site LINES

A Journal of Place

Volume 11 | Number 1 | Fall 2006

A Publication of the Foundation for Landscape Studies

Letter from the Editor

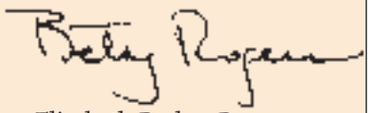
The term 'globalization' today has widespread currency. We use it to describe the growth of multi-national corporations, the offshore manufacture and assembly of products and provision of services, and the revolution in media communications made possible by satellite technology and the Internet. There is, however, another much older globalization that has been in process ever since prehistoric peoples traded seeds and crops. The study and classification of plants was well established in antiquity and the Middle Ages. During the Renaissance Europeans made botany a modern science, and as their seafaring skills gave them the ability to circumnavigate the earth, a great transplantation of species from one land to another began. Colonial botanical gardens were established to facilitate the propagation and cultivation of new kinds of food crops and to act as holding operations for plants and seeds intended for shipment to parent institutions in Europe. Botany was thus globalized.

Even as vernacular languages were coming into general use, newly discovered plants continued to be named in Latin, and by the eighteenth century the universal system of binomial Latin taxonomy that is still used internationally had been adopted. As a result, botanists in Buenes Aires and in Osaka can communicate, secure in the knowledge that they are speaking about the same plant.

While the European discovery and collection of new plant species was the primary focus of botanical gardens in former times, the loss of species and habitats through ecological destruction is a pressing concern in our own. As we come to understand more fully that all life depends on plant life, the floor of the food chain, and that plants still provide a large portion of humanity's pharmacopoeia, the role of botanical gardens in fostering the conservation of native and locally cultivated vegetation throughout the world has become imperative. Botanical gardens today play an ever-increasing role in propagating endangered plants and fostering programs to reconstitute destroyed natural habitats. At the same time, a relatively new type, the ethnobotanical garden, is coming into existence. Its mission is to assist the preservation of the culture of traditional communities and the indigeneous plants they collect and grow.

Because of the botanical garden's importance to society, the principal essay in this issue of *Site/Lines* treats it as a historical institution as well as a landscape type that combines nature, art, and science within a global context. We could not within the space allowed include more of the botanical gardens whose distinguished histories would have enriched the composite essay we have devoted to the subject but hope that the eight articles that are included here are sufficiently representative to convey the story that leads to this conclusion.

With good green wishes,



Elizabeth Barlow Rogers
Editor

On the Cover:
"Snake with Ipomoea ochracea," hand-colored engraving from Albertus Seba's *Locupletissimi rerum naturalium thesauri.* (Amsterdam: Janssonio-Waesbergios, 1734-65)

The Botanical Garden

Introduction

The Sixteenth and Seventeenth Centuries

The botanical garden is generally considered a Renaissance institution because of the establishment in 1534 of gardens in Pisa and Padua specifically dedicated to the study of plants. However, these and other sixteenth- and early-seventeenth-century botanical gardens, including those at Breslau, Heidelberg, Kassel, Leiden, Leipzig, and Montpellier, did not spring into existence purely as a result of the great intellectual ferment of the times. Rather, they have their roots in the herbal manuscripts of antiquity, most notably the *De materia medica* of the first-century CE Roman physician Dioscorides. This long-consulted reference work, which combines a brief discussion of a plant's physical characteristics with remarks about its remedial properties for specific diseases or injuries, was copied many times and remained the authoritative text on most known plant species well into the seventeenth century.

Many Dioscorides-based herbals perpetuated the knowledge and application of simples, as herbs were called then, and the collection and study of pharmacological herbs remained the focus of apothecaries and physicians both in Europe and the Islamic world. In the thirteenth century Ibn al-Baytar (c. 1179–1248), the most famous Arabic physician and botanist in Andalusian Spain, wrote two important books, *The Ultimate in Materia Medica* and *Simple Medicaments and Nutritional Items*, both of which were based on his own personal observations of some 1,400 plants as well as knowledge derived from Dioscorides and the Greek physician Galen. As early as the tenth century, exotic collections were planted in Andalusian experimental gardens. Furthermore, Christian medieval art depicted images of gardens containing ornamental flowers that had symbolic value, the highest ranked being the rose and the lily, both emblematic of the Virgin Mary. Monasteries also contained gardens with collections of medicinal herbs. Until Renaissance humanism revived a comprehensive and categorical Aristotelian approach to natural history, however, there was little impetus to create botanical gardens as ordered collections of plants.

Factors besides pedagogy influenced the design of the earliest botanical gardens, and their layouts sometimes incorporated astrological, cosmological, and religious notions. As the

botanical scholar Luisa Tongiorgi Tomasi points out, the geometric arrangement of Renaissance botanical gardens according to astrologically resonant forms – circles, squares, triangles – was intended to channel the positive energy radiating from the planets and stars into objects on earth, thereby increasing the healing power of the gardens' simples. The cardinal directions, cosmologically significant in all cultures, also influenced pre-Enlightenment botanical garden plans. In addition, early botanical garden designs embodied the biblical concept of paradise as an enclosed, geometrically ordered quadripartite space with four dividing paths symbolizing the description in Genesis 2:10: "A river went out of Eden to water the garden; and from thence it was parted and became into four heads." Seen in this light, the arrangement of plants collected from the four corners of the earth in botanical gardens was intended to be a re-gathering of the paradisiacal bounty of Eden that was scattered at the time of the Fall. These early botanical gardens also should be understood as outgrowths of the gardens of princes and other wealthy individuals whose collections of rare plants were outdoor extensions of their *wunderkammer*, cabinets containing all manner of exotica, both natural and manmade. The concept of the botanical garden as a kind of ethnographic and natural history museum can be traced back to this period.

Libraries were, as they remain today, essential elements of botanical gardens. The invention of the printing press in the fifteenth century greatly increased the opportunity for libraries to expand their collections, thereby extending the distribution of plant knowledge in general. However, the wood-block prints in Renaissance herbals retained the diagrammatic character of illustrations found in earlier illuminated manuscripts, and the close observation of actual plant forms, such as one sees in the drawings of Leonardo da Vinci (1452–1519) and in the engravings of Albrecht Dürer (1471–1528), did not become the norm in botanical illustrations until the second half of the sixteenth century when the second grand duke of Tuscany, Francesco I (1541–1587), commissioned Jacopo Ligozzi (1547–1626) to make watercolor drawings of the pineapple, fig, iris, and other exotic plant specimens in his garden.*

This does not mean, though, that close observation, analysis, and attempts to group and classify plants did not proceed apace. In 1544 Luca Ghini (1490–1566), the great Italian botanist and founder of the botanical garden at the University of Pisa, invented the herbarium, a collection of pressed dried plants labeled and systematically classified. This method of display, unlike temporary field observation, enabled the study of a plant's form and structure over an indefinite period of time. The co-evolution of the herbarium and the botanical garden continues, with many herbaria serving as important complements to living plant collections. For example, the New York Botanical Garden's continually growing 7.2 million-specimen herbarium is used by plant scientists every day.

The Chelsea Physic Garden as seen from across the Thames, mid-eighteenth century painting after Canaletto (1697–1768). The boathouses, center, housed the boats used for "herborising" expeditions to collect plants.

The great voyages of exploration of this era expanded the collections of living plant material and transformed botanical gardens from places primarily useful to apothecaries and physicians to vital, active centers for the study of ornamental and crop plants. For instance, the collection and later hybridization of the tulip, a much-prized purely ornamental garden flower originally found in the wild in central Asia, was due to the efforts of Carolus Clusius (Charles de l'Escluse, 1526–1609), the first prefect of the Hortus Botanicus Leiden. The European diet also gained new foods such as the potato and corn. The gathering and shipment of plant seeds and cuttings from the Americas, Africa, the Middle East, and Asia as well as from the East and West Indies necessitated expanded and re-organized layouts of botanical gardens. In addition, because the plethora of new plants being introduced into Europe included many non-medicinal species, exploration and subsequent colonization required the consideration of botanical science as a discipline in its own right.

The Eighteenth Century

In order to communicate across vernacular language barriers, medical men and botanists needed a universal classification system that would provide a uniform designation for every plant. The Latin binomial or two-name system – one for genus, the other for species – was the great contribution of the Swedish botanist Carolus Linnaeus (1707–1778) to natural science. As vernacular languages began to replace Latin as the European lingua franca in letters and published texts, Latin still retained its status as a living language through botany. To this day each new plant, fungus, or other biological discovery is given a Latin binomial.

While apothecaries wishing to expand their store of herbal knowledge continued to make regional trips in search of medicinal herbs, explorers fostered the development of economic botany farther afield. British landowners in the West Indies found wealth in sugarcane, tobacco, and other cash crops through the exploitation of slave labor. In Mexico and Guatemala Spanish conquerors forced native people to work producing plant-related dyes, notably indigo and also cochineal, the latter derived from a parasitic insect (*Dactylopius coccus*) harbored on cacti of the *Opuntia* family (the source, incidentally, of the red dye once used for the uniforms of the British army).

* These magnificent and rare watercolors were displayed at the National Gallery of Art in Washington, D.C. in "The Flowering of Florence: Botanical Art for the Medici," an exhibition curated by Luisa Tongiorgi Tomasi in 2000.

The exchange of economic plants from colony to colony became common. After the Dutch discovered coffee in India at the beginning of the eighteenth century, they established coffee plantations in Java, Sumatra, and Bali, their colonies in the East Indies. From Java they shipped seeds to Amsterdam for conservatory-propagation in order to produce seeds that were sent to other conservatories throughout Europe. From this source the French were able to take coffee seeds in 1715 to start plantations on Martinique in the West Indies. The Portuguese brought seeds from their colony in Goa to Brazil, while the Spaniards brought seeds to Brazil from Cuba.

The Nineteenth Century

By the nineteenth century European botanical gardens, most notably the Royal Botanic Gardens at Kew, were sending botanists on plant-hunting expeditions and establishing colonial botanical gardens as outposts to hold and propagate plants destined to be sent back to parent institutions. Scotland's Royal Botanic Garden in Edinburgh was also active in funding expeditions to remote areas. Its roster of intrepid botanical explorers includes David Douglass (1799–1834) for whom the Douglas fir (*Pseudotsuga menziesii*) of northwestern America is named, and Robert Fortune (1812–1880), whose plant-hunting skills are immortalized in the Euonymus fortunei. Kew sent Joseph Hooker (1817–1911), E . H. ("Chinese") Wilson (1876–1930), and many other notable botanists to faraway lands, while the Royal Horticultural Society sponsored several plant hunters, including William Forsyth (1737–1804), one of whose discoveries is honored by the name of the shrub *Forsythia*. The Cambridge University Botanic Garden was the beneficiary of numerous herbarium specimens that Charles Darwin (1809–1882) collected during his five-year voyage on the HMS *Beagle* and later sent to its director, John Stevens Henslow (1796–1861), his former professor and mentor. Partly because of the exciting discoveries of these explorers, botanical gardens also became horticultural showcases, thus stimulating the growth of the nursery industry and the introduction of exotic plants into private gardens during this period.

Simultaneous advances in the manufacture of iron and glass introduced prefabricated parts into building technology, enabling the construction of large-scale conservatories with curving sides and glass roofs admitting a maximum amount of sunlight, which allowed gardeners to house and protect tropical plants in northern latitudes. In 1836 at Chatsworth, the seat of the dukes of Devonshire, head gardener Joseph Paxton (1803–1865) used these malleable materials to pioneer the construction of a 67-foot-high conservatory measuring 227 by 123 feet. Called the Great Stove, it became the model for his design of the Crystal Palace for London's Great Exhibition of 1851. In 1844 Decimus Burton (1800–1881), working with iron founder Richard Turner, built the Palm House at Kew. Its dimensions are 363 feet long by 100 feet wide by 66 feet high. Such architecturally striking structures soon became the conspicuous centerpieces of many botanical gardens and parks, particularly in America where grand conservatories were built in Golden Gate Park in San Francisco, Garfield Park in Chicago, the United States Botanic Garden in Washington, D.C., the New York Botanical Garden in Bronx, New York, and the Missouri Botanical Garden in St. Louis.

The popularity of the nineteenth-century botanical garden was coincident with the growth of the public parks movement, and as botanical gardens became places of recreational resort, as well as learning institutions, their collections began to be arranged and displayed within redesigned grounds of a picturesque parklike nature. At the same time, parks became more like botanical gardens with the planting of exotic trees and the addition of display beds for flowers.

The Twentieth- and Twenty-first Centuries

The role of the botanical garden as a place to study the medicinal properties of plants persists in a world where approximately 80 per cent of the population still uses herbal remedies. Ethnobotany has become an important branch of botanical studies, wedding sociology with plant science. The recently established Jardín Histórico Ethnobotánico at the former convent of Santo Domingo in Oaxaca has as its mission the study of the craft, culinary, and medicinal uses of wild plants by indigenous Mexicans, the conservation of human and plant communities, and the protection of succulents in areas where they are being plundered for sale to commercial nurseries.

Today the global conservation of endangered plants and the ecological niches in which they grow has become an important component of the operations of many botanical gardens. Field scientists work in rain forests and other areas where plants and ecosystems are being destroyed by clear-cutting. The worldwide destruction of native plant species and plant communities has propelled many botanical gardens to undertake educational programs that stress the role of plants as the primary biological unit upon which all life depends. Some botanical gardens are actually propagating endangered plants and reestablishing them in their natural habitats.

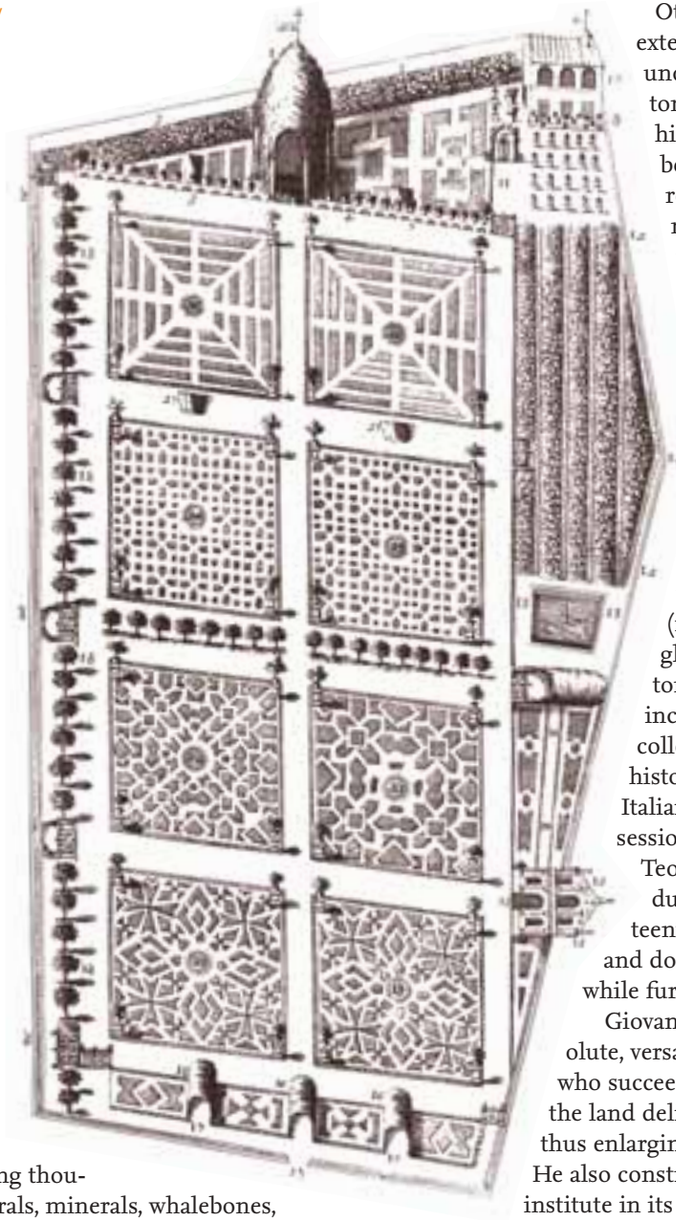
The transformation of the botanical garden through successive stages can be observed in individual botanical gardens. We are grateful to the directors, curators, and staff of seven of these institutions for providing the illuminating histories that follow. – EBR

The evolution of the Renaissance botanical garden from its origins in the princely display of exotic plants in the palace and villa gardens of the Medici to university-based institutions dedicated to scientific study is illustrated in the following essay by Fabio Garbari.

