Notes on Transatlantic Migrants

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Records of the early colonial period in New England illustrate the multidirectional plant exchanges that followed the discovery of the New World.

Populations of plant species have been migrating from one part of the world to another for millennia. It has long been known that some plants considered "native" to one region were actually carried by man or his domesticated animals from another region, sometimes continents away. For instance, the chestnut, the filbert, and the "English" walnut trees—all considered thoroughly at home in England—were actually brought there by the Romans in relatively recent times. But the most significant of all floral transmigrations may have been the one begun by Columbus. As early as his second voyage to the New World, Columbus inaugurated a biological exchange of plants, animals, and pathogens between the New and Old Worlds that laid the foundations for colonization of the New World by Europeans in the early seventeenth century and has continued to the present day. From the first, this exchange had tremendous consequences for the aboriginal peoples of the New World as well as for its floras and faunas.

Consequences of equal magnitude were to follow in Europe and throughout the Old World. The exchange fueled the European economy through the exploitation of the New World's abundant natural resources. Equally important, it hastened development of the "new science," which had slowly begun to replace the medieval perception of the world that was rooted in the classical writings of the ancient Greek and Roman scholars.

Columbus' Second Voyage

On that second voyage in 1493, Columbus sailed with twelve hundred men in seventeen ships to Hispaniola. Included in the ships' cargo were seeds and cuttings of common Eastern Hemisphere crops including chickpeas, melons, radishes, onions, salad greens, grapevines, and sugar cane, as well as the stones and seeds of European orchard trees. Later explorers continued to introduce plant species from the Old World to the New. By 1516 the banana had been introduced to the Caribbean region from the Canary Islands. Ginger and garlic—the latter quickly adopted into the diets of the native Americas—were early transplants, and coffee, an Old World plant, was to flourish in the New World where climatic conditions suited its growth. American production of the coffee bean was soon helping to satisfy the Europeans' seemingly unquenchable thirst for the brew, a thirst that initiated the birth of the coffeehouse in England and on the continent.

By the year 1600, twenty years before the Pilgrims landed at Plymouth, all the major food plants of the Old World had been introduced and were being grown in the Americas, doubling or even tripling the number of species that were known as food plants. But scores of

Viburnum opulus, the guelder rose or snowball, from Flora Danica, Volume 4, published in Copenhagen, 1770. By courtesy of the Gray Herbarium Library, Harvard University.
new plants had in turn been carried back to the Old World in the holds of the caravels and galleons. Peanuts, sweet potatoes, white or "Irish" potatoes, squashes, pumpkins, chile peppers in infinite variety, the tomato, manioc (sometimes known as cassava or tapioca), and beans of many sorts—including the lima, pole, kidney, snap, haricot, and French—all attested to the agricultural prowess of the aboriginal Americans. Most important of all were the numerous varieties of maize or Indian corn—vegetable gold—that were adapted to growing conditions from sea level to well over eight or ten thousand feet in the mountains. While maize was not widely accepted as a human comestible in northern Europe, it quickly found a use as feed for livestock.

Many other New World crops helped to revolutionize Old World cuisines and to provide new crop plants adapted to a wide variety of growing conditions, among them the pineapple, the avocado, cacao (the source of chocolate, which Linnaeus later gave the name *Theobroma*, "food of the Gods"), the papaya and guava, and cashews and Brazil nuts, all of which began to reach European markets in the seventeenth century. In fact, so successful were American food plants in the Old World that the population increase experienced in Europe and elsewhere throughout the Eastern Hemisphere during the sixteenth and seventeenth centuries has been tied to the availability and acceptance of increased food supplies from American crop plants.

