

Early American Agriculture

PLANT INTRODUCTION has played a significant role in the growth of American agriculture. It has wrought tremendous changes in the American landscape, and has added many new food elements to our diet. As the dean of American plant explorers, Dr. David G. Fairchild, once wrote: "The era of pork and hominy has passed forever in this country, but so short a time ago that our fathers refer to it as the time of plain living."

The importation of new agricultural plants has been a constant necessity in America, from the first attempt of the Europeans to settle here until the present day. Although the colonies teemed with plant life, the Indians cultivated few crops in comparison with the wealth of plant life which the immigrants brought with them. Even today it is estimated that we have in America only a fourth of the plant resources of Europe and not more than a tenth of those in Asia. This enormous reserve of plant life is a challenge to those who hold that the diminishing food supply of the world, in face of an increasing population, is a threat to our survival.

A list of the fruits, vegetables, and small grains brought to this country from the Old World would include most of our familiar market and garden varieties.¹ Henry A. Wallace, as Secretary of Agriculture, said that of our seventy-eight leading crops in 1937, only about ten were native to the United States. Maize, or corn, and the "Irish" potato are probably the outstanding contributions of the Indians to American agriculture. The Indians used many

¹The fruits include apple, pear, quince, loquat, peach, certain plums, apricot, orange, grapefruit, lemon, lime, kumquat, fig, olive, pomegranate, mango, pineapple, date, European grapes, currant, and the more important mulberries. The vegetable crops would include onions, lettuce, cabbage, asparagus, eggplant, muskmelon, watermelon, cucumber, okra, beets, Brussels sprouts, carrots, cauliflower, celery, kale, collard, kohlrabi, leek, parsley, parsnip, peas, radish, salsify, spinach, and turnips.

other plants whose cultivation awaited "discovery" by the plant explorers sent out from Europe. Seeds and cuttings of many of these native plants were sent to Europe for trial before they were brought back to the North American colonies for cultivation.² Some of them have been adapted to our agriculture through the persistent efforts at adaptation by the settlers. Many others are tropical plants not suited to the temperate zone. (1)

METHODS AND TERMINOLOGY

In discussing plant introductions, we are interested chiefly in living flora imported for agricultural or other economic uses, rather than for botanical purposes. The returns to society from this work are comparable to the benefits derived from scientific invention and discovery. Frequently the discovery of a single useful plant is of sufficient value to offset the expense and labor of collecting many hundreds of worthless introductions.

Plant introduction has been practiced since the dawn of agricultural history; but to be successful, it requires a knowledge of the methods of cultivation, harvesting, and uses of plants. In increasing farm production, superior plant varieties are factors that need to be considered along with tillage, rotation, fertilizers, and irrigation. Recent methods of introduction are based on plant breeding according to the relatively new laws of genetics. Even these efforts, however, depend heavily upon a wealth of plant stocks for the factors not already present in our native or acquired flora.

Breeding experiments seek to develop such qualities as resistance to disease and insects; indifference to cold, aridity, heat, and wind; and tolerance of peculiar soil conditions such as acidity and alkalinity. The extension of the harvest season—and changes in the character of the product such as color, size, shape, flavor, and strength—are also factors. Other changes bring about advantages in handling the plants from planting to marketing, or make possible the extension of the crop into new areas.

The traditional means of improving plants is by *selection*; and skilled breeding, or hybridizing, has helped to create new

² Among these are the agave, arrowroot, many varieties of kidney and lima beans, cacao, chili pepper, cashew nuts, cherimoya, cocoa, cotton (*Gossypium barbadense*), gourds, guava, Jerusalem artichoke, manioc or cassava, mate or Paraguay tea, papaya, peanut, pineapple, prickly pear, pumpkin, quinoa, squash, sweet potato, tobacco, and tomato.

plants almost according to need. The work of testing and breeding plants for particular climates, soils, or commercial uses is known as *adaptation*.

Acclimatization was often used synonymously with the term *introduction* in the nineteenth century. Many experimenters believed that plants could be inured to cold and adapted to survive in temperatures lower than those found in the original environment. So strong was this belief that as late as 1882, Alphonse De Candolle, a noted Swiss botanist, considered it necessary to refute this view. De Candolle is recognized as the greatest modern authority on the origin and distribution of cultivated plants. As professor of botany and director of the Botanical Garden at Geneva, he published many works on botanical subjects.³

The acquisition of new territories by the United States opened up regions of new climates and soils, and intensified the search for new plants. During this period vast areas of land were coming into cultivation by the settlers moving westward. The task of finding crops that might be grown in these regions fell first upon the Patent Office and later upon the Department of Agriculture. Many crops were imported and tried for a time, only to be found unsuited to the land and climate or inferior to native varieties.