The Botanical Garden of the University of Pisa

In 1543, the great naturalist, herbalist, and physician Luca Ghini (1490–1556) was summoned by Grand Duke Cosimo I de' Medici (1519–1574) from Bologna to Pisa and given a piece of land for the purpose of teaching botany. In a letter dated July 4, 1545, Ghini states that he had gathered plants "which I have planted in a garden of Pisa to be useful for the students." From this we can infer that his garden of simples was the world's first academic botanical garden. Ghini's garden was soon replaced by another in the eastern part of the city. It was entrusted to Andrea Cesalpino (1525–1603), the most brilliant of Ghini's pupils. However, its site also proved unsuitable, and Grand Duke Ferdinand I (1549–1609), who was Cosimo's son and successor after his brother Francesco de'Medici (1541–1587), ordered the garden to be moved again. During the years 1591 to 1595, two hundred meters from Pisa's baptistery, cathedral, and famous leaning campanile, the third and remaining botanical garden was created. Its construction initially was entrusted to Lorenzo Mazzanga, probably a student of Cesalpino's, and then to the Flemish gardener Jodocus De Goethuysen (d. 1595), known as Giuseppe Casabona, who had served the Medici family in Florence.

The plan of this garden, which can be seen in a copperplate engraving in the *Catalogus Plantarum Horti Pisani* published in 1723 by Michelangelo Tilli (1655–1740), is a descendant of the



The Botanical Garden at the University of Pisa, copperplate engraving, 1723

medieval *hortus conclusus*. It depicts eight slightly rhomboid beds, each of which is divided into smaller geometric shapes, which may have had symbolic significance of an astrological or religious nature. A circular or octagonal fountain marked the center of each bed, six of which are still in place. Tilli's *Catalogus* lists more than four thousand plants cultivated in the garden, fifty of which are illustrated by the artist Cosimo Mogalli. Since the end of the sixteenth century, many artists have been commissioned to illustrate the garden's specimens, and a collection of their watercolors is preserved in the central library of the University of Pisa.

Although intended to be instructive, the Botanical Garden of the University of Pisa was also a place of pleasure where members of the Medici family and their guests could discuss scientific, artistic, and literary subjects and enjoy the display of specimen plants. In addition to presenting exotic plant material, the garden boasted a cabinet of curiosities – a gallery showcasing thousands of specimens, such as corals, minerals, whalebones, a dried crocodile, a mummy, a variety of shells, and fossil plants and animals. The facade of this forerunner of the natural history museum was decorated in the Grotesque style. Its restoration in 2005 perpetuates an important element of the garden's early years.

Other parts of the garden reveal the extensive revisions to the original plan undertaken in 1782 by the new director Giorgio Santi (1746–1822). During his enthusiastic stewardship the old beds of medicinal plants were reconfigured as a series of symmetrical rectangles and replanted with new species that were classified according to Carolus Linnaeus's (1707–1778) system of binomial taxonomy. In addition, outside the confines of the garden's basic geometrical layout Santi planted an arboretum. A fine ginkgo tree (*Ginkgo biloba*) and a *Magnolia grandiflora*, both planted in 1787, are still standing.

Under the direction of the noted botanist Gaetano Savi (1769–1844) the garden gained new glasshouses and a special conservatory for aquatic plants. Savi also increased its library and herbarium collections, and in 1839 he hosted a historically important first meeting of Italian scientists, himself chairing the session on botany and plant physiology. Teodoro Caruel (1830–1898), director during the second half of the nineteenth century, continued to enrich and document the garden's collections while further revising its layout.

Giovanni Arcangeli (1840–1921), the resolute, versatile, and prestigious naturalist who succeeded Caruel, managed to acquire all the land delimited by four streets of the town, thus enlarging the garden to its present size. He also constructed a neoclassical botanical institute in its center. As a skilled systematic botanist experienced in agricultural techniques, Arcangeli studied the practical applications of plant biology. In addition, he was a highly respected taxonomist. His 1892 *Compendio della Flora Italiana* outlines the modern concept of subspecies.

The three-hectare (7.4-acre) garden is divided into two principal parts: the southern half contains the school and the northern half the arboretum. In addition, 880 square meters are devoted to glasshouses and service areas. In order to facilitate maintenance and to improve botanical pedagogy, the school section recently has been subdivided into smaller beds, each containing a single herbaceous species, mainly Mediterranean ones. Students and teachers from the University of Pisa in the courses of biology, natural sciences, environmental sciences, agriculture, veterinary medicine, and pharmacological studies regularly visit the garden. Twelve staff members – the director, the curator, and ten gardeners – ensure that it contains material for their courses and laboratory experiments.

In addition to fulfilling its traditional didactic and scientific roles, the Botanical Garden of Pisa University now focuses on the conservation of plants threatened with extinction. A humidity-controlled seed bank with a temperature of twenty degrees below zero has been provided to store seeds of critically endangered or vulnerable species gathered mainly from the National Park of the Tuscan Archipelago, the Regional Park of the Apuan Alps, the San Rossore Estate, and their surroundings. Scientists from the university's biology department study their physiology in order to develop appropriate strategies for ex situ conservation. Further, the garden hosts the presidency of RIBES, the Rete Italiana Banca Ex Situ, a national network of approximately twenty research units dealing with the conservation of Italian flora. In addition, it is a member of ENSCONET, the European Native Seed Conservation Network. The twin aims of both organizations are to promote the quality, coordination, and integration of European native plant conservation practice, policy, and research and to assist the European Community in meeting its obligations to the Rio de Janeiro Convention on Biological Diversity.

Thus, the world's oldest botanical garden, while rich in historical material – much of which is displayed in its fine museum containing portraits of famous early botanists, wax models of more than a hundred fungi, and the studiolo, or multidrawer writing desk, of Grand Duke Ferdinand I (the seed bank of its day) – is also a modern institution whose distinguished past is linked to the challenges of the future. – Fabio Gabari, Director, Botanical Garden of the University of Pisa

Like the earlier botanical garden at Pisa, the Hortus Botanicus Leiden has its origins as a university-based teaching garden, which, as Gerda van Uffelen explains, has evolved from an institution focused on the study of medicinal plants by physicians and apothecaries to one that has become increasingly dedicated to pure botanical science and the preservation of its own rich historical record.

Hortus Botanicus Leiden

Sixteenth Century

Founded in 1590 by the curators of Leiden University on a thirty-meter-square plot obtained from the municipality at the back of their academy, the Hortus Botanicus Leiden is the oldest botanical garden in the Netherlands. Like other early botanical gardens, its original purpose was to instruct medical students on the healing properties of various plants. In 1592, Carolus Clusius (Charles de l'Escluse, 1526–1609), a major figure in Renaissance botanical science who recently had laid out a garden in Vienna for the Emperor of Austria, agreed to come to Leiden to become its first prefect, or scientific director. He brought with him a large tulip collection that eventually was planted in Leiden, thus forming the basis of the tulip trade in the Netherlands.

Clusius, then age sixty-six, had traveled widely all over Europe and had published extensively. He continued to maintain a vast network of scientific correspondents. Because of his advanced years and his having been seriously injured by a fall, the university appointed Dirck Outgaertszoon Cluyt (1546–1598), a pharmacist from Delft, as his assistant. Cluyt, or Clutius according to his Latin appellation, was called *hortulanus*, the keeper of the garden. Working as a team, Clusius and Cluyt developed a plan with carefully numbered beds accompanied by a list of the plants they intended them to contain. In 1594 they presented this plan to the overseers of the university, who were surprised to find that what Clusius and Cluyt envisioned was a botanical garden laid out for the study and enjoyment of plants rather than a simple herb garden focused solely on *materia medica*. Nevertheless, the garden was constructed according to their intentions.

Seventeenth Century

In the summer of 1600 the Ambulacrum, the Hortus Botanicus's first permanent building for the protection of delicate plants in winter, was constructed. Here, on the south side of the garden, both plants and students could find a place sheltered from inclement weather. The Ambulacrum might be called the oldest museum in the Netherlands because of its collection of curious objects, including representations of a dragon and a mermaid described in three contemporary inventories.

The oldest plant still surviving from that early period is the Golden chain tree (*Laburnum anagyroides*) next to the main entrance. It was planted in 1601, at which time Clusius was preparing two of his major works for publication: *Rariorum Plantarum Historia* (1601) and *Exoticorum Libri Decem* (1605). At the same time he wrote letters to the board of the Dutch East India Company encouraging its members to ensure that physicians and other travelers to faraway places collected exotic plant material for study in the Hortus, an activity continued by his successor, Pieter Pauw, a professor of botany at Leiden University. Between 1669 and 1676, Antoni Gaymans, a pharmacist in Leiden, accumulated a still extant large herbarium containing more than 1,450 foreign plants, many of which became part of the collection of the Hortus. In this way the collection grew spectacularly over the decades from a thousand species in 1594 to three thousand by 1685, when Paul Hermann, also a professor of botany at Leiden University, was prefect of the Hortus.

Carolus Clusius (1526–1609)

Eighteenth Century

From 1709 to 1730, Herman Boerhaave, a physician of worldwide standing, was the director of the garden. A catalogue published two years after his death in 1738 lists approximately seven thousand species. In the eighteenth century several exotic trees were planted that still survive. These include a tulip tree (*Liriodendron tulipifera*), from North America planted sometime between 1710 and 1720; a date plum (*Diospyros lotus*) from Asia planted around 1740; and a Ginkgo (*Ginkgo biloba*), a tree Europeans had previously thought extinct but which had been rediscovered in China a few years earlier, planted in 1785. The eminent Swedish botanist Carolus Linnaeus met Boerhaave and visited the Hortus during his stay in the Netherlands from 1735 to 1738, during which time he reputedly planted a specimen of the Alpine honeysuckle (*Lonicera alpigena*).

Following some small additions in the seventeenth century, the garden was substantially enlarged in 1730. It now covered land on both sides of the Binnenvestgracht, the canal that continues to run through it. Its size at this point was approximately sixteen hundred square meters. A large brick orangery designed by the French Huguenot architect Daniel Marot (1661-1752) was erected in 1744. This building housed both a large number of tub plants in winter and a collection of classical sculptures left to the university by Gerard van Papenbroeck, founder of the University of Amsterdam.

Nineteenth Century

During the heyday of the exploration of the Dutch East Indies, the search for and study of useful and valuable plants led to the establishment of the Rijksherbarium, or National Herbarium, in 1829 by royal decree of King Willam I. Today its Leiden branch houses about four thousand specimens.

In 1816 the garden quadrupled in size when the city bastion beside the Singel Canal was extended. The new part of the Hortus was laid out in the then popular *jardin anglais* style, and several of the remaining trees from that period are among its most venerable specimens. These include an enormous horse chestnut (*Aesculus hippocastanum*), a Caucasian wingnut (*Pterocarya fraxinifolia*), and a fern-leaved beech (*Fagus sylvatica* 'Asplenifolia'). Many of the garden's nineteenth-century trees were imported from Japan by Franz Philipp von Siebold (1796–1866), a German physician in the service of the Dutch East India Company. He collected and described a large number of animals and plants as well as an enormous number of Japanese objects, which are now exhibited in the Ethnology Museum in Leiden and in the Siebold House, which is located near the Hortus. About fifteen plants in the Hortus were personally imported by von Siebold, who lived in Leiden for several years and even owned a nursery there. He introduced many well-known garden plants such as *Hydrangea* and *Wisteria* into Holland. In 1990 a newly designed Japanese garden commemorating von Siebold was laid out around a *Zelkova serrata* tree that he had planted.

In 1857 the Hortus had to give up a parcel of land in order for the university to build an astronomical observatory. Today its telescopes are no longer employed for scientific purposes, and it may prove possible for the garden to repossess the observatory grounds and gain more space in which to increase its outdoor collections in years to come.

The recreated Clusius Garden, Hortus Botanicus Leiden

Twentieth Century

In the last century many changes were made to the Hortus that are still visible today. Between 1930 and 1940 the prefect, Professor Lourens Baas Becking, and the *hortulanus*, Hesso Veendorp, collaborated on the completion of some large projects begun earlier. They laid out a new rose garden, built a new set of tropical glasshouses to replace a number of glasshouses scattered throughout the garden, and undertook a replication of the 1594 garden laid out by Clusius. Since 1999 the united Hortus and the Rijksherbarium have functioned as a separate institute of Leiden University. Its combined collections have grown, and 77 percent of the now more than twelve thousand specimens are used for research and teaching.

The glasshouses contain the larger part of the collections, mainly tropical plants from Southeast Asia, especially orchids, ferns, pitcher plants, and cycads. These form part of the national plant collection, established in 1988, in which seventeen Dutch botanical gardens participate. Contemporary taxonomic research includes DNA-analysis, for which purpose a laboratory is situated next to the Hortus.

Twenty-First Century

Since the turn of the twenty-first century, the Hortus Botanicus Leiden has gained the Winter Garden, a temperate greenhouse for subtropical plants. In 1993 Gerda van Uffelen, a botanist who has studied fern spores and published on ferns, was appointed collection manager with responsibility for horticultural administration and, beginning in 2005, the laying out of a new systematic garden according to the latest results of plant DNA.

Research concerning the early years of the garden continues and recently was benefited by the discovery in Krakow of a set of several hundred botanical watercolors dating from the second half of the sixteenth century. Many of the plants found in these *libri picturati* were present in Clusius's original layout of the Hortus, and there is reason to believe that the watercolors were made in Flanders under his supervision. In addition, there are close links between the Hortus, the National Herbarium of the Netherlands, and numerous museums in Leiden, such as the Naturalis, the museum of natural history. In 2007 Linnaeus's three hundredth birthday will be celebrated in the places he visited in Holland, including the Hortus in Leiden.

Today the garden is a haven of rest in the middle of a university town and attracts students and visitors from all over the world. It is a registered museum, where many Leiden citizens have queued at night to witness the large nocturnal bloom of the giant water lily (*Nymphaea amazonia*) or to have their babies photographed on one of its enormous floating leaves. All schoolchildren in and around Leiden are offered a visit to the Hortus during their school career. Thus, this remarkable 416-year-old botanical garden continues to play an important role in the life of both the university and the city of Leiden. – Gerda van Uffelen, Collection Manager, Hortus Botanicus Leiden

---

Among early botanical gardens, the Chelsea Physic Garden is notable for being founded not by aristocratic patronage or by a university but rather by an independent guild of apothecaries as a means of furthering their own professional knowledge and that of their apprentices. Operated today as charitable trust under the direction of curator Rosie Atkins, it is now a pleasant London oasis and educational institution featuring primarily plants used in herbal medicines, cooking, cosmetics, fabric dying, and other purposes of a socially and economically beneficial nature.