**Plants the Pilgrims Brought**

Specific illustrations of these migrations between the Old World and the New—and back again—can be drawn from surviving records of the early colonial period in New England. When the Pilgrims came ashore on Cape Cod to establish the Plymouth Plantation in 1620, they arrived fully resolved to reestablish their ordered European lifestyle in the new colony. Despite the vegetable abundance of the territory they were colonizing, they came prepared for the worst, not intending to depend upon unknown plants in order to subsist. Therefore, the Pilgrims as well as other colonists who soon followed brought with them seeds of all the vegetables and salad greens familiar in European fields and gardens at that time. Even melons, squashes, cucumbers, and maize, which had been brought to the Old World from the New shortly after Columbus's maiden voyage, returned with the settlers to help them establish in the new colonies gardens similar to those they had left behind in Europe. The pattern of plant introduction established by the Spanish in New Spain was repeated by the English in New England. They too cultivated familiar foodstuffs in order to transplant their version of European society and culture to the wilderness.

Thus history records that on the unusually warm morning of Monday, the nineteenth of March 1621, the Pilgrims set about the task of allotting garden plots to the various families comprising the Plymouth Plantation. Six acres of barley and peas were planted while twenty acres were sown to Indian corn. In their work they were assisted by the kindly Indian Squanto, who, legend has it, instructed them in the Indian technique of planting the kernels in hills that had been fertilized with fish. Familiar with Europeans by virtue of having been kidnapped and taken to Europe but returned to New England before the arrival of the Pilgrims, Squanto was one of the few survivors of the Patuxet group of the Wampanoag tribe, which had been devastated by an epidemic of the plague a few years before 1620.

Soon after 1629, when Governor Endicott arrived at Naumkeag (Salem) and established the Massachusetts Bay Company settlement, the Reverend Francis Higginson, who led the second emigration to the colony, observed the following in a letter carried back to England.

> Our Governor hath already planted a vineyard with great hopes of increase. Also mulberries, plums, raspberries, currants, chestnuts, filberts, walnuts, small nuts, huckleberries, and haws of white thorn. . . . They have tried our English
corn [wheat] at New Plymouth Plantation, so that all our several grains will grow here very well, and have a fitting soil for their nature. (Slade 1895)

In fact, included in the list of stores that were to be sent to the Massachusetts Bay Colony in 1629 were the following plants and seeds: "vine-planters, wheat, rye barley, oats, a hogshead of each in the ear: beans, pease, stones of all sorts of fruits, as peaches, plums, filberts, cherries: pear, apple, quince kernels: pomegranates, woad seed, saffron heads, liquorice seed, madder roots, potatoes, hop-roots, hemp seed, flax seed, currant plants, and madder seeds" (Slade 1895). Domesticated animals, chickens, pigs, and goats rounded out the biological cargo. Cattle had arrived earlier, by 1624. Not finding suitable species for forage in the native flora, the ineptly named Kentucky bluegrass (Poa pratensis L.), white and red clover (Trifolium repens L. and T. pratense L., respectively), and probably alfalfa (Medicago sativa L.) were brought from English meadows and pastures and over the years have become completely naturalized across eastern North America.

Of course, this was not the first migration for many of these species. Of the woody plants listed in Higginson’s letter, the chestnut (Castanea sativa Miller), sometimes known as the Spanish or sweet chestnut, is native to southeastern Europe, western Asia, and northern Africa, and was probably introduced into England during Roman times. Valued for the sweet meat of its nuts as well as for its timber, the tree was widely planted in England. The nuts were sometimes roasted before open fires or ground with oats or barley to make a kind of bread by the poorer classes. Likewise the filbert (Corylus maxima Miller) and "small nuts" (probably Corylus avellana L., European hazelnut, and C. colurna L., Turkish hazelnut) were valued for their nutmeats and for their extremely tough and flexible shoots that were used to make a variety of objects from hoops and wattles to fasteners for roof thatch. Both the filbert and Turkish hazelnut are native to southeastern Europe and western Asia and had been introduced into Britain, again probably by the Romans, while the European hazel is indigenous to all of Europe including England.

The "English," "Persian," or "royal" walnut (Juglans regia L.), native to an area extending from southeastern Europe to the Himalayan region and China, was also widely cultivated throughout Europe by the early seventeenth century, and like the chestnut, filbert, and Turkish hazelnut, had probably been carried to the British Isles in Roman times. Its chief value lay in its edible nuts as well as its fine-
grained timber, which was utilized, as it is today, for cabinets and particularly for gunstocks.