Since very early times, rulers interested in the prosperity and independence of their governments have favored plant introduction. An inscription found in Mesopotamia tells of Sargon crossing the Taurus Mountains to Asia Minor and bringing back specimens of trees, vines, figs, and roses for acclimatization in his country about 2500 B.C. The earliest recorded account of an expedition organized for the collection of plants is that of Queen Hatshepsut of Egypt who sent ships to the "Land of Punt" in East Africa in 1500 B.C. to procure the incense tree. At Kamo-

³ In his famous *Origin of Cultivated Plants* De Candolle concluded that: "I have not observed the slightest indication of an adaptation to cold. When the cultivation of a species advances toward the north . . . it is explained by the production of early varieties, which can ripen before the cold season, or by the custom of cultivating in the north in summer, the species which in the south are sown in winter . . . the northern limits of wild species . . . have not changed within historic times although the seeds are carried frequently and continually to the north of each limit. Periods of more than four or five thousand years, or changements of form and duration, are needed apparently to produce a modification in a plant which will allow it to support a greater degree of cold."

Mura in the province of Wakayama, Japan, there is a monument to one Taji Mamori who went to China in 61 A.D. on an imperial order to bring back citrus fruits to Japan. He spent nine years on this project and the monument records, "How magnificent is the result of Taji's work." (2)

The introduction of new crop industries is necessarily a responsibility of governments. Plant exploration and introduction is generally too costly and risky an undertaking for individuals. A great deal of time and effort must go into a plant before the grower can realize a profit, and even then he is not well protected by patent laws. While individuals have made many contributions to plant introduction, the recognition by governments of the importance of this work is largely responsible for its effect on agriculture.

COLONIAL INTRODUCTIONS

America's adoption of European crops began with the second voyage of Christopher Columbus to found the colony of Hispaniola (Haiti). Columbus brought with him livestock and the seeds of many Spanish crops, as well as sugar cane from the Canaries. Cane thrived so well in the new colony that the sugar industry spread rapidly to Cuba, Mexico, and other provinces of the New World. The Spanish conquerors brought with them many introductions which later found their way into the United States. Cultivation of figs, dates, grapes, olives, and pomegranates dates back to the founding of the Spanish missions in New Mexico and California. The Spaniards also gave us such crops as alfalfa, lemons, oranges, and ginger.

Lyman Carrier, in *Beginnings of Agriculture in America*, quotes an English fisherman's letter published by Hakluyt, concerning the fisherman's experiences in Newfoundland in 1578. The letter stated: "I have in sundry places sowed Wheate, Barlie, Rie, Oates, Beanes, Pease and seeds of herbs, kernels, Plumstones, nuts, all of which prospered as in England."

Several explorers have mentioned such instances of sailors' testing European plants in American soil. Cartier recorded that on his voyage to Canada in 1541, his men sowed European cabbage, lettuce, and turnips. The chronicles of Sir Humphrey Gilbert's Expedition to Newfoundland in 1583 show that peas were sown and harvested. Carrier suggests the possibility that

some plants mistakenly considered native to America may have been preserved by the Indians or may have grown wild until "discovered" in later years.

A variety of the common agricultural crops of Europe were planted during the founding of the American colonies. *Guinea corn*, a sorghum plant grown on plantations in the South prior to the Civil War, was called "guine Corn" in the West Indies in 1601. It flourished in the summer of 1671 along with cotton and indigo on the Ashley River in South Carolina. The common use of Guinea corn in Africa, and as a food on slave ships, makes it seem probable that it was brought in with slaves at an early date.

During their first two years at Jamestown, the colonists tried planting European crops. The plants did not mature because they were started too late in the season, and by 1609 most of the colonists were concentrating on Indian methods of agriculture. William Strachey, in writing of his travels through Virginia from 1610 to 1612, stated that the natural Virginia tobacco was inferior to varieties brought in from the West Indies. (3) Carrier attributed the importation of the improved tobacco seeds to Sir Walter Raleigh who brought them from Trinidad via England in 1595. John Rolfe first cultivated tobacco in Virginia in 1612.