Chelsea Physic Garden

History of the Chelsea Physic Garden

In 1673 the Society of Apothecaries of London founded a Physic Garden at Chelsea so that its apprentices could learn to grow medicinal plants and study their uses. Similar teaching gardens were created in Padua and Florence, and the universities in Bologna, Leiden, Montpellier, Edinburgh, and Oxford soon founded others. With the exception of the Chelsea Physic Garden, these medicinal teaching gardens grew into botanical gardens as we know them today. Never having been attached to a university or teaching hospital, Chelsea maintains continuity with its origins.

When the Society of Apothecaries chose to rent four acres beside the River Thames, the area known as Chelsea consisted of green fields, market gardens, and orchards. London was still recovering from the Great Fire of 1666 and several years of plague. Travel was infinitely safer and quicker by boat than by road, and King Henry VIII, his chancellor Sir Thomas More, and Sir John Danvers had all built fine country houses in Chelsea. The location, which was a convenient distance from the crowded city and had the added attractions of good, free-draining soil and a southerly aspect, also met the Society's need for a place near the river to house the gaily painted barge used for royal pageants and for their celebrated "herborising" expeditions to collect plants.

For the first ten years the Society had difficulty finding a good gardener to grow simples, the herbs that the apothecaries who were its members would have taken downriver to their guild hall at Blackfriars. However, by 1683 John Watts, the apothecary whom they appointed to oversee the garden, was able to establish valuable links with Paul Hermann, a professor of botany at Leiden University, and the two men were exchanging plants and seeds, the most famous being four seedlings of the cedar of Lebanon (*Cedrus libani*), which had never before been cultivated in Britain. Offspring of the Chelsea Physic Garden cedars still can be found in botanical gardens and old estates, and the garden continues to exchange seeds with other botanic gardens around the world and to publish a yearly *Index Seminum*.

As early as 1685, the celebrated diarist John Evelyn describes a heated glasshouse, thought to be the first in Europe, along with one of the plants it sheltered, a cinchona tree (*Cinchona ledgeriana*), the source of quinine, a drug promoted by the physician Hans Sloane (1660–1753), an important figure in the garden's history. Sloane, who studied medicine at Montpellier in France and who was appointed president of both the Royal Society and the Royal College of Physicians, was knighted in 1716. By 1712 he had acquired enough money to buy the manor of Chelsea, and in so doing he also took over the freehold of the Chelsea Physic Garden. Sloane was sympathetic to the Society's constant struggle to pay the rent on the property, and in 1722 he granted them a lease of £5 a year in perpetuity on condition the garden "*be for ever kept up and maintained as a physick garden.*"

This deed of covenant secured the garden's future and established its place in horticultural history. One condition of the lease required that each year the garden must deliver fifty pressed and mounted plant specimens to the Royal Society until two thousand had been received. By 1795 the garden had provided more than thirty-seven hundred herbarium specimens, which are now housed at the Natural History Museum in London.

When Sloane died at the age of ninety-two, his collection of curiosities and his vast library became the nucleus of the British Museum. His plant specimen collection later was moved to the Natural History Museum. Botanists from this institution continue to use the Chelsea Physic Garden and its team of expert gardeners to help them with their research. Sloane's name lives on in such local landmarks as Hans Crescent and Sloane Square as well as in the fixed rent of £5 that the Chelsea Physic Garden still pays to Sloane's heirs every year.

On Sloane's recommendation Philip Miller (1691–1771), a Scottish botanist, was appointed head gardener in 1721. Miller, who made the garden world-famous during his fifty-year tenure, trained William Aiton (1731–1793), another Scottish botanist and the first director at the Royal Botanic Gardens at Kew, as well as his successor at Chelsea, William Forsyth (1737–1804). Miller's correspondence with the leading botanists of his day generated an exchange of plants and seeds, many cultivated for the first time in Britain. Miller also produced eight editions of his famous *Dictionary of Gardening*, which became the standard reference work for several generations of gardeners in Britain and America.

Carolus Linnaeus, the great Swedish botanist who is considered the father of binomial Latin plant taxonomy, made several visits to the garden in the 1730s, and many species first described by Miller retain the names Linnaeus ascribed to them. (The Chelsea Physic Garden will celebrate the three hundredth anniversary of Linnaeus's birth in May 2007 with an exhibition focusing on plant taxonomy and modern methods of plant identification.)

Sloane was active in fostering economic botany – research on cash-producing crops – an endeavor promoted by Miller, who arranged for various crops including cotton to be sent out from Chelsea to the new colony of Georgia in America.

Miller also introduced the cultivation of madder (*Rubia tinctorum*), the roots of which are used to produce red dye, as an agricultural crop in Britain. In 1732 Sloane laid the foundation stone for an orangery where Miller lived for a short time with his family; sadly, this elegant building was pulled down in the mid-nineteenth century when the Chelsea Physic Garden's fortunes went into decline.

Sir Hans Sloane (1660–1753)

In 1899 the Society of Apothecaries finally gave up the management of the garden, and it was taken over by the City Parochial Foundation. Until 1983 it remained closed to the general public, although university and college students continued to use it for scientific research. When the City Parochial Foundation then determined that it could no longer maintain the garden, a new independent charity was established to manage and operate it. At this time it was also decided to open the garden to the public for the first time in its three hundred year history.

Description of the Chelsea Physic Garden

Today the Chelsea Physic Garden occupies 3.8 acres of prime London real estate bounded by Royal Hospital Road to the north, Swan Walk to the east, and the Embankment to the south. As the Embankment is a busy thoroughfare, the garden is now cut off from the Thames. Otherwise, it has changed very little since the mid-eighteenth century. The main buildings – offices, lecture rooms, and the curator's house – as well as most of the glasshouses are at the northern end. Gravel paths divide it into quadrants, and grass paths run between beds that are planted in a manner that demonstrates the botanical relationships of various plants. Beds in the northeast quadrant display plants used in the pharmaceutical industry as well as plants such as the opium poppy that have been used over the centuries in herbal medicines. In addition, there are culinary plants, ones for the perfumery and cosmetic industries, and others that are used in the manufacture of fabrics and dyes. In 1993 the garden laid out A Garden of World Medicine, a living exhibit displaying medicinal plants used by the world's indigenous peoples.

A replica of the 1733 statue of Sir Hans Sloane by Michael Rysbrack (1694–1770) stands in the center of the garden. The original, which was being damaged by air pollution, is now in the British Museum. Next to the statue is an exhibition created in 2003 to commemorate the 250th anniversary of Sloane's death. Nearby is the oldest rock garden in Europe. Here the rocks include pieces of the Tower of London and basalt used as ballast on Sir Joseph Banks's (1743–1820) ship on a voyage to Iceland in 1772. In the northeast corner an education department building, opened in 1997, is used to teach children about the vital role plants play in our lives. Nearby is the Historical Walk. It charts the garden's history with plants introduced into cultivation over the centuries by the garden's curators and by other notable botanists including Banks, William Hudson (1730–1793), William Curtis (1746–1799), and Robert Fortune (1812–1880). By the Embankment a wider area of flowering shrubs and rare peonies offers places to sit and enjoy the garden's tranquil atmosphere.

Wildlife flourishes in the garden. The frogs, toads, and newts inhabiting the Fortune's Tank Pond help control the growth of the slug population. This year videocameras installed in the Tank Pond and a bird box have broadcast wildlife activity live on television. *The Ethnomedica Project* – a joint initiative with the Royal Botanic Gardens at Kew, the Eden Project, the Royal Botanic Garden in Edinburgh, and the Natural History Museum – supports the collection of data on herbal remedies that have been used over the centuries in Britain. In June 2006 Princess Alexandra opened the Back to the Garden Recycling Project, which reveals the mysteries of making compost and the recycling of green waste. Like all botanical gardens in the twenty-first century, conservation, scientific research, and education play vital roles in the Chelsea Physic Garden's activities. Indeed, the garden can be said to be London's oldest outdoor classroom. – Rosie Atkins, Curator, Chelsea Physic Garden

The voyages of exploration in the seventeenth century inaugurated the era of European colonization of hitherto unknown continents and islands with resources ripe for exploitation. At the same time, the founding of colonies fostered opportunities for the enrichment of botanical gardens with numerous newly discovered exotic plants. Colonial botanical gardens were thus set up as propagating stations for plants awaiting shipment to parent institutions. According to Nina Antonetti, the environmental degradation of colonial lands through tree-cutting and agricultural abuse imposes environmental restoration challenges for the British colonial botanical gardens still in existence today in the West Indies.

British Colonial Botanical Gardens in the West Indies

The rapacious exploitation of the New World colonies for plantation development and exportation of cash crops in the eighteenth century led scientists to recognize nature as both bountiful and fragile. British colonial botanical gardens played an important role in achieving this understanding.

The history of British colonial botanical gardens can be traced back to the beginnings of botanical science in England. John Parkinson (1567–1650), apothecary to King James I of England and a founding member in 1619 of the Society of Apothecaries, and John Evelyn (1620–1706), English diarist, author, gardener, and early environmentalist, were among those who fostered the development of modern botanical science. Parkinson, the author of *Paradisi in sole paradisus terrestris* (1629) and *Theatrum botanicum* (1640), was able to graduate from the role of herbalist to that of botanist and to examine and write comprehensively about plants imported from exotic lands. Evelyn, one of the founders of the Royal Society in 1660, is the author of two important treatises: *Fumifugium* or *The Inconveniencie of the Aer and Smoak of London Dissipated* (1661) and *Sylva, or discourse on forest trees* (1664).

The further progress of botanical science during the Enlightenment was characterized by a zealous search for hitherto unknown plants. Several plant-hunting expeditions were sponsored by the Royal Society under the direction of the noted naturalist, botanist, and trusted scientific adviser to King George III, Joseph Banks (1743–1820), and by the Royal Botanic Gardens at Kew under the direction of the Scottish botanist William Aiton (1731–1793). Banks himself went on voyages to Australia, the Faroes, and Orkney Island in Scotland, discovering nearly eighty species. In 1789 Aiton published *Hortus Kewensis*, a catalogue of all the plants in cultivation in the Royal Botanic Gardens. The explorer, navigator, and cartographer Captain James Cook (1728–1779) also played an important role in this era of discovery, conferring the name Botany Bay on the harbor where Banks and the Swedish botanist Daniel Solander (1733–1782), who were attached to his voyage to Australia, enthusiastically collected numerous plant species.

Soon colonial botanical gardens began to be created for the collection and propagation of plants intended for shipment to Kew. These played a central and sustaining role in colonial botanical expansion during the directorships of William Jackson Hooker (1785–1865) and Joseph Dalton Hooker (1817–1911), father and son. With ties to Britain and a strong link to India, Kew-sponsored colonial botanical gardens provided a network of scientific inquiry and economic trade.

As British colonization proceeded, information began to flow back home in the form of diaries, correspondence, ledgers, and sketches. These provide historians today with precise and valuable evidence of the material, economic, political, cultural, and scientific world during England's age of imperial expansion. Botanical illustrators were among those sailing back and forth from motherland to colony. The naturalist and artist Marianne North (1830–1890), for whom the Marianne North Gallery at Kew is named, was one of a handful of women central to the history of the colonial botanical garden. During her travels to the West Indies as well as to Brazil, Java, India, Africa, and Australia, she documented more than nine hundred species in more than eight hundred botanical paintings.

Paradoxically, as the ancient ideal of paradise continued to expand in European literature, drama, and art, and while the realms of research science and horticulture were being vastly enriched by the importation of exotic species, native plant communities in the British West Indies were being degraded. This was especially true on the islands of Barbados and Jamaica, where the clear-cutting for sugar plantations by slave labor caused rapid deforestation and resulting soil depletion. As a consequence, eighteenth- and nineteenth-century botanists there found themselves engaged in issues of soil erosion and depletion of native species coupled with famine and environmentally induced illness. Thus, while the first colonial botanical garden managers were mainly interested in shipping specimens back home, their successors began to provide reports of deforestation, soil erosion, and land mismanagement. Evelyn's plea in his *Sylva* for the reforestation of England, where extensive shipbuilding had depleted its timber resources, fell on deaf ears at home; however, his concerns became obvious in colonial lands where the effects of aggressive tree cutting on soil and climate were more obvious. As a result, new conservation restrictions were made to benefit such island settlements as Tobago, which consequently escaped the environmental destruction inflicted on Barbados and Jamaica.

View of the Botanic Garden of St. Vincent from the superintendent's house. Lithograph of a drawing by the Reverend Lansdown Guilding in his *Account of Botanic Garden in Island of St. Vincent* (1825). Originally published in *Kew: The History of the Royal Botanic Gardens* by Ray Desmond (1995).

Founded in 1754, the Royal Society of Arts subsequently played a key role in launching measures to protect the natural resources of British territories. The Society in 1765 assisted in the creation of the first colonial botanical garden in the Western Hemisphere on St. Vincent in the Caribbean. The medically trained Scottish botanist James Anderson was its first curator. Among the tropical species still protected there is the breadfuit tree (*Artocarpus altilis*), which was brought to the island from Tahiti in 1793 as a potential food crop for slaves by Captain William Bligh (1754–1817), whose name is associated with the famous mutiny aboard the HMS *Bounty*. Anderson launched a bifurcated campaign, balancing fact-gathering missions with interest in native cultures. Despite the depredations inflicted by the Arawak and Indian Carib tribes and then by the British and French along with the volcanic eruptions of Soufrière in 1812 and 1902, the St. Vincent Botanical Garden has survived and retained its reputation for forest protection and the conservation of rare species.

The colonial botanical gardens of the West Indies always have been threatened with extinction. More modest in scale and reputation than the great sponsoring gardens in Britain, they are still plagued by natural and political storms as well as by chronic underfunding. As an example of their tenuous state, visitors arriving at the grounds of the Dominica Botanic Gardens at Roseau in the eastern Caribbean are confronted with a startling scene: a school bus crushed by a fallen baobab tree (*Adansonia digitata*) during Hurricane David in 1979 is now part of an exhibit demonstrating how prostrate trees put forth new growth.

The ecological destruction and the loss of biodiversity in colonies during the period of imperial rule is now a global phenomenon. The environmental concerns originally raised on such islands as St. Vincent, Tobago, Trinidad, Dominica, Barbados, and Jamaica, have become universal. In spite of their lack of financial resources, the British colonial botanical gardens in the West Indies are participating in land restoration projects that are germane to the regeneration of plant species throughout the world. Thus, the recovery of parts of these ecologically damaged islands offers lessons and hope for the rebuilding of native plant communities elsewhere.

– Nina Antonetti, Assistant Professor of Landscape Studies, Smith College

The story of the Botanic Garden of the University of Cambridge differs from that of typical botanical gardens in that it was laid out by Professor John Stevens Henslow as a living laboratory for studying the question of plant speciation: when does a variety of a particular plant develop into a separate species? The dividing line between trees that are simply variations of the same species and trees that share common characteristics but are sufficiently different as to constitute a separate genealogical family branch is difficult to determine. John Parker's discussion of the history of the garden implies how Henslow's theories may have stimulated the discoveries of his star student, Charles Darwin.

The Botanic Garden of the University of Cambridge

In 1831, on the wheat fields to its south, the University of Cambridge established a new botanical garden to replace its small physic garden, founded in 1762, which lay in a smoky location overshadowed by buildings in the heart of the city. The new garden's design, planting, and care became the lifework of John Stevens Henslow (1796–1861), an accomplished mathematician, zoologist, and artist, as well as an ordained priest. A professor of mineralogy from 1822 until his resignation in 1827, he also served as the university's professor of botany from 1825 until his death.

