from manuscripts previously unpublished. Nearly every important paper or fragment, previously inaccessible, was reproduced.

When Doctor Harris's *Insects Injurious to Vegetation* appeared, there were quite a few persons interested more or less in insects despite the general belief now that only a handful of people paid any attention to entomology at that time. True, the professional entomologists were scarce, but a careful reading of Doctor Harris's book will reveal the names of many persons who were genuinely interested in insects. Leaving out the names of the few professionals, we find that Doctor Greene, of Mansfield, investigated the rose chafer; the Rev. L. W. Leonard, of Dublin, New Hampshire, sent beetles to Harris, as did Mr. Nuttall; Mr. M. S. Deane, in the *Boston Cultivator* (July 1, 1848) wrote about the pea weevil; Wilson, the ornithologist, described insect injury; Dr. James Tilton, of Wilmington, Delaware, wrote the account of the plum weevil in Dr. James Mease's edition of Millich's *Domestic Encyclopaedia* (Phila. 1830); Dr. Joel Burnett wrote two articles on the plum weevil, one for the *New England Farmer* (Mar. 11, 1840) and the other for Hovey's *Magazine of Horticulture* (Aug. 1843); and Mr. M. H. Simpson wrote on the same subject for Hovey's in the June, 1850, issue. The Hon. John Lowell, of Roxbury, Mr. Henry Wheeler and Dr. Oliver Fiske, of Worcester, corresponded with Harris about insects. Dr. Paul Swift wrote to Harris in May, 1844, and told him of the trees in Washington and Independence squares, Philadelphia, Pennsylvania, being infested by a "*Saperda*." Theophilus Parsons likewise wrote to Harris in 1847 about the insects on the trees of Boston Commons. Mr. Phaniel Flanders, of Lowell, Massachusetts, showed to Harris potato leaves riddled by flea beetles. Mr. F. C. Hill, of Philadelphia, sent him eggs of the katydid, and the Rev. Thomas Hill, of Waltham, Massachusetts, sent him eggs of another Orthopterous insect. Mr. Robert Treat Paine sent him specimens of locusts, and Dr. D. S. C. H. Smith supplied grasshoppers. Mrs. N. G. S. Gage, of Concord, wrote to Harris about insects. Mr. Enoch Perley, of Bridgeton, Maine, published his writings on apple bark lice in the early papers of the Massachusetts Agricultural Society (1796, p. 32). Harris received specimens of Lepidoptera from Dr. D. S. C. H. Smith, of Sutton, and from the Rev. L. W. Leonard, and T. G. Fessenden. From E. C. Herrick, of New Haven, Connecticut,

Harris received wheat eaten by grain moths. In addition, there were numerous persons who wrote for the agricultural journals and each professional entomologist always had correspondents and collectors with whom he kept in touch.

JOHN EATTON LECONTE (1784-1862)

In 1824, John Eatton LeConte, the father of John Lawrence LeConte, wrote,

"Owing to the difficulty of determining in this country, what insects are known to naturalists in Europe, the science of entomology has as yet made but small progress amongst us: even if all the books which have been published on this subject were commonly available, we still should not be in a much better situation."

This statement appeared in a paper entitled "Description of some new species of North American insects," that was published in the *Annals of the New York Lyceum of Natural History* (vol. 1, pt. 1, pp. 169-173, 1 col. plate). The author, in offering his new descriptions, stated that he acted with due caution and hesitation after being advised by Baron Dejean, "profoundest entomologist and most accomplished soldier of his age." Twenty species are described, in *Anthrenus*, *Bruchus*, *Hister*, *Pissodes*, and other genera, many of them from Georgia. The descriptions are very short and one rather poor colored plate accompanies them. This was drawn by J. E. LeConte and engraved by Emily Maverick, who came of a well-known family of engravers. The beetles are rather stiff looking and the colors are incorrect.

John Eatton LeConte was born in Shrewsbury, New Jersey, February 22, 1784. He married Mary Anne H. Lawrence in July, 1821, and had three sons, two Edwards who died in infancy, and John Lawrence, who was born May 13, 1825, and later became the distinguished entomologist. John Eatton LeConte lived most of his life in New York. When thirty-four, he entered the corps of topographical engineers of the United States Army with the rank of captain and remained until 1831, attaining in 1828 the rank of brevet-major after ten years of service.