White thorn or common hawthorn (Crataegus oxycantha L. or, perhaps more correctly, Crataegus laevigata [Poiret] De Candolle) is a widely distributed European species that was well known to New England's first settlers. Plants of this small thorny tree were among the first used to create the hedgerows, living fences that remain a characteristic and prominent feature of the English countryside. When planning for the new colony in New England, the Pilgrims doubtless considered the white thorn necessary to protect their garden plots from freely roaming livestock as well as from wild marauding animals. The development of horticulture in the new colony would depend on the settlers' ability to establish enclosures that animals could not penetrate, which may seem strange to us today, living in an era when animals are fenced in rather than out.

But beyond the anticipated need for garden enclosures, the Pilgrims had a variety of other reasons for bringing the hawthorn along on their first voyage to New England. It had long been associated with folk customs and rituals welcoming the spring season. Since Greek and Roman times, the first of May had been a day of celebration that centered on gathering the flowering boughs of the hawthorn. In addition,
the hawthorn’s small, applelike fruits had a history of medicinal use, and many legends tell of the power of its flowers’ scent to revive the spirits and counteract poisons. Other legends tell of the use of hawthorn branches to form Christ’s crown of thorns or of the plant’s miraculous appearance (apparently out of nowhere) to signify a favorable omen of religious import. In all probability, the first colonists carried along to New England not only the hawthorn itself, but all the European traditions, legends, and superstitions associated with it as well.

The mulberries referred to by Higginson could have been either the white mulberry of the Orient (Morus alba L.) or the common European or black mulberry (Morus nigra L.). Perhaps both species were represented since both were cultivated in England. Governor Endicott of the Massachusetts Bay Company was not the first European to attempt their cultivation in New World soils. As early as 1548 the Spanish had introduced plants of the black mulberry into Mexico, and English settlers had established mulberries in the Jamestown region as early as 1619. An earlier attempt to establish the trees in 1609 had failed when the ship on which the plants were being transported from England was lost at sea.

While the Pilgrims occasionally ate the seedy mulberries, sometimes directly from the tree, it is unlikely that they brought these trees
to New England for their fruit. More likely, they included them in their gardens for their milky-sapped leaves, the major food of the silkworm, the larval stage of the silkworm moth (*Bombyx mori*). The trees are therefore prerequisites for sericulture, an industry that Endicott may have intended to establish in New England. Given the enormous demand for silk in England and in other parts of Europe, sericulture might have proved very lucrative for the colonists.

Silk from China was known in Europe from Greek times, and the craze for the luxurious fabric, the “queen of textiles,” had resulted in the establishment of trade routes, the so-called silk road, between Europe and Cathay during Greek and Roman times. The closely guarded Chinese technique of sericulture had been brought to Europe at about the beginning of the sixth century by monks who had also carried the precious eggs of the moths concealed in the hollows of their canes; seeds of the white mulberry tree were introduced at about the same time. The industry (including both the animal and plant component) spread through southern Europe and became firmly established in Italy. But by the beginning of the seventeenth century the increasing demand for silk in Europe, particularly by the nobility, prompted James I to issue an edict promoting the planting of mulberry trees in England in order that the industry might be established there. Mulberry seeds were distributed to anyone who would sow them, and steps were taken to encourage the colonists in Virginia to abandon the profitable cultivation of tobacco and replace it with sericulture.

No one has yet succeeded in establishing a silk industry in New England, but the desire to do so gave rise to sporadic experimentation long after the colonial period. In one of these experiments, in 1869, the gypsy moth was introduced from Europe into Medford, Massachusetts, for cross-breeding with the silkworm. The goal was a hybrid that would feed on oak leaves, like the voracious gypsy moth larvae, while possessing the silkworm's unique capacity to produce silk. The desired hybrid was never produced, but the effects of this experiment are still visible in the damage to northeastern forests that began when gypsy moths were accidentally released from their cages.