Henslow considered trees to be the most important plants in the world and was particularly excited by the recent discoveries of such conifers as the Douglas Fir (*Pseudotsuga menziesii*) in North America. As a result, the visionary young professor planned the new botanical garden as an arboretum, thereby deflecting botanical study at Cambridge towards trees rather than the medicinal properties of plants, its original focus. Within the garden, according to Henslow's contemporary parklike design, trees, shrubs, and herbs were to be planted in naturalistic groupings, and modern glasshouses were to extend the range of climates and, hence, plants available for study. Then as now, the garden was meant to be a working collection in which all plants would be grown and maintained primarily for scientific research and teaching purposes.

Henslow was a passionate advocate of universal education. He was closely associated with the development of mechanics institutes, night schools for the education of workingmen, and the organization of village schools for the children of illiterate farm workers. Thus, his garden for botanical research was intended to be a *public* institution accessible to both town and gown, a place created according to the highest horticultural standards while also providing a beautiful, tranquil haven available to everyone for recreation and self education.

John Stevens Henslow (1796–1861)

Henslow quarrelled vehemently and passionately with the ruling Senate of Cambridge University for funds to develop and support his new botanic garden, and this argument eloquently expressed his view of the significant value of botanical gardens to the whole of society. However, an appreciation of the scientific philosophy that underpinned his design and planting of the Cambridge Botanical Garden has been lacking until recently. Unfortunately, as far as we know, Henslow never wrote down his theories on why he grouped trees according to certain relationships to one another, nor do we have any documents of his short-lived curator, Andrew Murray, who planned and planted much of the garden. Nevertheless, a partial understanding of the intellectual framework guiding its development recently has emerged through close scrutiny of Henslow's scientific career and observation of the way in which the groups of trees remaining from his original plantings are interrelated.

Henslow's botanical research during the 1820s was directed toward understanding the nature of species based on the study of plant variation through examination of wild populations and by experimental manipulation of plants in cultivation. Contemporary analysis of his herbarium specimens, research papers, and letters has revealed three elements that were fundamental to the development of his understanding of species: the nature and extent of continuous variation that characterize species in nature; the phenomenon of "monstrosity," sudden changes of flower or leaf form due to mutation or developmental abnormality; and the properties of hybrids, which he believed would reveal "the laws that govern nature." Although many of the garden's original plant specimens have been lost over the years, sufficient numbers remain to enable us to deduce some of the ideas behind Henslow's initial plantings.

Remarkably, the three themes around which Henslow focused this collection – variation, monstrosity, and hybridization – are all represented by groups of trees still living in the garden. So far, nine different assemblages have been identified within the surviving trees that illustrate his research, allowing

us to interpret some of the interesting visual dialogues he set up among trees.

The garden's central axis is an east-west avenue flanked by conifers. Among these is a group of four subspecies of the widespread European species of black pine (*Pinus nigra*). Extreme variants of this species are planted opposite each other, presenting an oddly unbalanced juxtaposition for such a majestic vista since, unlike traditional axial allées, the trees that line it are not uniform in appearance. Thus, *P. nigra* 'nigra' from central Europe, with an almost unbranched growth habit with densely crowded, very short needles clustered at the apex and on the ends of thin downward-directed branches, is placed opposite a huge dominating specimen of *P. nigra* 'salzmannii' from the Pyrenees, which has massive upward-directed, trunklike branches, an open, spreading crown, and long, flexuous needles. Here Henslow's fundamental scientific query is starkly revealed: Do these trees belong to one species or two? By placing other variants nearby, the commonalities of the two dissimilar pines become clear. Thus, we can ascertain that Henslow was attempting to explore visually a principle that modern botanical science confirms: we are viewing variation within a single species. Similar visual arguments are represented by plantings of the *Cedrus* species *libani, atlantica,* and *deodara,* regarded by Henslow as belonging to a single species and thereby illustrating his theory of continuous variation.

Elsewhere, on the eastern side of the garden's perimeter belt of deciduous trees, we can see Henslow's investigation of "monstrosity" within a group of three European beeches (*Fagus sylvatica*), which were arranged according to the "natural taxonomic order" of the Swiss botanist Augustin Pyrames de Candolle (1779–1841), director of the Botanic Garden at the University of Montpellier. One beech is a standard tree typical of British woodlands, the second is a weeping form grown from a graft on a standard rootstock, and the third is a superb specimen of the cut-leaved beech (*F. sylvatica* var. *asplenifolia*) with fine filigreed leaves instead of normal ones of simple ovate outline.

Henslow's interest in hybridization is evident nearby in a collection of three trees of the genus *Platanus: P. orientalis* and two different interspecific hybrids with the American sycamore, *P. occidentalis,* referred to as *P. x acerifolia* (the London Plane), and *P. x acerifolia* 'cantabrigiensis' (the Cambridge Plane). In addition, parents and their hybrids are still represented by some of the garden's remaining oaks, *Quercus robur, Q. petraea, Q. cerris* and *Q. suber.*

By 1829 Henslow had a coherent view of the nature of species, which he transmitted to his students through lectures and field classes. His most assiduous student was Charles Darwin (1809–1882), known around Cambridge as "the man who walks with Henslow" due to his constant proximity to the professor. It was Henslow's methods of investigation and intellectual position on speciation that Darwin took with him on his epic five-year voyage on the HMS *Beagle,* during which he collected plant specimens as well as those of rocks, fossils, and animals. Today one can see all Darwin's pressed plants from this expedition on sheets bearing his name in the university's herbarium collection.

Henslow's successors did not value, or did not comprehend, his innovative botanical approach, so the emphasis in the Botanic Garden of the University of Cambridge shifted from plantings based on plant variation to studies in ecology and genetics as these sciences developed in the late nineteenth century. The twentieth-century expansion of Cambridge swept over the countryside, and the Cambridge Botanic Garden is now surrounded by the city. However, its boundaries have remained inviolate, and the forty-acre garden is now a serene urban oasis where many of Henslow's trees live on as testimony to the scientific brilliance of Darwin's mentor. – John Parker, Director of the Botanic Garden of the University of Cambridge

---

When the present-day United States was still a collection of colonies, it served as an immense field for botanical exploration. Many New World species collected by European plant hunters were sent to botanical gardens where they were propagated and then dispersed into the estate gardens of horticultural connoisseurs. At the same time, colonial Americans such as George Washington and Thomas Jefferson planted foreign as well as native species in their gardens, and a lively plant exchange and burgeoning nursery trade existed. Holly Shimuzu tells how the establishment of a national botanical garden became a priority of the new federal government at the time of its inception.

United States Botanic Garden

Visitors to the National Mall often are surprised to see a large conservatory and surrounding gardens situated so near the U.S. Capitol. It was President George Washington – himself the designer of the garden at Mount Vernon – who initially envisioned a botanical garden at the seat of government. Washington wrote a letter in 1796 to the Commissioners of the District of Columbia asking that a "Botanical Garden" be incorporated into the plan for Washington, D.C. Recognizing the value of plants to the well-being of the young nation, he suggested that the proposed botanical garden be placed prominently in the new city and pointed out several possible sites, including the square next to the President's House.

In 1816 a group of respected citizens founded the Columbian Institute for the Promotion of Arts and Sciences. One of the institute's goals was to create a center for scientific pursuits. The first objective of its constitution was "to collect, cultivate, and distribute the various vegetable productions of this and other countries, whether medicinal, esculent, or for the promotion of arts and manufactures." The Columbian Institute received a congressional charter on April 20, 1818, and after considerable lobbying by its members, on May 8, 1820, Congress approved a bill providing for the use of five acres on the Mall for a national botanical garden. The bill was signed by President James Monroe and Speaker of the House Henry Clay, and the president, who accepted the title of Patron of the Columbian Institute, agreed to let the institute place the botanical garden on property adjacent to the west side of the Capitol. Other early members of the institute included presidents John Quincy Adams and Andrew Jackson, who served ex officio during their terms of office. Honorary members included former presidents John Adams, Thomas Jefferson, and James Madison.

While the collection of plants and seeds continued, work on the site began by clearing and draining the soggy land followed by tree planting. In 1824 one of the institute's members, William Elliot, wrote a "List of Plants in the Botanic Garden of the Columbian Institute," which contains more that a hundred species. In 1826 Congress appointed a committee to meet with the heads of government departments to help solicit "all subjects of natural history that may be deemed interesting" from foreign representatives. However, Congressional support was limited and maintenance of the garden was sporadic, often done by volunteers or by an occupant of the house located on the grounds. Occasionally, the gardener from the Capitol grounds would help out after hours. The Columbian Institute for the Promotion of Arts and Sciences disbanded in 1837 due to lack of professional leadership and lack of financial support. It was reconstituted in 1941 and merged with the Historical Society of Washington.

The efforts to create the U.S. Botanic Garden gained momentum in 1842 when the U.S. Exploring Expedition with six naval vessels captained by Lt. Charles Wilkes (1798–1877) returned after four years of scientifically exploring the lands

along the South American, Australian, and Asian coasts; 280 islands of the South Pacific; one hundred miles of the Oregon coastline; and a hundred-mile stretch of the Columbia River. Included on the expedition were naturalist Charles Pickering, horticulturist William Brackenridge, botanist William Rich, and geologist James Dana as well as taxidermists, artists, and a philologist. After encircling the globe and logging more than eighty-seven thousand miles, Captain Wilkes returned with four thousand ethnographic objects and fifty thousand specimens of ten thousand species of pressed plants. A place was needed to care for this immense herbarium along with the living botanical treasures collected by Pickering and Brackenridge.

The United States Botanic Garden, 1874

Initially, the expedition's plant collections were housed at the U.S. Patent Office, where a glasshouse was added to the back of the building to accommodate the study and propagation of plant specimens. However, the presence there of so much exotic flora rekindled congressional interest in having a national botanical garden, and in 1850, when the Patent Office building was enlarged, Congress appropriated $5,000 to build a new glasshouse on the site of the former Columbian Institute's previous garden. This small Gothic structure filled with rare plants quickly became a public attraction, and by the end of that year, the old garden grounds had been reestablished on ten acres of the Mall adjacent to the Capitol. Officially named the United States Botanic Garden in 1856, the garden was placed under the jurisdiction of the Joint Committee on the Library of Congress and was given regular funding to support its growth.

Brackenridge, the horticulturist who had collected many of the plants to be installed in the reestablished garden, was put in charge. In 1853 he hired a young Scotsman, William R. Smith, to begin work as a gardener. Having been trained at the Royal Botanic Gardens at Kew, Smith brought experience and determination to his new position and initially was charged with preparing a comprehensive catalogue of the garden's plants. While the majority of the plants in the garden's collection were from the U.S. Exploring Expedition, Brackenridge obtained a wide variety through exchanges with other botanical gardens.

When Commodore Matthew Perry (1794–1858), having opened Japan to Western trade two year earlier, returned from his second voyage in 1855, new species of Asian flora were added to the U.S. Botanic Garden. Larger glasshouses were built to display the expanding collections and to study and propagate new plants. Smith was appointed first superintendent of the U.S. Botanic Garden in 1863, a post he held until his death in 1912. During his tenure, the garden experienced tremendous growth and increasing national prominence.

Built in 1867, the conservatory's rotunda contained more than three hundred majestic palms in addition to plants from Asia, New Zealand, Madagascar, Panama, and South America. The wings of the conservatory housed plants from the East and West Indies, the South Seas, and China. In a nearby conservatory a lecture hall holding up to a hundred people doubled as a botanical classroom.

Although well established and surrounded by lush gardens and large trees, the site of the U.S. Botanic Garden at the east end of the Mall became problematic at the beginning of the twentieth century when the Committee on the District of Columbia headed by Senator James McMillan (1838–1902) sought to restore Pierre L'Enfant's (1754–1825) 1791 plan for the nation's capital according to the tenets of the City Beautiful movement. In 1902 the McMillan Commission – a distinguished group of professionals including architects Daniel Burnham and Charles F. McKim, sculptor Augustus Saint-Gaudens, and landscape architect Frederick Law Olmsted, Jr. – presented its report. Among its many recommendations was that the U.S. Botanic Garden be relocated in order to reestablish the Mall's original axis between the Capitol and the grounds adjacent to the Washington Monument, with a further extension to a grand terminus at the proposed site of the Lincoln Memorial.

Public outcry was enormous. Washingtonians, including members of Congress, were openly opposed to the move because it meant uprooting many magnificent trees. When the relocation from the center to the edge of the Mall bordered by Maryland Avenue and First Street SW finally occurred twenty years later, more than two hundred trees were destroyed and the glasshouses dismantled.

In November 1931 the cornerstone was laid for the present U.S. Botanic Garden's new conservatory. The following year the fountain created by French sculptor Frédéric-Auguste Bartholdi (1834–1904) for the 1876 Philadelphia Centennial Exhibition (at the same time he was working on New York's City's Statue of Liberty) was brought out of storage and placed in the Frédéric-Auguste Bartholdi Park, which this part of the relocated U.S. Botanic Garden has been called since 1985. Although now significantly smaller in size, the garden was able to successfully continue its operations throughout the twentieth century, and in the 1990s the conservatory received a major reconstruction. The newest addition to the U.S. Botanic Garden is the National Garden made possible by private donations to the National Fund for the U.S. Botanic Garden. This three-acre garden is on the land adjacent to the west gallery of the conservatory. It consists of a regional garden, rose garden, and the First Ladies Water Garden.

Thus, from its rich roots with ties to the vision of George Washington and other important figures in American history, the U.S. Botanic Garden has emerged in the twenty-first century as one of the nation's foremost botanical gardens. Through partnerships with other botanical gardens, exhibits, and horticultural displays, its public outreach, conservation, and volunteer programs, and through the scientific work it does in conjunction with the Smithsonian Institution's Department of Botany, the U.S. Botanic Garden ensures the nation's commitment to plant science, display, and education. – Holly H. Shimizu, Executive Director of the U.S. Botanic Garden

Today one of the world's greatest botanical gardens, the New York Botanical Garden is a relative latecomer to the scene. Like the first botanical gardens, however, it too had its embryonic origins in the quest for plant-based medicinal knowledge. Under the leadership of Gregory Long during the past fifteen years, its three-prong mission has renewed that of the garden's founders in 1890: to make the garden an important center for scientific research; to offer a strong public education program; and to design, restore, and maintain its landscape as a beautiful setting for its collections.

The New York Botanical Garden

Origins

The principal center for the study of plants in pre-Revolutionary War America was Philadelphia, but by the early nineteenth century New York City had become the focal point for scholarship and higher education in plant biology. This was so because medical practice still involved extensive herbal knowledge and the New York College of Physicians and Surgeons and Columbia College were eager to foster its expansion. Dr. David Hosack (1769–1835), who taught botany on the faculty of Columbia College and maintained a large, lucrative, and socially prominent medical practice, knew that his students needed a botanical garden in order to learn from living plants. In 1801 on the site of today's Rockefeller Center, then some distance north of the settled parts of the city, he founded the Elgin Botanic Garden, forerunner of the New York Botanical Garden. Hosack invested substantial personal capital in its elegant conservatory, order beds, and a catalogue of the collection, but in 1811, when he could no longer afford to support it, the Elgin Botanic Garden ceased operations.

Hosack continued to teach, however, and two distinguished lines of botanists descended from his star student, John Torrey (1796–1873), and Torrey's student, Asa Gray (1810–1888). Torrey and Gray collaborated on the *Flora of North America* (1838–43), but soon thereafter Gray left for Harvard, where he became America's most celebrated plant scientist and Charles Darwin's strongest early supporter in the United States, thereby establishing the New England branch of Hosack's educational tree.