Previous to his army service, he published a catalogue of the plants of New York City, edited by Doctor Hosack. Later he published special studies on various genera of plants as well as on our native grapes, tobacco and pecans. He was also the author of papers on mammals, reptiles, batrachians and crustacea, mainly systematic, and he collected much material for the natural history of our insects. In cooperation with Boisduval, a single handsomely illustrated volume upon North American butterflies was published in Paris in 1833, under the title *Historie Generale et Iconographie des Lepidopteres et des Chenilles de l'Amerique Septentrionale*, "par le Docteur Boisduval, et M. John LeConte de New York." Although published jointly, LeConte did most of the work. He was particularly interested in the Coleoptera, although he published but a few papers upon them and those mainly upon the family Histeridae. His monograph on the North American Histeroides was printed in the *Journal of the Boston Society of Natural History* in 1845 (vol. 5, No. 1, pp. 32-86), and his paper, "Remarks on two American *Cimex*", was printed in the *Proceedings of the Academy of Natural Sciences of Philadelphia* in 1855. For the former paper, in which the seventy-five descriptions are in Latin, his son, John Lawrence LeConte, drew with much care the figures on six plates.

According to Henshaw, J. E. LeConte described eighty-six species of Coleoptera. Of this number, sixty-one retained LeConte's names; two were varieties; and twenty-three were synonyms. He left behind many water-color illustrations of our native insects and plants which he himself had made. These are said to be the property of the Missouri Botanic Garden. He died

at Philadelphia, November 21, 1862.

JOHN T. SHARPLESS (17??-18???)

The possibilities in silk culture continued to interest many people. John T. Sharpless, M.D., read before the Maclurian Lyceum of Science of Philadelphia, on June 11, 1826, "An essay on the *Bombyx mori*, or silk worm" that was printed in the *Franklin Institute Journal* in 1826 (vol. 2, pp. 22-9; 94-100; 139-144). In this he traced the history of the silk worm in China, India, Persia, Greece, Rome, etc., its introduction in the British colonies, the formation of the society known as "The Filature of Philadelphia," developed and encouraged by Benjamin Franklin, the silk shipments sent to England for manufacture, the premiums offered for the greatest number of cocoons and similar matters.

Doctor Sharpless claimed that the revival of interest, at the time he wrote, was due in great part to Mr. Samuel Alexander of Philadelphia, who had brought eggs from Gibraltar to observe the habits of the larvae. He was so impressed with the possibilities of the insect in this country that, by great perseverance and industry, he produced about five millions of eggs. These he distributed, and most of the larvae in and near Philadelphia at that time were from his Gibraltar eggs. Italian eggs interested him also. Doctor Mease also imported a quantity of eggs from Genoa, and his worms were thriving at the "Hospital." Sharpless stated that there were about 500,000 larvae in Philadelphia and vicinity. Of this number, 25,000 were at the "Hospital," and Mr. Alexander, Mr. Duser, and Mrs. Kempton each had 10,000. Sharpless then described the life-history of the silk worm, and other matters of importance to silk culturists, including the cultivation of mulberry trees. Even the internal anatomy as described by Malpighi and Blumenback came in for attention. In fact the entire paper is good.

AMOS EATON (1776-1842)

In 1826, Amos Eaton's text book on zoology was published at Albany, New York. The title is *Zoological Text Book, comprising Cuvier's Four Grand Divisions of Animals: also, Shaw's Improved Linnean Genera, arranged according to Classes and Orders of Cuvier and Latreille*. Of its 282 pages, 13 are devoted to insects. Eaton said,

"By studying insects and becoming acquainted with their beautiful structure, all those artificial horrors, excited by their presence, are changed into feelings of adoration for Him, who drew out their microscopic tubes, and set their respective fluids to flow into them."

Brief diagnostic characters are given for the following orders, which are then subdivided into families: 1, Myriapodia; 2, Thysanoura [sic]; 3, Parasita; 4, Suctoria; 5, Coleoptera; 6, Orthoptera; 7, Hemiptera; 8, Neuroptera; 9, Hymenoptera; 10, Lepidoptera; 11, Rhipptera; 12, Diptera.