A Living Apothecary

The early colonial gardens also included many imported nonedible plants, some of which have become naturalized in New England, but the seeds for these plants were not given space in the settlers' tightly packed chests for their ornamental value. Just as today's travelers invariably include aspirin and any required prescription drugs in their luggage, so did the Pilgrims include medicine chests in the form of seeds with their other essential belongings. The colonists' ability to survive and establish themselves permanently across the Atlantic would depend on their success in growing medicinal herbs, since medical practice of the time still relied on these "simples," or their look-alikes, the bulk of which had been listed by Dioscorides, Pliny, and Theophrastus in Greek and Roman times.

In the summer of 1631, the Lyon dropped anchor in Agawam (Ipswich) harbor, bringing to John Winthrop, Junior, an assortment of seeds from England, perhaps to reestablish plants that had not survived the previous winter. A list of the species represented has survived, showing not only a variety of vegetable seeds but numerous medicinal herbs as well. Ann Leighton, in her *Early American Gardens: "For Meate or Medicine,"* made the following observations about the plants on the list.

The list of seeds could have belonged to any distinguished Pompeian householder, except for a few additions of harder plants culled from the English countryside and brought into garden cultivation before the colonizers of William the Conqueror arrived with a few reliable herbs of their own. There is no concrete example of the many thrilling new discoveries which suddenly burst upon gardeners and willing experimenters in the art of physic from the Spanish conquests in South America—even to tobacco. On the
whole Winthrop's seed list is a very old and reliable one indeed, well tried for more than a thousand years.

**Plants for Beauty**

Unlike medicinal and culinary herbs, ornamental plants were not essential to the establishment of European settlement in New England, but no doubt a few were brought from English and Dutch gardens if only for sentimental reasons. The common lilac (*Syringa vulgaris* L.), native to mountainous regions of eastern Europe, had been introduced into western Europe in the middle of the sixteenth century. Although no documentation has been located, it was probably one of the first exotic shrubs to be carried from Old World gardens to newly established ones across the Atlantic. It has become as characteristic of New England gardens as it is of English villages, and in New England its longevity and persistence in fields and woodlands often signal the site of a now abandoned homestead.

Circumstantial evidence suggests that the common barberry (*Berberis vulgaris* L.) was also an early introduction into New England. The alternate host of black stem rust disease of grain, the barberry provides an essential link in the life cycle of the microscopic rust plant. Without the barberry as alternate host the rust cannot infest wheat, oats, barley, and rye, and without these grains, barberries are likewise apt to be free of the rust. But if barberries and grains grow near one another the conditions are satisfied for the growth and reproduction of the rust, and grain plants in the vicinity will become infected by its airborne spores. Damage to the grain plant ensues, reducing considerably the amount and quality of the crop yield. Apart from small, orange, circular pustules that appear on the upper surfaces of its leaves, infected barberry plants show few if any effects from the rust.

Wheat or "English corn," rye, barley, and oats were among the staple crop plants brought to New England by the earliest settlers, and damage to these grains was noted at an early date. While the relationship between the rust disease of cereal grains and the barberry shrub was not proven scientifically until early in the
nineteenth century, the cause and effect relationship must have been fully suspected by the middle of the eighteenth century. In 1726 the Connecticut colony, followed by Massachusetts in 1755, enacted legislation forbidding the planting of barberries and promoting their eradication. Presumably, large enough populations of barberries were present in those two colonies to support the rust and cause widespread damage to the grain crops, prompting concern and legislation.

Like the white thorn, the spiny barberry shrubs were undoubtedly imported primarily as hedging plants; their dense habit of growth coupled with their sharp spines formed an imposing barrier to both man and animal. Barberries offered an expedient substitute for the more labor-intensive process of fence or stockade building when a low enclosure was desired. The plant was also useful in other ways. The bark of the roots and stems provided a yellow dye, and the pleasingly acidic leaves served as seasoning for meat and as a salad green. The small red fruits were frequently used for syrups and jellies, and—because of their astringency—as a purgative and all-purpose tonic. Tolerant of shade as well as full sun, seedlings had probably become established in the woodlands surrounding settlements by the early eighteenth century, where, despite attempts to eradicate them, survivors can still be found today.