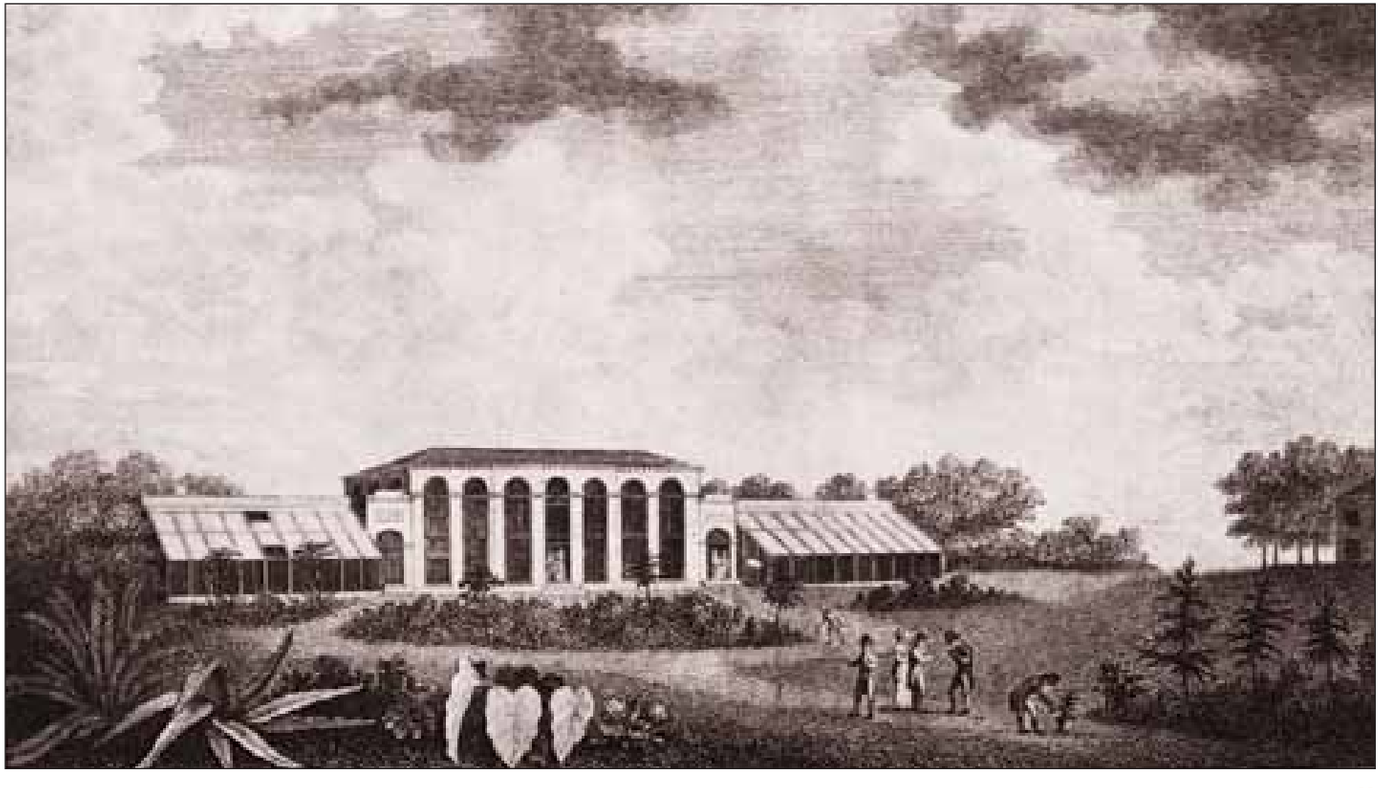
The New York line of botanists following Hosack included other mid-nineteenth-century protégés of Torrey, many of whom joined together in the 1860s to create a learned society called the Torrey Botanical Club, whose members were for the most part associated with Columbia University. It was at their meetings in the late 1880s that the idea for a new botanical garden – one with a scientific emphasis – was first formulated. The New York Botanical Garden's link to Torrey is significant in many ways, and not the least is that its research collections contain both his botanical library and herbarium.

Creation

In the period between the end of the Civil War and the beginning of World War I, the civic leadership of New York City was intent on creating a cosmopolitan world capital. Men such as J. P. Morgan (1837–1913), Andrew Carnegie (1835–1919), John D. Rockefeller (1839–1937), and Cornelius Vanderbilt II (1843–1899) possessed sufficient wealth to found an impressive roster of institutions emulating those they admired abroad: the American Museum of Natural History (1869), the Metropolitan Museum of Art (1870), the Metropolitan Opera Company (1883), the New York Botanical Garden (1891), the New York Zoological Society (1895), and the New York Public Library (1895). The New York Botanical Garden is thus part of a constellation constituting the city's cosmopolitan cultural infrastructure.

The New York Botanical Garden's professional founders were Nathaniel Lord Britton (1859–1934), a Columbia professor of botany and geology who later distinguished himself with major publications on the trees of the northeastern United States, the plants of the West Indies, and the cactus family; and his wife, Elizabeth Gertrude Knight Britton (1858–1934), an avid and respected scholar of mosses. In 1888 the Brittons traveled to London, visited the Royal Botanic Gardens at Kew, and admired the way that institution operated in three principal areas: as a museum of plants in a designed landscape; as a public educational program deriving authority from the curators of its plant collections; and as an international plant exploration and research program devoted to the study of the evolutionary history and basic biology of plants and the relationship between plants and people. Upon their return home, the Brittons launched a public campaign to establish a similar institution. Three years later the New York Botanical Garden was founded, Vanderbilt became the first president of the board, and in 1896 Britton became its first director.

The New York Botanical Garden has remained constant to a tripartite mission inspired by Kew throughout its history. However, its scientific emphasis, following that established by Britton, has differed somewhat from that of Kew in that the New York Botanical Garden



The Elgin Botanic Garden existed on the site of present-day Rockefeller Center from 1801 until 1811.

has focused more on the plants of the Western Hemisphere. A number of distinguished figures associated with the garden – Addison Brown, Henry Hurd Rusby, Henry A. Gleason, Bassett Maguire, William C. Steere, Sr., Arthur Cronquist, and Ghillean Prance – have perpetuated this tradition. Scientists such as Patricia and Noel Holmgren, Scott Mori, and Dennis Stevenson, and John Mickel are carrying it forward today, identifying, documenting, and publishing the plants of North America and Latin America. Thus, Britton's original vision of a botanical garden oriented towards the plants of the Americas has endured for more than a century.

Landscape

In the 1870s and 1880s, following the example of New York's Central Park, many cities started planning parks and park systems. At the same time, social activists and urbanists in New York City began to dream of new parks in outlying parts of the growing metropolis. In 1887 John Mullaly (1835–1911), a journalist with the New York *Herald*, published his influential book, *The New Parks Beyond the Harlem: Nearly 4,000 Acres of Free Playground for the People*, in which he described his vision for a chain of parks in the Bronx, a borough that recently had been incorporated into New York City. Extending from the old Van Cortlandt estate in the north, this system of large-scale parcels linked by wide parkways would run south to include the historic properties of the Lorillard and Bronck families (the present sites of the Botanical Garden and the Bronx Zoo, respectively) and continue eastward to Pelham Bay on Long Island Sound.

Nathaniel Lord Britton (1859–1934)

In 1884 the legislature of New York State adopted the Mullaly plan, and the resulting "emerald necklace" remains a significant part of New York City's park system. When Britton, encouraged by fellow members of the Torrey Botanical Club, was searching for a suitable site for his American Kew, city officials offered the 250-acre Bronx Park – the central park in the new Bronx park system – as a possible site. Because of its highly picturesque terrain, its freshwater river in a rock-cut gorge, and its fifty acres of old-growth forest, Nathaniel Lord Britton fell in love with it. The New York Botanical Garden had found its home.

Calvert Vaux (1824–1895), the designer of Central Park along with Frederick Law Olmsted, laid out the garden's first schematic design. Unfortunately, Vaux's death interrupted the work, which was subsequently taken up by Britton himself with assistance from Samuel B. Parsons, Jr. (1844–1923) and John Brinley (1861–1946). The Olmsted Brothers, the firm originally founded by Olmsted, completed the layout of roads and pathways in the early 1920s.

Collections

From the beginning, the garden's founders intended the collections to be comprehensive and worldwide. They dedicated propagation and exhibition space in the conservatory to tropical and desert plants and identified sites within the garden for a deciduous arboretum, for two large-scale conifer collections, and for native plants, alpine plants, herbaceous perennials, bulbs, annuals, and roses. In the early years many plants, such as the now-mature specimen trees in the Arthur and Janet Ross Conifer Arboretum, were grown from seeds collected in the wild or from cuttings. Later, Beatrix Jones Farrand (1872–1959), Ellen Biddle Shipman (1869–1960), and other professional designers were retained to create gardens within the garden for the display of new collections. In 1949 Marian Cruger Coffin (1876–1957) designed a fifteen-acre landscape to house the collection of rare conifers amassed by Colonel R. H. Montgomery. This collection recently was restored and expanded under the supervision of Todd Forrest, the garden's vice president for horticulture and living collections, and is now known as the Benenson Ornamental Conifers.

Today there are a million plants growing throughout the 250-acre National Historic Landmark site, representing eighteen thousand species or groups. The most significant collections are tropical ferns, cycads, New World succulents and palms, orchids, alpine plants, ornamental flowering trees, the deciduous trees of the northeastern United States, and the conifers of the world. These collections are exhibited within a landscape composed of venerable trees native to the site, including notable white, red, and black oaks (*Quercus alba*, *Q. rubra*, and *Q. niger*) , tulip trees (*Liriodendron tulipifera*), black gums (*Nyssa sylvatica*), and sweet gums (*Liquidamber styraciflua*).

In addition to the living collections, the New York Botanical Garden has major research collections in its library and herbarium. Torrey's fine botanical library became the nucleus of the LuEsther T. Mertz Library, which currently contains more than one million items, including books, journals, seed and nursery catalogues, architectural plans of glasshouses, scientific reprints, and photographs, and his herbarium is part of the 7.2 million plant and fungi specimens that comprise the William and Lynda Steere Herbarium.

The New York Botanical Garden recently has undertaken a comprehensive, fifteen-year renewal that includes strategic planning, programmatic and financial expansion, capital development, and landscape restoration. During this period, the private sector and the City and State of New York have made substantial investments in these initiatives and improvements. The educational programs and facilities for children and adults have been expanded; the garden has built or restored fifty thousand square feet for the library and herbarium; it has added molecular research to its agenda; and it has constructed a new twenty-eight-thousand-square-foot laboratory and forty-five-thousand square feet of new glasshouses. In addition, it has restored many historic buildings, including the great Victorian-style conservatory and approximately a

Elizabeth Gertrude Knight Britton (1858–1934)

hundred acres of landscape and living collections. Architects, landscape architects, and garden designers responsible for recent work include Beyer Blinder Belle; Cooper, Robertson & Partners; Hugh Hardy; Polshek Partnership Architects; Lynden Miller; Patrick Chassé; Shavaun Towers; and Laurie Olin.

Conclusion

In spite of new developments, the New York Botanical Garden's intellectual, urbanistic, and cultural goals remain unaltered. New York City's role as an important center for scholarship and higher education in plant biology in the nineteenth century continues in its universities and science centers, and the New York Botanical Garden is a nexus for the work of this consortium of institutions. The 1880s movement that resulted in the creation of the Bronx's system of linked parks is still alive and has become Bronx Green-Up, a New York Botanical Garden-sponsored community gardening program. Thus, within the constellation of world-famous cultural institutions created during the Gilded Age, the New York Botanical Garden continues to play its role both in the life of New York City and the rest of the world. – Gregory Long, President and CEO, New York Botanical Garden

---

While botanical gardens in northern latitudes must protect palms and other tropical plants in conservatories, in Florida's warm climate many tropical species can flourish outdoors. The agricultural scientist and plant explorer David Fairchild, who made the collection and study of tropical plants his life work, eventually settled in Florida where he grew species that he had previously gathered in the wild. Mike Maunder explains how Fairchild's passion has been perpetuated in the garden outside Miami that is named for him.

Fairchild Tropical Botanic Garden

Located in Florida's subtropical Coral Gables, the Fairchild Tropical Botanic Garden, named after David Fairchild (1869–1954), plant explorer for the U.S. Department of Agriculture, was opened in 1938 to provide the residents of Miami and neighboring resort towns a glimpse of the flora of distant and exotic landscapes. As a result, visitors to the eighty-three-acre garden today enjoy one of the world's largest collections of tropical plants. Designed by William Lyman Phillips (1885–1966), a pioneer of tropical landscape architecture who had been a student and then partner of Frederick Law Olmsted, Jr., its landscape features lakes, lagoons, and broad vistas as a frame for a combination of Floridian and non-native plant species such as palms and cycads.

Fairchild and Phillips sought to entrance the visitor with their joint vision of a tropical paradise, resembling in this regard the Renaissance princes whose gardens and *wunderkammmer* – the cabinets of curiosities that prefigure the natural history museum – displayed botanical, ethnographic, and zoological specimens of an exotic nature. Indeed, Fairchild established an ethnographic museum at the garden and often entertained his audience with demonstrations of his skill with a South American blow pipe.

Like Fairchild, who chronicled his discoveries and contributions to economic botany and ornamental horticulture in *The World Was My Garden: Travels of a Plant Explorer* (New York: Charles Scribner's Sons, 1938), the curators of the earliest European botanical gardens watched in awe as the world of natural history expanded with each crate of new specimens that arrived from the frontiers of exploration. Today, however, we watch via satellite television and video as the botanical world contracts and is increasingly burned, grazed, or ploughed into oblivion. This places an enormous responsibility on all botanical gardens.

The Fairchild Tropical Botanic Garden believes that in the twenty-first century it should serve as more than a series of scenes of luxuriant vegetation and collections of interesting specimens; it also must engage in issues related to the loss of global biodiversity as many species near extinction and environments undergo profound ecological collapse. The garden therefore has made the strategic decision to support conservation in the field and in the country of origin. This has resulted in a number of changes in policy and administration. Fairchild has become an arena for interpretation and debate, and its research agenda has shifted from one that is merely academically interesting to one that addresses issues of species and habitat preservation. Its research team now works with partners in South America, the Caribbean, East Africa, and Madagascar, and it mounts exhibits that interpret the botanical diversity and environmental issues of those regions.

In addition, the garden is attempting to address problems in its own community. In the 1930s, before Miami had undergone rampant expansion, David Fairchild, who deplored the effects modernization was having on the native cultures with which he was familiar through his far-flung explorations, predicted its deleterious consequences at home. Today Miami, like other large cities, has an increasing number of citizens whose lives are divorced from the natural world; they have not seen a growing pineapple or banana plant, never stood in the shade of a native woodland canopy, or watched a hummingbird. Their plight, which may be described as bioilliteracy, is not one that is restricted to poor urban neighborhoods.

Palm tree grove at the Fairchild Tropical Botanic Garden

Seen in this light, parrots provide a useful parable. According to legend, the eighteenth-century German scientist Baron Alexander von Humboldt (1769–1859) was traveling on the Orinoco River in Venezuela when he encountered a Carib Indian tribe. Humboldt noticed that their pet parrots were speaking a dialect different from that of their owners. The Indians explained that the birds had belonged to the Maypure tribe, whom they recently had exterminated during a tribal conflict. The parrots were the last remaining speakers of Maypure, the unwitting and ornamental custodians of a language they could neither understand nor conserve. The implications for botanical gardens that are perceived primarily as places of exotic plant display are clear: How do they avoid becoming like Humboldt's parrots, squawking an incomprehensible rhetoric about conserving almost extinct species when what their visitors experience is a vision of paradise?