Silk production began its long, unavailing struggle for a place in American agriculture in 1621, when England encouraged mulberry planting in Virginia in order to feed the silkworm. Five years later, the Dutch West India Company was sending samples of wheat, rye, barley, oats, buckwheat, beans, and flax back to the West India Company in Holland. Three hundred trees were shipped to Massachusetts Bay in 1630 to promote orcharding there.⁴ Hemp was among the first plants, and was used along with flax for sails and cordage for shipping. But there was no surplus for export. Further efforts were made in 1658 to promote silk production, and in 1661 the cultivation of flax and hemp was stimulated as part of the colonial mercantilistic policy of encour-

⁴In Massachusetts the Endicott expedition for the Massachusetts Bay Colony in 1628 was directed to take with it seeds of wheat, rye, barley, oats, beans, peas, stones of peaches, plums, cherries, and seeds of filberts, pears, apples, quince, and pomegranate, woad seed, saffron heads, licorice seed, madder roots, potatoes, hop roots, hempseed, flaxseed, and currant plants. By 1630 such vegetables as cabbage, turnips, lettuce, spinach, radishes, onions, peas, and beans had been introduced into the gardens of Massachusetts.

aging crops thought to be of value to the empire. By 1679 the Dutch had introduced clover; and orchards planted to apples, peaches, pears, and cherries were thriving. There is also some evidence of the introduction of clover about 1615.

CEREALS AND GRASSES

Many accounts of the introduction of rice varieties in South Carolina are questionable, but the proprietors of South Carolina wrote in 1677 that they were trying to get rice seed for distribution. Rice was first planted in the area about 1688, and during the next decade the rice industry was encouraged by the appearance of new, superior varieties. These introductions, probably from many parts of the world, led to an era of experimentation in the eighteenth century. (3) The rise of the rice industry, like that of the cultivation of tobacco in Virginia, marked the beginning of a successful colony in South Carolina. During the eighteenth century rice became an exportable commodity much in demand in England. Later, John Bradby Blake brought the upland rice from Canton to Charleston in 1772. Rice culture was inaugurated in Louisiana by the "Company of the West" in 1718.

Many pasture and forage crops were introduced during the colonial period. *Bent grass*, had become a wild pasture grass by the middle of the seventeenth century. Millet, a rather common crop of Old World origin, was probably brought in at a very early date. *Pearl millet* is thought to be a native of Africa, and was brought to America by slaves. It was noticed growing in Jamaica on Negro plantations in 1689 and was later grown by slaves in the South. The common millet was grown in Massachusetts in 1637, and a hundred years later, planters were fattening poultry on it.

Cowpeas are mentioned by the earliest writers on American products. They were grown in New England before 1663, in South Carolina before 1682, and were found in North Carolina about 1700. Sloane, the English botanist, noted the black-eye pea in 1707 and called it the "Calavance." Alfalfa was undoubtedly brought in by Columbus in 1493. Its early history, which is confused with that of lucerne and bur clover, is impossible to unravel. It was grown in Georgia in 1735 and four years later was found growing in South Carolina. *Red clover* was

noted in cultivation for hay near New York in 1749 by Peter Kalm, but it probably was brought in before this by early colonists in Maryland.

Bluegrass was identified in Montreal by Kalm in 1751. It was probably taken by the French a half century earlier to Indiana and Illinois and spread from there to Ohio and Kentucky. *Orchard grass*, not considered of special value in England, won popularity in America where its cultivation seems to have started in Virginia prior to 1760. *Nut grass* was growing in the colonies before 1775. The nuts on its roots made it desirable for hogs, but it is now considered a pest in the South. At the same time, crab grass was grown in the southern colonies.⁵

INTRODUCTIONS OF THE EIGHTEENTH CENTURY

Indigo cultivation for dye had been encouraged for at least half a century before it was grown to any considerable extent. It apparently awaited the arrival of superior varieties and favorable market conditions to assume economic importance. The successful cultivation of indigo was assured when George Lucas, governor of the island of Antigua in the West Indies, sent some seeds to his daughter, Miss Eliza Lucas. Her experiments in 1742 were so successful that in a few years the production of indigo became one of the main industries of South Carolina. In later years, cotton, also of West Indian origin, supplanted indigo as an important staple. (3)

Sugar cane was introduced early in the eighteenth century into Louisiana, but almost a century of experiment and trial passed before sugar was successfully produced. Some of the first experiments were made between 1726 and 1744. The introduction of 1751 was instrumental in bringing about the commercial production of sugar in Louisiana. It arrived in a troopship carrying sugar cane sent by the Jesuits at San Domingo, to other Jesuits in Louisiana. Many difficulties were encountered in attempting to produce sugar from the transplanted cane, and it was 1794 before the first successful crop of sugar was produced commercially in Louisiana by Etienne de Bore.