Another imported shrub that may have been among the first woody ornamentals cultivated in New England is the guelder rose or snowball, not a rose at all but a form of the European cranberry bush (Viburnum opulus L.). Known from European gardens since the sixteenth century, its large, snowball-like inflorescences formed by numerous double, sterile flowers made the guelder rose an immediate favorite as a decorative shrub. Not known as a wild plant, this garden form is reputed to have originated in the Netherlands, in Guelderland.

The numerous fruit trees introduced into New England by the first colonists not only yielded essential and valuable harvests of apples (cultivars selected from complex hybrids probably involving Malus sylvestris Miller, Malus dasyphylla Borkhausen, and Malus praecox [Pallas] Borkhausen), pears (cultivars of Pyrus communis L., another complex hybrid involving several species), peaches (Prunus persica [L.] Batsch), and plums (cultivars of Prunus domestica L., a probable hybrid between Prunus spinosa L., the sloe, and Prunus cerasifera Ehrhart), but also added to the beauty of the landscape when in flower. Until the middle of the eighteenth century the
few written accounts that document horticultural and agricultural activities in New England focus primarily on the development of orchards throughout the settled areas, recording the yields of particular harvests and commenting on the sporadic origin and attributes of new varieties of apples, pears, and other orchard fruits.

At the same time that the first settlers in the wilderness of New England were trying to establish an agrarian society based on the traditional European model, gardening in Europe was experiencing a minor revolution. For centuries the only plants cultivated other than staple food crops had been the simples required for practicing the type of medicine brought by the Pilgrims to New England. Largely confined within the walls of monasteries during the Middle Ages, the "physic gardens" that provided simples slowly became linked with universities and the teaching of medicine. In 1542 the first botanical garden in Europe was established at Padua, west of Venice in northern Italy. Soon after, botanical gardens were established in Montpellier, in Paris, and in Germany, and plants became the focus of experimentation and close observation as well as the objects of increasingly accurate illustrations. Botanical knowledge was documented in the great illustrated herbals that were produced from the late fifteenth century well into the late seventeenth century, primarily serving the medical community and only secondarily the broader botanical community.

But by the middle of the sixteenth century, with the increasing number of new plants that were introduced into Europe from the Levant, Asia, and the Americas and with the increased awareness of the natural world that had been thrust upon European society by the discoveries of their navigators, gardening and the cultivation of curiosities became pastimes of royalty and the wealthy. Even the flora of Europe itself was scrutinized for the first time since the Greeks and Romans. Plants were placed in the landscape for architectural effect; flowers were arranged to beautify banquet tables, and gardens became pleasure grounds.

All of North and South America contributed to the gardens of Europe, and dried specimens of botanical novelties from the Americas as well as Africa and Asia accumulated in the European centers of botanical study, which were in an embryonic stage when the first settlers brought their familiar food plants and medicinal herbs to the New World. The immigrants to New England left Europe at a time when plants were just beginning to be studied and appreciated in their own right, over and above their economic potential or their real or imagined medicinal value. Slowly and then
with a quickened pace, in gardens, in "cabinets" of natural history, and in libraries, the materials—dried specimens, the living plants themselves, and increasingly detailed publications about plants—began to accumulate. These materials would enable botany to emerge as a branch of science distinct from medicine. Botanical and horticultural exploration would follow, the two alternating in emphasis, but always closely linked.

The Pilgrims and other early settlers cannot be given credit for bringing a multitude of horticultural treasures to New England, but they did play a part in the biological exchange that followed the discovery of the New World by establishing in New England the basic food plants we still rely on. Each succeeding generation of New Englanders would produce individuals who played increasingly active and important roles in the development of botany, horticulture, and plant introduction in the "newe founde world."

Sources and Suggested Reading


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