This dilemma was the focus of recent strategic revisions at Fairchild. Following discussions with staff, volunteers, donors, and board members, Fairchild determined to be more than a pretty parrot cage, a garden intended simply for viewing tropical vegetation. First, it sought to define the role of a botanical garden in a city where most people were born elsewhere and where the prevailing cultural influences are from Latin

America and the Caribbean. Second, it sought to identify how a botanical garden tackles environmental education and stewardship in a city with as many poor and culturally diverse residents as Miami. Third, recognizing that species and habitats cannot be saved within the confines of a botanical garden, it sought to understand how the garden could truly play an effective role in preventing the further extinction of plant species elsewhere.

Defining its duty to confront the biodiversity crisis and bioilliteracy dilemma does not mean that Fairchild should neglect its original mission to provide visitors with an experience of delight, wonder, and fascination. After all, how many people come to Fairchild to seek an understanding of the perianth structure of the *Melastomataceae* or to discuss the implications of climate change? They do come to enjoy shaded walks and to admire orchids, hibiscus, tropical water lilies, and the occasional flowering of the giant *Arum*. Garden officials have therefore worked to increase the number and abundance of flowers, to create a sense of welcome, and to host art and music events in the garden. These efforts have broadened the attraction of the garden to a wider range of communities and cultures.

At the same time, festivals centered around orchids, butterflies, and mangos serve as a means of promoting an understanding of ecological issues and concepts. In addition, to develop a sense of individual responsibility for all landscapes, whether or not they are endangered, the Fairchild Challenge – an environmental education outreach program for middle schools and high schools – was created. Schools participate in such diverse course options as the fine arts, website design, gardening, science, habitat restoration, community service, creative writing, photography, environmental debate, and ethnobotany. In 2006 an estimated 16,500 students from sixty-three schools took part in the Fairchild Challenge.

Every botanical garden is a combination of historical and contemporary influences. While Fairchild is a relatively new garden, it has undergone a series of dramatic cultural changes. It has listened to Baron von Humboldt's parrots and taken note. Like many other botanical gardens, it is developing a new institutional culture that is both socially relevant and culturally audacious. Although the mission of the Fairchild Tropical Botanic Garden is increasingly focused on combating species extinction and overcoming bioilliteracy, the twenty-first century garden – the public face for Fairchild's mission – is still true to David Fairchild's original vision of a tropical *wunderkammer*, a garden of revelation and enchantment. – Mike Maunder, Director, Fairchild Tropical Botanic Garden.

References

Web sites for botanical gardens discussed in this issue of *Site/Lines*

Pisa Botanical Garden: www.dsb.unipi.it/hbp

Hortus Botanicus Leiden: www.hortus.leidenuniv.nl

Chelsea Physic Garden: www.chelseaphysicgarden.co.uk

Cambridge University Botanic Garden: www.botanic.cam.ac.uk

United States Botanic Garden: www.nationalgarden.org/national_garden.html

New York Botanical Garden: www.nybg.org

Fairchild Tropical Garden: www.ftg.org

Books and Periodicals

Casid. Jill H. *Sowing Empire: Landscape and Colonization.* Twin Cities: University of Minnesota Press, 2005.

Ceo, Rocco and Joanna Lombard. *Historic Landscapes of Florida.* Miami: The Deering Foundation and University of Miami School of Architecture, 2001.

Desmond, Ray. Kew: *The History of the Royal Botanic Gardens.* London: The Havill Press with the Royal Botanic Gardens, Kew, 1995.

Fallen, Anne-Catherine. *A Botanic Garden for the Nation: The United States Botanic Garden.* Washington, D.C.: U.S. Government Printing Office, (forthcoming 2007).

Fairchild, David. *The World Was My Garden: Travels of a Plant Explorer.* New York: Charles Scribner's Sons, 1938.

Garbari, Fabio, Lucia Tongiorgi Tomasi, and Alessandro Tosi. *Giardino dei Semplici – Garden of Simples.* Pisa: Edizioni Plus, 2002.

—. *L'Orto Botanico di Pisa.* Pisa: Edizioni ETS, 2005.

Gager, C. Stuart. "Botanic Garden" in *The Standard Cyclopedia of Horticulture* by Liberty Hyde Bailey, Vol. I, pp. 526–532. New York: The Macmillan Company, 1935.

Harvey, John. *Medieval Gardens.* Beaverton, Oregon: Timber Press, 1981.

Hedrick, U. P. *A History of Horticulture in America to 1860,* with an addendum of books published from 1861–1920 by Elisabeth Woodburn. Portland, Oregon: Timber Press, 1988.

Hunt, John Dixon, ed. "The Botanic Garden" issue, *Studies in the History of Gardens & Designed Landscapes* 25:2 (April–June 2005).

Jackson, Faith Reyher . *Pioneer of Tropical Landscape Architecture: William Lyman Phillips in Florida.* Gainesville. University Press of Florida. 1997.

Kohlmaier, Georg, and BarnaVon Sartory. *Houses of Glass, A Nineteenth-Century Building Type.* Translated by John C, Haevey. Cambridge, Massachusetts: MIT Press, 1986.

Long, Gregory, and Anne Skillion, eds. *The New York Botanical Garden.* New York: Harry N. Abrams, 2006.

Minelli, Alessandro. *The Botanical Garden of Padua 1545–1995.* Venice: Marsilio Editori, 1995.

O'Malley, Therese. *Art and Science in American Landscape Architecture: The National Mall, Washington D.C, 1791-1852.* Ph.D. dissertation, University of Pennsylvania, 1989.

Prest, John M. *The Garden of Eden: The Botanic Garden and the Re-Creation of Paradise.* New Haven and London: Yale University Press, 1981.

Rix, Martyn, ed. *Curtis's Botanical Magazine,* Volume 23, 2006, pp 1–144.

Ruggles, D. Fairchild. *Gardens, Landscape, and Vision in the Palaces of Islamic Spain.* University Park: Pennsylvania State University Press, 2000.

Schiebinger, Londa, and Claudia Swan, eds. *Colonial Botany: Science, Commerce, and Politics in the Early Modern World.* Philadelphia: University of Pennsylvania Press, 2005.

Solit, Karen D. *History of the United States Botanic Garden,* 1816–1991. Washington D.C.: U.S. Government Printing Office, 1993.

Soderstrom, Mary. *Recreating Eden: A Natural History of Botany.* Montreal: Véhicule Press, 2001.

Spary, E. C. *Utopia's Garden: French Natural History From Old Regime to Revolution.* Chicago: University of Chicago Press, 2000.

Veendorp, H., and L. G. M. Baas Becking. *Hortus Academicus Lugduno-Batavus* 1587–1937. Leiden: Rijksherbarium/Hortus Botanicus, 1938, reprint 1990.

Walters, S.M. and Stow, A.E. *Darwin's Mentor: John Stevens Henslow.* Cambridge: Cambridge University Press, 2001.

—. *The Shaping of Cambridge Botany.* Cambridge: Cambridge University Press, 1981.

Kim Tripp

Kim Tripp, recently appointed to the newly created position of Director of the Botanical Garden at the New York Botanical Garden, has been helping shape its planning, policies, programs, and physical character for the past six years. Her doctorate in horticultural science, a visionary passion wedded to good management skills, and the ability to collaborate productively with others, however, do not alone explain her enthusiasm for the job.

"I grew on Eastern Long Island," she explains, "and I think that beautiful landscape – its reflective light, expansive fields, and long sandy beaches – was imprinted on me. I saw it as a portrait of itself, a living painting of layered wetlands and woodlands. You internalize that kind of thing. It gives you a sensibility. In addition, growing up in a town where my family thought about community as more than an artifact of history, as something that should be lived in, helped me understand the importance of space as layered by time, and how all of it – homes, yards, streets, parks – is interconnected. Honoring the space where you live and taking responsibility for it gives you an emotional connection to place that affects you the rest of your life."

Helping her mother garden in Sag Harbor encouraged Dr. Tripp's interest in plant science, which she furthered as a student at Cornell University, where she earned B.S. and M.S. degrees. At North Carolina State University she received a Ph.D. and served as postdoctoral associate with J. C. Raulston while holding the position of curator of conifers at the J. C. Raulston Arboretum. Additional postdoctoral work at the Arnold Arboretum of Harvard University and the directorship of the Botanic Garden of Smith College prepared her to become the New York Botanical Garden's vice president for Horticulture and Living Collections.

Dr. Tripp's tenure at the New York Botanical Garden coincides with the implementation of President Gregory Long's vision for the institution's mission: to further research excellence in botanical science, to build its educational programs, and to restore the 250-acre landscape as a combined horticultural showcase and public space. She has been instrumental in the garden's current renaissance in several ways: leading her staff in creating *The New York Botanical Garden Forest Management Plan* and *The New York Botanical Garden Collections Master Plan*, establishing a new program of museum exhibitions and flower shows, and reinterpreting the garden's collections with new signage and guidebooks. She has recently overseen several major construction projects, including the Nolen Greenhouses for propagation and research, the horticultural rejuvenation and interpretation of the forty-acre Arthur and Janet Ross Conifer Arboretum of mature pines, spruces, and firs, and the restoration of the fifteen acres containing the garden's collection of rare cultivated conifers, now known as the Benenson Ornamental Conifers.

This last project, the largest complete restoration of an individual section that the garden has ever undertaken, involved revealing vegetation-impacted Fordham gneiss rock outcrops, importing boulders to give additional structural character to the landscape, integrating new specimens with surviving members of the earlier conifer collection, and harmonizing the redesign with the adjacent swath of mature native woodland that the garden allows to remain in a generally natural state. "Think of the garden as a multi-layered tapestry with fifty plant collections woven into its historic landscape," Dr. Tripp urges. "Or think of it as a museum with galleries. We have to create a flow that carries the visitor through several specialized areas without losing the continuity of the garden's landscape as a whole." She continues, "Our collections are not just horticultural either; indoors we have the LuEsther T. Mertz Library with more than a million books and journals plus other materials, including botanical illustrations. Then there is the Steere Herbarium with over 7.2 million dried plant specimens."

Although her education prepared her to be a research scientist, Dr. Tripp clearly enjoys the complexity and diversity of her job as an administrator and interacting with staff, donors, scientists, board members, and the general public. About her colleagues, she says, "It is humbling and a privilege, working closely with people who have such an array of talent and such commitment." With regard to the garden's visitors, she maintains, "We're really happy that people want to come here for beauty, pleasure, and to learn about the importance of plants in the world."

For her the New York Botanical Garden doesn't stop at its perimeter fence. She oversees Bronx Green-up, the garden's outreach program, which supports two hundred gardens in the Bronx with its "Hortmobile" of roving advisors who help communities create and maintain gardens on abandoned property in their neighborhoods. "What is great," she says, "is to see children learn how to grow plants and adults take responsibility for these gardens, which really are much needed outdoor community centers."

Returning to the subject of the garden's landscape, Dr. Tripp acknowledges the challenge that, like all landscapes, it is in a constant state of transformation. Good day-to-day management is critical, along with continuing restoration and periodic rejuvenation with new ideas and new plantings. She sees landscape mutability as an opportunity for experimentation and education. For instance, she has recently been working with the public garden designer Lynden Miller to reconstruct a mixed flower border laid out by the early twentieth-century landscape designer Ellen Biddle Shipman. "We found Shipman's plans and notes in the library, but we didn't think it necessary to try to replicate what she had done even if we could have obtained the exact same plants that she used. Lynden and I discussed how the climate has been changing over the past couple of decades and decided to grow what have traditionally been classified as half-hardy plants here – myrtle, mahonias, camellias, the sorts of plants you find in Virginia and North Carolina. We think we can have a beautiful border similar to the one Shipman planted while being experimental at the same time – exactly Shipman's original interest. That way we'll see what thrives and what we'll be able to incorporate into our regional plant vocabulary."

If the test of good leadership is the ability to attract talented individuals, give them the freedom to innovate within the bounds of an organization's overall mission, and then promote them to positions of increased responsibility, President Gregory Long is to be applauded for nurturing Kim Tripp's exceedingly productive career and appointing her director of the New York Botanical Garden, a position she will fill with ability and distinction. – EBR

Exhibitions

Dutch Watercolors: The Great Age of the Leiden Botanical Garden
William D. Rondina and Giovanni Foroni Lofaro Gallery at the New York Botanical Garden
April 8–July 9, 2006

Dutch Watercolors: The Great Age of the Leiden Botanical Garden was that rare gem of an exhibition that tells the story of a place through an exquisite collection of art objects – in this case, a carefully chosen selection of woodcuts, drawings, hand-colored engravings, lithographs, and watercolors. All of these works were created in or collected by the Hortus Botanicus Leiden, the botanical garden established in 1587 in that historic Dutch city as part of its newly founded university (page 6).

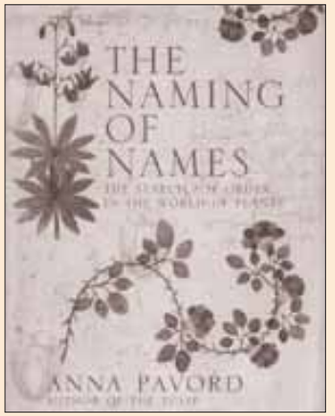
While the Hortus Botanicus was first created for the use of the university's medical students, it quickly became one of the most prominent botanical gardens in Europe through the brilliance and avid plant collecting of its first prefect, Carolus Clusius Clusius, who is perhaps best remembered for introducing the tulip to the Netherlands, convinced the Dutch East India Company to bring back specimens from its overseas trading posts and colonies. Plants from South Africa, Java, and elsewhere were transported to Leiden and then painted and drawn from life in situ. In time the Dutch West India Company followed suit, sending back specimens and drawings from Brazil, Suriname (formerly Dutch Guiana), and North America. Thus, the exhibition illustrated flora and fauna from all over the globe.

Albertus Seba, an early-eighteenth-century apothecary in Amsterdam, commissioned numerous depictions of the objects in his extraordinary cabinet of curiosities, a vast collection of plant and animal specimens from around the world, and these were published as copperplate engravings in his four-volume *Thesaurus*. Among those on display from this extraordinary work were, most notably, a highly disturbing, but beautifully calligraphic illustration (see cover) of a snake entwining an ivyleaf morning-glory (*ipomoea hederacea*).

The works in this exhibition, which also included the later work of Philipp von Siebold (1796–1866), the German-born physician who introduced Western medicine to Japan and catalogued Japanese flora and fauna, represented some of the earliest and finest botanical illustrations ever created. The title of the exhibition was, however, somewhat misleading since watercolors made up only a very small percentage of the works on view and most were in fact colored engravings. The limited gallery space requiring tight installation of works in vitrines was perhaps the greatest problem facing the curators, limiting the amount of accompanying textual exposition. This space limitation also meant that photographs of the Hortus Botanicus Leiden were not part of the exhibition, a great pity as a sense of the size of the gemlike Clusius garden within it – no larger than a volleyball court and now reconstructed in fascinating detail (page 7) – would have been both enlightening and surprising considering that it was the home to more than a thousand plant specimens new to Western horticulture.
– Justin Spring

Books

The Naming of Names: The Search for Order in the World of Plants
By Anna Pavord
(New York: Bloomsbury Publishing, 2005).



Browsing through plant encyclopedias and garden catalogs or visiting botanical gardens and nurseries, one can see many varieties of offerings, each carrying a binomial, or two-name, Latin label comprising a particular plant's genus, or family name, and an epithet, a characterizing secondary name denoting its species. This epithet may refer to a plant's distinguishing physical characterisitics: for instance, *Pinus rigida* for the upright pitch pine native to eastern North America or *alba*, the species name given to many white-flowered plants. It may also denote the plant collector who discovered it in the wild. For instance, one species of rhododendron is called *fortunei* because it was first brought into cultivation by Robert Fortune (1812–1880).