Amos Eaton was an educator and scientist who was born May 17, 1776. He graduated from Williams College in 1799, was admitted to the bar in 1802, and lived in Catskill, as a lawyer and land agent. However, he became interested in botany and other natural sciences through Dr. Samuel L. Mitchell and Dr. David Hosack, and by 1810 he was giving popular lectures on botany. Later he lectured on other nature subjects. In 1820 he was appointed professor of natural history in the Medical School at Castleton, Vermont, and in 1824 he was made senior professor in the Rensselaer School at Troy, New York. This latter position he held until his death in Troy on May 10, 1842. He wrote five works on botany, two on chemistry and six on geology, in addition to various papers on educational and other subjects.

JACOB PORTER (17??-18??)

Dr. Jacob Porter, of Plainfield, Massachusetts, presented "a collection of minerals, reptiles and insects" to the New York Lyceum of Natural History in June, 1827. Apparently Doctor Porter was a collector who was interested in everything pertaining to the "art" of capturing insects, for in 1831 the *American Journal of Science and Arts* published "Instructions for the benefit of those who are engaged in collecting insects for cabinets of natural history" by Theodore Roger (vol. 19, No. 2, Jan., art. 2, pp. 213-20) which Porter had translated from the French. Roger's paper originally had appeared in the first volume of the *Bulletin d'Histoire Naturelle de la Societe Linneene de Bordeaux*.

The paper starts off with a few general statements concerning the places where insects may be found, the desirability of not injuring them or breaking them, and so on. Then the collecting utensils are listed as follows:

1. A net of gauze.
2. Rackets in gauze.
3. Umbrella.
4. Trowel.
5. A bownet of horse hair or canvas — for water collecting.
6. Tin box.
7. Wooden box lined with cork.
8. Paper triangles.
9. Pins — several sizes.
10. Bottles with large necks.

"The rackets may be compared to the pinchers used by surgeons, or to scissors, each half of which should be terminated by a rhomb covered with gauze, drawn tight over it, so that on shutting the pinchers, the two rhombs may perfectly fit each other.

"Butterflies captured in the rackets will never be injured because they can not struggle in the rackets."

General directions are given concerning the uses of the different collecting utensils, which the author calls "Instruments of Pursuit." Several pages of directions are given, as for example, on how to handle beetles, orthopterous insects, Neuroptera, Hymenoptera, Lepidoptera, etc.

Jacob Porter was interested in local history as well as in insects. He wrote an "Account of Plainfield" that was published in the *Massachusetts Historical Collections* (vol. 8, 2nd ser. Boston, 1826) and also a *Topographical Description and Historical Sketch of Plainfield* that was published in Greenfield in 1834.

JOHN BIGLAND (17??-18??)

The first edition of John Bigland's *A Natural History of Birds, Fishes, Reptiles, and Insects* was published in Philadelphia in 1828. In 1831 another edition followed. Pages 139 to 174 of Part 4 are devoted to entomology. Chapter I covers insects generally, their characteristics, and general remarks on such insects as the "scorpion," silk-worm, bees, locust. Chapter II has the following heading, which is sufficiently indicative of its contents: "Concluding Reflections on the conformation of Animal bodies. Structure of heart, eye, Convincing proofs of an all wise Design in the formation of the Universe, and consequently, of the Existence of a Supreme Intelligence." These reflections, however, applied to all animals, including insects. An appendix includes insect accounts from Goldsmith's *Animated Nature* and these of course are quite readable. Bigland has nothing in particular upon American insects.

JEREMIAH VAN RENSSELAER (1793-1871)

A trace of what is now known as medical entomology made its appearance in 1828 in the pages of the *American Journal of*
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Science and Arts (vol. 13, No. 2, art. 4, pp. 229-34), in the shape of a contribution from Jeremiah Van Rensselaer, entitled "On a larva in the human body . . ." Doctor Van Rensselaer presented this paper at a meeting of the New York Lyceum of Natural History. At a previous meeting he had donated to the Lyceum a larva from a human body. In the paper referred to, he recounts various instances of larvae occurring in the human body, and tells of thirty larvae having been vomited by a girl of seventeen, who suffered severely for eighteen months from spasmodic and nervous affections. Numerous other records of insect larvae in the human body are cited, both in this country and abroad, but nothing is said about the identity of the species.

