BICENTENNIAL REVIEW OF EARLY AMERICAN ENTOMOLOGY

C. A. MUSGRAVE, AND D. R. BENNETT
Department of Entomology & Nematology
University of Florida
Gainesville, Florida 32611

Various aspects of entomological history have been reviewed previously but little attention has been given to the development of this science in the United States prior to 1800. Admittedly, most references to early American insect studies are brief, sometimes vague, and widely scattered. Nevertheless, these accounts do allude to the impact that beneficial and pest insects had on colonial economy. In keeping with the bicentennial spirit, we have researched some of these little known aspects of America's entomological heritage, tracing some subjects back 200 or more years.

Silk production was actively promoted in the English colonies as early as 1613 (Gray 1933). Encouraging reports on the extensive growth of wild mulberry and "silkworms" (possibly the Spicebush silk moth, Callosamia promethea Drury) in Virginia prompted King James to commission the writing of an agricultural treatise, including a special section on sericulture, each Virginia colonist was instructed to read the text carefully. In 1679 one of the more zealous American proponents of silk culture, Edward Digges, wrote a pamphlet entitled "The Reformed Virginian Silkworm." Digges extravagantly claimed that native silkworms could be kept outdoors on native mulberry trees and that Indians could be employed to care for the worms. Compulsory mulberry planting laws were passed by the Virginia assembly, the first appearing as early as 1619. Indeed, mulberry planting became one of the initial conditions of land tenure. By 1750, a deputy in the Commons House of Assembly had to produce 15 pounds of silk for each 15 acres that he owned; he also had to have at least 1 female member of the family trained in the art of reeling silk. By this time, the true silkworm had been imported and a well subsidized industry was established, the character of which resembled a manufacturing enterprise employing mostly well trained women and children. The most successful silk growers in the Georgia colonies were the Salzburgers of Ebenezer who were producing 20,000 pounds of cocoons in 1766 (Donner 1964). However, Indian problems, severe winters, tobacco and rice speculation, and general planter disinterest doomed American sericulture to ultimate collapse. During the Revolution, Ebenezer was devastated by British invaders; the silk subsidy disappeared with independence, and the industry slowly died despite sporadic efforts to revive it up through the nineteenth century.

Interest in apiculture dates back to at least 1621 when a load of "honeybees, peacocks, pigeons, conies and mastiffs" was delivered to Jamestown (Gray 1933). Transhipment and subsequent swarming helped distribute these beneficial insects throughout the colonies. The Indians marvelled at the productivity of these newly introduced bees (Apis mellifera L.) and the efforts white men made to culture them.
Since they had no name for them, most Indians referred to honeybees as "white man's flies" (Pellett 1938).

One of the earlier enterprises of Newberry, Massachusetts was municipal beekeeping. In 1645 the legislature ordered that John Eels, a bee hive builder, should be stationed in Newberry and paid by Newberry citizens (Pellett 1938). Undoubtedly, many of the other northern colonies made such arrangements for beekeepers since honey was frequently the only available sweetener.

Although some colonial planters kept bees, the bulk of the honey and beeswax was taken from wild hives. Honey was a ready source of cash for pioneers lacking other valuables for sale or trade. Since bounties were paid for both wax and honey, frontiersmen usually exported their surpluses (Gray 1933). For instance, during the fiscal year 1776-1777, British Florida exported several hundred pounds of honey and beeswax in addition to small amounts of ginger, sarsaparilla, salt, indigo, lumber, 65,000 oranges, and 2 casks of orange juice.

Another beneficial use of insects was in medicine. In the 1723 edition of "The Natural History of North Carolina . . ." Dr. John Brickell recommended applying dried powdered silkworms to the head for "Megrims, Vertigoes and Convulsions, and the ashes of the silk cleaneth wounds, &c." "Powdered cicadas given with pepper, help the Cholick." Hog lice were a readily obtained panacea. Ant "eggs" were recommended for treating deafness, and a cordial made from lady beetles was supposed to "cure all Fevers how poysomous or malignant soever, by its sudorifick quality" (Weiss 1937).

Not surprisingly, colonial America had its supply of entomological students and artists. Mark Catesby (1679-1749) was one of the first illustrators of American insects. In "The Natural History of Carolina, Florida and the Bahama Islands . . ." (1726), Catesby included 26 engravings of insects. More extensive drawings, paintings and life history studies of American insects were done by John Abbot (1750-1840) when he worked in Georgia. William Bartram (?-1823) published "Travels through North and South Carolina, Georgia, East and West Florida"; it included a number of illustrations and observations on insects and plants of those regions. Periodical cicadas were first described by Peter Collinson (1694?-1768), a botanist, and Andreas Hesselius, a Swedish pastor in a Wilmington, Delaware church. Hesselius described the "most peculiar insects" which he understood had not been seen for 15 years. He discussed the emergence of nymphs, the loud singing of adults and their predation by Indians and squirrels.

The most outstanding American entomologists of the period were active by the late 18th century. Frederick Valentine Meisheimer (1749-1814) made the first important collection of American insects and in 1806, published the first important entomological work in the United States. Thomas Say (1787-1834), though younger than Meisheimer, is usually called the "Father of American Entomology." Say is credited with making extensive insect collections and the taxonomic descriptions of numerous American species. Although Thaddeus Harris (1795-1856) is referred to as the "Pioneer Economic Entomologist," his work is preceded by that of William D. Peck (1763-1822).
Peck was one of the first entomology students to devote himself to the life history and control of harmful insects.