At the moment I am looking through *The Random House Book of Perennials*, which both describes and illustrates with color photographs 1,250 plants. If I want to plant the lovely bell-shaped campanula, I can choose and probably buy one or more of several members of the family *Campanulaceae*. If I have a rock garden I may want *Campanula carpatica*, which, as its name suggests, was discovered in the Carpathian mountains of Poland, Czechoslovakia, Romania, and western Russia. Or, I might want instead *C. persicifolia*, so named because its leaves resemble those of a peach tree. Its natural habitat, unlike that of the alpine *C. carpatica*, consists of meadows, open woods, and forest edges across most of Europe, from Belgium and Holland eastward through central and southern Russia and northwestern Turkey. Should I wish to have a particular white cultivar–that is, a hybrid variety – I might pick *C. persicifolia* 'Hampstead White.' (A plant's Latin binomial is always italicized while varieties of that species, whether natural or cultivated, invariably are indicated in 'Roman type.')

You don't have to be a gardener to find botanical Latin useful. Field guides provide helpful information accompanied by illustrations – often colored line drawings or photographs – for the naturalist or curious hiker. In Roger Tory Peterson's *A Field Guide to Wildflowers of Northeastern and Northcentral North America*, I find that the pretty violet-blue harebell I have seen in meadows and on rocky alpine slopes is called *Campanula rotundifolia*. Even though the small roundish basal leaves that give it its name wither early and are not usually apparent, I can identify it by its wiry, hairlike stems and linear leaves, which match those described and depicted in the Peterson guide.

The precise and systematic nomenclature that groups all plants into commonly held categories, employing Latin, the enduring language of Western society since antiquity, is generally credited to the great Swedish botanist Carolus Linnaeus. Whether Japanese, French, or Brazilian, when botanists and plant specialists around the world today communicate, they use binomial Latin and know that they are signifying the same plant.

Binomial Latin remains the system of naming plants newly discovered in the wild, and with classical studies departments on the decline, it may be fair to say that the survival of Latin as a living language is due in no small part to botanists. But this system – and even the word "botany," which did not gain currency until the eighteenth century – rests upon the struggle since ancient Greek times to classify plants in a meaningful way.

Today it is hard to remember that the main reason for classifying plants was originally medical. Herbals, handbooks identifying their use by doctors and apothecaries, were the first written texts on plants. The primary role of herbals was to describe plants as *materia medica*, and apothecary recipes are included in many old herbals. Initially written on parchment and later on papyrus (the discovery of this important practical use of an Egyptian sedge changed the form of books from scrolls to bound volumes), herbals were transmitted as manuscripts with, as one may imagine, multiplying errors until the invention of printing in the middle of the fifteenth century. Then books created on paper – a second-century CE Chinese invention that was not adopted in Europe until the printing press made its use inevitable – became textually and pictorially uniform.

Until the sixth century CE herbals were without illustrations. The first plant portraits are found in a magnificent parchment manuscript simply called "Juliana's book" after its patron, the eastern Roman empress Juliana Anicia. Like many other herbals from antiquity through the Renaissance, Juliana's book is based on *De materia medica*, a treatise written around 77 CE by the Greek doctor Pedanios Dioscorides.

The quest for a proper classification system by Dioscorides and other pre-Linnaean botanists and the parallel evolution of the botanical illustration from a formulaic to a naturalistic and scientifically observed image is the story Anna Pavord has chosen to tell in *The Naming of Names: The Search for Order in the World of Plants*. Doing justice to the images in the rare books that are its subject, Pavord's book is handsomely produced and contains 159 full-page illustrations, the bulk of which are of plants depicted in herbals dating from the time of Juliana's book until the end of the seventeenth century. Crammed with facts and based on an astonishing amount of research, her text strives for drama, with Pavord herself as protagonist. She tells us of the remote regions she has trekked in search of the rarities described in ancient treatises; the graves and memorials of eminent and obscure persons she has visited; and, of course, the numerous libraries where she has poured through precious volumes, deciphering their meaning and the accuracy of their illustrations.

However, in employing this spirited, first-person narrative, Pavord adopts an often irritatingly opinionated stance. With a large degree of journalistic license, she plays favorites, extravagantly praising one person while denigrating another. Readers may wince at some of her chapter titles: "Pliny the Plagiarist" deals with the great natural historian Pliny the Elder (23–79 CE), and "The Long-Nosed Nit-Picker" refers to Pier Andrea Mattioli (1501–1577), who "just continued to hoover up new plants for further, ever-expanding editions" of his 1565 herbal, *Commentarii in libros sex Pedacii Dioscoridis Anazarbi*. Pavord accuses Mattioli of appropriating without acknowledgment the work of one of her heroes, Andrea Cesalpino (1519–1603), the Italian plantsman who served as curator of the botanical garden at Pisa.

Scholars also may cringe at her breezy style. Worse, they will be dismayed at the confusion she betrays in the course of her voluminous, though sometimes overhasty, research as when she mistakenly attributes the famous letter of Pliny the Younger (62–c.115 CE), in which he describes his garden at Laurentum, to his uncle, her anti-hero Pliny the Elder, whom she calls "a Roman Gradgrind" ("Facts, facts, facts were what he consumed and regurgitated in vast quantities"). Compounding the error, Pavord conflates the younger Pliny's description of his Laurentine garden with the picture he draws in a separate letter of an entirely different villa garden he owned in Tuscany. About this garden the younger Pliny writes of an open riding ground surrounded by ivy-clad plane trees linked together by vines, a shady outer ring of laurels, and grass lawns separated by "box shrubs clipped into innumerable shapes, some being letters which spell the gardener's name or his master's." From this Pavord leaps to the conclusion that Pliny's garden of box topiary, grass lawns, and ivy-clad plane trees is ancestral to "a garden style re-created over and over again through the centuries that followed [down to the present day in which] the vine-covered pergola has become the hallmark of the kind of property most likely to find its way onto the glossy pages of *House and Garden* magazine." With unintentional irony in light of the above, she maintains that the encyclopedic elder Pliny was merely a "credulous compiler [and] not even a serious researcher."

Her prose is overwrought and often redundant. The same ideas and sometimes virtually the same sentences pop up in several places. However, Pavord does make an important point: first-hand field observation and scientific investigation of plants were slow in coming. Such was the reverence of later herbal writers for Theophrastus (c. 372–287 BCE) and his successor Dioscorides that even in the Renaissance – the Age of Discovery – as hitherto unknown plants were being sent back to Europe from the Americas and China, humanist scholars were chiefly writing glosses on ancient texts. Thus, knowledge was passed on mainly as received information.

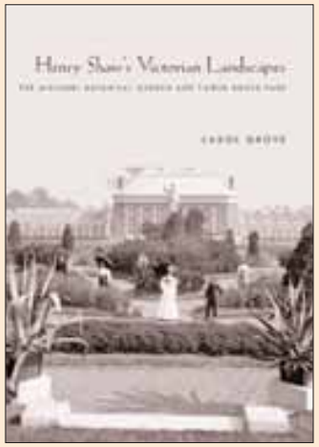
Pavord's principal hero is Theophrastus, and he figures prominently throughout *The Naming of Names*. This early naturalist taught at the Lyceum, which his teacher Aristotle founded in 335 BCE. He was, by her reckoning, "the first in the long list of men who fought to find the order they believed must exist in the dizzying variety of the natural world." From our post-Darwinian, secular, scientific perspective, it is difficult to realize how hard Theophrastus and other men of great minds once had to strain to make sense of the natural world. Eventually, it was necessary to transcend the Aristotelian system that posited a stable universe in which all things are knowable. Nevertheless, even for contemporary open-ended natural science, a system of classification such as the one Aristotle and his pupils pioneered remains necessary. For Theophrastus and those who came after him, the first order of business was simply to figure out a method of differentiating one class of plants from another and then universalizing this identification system by means of a language that transcended parochial tongues. Should plants be categorized according to leaf structure, seed and fruit character, growth habit, or some other common indicator that would logically divide them into families and species? The basic differentiation between trees, shrubs, and herbs (long called simples) was the primary and obvious place to begin. But without understanding, as Linnaeus did, how sexual means of reproduction distinguished one plant from another, many attempts reached dead ends.

Only much later would it be possible to banish hearsay and superstition from humanity's relationship to plants, thereby avoiding

their erroneous medical applications and liberating doctors and apothecaries from the wiles of herb women who gathered their supply of roots and tubers. By tracing the two-thousand-year effort to find a universal system of classification and the application of a scientific method to their study, Pavord makes us aware of the great adventure in the naming of plants. Her story is one that is fraught with the attrition of knowledge though book burnings, war, and other kinds of loss. Breaking with the slavish reliance on the received wisdom of ancient authorities, artists – notably Leonardo da Vinci and Albrecht Dürer – and seventeenth-century scientists such as John Ray (1627–1705) set plant knowledge on its present course by adopting close personal observation and independent scientific analysis. For making us aware of the necessity for a universally recognized system of plant classification and of the arduous process by which knowledge is acquired and transmitted through the centuries, we may want to overlook some of the flaws in Pavord's galloping and sometimes confusing narrative. Her story is in the end a fascinating one. – EBR

This review first appeared in The New Criterion, Volume 24, Number 8, April 2006

Henry Shaw's Victorian Landscapes: The Missouri Botanical Garden and Tower Grove Park
By Carol Grove
(Boston: University of Massachusetts Press and Amherst: Library of American Landscape History, 2005)



In *Henry Shaw's Victorian Landscapes: The Missouri Botanical Garden and Tower Grove Park* Carol Grove underscores the English heritage and tastes of her transplanted subject, the botanist and philanthropist Henry Shaw (1800–1889). A naturalized American citizen since 1843, Shaw spent his early childhood in Sheffield, an industrial town in South Yorkshire, where he was born to middle-class parents of apparently unequal social standing. Although there were manufacturing interests on both sides of the family, his father, a producer of grates, fire-irons, and other kinds of heating equipment, was thought to have "married up." Shaw himself never married. After leaving home in 1819 to seek new markets for his father's business, he settled in New Orleans where he set up a hardware business.

He subsequently relocated to rapidly growing St. Louis where tools and utensils were in great demand by both newcomers and frontier emigrants heading west on the Santa Fe Trail. Here Shaw amassed a considerable fortune, enabling him to retire in 1839 in order to return to his boyhood interest – a fascination for plants – that he had acquired at Mill Hill, a boarding school north of London. Coincidentally, the site of that school had been once occupied by the home of the noted Quaker horticulturist Peter Collinson (1694–1768). As Grove relates the story of Collinson's exchanges of seeds with the Philadelphia botanist John Bartram (1699–1777), we are reminded of the sort of Anglo-American connections that Shaw would build upon over the course of his lifetime.

In 1851 Shaw engaged architect George L. Barnett to design Tower Grove, his mansion and estate, where he was able to pursue his passion for botany and horticulture. In 1859 he founded the Missouri Botanical Garden, turning over 79 acres of his grounds to that institution. The remaining 289 acres of his estate was deeded to the city of St. Louis in 1868 as Tower Grove Park. According to Grove these combined bequests were meant to fulfill Shaw's "twin missions of [public] recreation and education."

Because this is a book about these two Victorian landscapes and not a biography, we do not learn of Shaw's views on the Civil War or slavery (although Grove notes that he owned eleven slaves, perhaps for more than a decade). We do learn how one of America's great botanical gardens was conceived by Shaw and developed under his direction. With ample illustrations – plans, renderings, paintings, horticultural advertisements, and photographs – the book depicts the physical development of the Missouri Botanical Garden, Tower Grove Park, and several related structures, including the charming cast iron gazebos that ornament the park. In portraits of Shaw, we can detect traces of pride, shrewdness, benevolence, and possibly amusement. Other portraits – of workmen, students, and colleagues such as James Gurney, superintendent of the Missouri Botanical Garden – remind us that Shaw's botanical garden and park were the products of many minds and hands.

And yet Grove makes clear that one visionary man was in charge. She identifies the sources of Shaw's ideas in books, journals, travel, and conversation. She dwells on the formative influence of a number of great English gardens, particularly the Royal Botanic Gardens at Kew and Chatsworth in Derbyshire, where, as head gardener for the sixth Duke of Devonshire, Joseph Paxton achieved some of the finest work of his productive career. For Shaw's general views on the aesthetics of landscape and garden design, Grove confirms the influence of William Gilpin, Uvedale Price, and Richard Payne Knight, the principal theorists of the Picturesque in England, as well as that of the renowned practitioner of Picturesque landscape design, Humphry Repton and John Claudius Loudon, champion of the Gardenesque, the style in which the display of specimen plants was a priority.

Grove also touches on the broader influence of Ralph Waldo Emerson, Henry David Thoreau, and Charles Darwin. In addition, Shaw shared the social concerns of Andrew Jackson Downing and Frederick Law Olmsted without entirely adhering to their Picturesque and naturalistic aesthetics. He sought the advice of men of science, including German-born botanist George Engelmann (1809–1884) and Harvard professor Asa Gray (1810–1888), whose *Manual of Botany* long remained the standard reference work in the field. Beyond these influences, he gained an appreciation of art from connoisseurs of landscape painting and drawing.

Grove demonstrates that, because of his keen interest in botany and plant collecting, Shaw quite naturally favored Loudon's Gardenesque design aesthetic in which each tree and shrub was given ample room to grow into a healthy individual specimen. At the same time, he combined this Gardeneque approach with that of the Picturesque so that, seen from a distance, his landscape compositions retained a parklike character. While this middle course in landscape design might serve the interests of both science and art, Grove notes that Shaw's deepest concern was for "the public and the art of gardening," hence his desire to share his estate and his passion with the citizens of St. Louis.

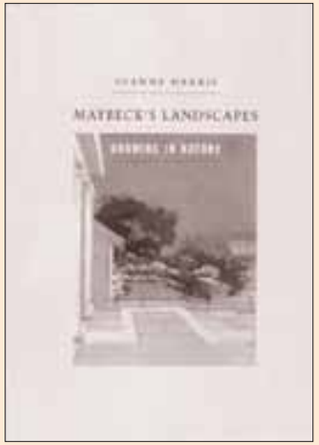
Not long after his death in 1889, changes in Shaw's layout of the Missouri Botanical Garden were initiated by the botanist William

Trelease (1857–1945), who succeeded him as director. From 1896 through 1905, the Olmsted firm (initially Olmsted, Olmsted, and Eliot) worked on a master plan that would have given the garden a much more naturalistic treatment than Shaw intended. In the end the garden became a collection of several special gardens and is perhaps best known today for its Climatron, a geodesic dome built in the 1950s to contain a representation of a tropical rainforest.