Doctor Van Rensselaer was born in Greenbush, New York, in 1793. He studied at Yale College, completing his work there in 1813. Then he went to New York where he worked under his uncle, Dr. Archibald Bruce, and where he acquired his liking for natural science. In 1823 he received his M.D. from the Vermont Academy of Medicine. Following this he spent three years abroad studying at hospitals in London, Paris, and Edinburgh. After returning, he practiced extensively in New York. For many years he was corresponding secretary of the New York Lyceum of Natural History. At one time he delivered a course of lectures before the New York Athenaeum. In 1852 he retired to take care of his estates at Greenbush. After another trip abroad, he returned to New York in poor health and died in 1871.

EARLY SOCIETIES AND ENTOMOLOGY PAPERS

The Franklin Society of Providence, Rhode Island, organized for the "Purpose of Promoting Investigation in Natural Science," published at Providence, Rhode Island, in 1829, an eight page pamphlet entitled, *General directions for collecting and preserving articles in the various departments of natural history; respectfully submitted by the Franklin Society of Providence, Rhode Island, to the attention of travellers, sea-faring men, and all lovers of nature and of nature's handy works, who are willing to lend their aid in promoting the cause of science, and advancing the progress of the arts.*

The first recipe is for the purpose of protecting the skins of animals from insect attacks, decay and for preventing decomposition. It is called "arsenical soap," the formula being camphor 2 1/2 oz.; arsenic in powder, 1 lb.; white or castile soap, 1 lb.; pearlash, 6 oz.; and lime in powder, 2 oz. Other recipes are mentioned, such as corrosive sublimate, chloride of lime, salt, cement, etc. In making the arsenical soap, the soap was to be cut fine, and heated with a little water, over a slow fire. The pearlash and lime were to be mixed in and stirred with a wooden spoon. After removal from the fire, the arsenic was added and "rubbed" in. Then camphor was added and the whole kept in jars.

Under the heading, "Insects," it is said that in catching them caution must be used not to injure them by breaking legs, wings, feelers, or by destroying their colors. Beetles may be killed by immersion in spirits of wine, or hot water and also by touching their heads with spirits of turpentine or by putting them under an inverted tumbler and filling it with sulphur fumes, by means of lighted matches held under one edge.

"All insects save butterflies and those consisting of a soft substance — may be packed in boxes, by making alternate layers of sand and insects. Butterflies must be pinned into boxes; and spiders, ants and other soft animals put into spirits. Procure if possible the caterpillar of the butterfly. If only caterpillar is found — it should be put in a box having a small air hole and be furnished with such leaves as it feeds upon. The eggs and various productions should be obtained; also a male and female and a specimen of the plants they feed upon, &c. Those used in medi-

cine, in dyeing and other processes, are more especially to be procured, and all information relating to them collected."

Daniel Prouty in 1831 supplied the *Massachusetts Agricultural Repository and Journal* with remarks on means against *Saperda candida*, under the title "Extirpating borer." In July, 1820, the same journal had printed an article on the same subject by Jesse Buel.

At this time the Boston Society of Natural History was concerning itself with entomology. At the June 13, 1831, meeting of the Council,

"upon the representation of Dr. Gould, that several gentlemen had expressed a readiness to collect insects for this Society if a proper case should be provided to preserve them, it was voted — that Dr. Gould have the power to expend 50 dollars to procure a suitable cabinet for this purpose."

On December 7, 1831,

"Mr. Fowle gratified the Society with a paper upon the history of the Animals he had presented, all of which were from the Island of Cuba . . . The luminous insect is the *Elatér Noctilucus*, called by the Spaniards, Cucullo . . ."

and more concerning the source of the light and of a young lady of Cuba, reading under the bed clothes, by the light of a few Cucullos in a thin glass bottle, when forbidden to read after a certain hour.

On January 4, 1832, "Dr. Gould exhibited about thirty species of Diurnal Lepidoptera, which he had captured in this vicinity. Of nearly twenty of these species, he gave a minute description pointing out the larvae and pupae — their habitats, seasons of appearing and various peculiarities.

"Thaddeus William Harris, M.D." — by Dr. Gould — was proposed as "a candidate for membership," and on February 1, 1832, he was "unanimously chosen a member of the Society."

At a meeting of the Council on February 8, 1831, the publication of a journal was proposed:

"Upon the representation of the President, that Dr. Harris was desirous to publish descriptions of some of our Insects in a scientific Journal, and would be pleased to publish them in the pages of a journal appearing under the auspices of this Society — and of Mr. Green, that Mr. Nuttall would also aid in supporting such a publication — A Committee, consisting of Mr. Binney and Dr. Flint, were chosen to ascertain to what extent we may depend upon original communications, if such a journal should be commenced, and also, what amount of funds would be required to carry it on."