Naturally this early entomological research fostered development of scientific societies and journals. For example, Paul Dudley (1675-1750), Chief Justice of the Massachusetts Supreme Court and amateur entomologist, wrote a scholarly paper on finding bee trees in the woods. His paper appeared in a 1723 volume of the “Philosophical Transactions,” an affiliate of the Royal Society of London. In 1785, the South Carolina Agricultural Society, first of its kind in America, was organized with George Washington and Thomas Jefferson as honorary officers (Gray 1933). The society was dedicated to “promoting and improving agriculture.” With proceeds from a lottery, they bought a 40-acre research farm and began offering rewards for research on cotton insect control, production of cotton seed oil, sheep breeding, and rice culture.

Annoying and destructive insects were commonplace in all of the colonies. The pest most often associated with colonial America is the Hessian fly, *Majetiola destructor* (Say). Supposedly this Cecidomyid wheat pest entered this country in the straw bedding of Hessian soldiers enlisted to fight in the Revolutionary War (Jones 1973). These flies or “jointworms” nearly destroyed the wheat crops in Maryland, Virginia, and North Carolina in 1778 (Gray 1933). By the early 1800’s, Hessian flies were widely distributed throughout the original 13 colonies and the frontier settlements in Tennessee and Kentucky.

Cotton leafworms, *Alabama argillacea* (Hubner), were the first major pests of that southern crop, sometimes destroying 25-90% of the cotton grown before 1800. Colonists also considered “cotton lice” and ants as pests. Bollworms, *Heliothis zea* (Boddie), first became notorious in the early 19th century. These and leafworms frequently destroyed all cotton fields in some areas. Since many early researchers could not differentiate between bollworms and leafworms, estimates of damage done by each pest were probably often inaccurate.

Other colonial crops were also plagued by insects. Hornworms, cutworms, and aphids were particularly abundant on tobacco, while armyworms, seed-eating pests and foliage feeders reduced yields in many crops including rice and indigo (Caffrey 1952). Outbreaks of grasshoppers and armyworms were recorded in New England as early as 1770.

The people of the day most certainly fought a continuous battle against many types of medical and stored product pests. The Swedish Professor Peter Kalm wrote about some of these in his “Travels into America.” He discussed “moths which eat clothes and furs, fleas in the beds of Indians, a plentifulness of bed bugs, and an abundance of cockroaches or ‘mill beetles’ found in almost every house in New York.” Concerning “wood lice,” (psocida?) he wrote that, “scarce anyone of us sat down but a whole army of them crept upon his clothes . . .”。 “There are examples of people whose ears were swelled to the size of the fist, on account of one of the insects creeping into them and biting them.” (Weiss 1937).

The British general Cornwallis may have lost the Revolutionary War at Yorktown in 1781 partly because of insect activity. When the
victorious Americans and French gathered up their prisoners they found that over 2000 British soldiers, or one-fourth of Cornwallis’ army, was incapacitated by malaria. Prior to the battle, the weather had been warm and Cornwallis himself complained that Yorktown was a post “which only gives us some areas of unhealthy swamp” (Nealon 1976).

Indeed, the lowly mosquito may have been partly responsible for the genocide of one race and the enslavement of another. The American Indians had virtually no resistance to white men’s pathogens. Several tribes were nearly exterminated by the mosquito-transmitted diseases yellow fever and malaria. The French and Spanish colonial priests were distraught at the decimation of their new Indian converts, while the English, religious and otherwise, generally looked upon it as evidence of God’s favor for His chosen people. At the same time, the black man’s relative toleration of malaria meant that he could, and did, servc admirably as a substitute laborer for the white master. If malaria had not been such a prominent factor in agricultural and industrial labor, the American slave trade might have been limited and the whole course of American, and possibly African, history might have been different.

Other historians noted that stored wheat could support large populations of black weevils, particularly if the grain had not been threshed for a long time (Gray 1933). Considerable quantities of flour and meal were probably ruined by the activities of miscellaneous stored product pests. Other “weevils” were well known for their ability to destroy seed crops, particularly cotton (Gray 1933).

Although their pest problems seemed insurmountable, the colonists did fight back with a curious combination of folk medicine, common sense and innovation. In 1738, William Byrd wrote that horseflies could be repelled by fastening dittany, an unidentified weed, to a horse’s bridle. He also noted that the Indians liberally applied “bear oyl to keep both bugs and musquetas from assaulting their persons” (Weiss 1896). Tobacco planters dusted aphid-infested plants with pulverized sulfur and sassafrass bark (Gray 1933). A rather common farm chore for women or slave children was picking caterpillars off the field crops. Rice growers perfected a method of coating their seeds with clay, supposedly saving the crop from insects and birds. Planters of other crops sometimes mixed seed with plaster of Paris, tar, or salt peter to discourage cutworms. Other farmers planted with the strategy of “One for the crow, One for the cutworm, and Two to grow.” Some wheat farmers tried soaking their seed in very hot water to discourage Hessian flies. Others worked with particular varieties of wheat, encouraged by reports in 1785 that “yellow bearded wheat” was resistant to jointw rms (Jones 1973). Plagued by ravenous aphids, armyworms, cutworms, leafworms, bollworms, and plant diseases, cotton farmers resorted to burning stubble and residues, rotating crops, and running turkeys in the fields to eat the pests.

Thus, insects have played a significant role in the history of the United States ever since the first European colonies were established. Few historians have reviewed early American entomology or the colonists’ first attempt to describe and deal with beneficial and destructive
insects. While the eminent scientists and major entomological developments of the period 1600-1800 admittedly were in Europe, American agriculturists and naturalists were laying the framework for the development of many phases of entomology in the United States. In this bicentennial year it is appropriate to recall these events and people so that modern American entomologists are aware of this aspect of their heritage.

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