Although I read an early draft of a portion of this book, I was not involved in its evolution, which has resulted in a lucid, scholarly work, handsomely produced and enhanced by Carol Betsch's elegant, understated photography. Grove's text is framed by contributions from others. The preface by Robin Karson, executive director of the Library of American Landscape History, highlights Shaw's independence from Olmstedian aims and design preferences. In the foreword, Peter H. Raven, director of the Missouri Botanical Garden, dwells on the alliance between the botanical garden and the University of Washington School of Botany, which Shaw endowed. In the informative afterword, John Karel touches on later developments in Tower Grove Park, including its designation as a National Historic Landmark in 1989. Together these pieces provide a multi-perspective context in which to consider Grove's important story of Shaw's personal and philanthropic gifts by providing St. Louis with two major attractions, the now world-famous Missouri Botanical Garden and Tower Grove, the epitome of an American Victorian park. – Melanie L. Simo

Maybeck's Landscapes: Drawing in Nature by Dianne Harris

(San Francisco: William Stout/Berkeley Design Books, 2004)



Interest in the Arts and Crafts Movement surged when the Los Angeles County Museum of Art and the Victoria and Albert Museum in London mounted two major traveling exhibitions that appeared in several United States cities from 2004 into 2006. The movement, which began in England during the latter part of the nineteenth century, was a response to the ills of industrialization. Although its prominence waned after World War I as modernism, with its firm embrace of industrial technology, became a countermovement, its influence continued to reverberate within the sphere of international design. Both of these exhibitions made clear that the Arts and Crafts Movement not only produced beautiful objects – ceramics, metalwork, textiles, book arts, and furniture, to name a few – but attracted a considerable number of highly individualistic designers. William Morris, C. R. Ashbee, Charles Rennie Mackintosh, C. F. A. Voysey, M. H. Baillie Scott, Edwin Lutyens, and Ernest Gimson are among the leading designers associated with the movement in Britain.

In America, where the movement took on a more craft-oriented approach, the names that immediately spring to mind are Frank Lloyd Wright, Gustav Stickley, and the Greene brothers. The 1907 Blacker and 1908 Gamble houses in Pasadena by Greene & Greene as well as Charles Sumner Greene's 1911 pool garden at Green Gables in Woodside are considered Arts and Crafts architectural masterpieces today, exemplifying the best qualities of regional building traditions, superb workmanship, and sensitive integration of house and landscape. The movement's principles of simplicity, utility, and expert craftsmanship appealed to younger American architects searching for an alternative to the dominant Beaux-Arts style. Like Wright, many of these architects distanced themselves from the international architectural mainstream by embracing a reverence for natural materials.

Bernard Ralph Maybeck (1862–1957) stands out as one of the best American architects of the period. His work, located primarily in the San Francisco Bay Area, is admirably covered in Sally B. Woodbridge's excellent book, *Bernard Maybeck: Visionary Architect* (New York: Abbeville Press, 1992), and Robert Craig's *Bernard Maybeck at Principia College: The Art and Craft of Building* (Layton, Utah: Gibbs Smith, 2004). Dianne Harris's new book, *Maybeck's Landscapes: Drawing in Nature* extends their scholarship with a welcome discussion of an often overlooked aspect of the architect's design approach: his skill in integrating landscape architecture and architecture.

During the Arts and Crafts period landscape design was considered an essential component of building, and while England abounds in examples of houses and gardens conceived as one – the work of Lutyens and Gertrude Jekyll immediately comes to mind – the United States produced fewer comparable examples. Landscape planning for American craftsman houses generally was uninspired. Exceptions include Wright's visions for his early houses, as captured in Marion Mahoney's exquisite renderings that set his houses within dreamy landscapes.

Educated at the École des Beaux-Arts at the end of the nineteenth century, Maybeck became one of the originators of the Bay Regional Style. He practiced between 1892 and 1940, the golden years of California architecture and design, when Julia Morgan, Irving Gill, the Greene brothers, Willis Polk, and others brought West Coast architecture to national attention. Maybeck's 1916 First Church of Christ, Scientist in Berkeley remains his most celebrated work (see Edward Bosley, *First Church of Christ, Scientist, Berkeley* [London: Phaidon, 1994]). In many ways this church is emblematic of the Arts and Crafts Movement's ideal of integrating buildings with their landscape surroundings. The wisteria covering the building and entwining the trellis structure, for example, brings nature to the building, while the richly painted polychrome interiors harking back to Pugin emphasize the rustic exposed wood beams – craft architecture bowing to nature.

Harris's study, which grew out of the author's 1989 master's thesis at the University of California, Berkeley, is based primarily on the collection of Maybeck's drawings and sketches in the university's Environmental Design Library. A recognized scholar in landscape history, she is currently associate professor of landscape architecture and architecture at the University of Illinois Urbana-Champaign. The first section of her book summarizes Maybeck's education, influences, and relationship to northern California design history, and the second provides detailed analyses of specific projects. A particular virtue of this slim volume is the inclusion of Maybeck's watercolor and pastel sketches, most executed on brown kraft. The gnarled oaks, villa gardens, fountains, and other classically inspired architectural ornament in some of the watercolor renderings

are reminiscent of Maxfield Parrish's famous illustrations, such as those for Edith Wharton's *Italian Villas and Their Gardens* (1904). They reveal the extent to which he valued the site and its surrounding landscape even more than the building.

Harris assumes the reader's familiarity with Maybeck's key works, such as the Palace of Fine Arts; the First Church of Christ, Scientist; the Phoebe Apperson Hearst Memorial Gymnasium for Women; and others. The projects selected for inclusion in *Maybeck's Landscapes* range from these major works to the delightful 1909 Leon Roos Residence in San Francisco. This half-timbered Arts and Crafts house, for which Maybeck also designed the furnishings, includes a storybook front garden and a large vegetable garden at the rear of the property. The detailed planting plan for the vegetable garden, employing the typical geometric configuration of an English Arts and Crafts garden, reflects the architect's early fascination with English cottage gardens and his knowledge of Jekyll, William Robinson, and other important theorists of the period. From these early influences, he went on to develop his own California style. Maybeck's love of the Berkeley hills emerges in his best work, particularly in his venture with Charles Keeler and the Hillside Club in envisioning Berkeley as a garden city (though not in the English sense of the term as applied to new town planning).

Harris discusses Maybeck's use of color, a subject often overlooked in other studies of architects and garden designers. He often used clipped evergreen hedges, the stalwart of many English Arts and Crafts gardens, to define a garden's edge and anchor the building to the soil. Ideally suited to the California climate, pergolas and trellises – Maybeck's two signature devices – extended the expression of the building's structural system outdoors. Vines were allowed to hang down in front of windows to further connect exterior with interior. Harris even goes so far as to treat Maybeck's planter boxes as a serious design component. He placed them on the top of the tall free-standing columns at the Palace of Fine Arts in San Francisco, on the terrace at the Hearst gymnasium, and along extended horizontal structural members of some of his houses. He used color to create mood and atmosphere in his projects, often selecting plants with purple and pink tones to complement the natural and stained woods of his structures. In the original planting scheme for the First Church of Christ, Scientist, Maybeck included not only purple-flowering wisteria and purple lantana but also pink Cherokee roses (*Rosa cherokeansis*), tea rose trees (*Leptospermum scoparium*), and *Clematis montana.*

In conclusion, Harris asks whether we should think of Maybeck as a landscape architect as well as an architect. Perhaps, she says, for "after all, he clearly regarded the two as constituent parts of the greater whole."

Maybeck's Landscapes, which is beautifully designed and filled with insightful analyses, provides an excellent launch to the series on modern landscape masters edited by Marc Treib. Future volumes will include *The Donnell and Eckbo Gardens: Modern California Masterworks* and *The Houses of Joseph Esherick* by Marc Treib and *Creating the Public Garden: The Suburban Parks of Robert Royston* by Reuben Rainey and J.C. Miller. – Judith B. Tankard

Calendar

Nature and Place: A Series of Conversations with Elizabeth Barlow Rogers
A lecture series co-sponsored by the New York Botanical Garden, the New-York Historical Society, and the Foundation for Landscape Studies

Nature and human beings exist in a perpetual bond, the outcome of which is never predictable. The confidence in the technological mastery of nature that was so prevalent in the first two-thirds of the last century is seriously questioned by many people today since nature can defy the engineer with unexpected and often cataclysmic destruction. At the same time, nature still inspires us with a sense of wonder that calls us to its defense in the face of our own destructiveness of the land and Earth's biological richness. For landscape designers especially, nature is an indispensable partner. This series will take the form of four talks on the nature of good place-making, each to be followed by a conversation between the guest speaker and Elizabeth Barlow Rogers, president of the Foundation for Landscape Studies. These conversations will explore how to plan and design landscapes of different kinds and at different scales that synthesize art and nature in ways that are environmentally respectful, experientially rewarding, and a source of personal delight.

To register: Call the Continuing Education Department of the New York Botanical Garden: (718) 817-8747

Location: New-York Historical Society, Central Park West at 77th Street

General admission:
Individual programs, $25 (members, students, educators, seniors $23)
Complete series, $90 (members, students, educators, seniors $81)

Tuesday, January 9, 2007
6:30 p.m.

Rick Darke
A Gardener's Conversations with the Woods
Rick Darke will reflect upon three decades of woodland observation and interaction and on how this exchange has influenced the eyes, ears, and heart of a naturalist-turned-gardener.

Rick Darke is president of Rick Darke, LLC, an independent consulting firm focused on landscape ethics, photography, and contextual design. His work has been featured on National Public Radio and is reflected in his many books, including the award-winning The American Woodland Garden: Capturing the Spirit of the Deciduous Forest.

Tuesday, February 13, 2007
6:30 p.m.

Tony Hiss
Two Addresses for New Yorkers to Call Home: The H2O Landscape
Tony Hiss will present the startling findings behind his most recent book, *H2O: Highlands to Ocean*, which show that despite four hundred years of nonstop growth in the New York City area, so much spectacular natural land and water survive that everyone here has two addresses: a street address and a place in the larger landscape.

Tony Hiss has written thirteen books, including the award-winning *The Experience of Place* (New York: Random House, 1991). He was a staff writer at *The New Yorker* for more than three decades and lives in Manhattan with his wife and teenage son.

Tuesday, March 6, 2007
6:30 p.m.

Tim Davis
The American Parkway: Past, Present and Future
Parkways combine recreation, transportation, and natural resource protection in landscapes specifically designed to promote the enjoyment of scenery in motion. This conversation with Tim Davis will trace the evolution of the American parkway, discuss contemporary management concerns, and speculate on future prospects.

Tim Davis is the lead historian for the National Park Service's Park Historic Structures and Cultural Landscapes Program. His writings on parkways and other aspects of the American landscape have appeared in numerous journals and in the prize-winning volume *America's National Park Roads & Parkways: Drawings from the Historic American Engineering Record* (Baltimore: John's Hopkins Press, 2004).

Tuesday, April 10, 2007
6:30 p.m.

Carol Franklin
Nature in the City
Carol Franklin, a landscape architect, reflects on how existing and future park systems based on rivers and their tributaries protect regions, cities, and neighborhoods from the worst effects of urban sprawl: destruction of natural areas, a general loss of urban character, and homogenization of the suburban landscape.

Carol Franklin is a founding member of Andropogon Associates, Ltd., a firm that has pioneered the rediscovery and celebration of place. She currently is finishing a book on a park system in the dramatic gorge of Philadelphia's Wissahickon Valley and the suburban countryside directly abutting it.

Contributors

Nina Antonetti, Ph.D., is an assistant professor in the new landscape studies program at Smith College in Northampton, Massachusetts. As a landscape and architectural historian, Antonetti has held research positions at the Center for the Advanced Study in the Visuals Arts at the National Gallery of Art and the Victoria and Albert Museum in London.

Rosie Atkins worked on the *London Sunday Times* newspaper from 1968 until 1982, leaving to become the gardening correspondent of the newly launched *TODAY* newspaper. In 1993 she launched *Gardens Illustrated* magazine, now owned by BBC publications and distributed worldwide. In March 2002 Atkins left her position as editor of *Gardens Illustrated* to become curator of the Chelsea Physic Garden. She is a Fellow of the Linnean Society, serves on the Horticultural Board and the Woody Plant Committee of the Royal Horticultural Society, and is a trustee of Gardening for the Disabled.

Fabio Garbari is professor of Systematic Botany at Pisa University, director of the Botanical Gardens and Museum of the Department of Biology, and president of Si.M.A. (Museums and Collections System of the Pisan Athenaeum). He is the author of many books and papers on Mediterranean flora and has co-authored *Gardens of Simples*, a text on the history, people, and roles of Pisa Botanical Garden over the centuries (Pisa: Pisa University Press, 2002). He is deeply involved in investigating the relationships between art and science, with particular focus on sixteenth- through eighteenth-century botanical iconography.

Gregory Long has spent thirty-five years in the management of cultural institutions in New York City. In 1989 after seven years with the New York Public Library, he was made president and chief executive officer of the New York Botanical Garden where he has presided over a period of unprecedented growth and development.

Mike Maunder, Ph.D., is executive director of the Fairchild Tropical Botanic Garden in Coral Gables, Florida. He is a fourth-generation horticulturist with degrees in plant taxonomy and conservation genetics. Maunder is chair of the World Conservation Union's Plant Conservation Committee and is a director of the American Public Garden Association (APGA).

John Parker is director of the University Botanic Garden, curator of the Herbarium, and professor of Plant Cytogenetics at the University of Cambridge. He is a director of the National Institute for Agricultural Botany and an honorary research fellow at the Natural History Museum in London, having previously served as a trustee of Royal Botanic Gardens, Kew, and as a council member of the Royal Horticultural Society. His research concerns the genetics of plant populations as well as the origins of the modern theory of evolution.

Holly H. Shimizu is the executive director of the United States Botanic Garden in Washington, D.C. She has had a rich and varied career in public horticulture that includes work in many parts of the world. Shimizu recognizes that the U.S. Botanic Garden's location on the National Mall mandates this institution's responsibility to educate and inspire people about the critical importance of plants in our lives.

Melanie Simo is a historian of art and landscape who has held teaching positions at the Harvard Design School, the Rhode Island School of Design, and Carnegie-Mellon University. She is the author of several books on landscape history, including *Loudon & the Landscape, From Country Seat to Metropolis, 1783–1843* (New Haven: Yale University Press, 1989), *Invisible Gardens: Search for Modernism in the American Landscape* with Peter Walker (Cambridge, Massachusetts: MIT Press, 1996), *Forest & Garden: Traces of Wildness in a Modernizing Land, 1897–1949* (Charlottesville: University of Virginia Press, 2003), and *Literature of Place: Dwelling on the Land Before Earth Day 1970* (Charlottesville: University of Virginia Press, 2005).

Justin Spring is a biographer, art historian, and curator. His biography of painter and critic Fairfield Porter (New Haven: Yale University Press, 2000) recently was hailed as "superb" by the *New York Review of Books*. He also has published works on artists Paul Cadmus, Wolf Kahn, Edward Hopper, and Jackson Pollock and currently is writing a biography of Samuel M. Steward, which will be published by Farrar, Straus and Giroux. An exhibition on the five-hundred-year history of the tulip in art, which Spring is curating, will open at AXA Gallery in New York City in March 2008 before traveling to museums throughout the United States. He is a dedicated amateur gardener at his weekend home in Bridgehampton, New York.

Judith B. Tankard, a landscape historian, teaches at the Landscape Institute of Harvard University's Arnold Arboretum. Her latest book, *Gardens of the Arts and Crafts Movement* (New York: Harry N. Abrams, 2004), was reviewed in *Viewpoints* (Spring/Summer, 2005), the predecessor journal to *Site/Lines*.

Gerda van Uffelen is the collection manager of the Hortus Botanicus Leiden. She studied fern spores and has been published on ferns. She is now responsible for the administration of all plants in the garden and laid out the new systematic garden. She also is involved in research concerning the early years of the garden.

FOUNDATION
for LANDSCAPE STUDIES

7 West 81st Street
New York, NY 10024

[site LINES]

Volume 11, Number 1
Fall 2006

Publisher:
Foundation
for Landscape Studies

For more information about
the Foundation for Landscape
Studies visit www.foundation-
forlandscapestudies.org,
or contact rogerseb@aol.com