And according to the report of the curators, on May 2, 1832, a cabinet had been provided for the department of entomology. It contained thirty drawers each fourteen by twenty-one inches and at the time it housed about 1,200 specimens. About 200 were from South America and the remainder were from New England. The specimens were all classified and most of them were labeled.

SAMUEL PRESCOTT HILDRETH (1783-1863)

Dr. Samuel Prescott Hildreth, one of the early pioneer physicians of Ohio and for nearly forty years a contributor to the *American Journal of Science and Arts*, on meteorology, geology and paleontology, wrote also a few things on insects. His paper on "Notices and observations on the American Cicada or locust" which appeared in the *American Journal of Science and Arts* in 1830 (vol. 18, No. 1, April, art. 5, pp. 47-50), is an account of the periodical cicada. It is illustrated by one plate, rather poorly drawn, of five figures showing adults of both sexes. Hildreth notes their appearance at Marietta, Ohio, in 1795, 1812, and 1829, and gives general notes on their noise, feeding habits, egg laying, etc. He believed that the eggs derived some sustenance

from the sap of the twig, because the eggs invariably perished in those branches that withered and died soon after the egg punctures had been made. He also stated that the pupae were so full of oily juices that they were used in the manufacture of soap. In 1847, Hildreth had additional notes on the periodical cicada at Marietta, Ohio, in 1846. These appeared in the *American Journal of Science and Arts* (vol. 3, ser. 2, pp. 215-218), to which he was a constant contributor.

Hildreth, who was born in Methuen, Massachusetts, September 30, 1783, studied medicine under Dr. Thomas Kittredge, of Andover. In 1805 he was practicing in Hampstead, New Hampshire. In 1806 he moved to Marietta, Ohio, and except for about a year and a half he remained there all his life. He explored the coal regions of Ohio and was deeply interested in natural history. In 1837 he was one of the assistant geologists of the Geological Survey of Ohio. In addition to his papers on natural history, he wrote for the medical journals and on historical subjects connected with the early history of Ohio and West Virginia. He also found time to serve in the Ohio legislature (1810 and 1811), as a tax collector, and as Clerk of the Ministerial Lands for many years. He helped to draft legislation regulating the practice of medicine and for the organization of medical societies in Ohio. He died at Marietta, July 24, 1863, and his collection of about 4,000 natural history specimens, together with his library, went to Marietta College.

POPULAR ENTOMOLOGY

In the early days, scraps of entomology appeared in various places. In the first volume of *The Cabinet of Natural History and American Rural Sports*, published by I. and T. Doughty in Philadelphia in 1830, there is on page 15 a paragraph on "Hunting Spiders," culled from the Family Library. And of course, the "redeeming trait in the history of these cruel creatures is their affection for their young." Furthermore, we learn that one of these spiders jumped two feet, on a humble bee. On pages 173-176 of the same volume, there is another article on spiders entitled "How Spiders Effect Their Aerial Excursions" by John Blackwell, Esq., F.L.S., and this paper was reprinted not from any "Family Library" but from the *Transactions of the Linnean Society*. Another and the final entomological article in volume 1 is found on pages 179-180, "*Oestrus Equi*, or the Horse Gad Fly." The article outlines the life-history and habits of the horse bot, and is signed "Nicholson." Most of the article is in quotation marks and its entomology appears to be good.

A serial magazine devoted in part to natural history made its appearance in Boston in 1831. It was entitled *The Naturalist containing treatises on natural history, chemistry, domestic and rural economy, manufactures and arts with twelve illustrations* and it was edited by D. J. Browne. The first number appeared in December, 1830, and the last in December, 1832. The editor selected articles from various journals and the first volume is the only one containing entomological articles. In this there are papers on termites, ants, bees and silk-worms. The bee article is from Bevan's *Treatise on Bees*. Others are from Eaton's *Zoology* and from Huber's works on bees and ants.

JOHN LEONARD KNAPP (1767-18??)

An English book that circulated in this country was *The Journal of a Naturalist*, by John L. Knapp, published by Carey and Lea of Philadelphia in 1851. It is devoted to meditations, observations of nature, etc., a large part being botanical. Of its 286 pages, thirty or forty are on insects — moths, the glow-worm, hornets, etc. — and also on the killing of insects. The