Cotton was not cultivated commercially in the United States until about 1770. Some 138,328 bales of the *Sea Island* variety

⁵In 1782 Thomas Jefferson listed some of the forage crops of Europe which were grown in Virginia during his lifetime: lucerne, St. Foin, burnet, timothy, orchard grass, red, white, and yellow clover, greensward, bluegrass, and crab grass.



THE WORLD SOURCES FOR AMERICA'S HERITAGE OF CROPS.

were exported from the United States in 1792, but the invention of the cotton gin in 1795 made it possible to use the upland or short staple cotton commercially. The upland cotton (*Gossypium hirsutum*) is of Mexican origin. The seed of the variety, *Gossypium barbadense*, usually regarded as native to the West Indies, received its commercial name because it thrived in the Sea Islands and the coastal region of the Southeast. (1)

CONTRIBUTIONS OF INDIVIDUALS

John Bartram is credited with starting the first botanical garden in America, on the banks of the Schuylkill River three miles above Philadelphia, in 1730. A diligent collector, Bartram traveled widely, studying American plants and selling seeds and plants to finance his work. During his lifetime, several other well-known private gardens were developed in eastern Pennsylvania. (4) In 1728, Bartram began the exchange of trees and plants with distinguished friends abroad. His son, William, continued his father's botanical work.⁶ In an extensive tour of the South he recorded evidence indicating the early importation of many common fruits by early colonists in the deep South.

George Robbins of Easton, Maryland, imported the seeds of the peach and the pear in 1735. The Linnean Botanic Garden at Flushing, Long Island, founded about 1730, tried to procure foreign and native plants, especially grapes. As a commercial firm under the Prince family in the early nineteenth century, this same garden did much to introduce and popularize various new plants.

Henry Laurens imported to Charleston in 1755, olives, capers, limes, ginger, Guinea grass, the Alpine strawberry, red raspberries, and blue grapes. From southern France, Laurens imported apples, pears, plums, and white Chasselas grapes. The notable garden of Charles Drayton, containing many foreign plants, also was located in Charleston. At St. Paul's, William Williamson tended a garden planted with native and foreign flowering trees and shrubs. Many of the well-known gardens of

* At Charleston, South Carolina, he found large plantations of European mulberry. In Savannah, William Bartram found fruit trees and flowering shrubs. On the site of Frederika, the first English town in Georgia, he saw peach, fig, pomegranate, and other plants growing among the ruins. Near the St. John's River in Florida orange groves were found flourishing from trees brought by the early Spanish settlers. Alabama had apple trees planted by the French. On Pearl Island near New Orleans he found peaches, figs, grapes, plums and other fruits; and near Baton Rouge, William Bartram saw a garden with many curious exotics.

lower South Carolina were founded in colonial days, and alien plants were shipped in by sea from the West Indies.

A colony of 1,500 Greeks, Italians, and Minorcans was established at New Smyrna, Florida, in 1767 by Andrew Trumbull. The colony produced sugar and indigo, and cultivated the vine, fig, pomegranate, olive, orange, and other tropical fruits. In 1769, Benjamin Coates of Salem, Massachusetts, advertised garden seeds imported from London. George Heusler, a well-trained German gardener, did much to promote gardening in New England. William Hamilton of Philadelphia collected curious exotics, or foreign plants, and in 1784 imported the Lombardy poplar.

Early agriculturists included the introduction of foreign plants as an important part of their work to promote agriculture. The first organized efforts along this line began with the formation of the Philadelphia Society for Promoting Agriculture in 1785. Seven years later, a similar society was formed in Massachusetts; and in 1795 the Agricultural Society of South Carolina was incorporated. (5)

PUBLIC EXPERIMENTATION AND EXPLORATION

The earliest record of organized public efforts to encourage crop cultivation in this country, is found in the annals of the experimental farm established in 1699 on the banks of the Ashley River in South Carolina. This farm was set up by the Lords Proprietors to test the adaptability of agricultural crops. They recommended that wine, oil, silk, indigo, tobacco, hemp, flax, and ginger be grown for export. After two years of trial, sugar cane and cotton were reported unable to withstand the South Carolina winters. The cotton that failed was a perennial variety. Some annual varieties were tried as early as 1682, and more than a century later they helped to make South Carolina a profitable cotton growing area.

The Trustee's Garden of Georgia, a government experimental farm at Savannah, was laid out in 1733. This garden was planned in England prior to the colonization of Georgia. One of its primary purposes was to make Georgia a center of silk production, since the native mulberry trees flourished there. Each male inhabitant was required to plant 100 European white mulberry trees supplied by the trustees.

In the spring of 1733, a ten-acre plot was set aside by General James Oglethorpe as an experimental garden for botanical pur-

poses and for testing agricultural plants. This garden continued as a public institution up to the Revolutionary War. Although silk production was later subsidized, only rice and indigo became staple crops. Many tropical plants were found to be unsuited to the Georgia climate. (6)

The famous Royal Botanic Gardens at Kew in west London, made many contributions to America through its pioneer work in plant introduction. Founded in 1760, the garden was dedicated to botanical study by the British royal family, and assisted in the spread of valuable plants among the British colonies. George III increased the original nine acres in 1772, and the Earl of Bute was made scientific advisor. On the death of Bute, Sir Joseph Banks became director. Banks held his post for forty-eight years, and became known as the guiding genius of Kew. He sent the first professional plant hunter, Francis Masson, to Africa in 1772. For three successive years Masson returned to Africa where he collected about a hundred new species of plants. He later explored for many years in the West Indies and South America.

Plant explorer, David Nelson, took part in the explosive drama of the mutiny on the *Bounty*. On a previous voyage in 1771, Nelson had been a member of Captain Cook's third expedition, exploring for plants in Tasmania. The ill-fated *Bounty* expedition was sent out to introduce the seedless breadfruit tree into the West Indies as food for slaves. Nelson died from exposure after the mutineers had captured the *Bounty* and set him adrift in a small boat with Captain Bligh.

WORK OF JOHN ELLIS

Prior to the American Revolution, the British were interested in introducing agricultural crops into the colonies. John Ellis in his first book, published in 1770,⁷ told how to pack seeds to prevent them from spoiling on long sea voyages. Ellis depended especially on packing the seeds in beeswax.

At that time, it was thought best to procure seeds from the resident-factors in China. China was considered—as it still is—a rich source of new plants. Missionaries were mentioned as able to give information on where to secure the most valuable seeds

⁷ *Directions for Bringing Over Seeds and Plants . . . with a Catalogue of Such Foreign Plants as are Worthy of Being Encouraged in Our American Colonies. . . .* Ellis' second book was titled *Some Additional Observations on the Method of Preserving Seeds from Foreign Parts, for the Benefit of our American Colonies—with an Account of the Garden at St. Vincent . . .*

and how to forward them. Ellis listed many plants which he hoped would be tried in the American Colonies. In his next book, published in 1773, Ellis gave some more information on plant introduction in the British Colonies.

I must further add, that there is at present a laudable spirit among many of the curious East-India captains, who are determined if possible, to bring over olive, plants of the true black pepper, the Cassia Lignea, the Rattan, and true walking Cane, Mangos and Mangosteens, Cardamums, Sago Palm, Sappan-tree the Assa Foetida, and to search for the valuable spices near some of our settlements; so that in a few years, I hope . . . our Colonies in North-America and the West Indies, will be in possession of all the useful plants of the East, as well as those of the Spanish and Portuguese settlements in South America.

Ellis made special mention of John Bradby Blake, resident-factor in China, who brought upland rice to South Carolina from Canton, and also credited him with bringing over "Cochin China Rice," seeds of the "Tallow tree," a single gardenia, and other curious and useful seeds from Canton. Ellis mentions rhubarb as having been sent into North America for introduction a year or two previous to 1773.

Although some of the plants native to America are of economic importance today, the European immigrant brought with him a much greater store of plant life. While most of our leading field, fruit, and vegetable crops were introduced during colonial times, much work remained to be done in finding varieties suited to special needs and growing conditions. The development of present day crops is due in a large measure to the successful importation of foreign plant varieties.

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