The St. Vincent Botanic Garden—The Early Years

Richard A. Howard

Late in the eighteenth century, while France and Great Britain were vying for control of the sugar-rich Caribbean islands, the first program of plant introductions in the British West Indies was instituted on the small island of St. Vincent. The garden's second superintendent—a master plantsman and collector of more than 100 plants new to science—not only expanded that program but also began propagating and distributing new discoveries from around the world.

The peace treaty signed in Paris in 1763 ended for a brief period the fighting between Great Britain and France in the Caribbean. British general Robert Melville (1723–1809) was appointed governor of the southern British Caribees—Dominica, Tobago, Grenada, St. Vincent and the Grenadines—and made Grenada his headquarters. In June 1765 he visited St. Vincent and discussed with George Young, surgeon of the military hospital there, his plan for a botanic garden, primarily to provide medicinal plants for the military as well as to improve the life and economy of the colony. Dr. Young agreed with the proposal, and Melville ordered that six acres of land previously designated for military use be set aside for the garden, with Dr. Young as the superintendent. This marked the beginning of the St. Vincent Botanic Garden, which eventually expanded to twenty acres.

The garden was to serve as a repository for all useful plants that could grow on St. Vincent but also, in contrast to the botanic gardens at Kew, Oxford, Cambridge, and European botanic gardens at the time, as a nursery for plants to be distributed around St. Vincent and to other islands. Melville wrote to Young in 1766:

I need not repeat to you how desirous I am that my foundation of a botanical plan entrusted to your skill and perseverance should prove successful, nor do I suppose it necessary that I give you fresh assurances how much my attentions and support may be relied on, for already you know my assistance shall be as great as my situation and multiplicity of public affairs will possibly permit... The articles of plants and seeds commissioned from the Main near Honduras I shall soon hope to receive, and seeds of the best cinnamon from Guadeloupe. If you have once made tolerable progress in raising useful and curious plants, I should not despair of obtaining from Home encouragement in books, machines, instruments, etc., but till then I find I must hazard what expenses are unavoidable (as I have already done)... Pray get as much information as possibly you can from all quarters relative to the indigenous medicines. It is against your craft but would be highly beneficial to the public and do yourself honour. And I should think for this purpose physical practitioners of the country, natives of experience, and even old Caribs and slaves who have dealt in cures might be worth taking notice of, and if at any time you should think that a secret may be got at or even an improvement for small expense, I shall readily pay for it.1 6 4 14

In spite of Melville's promises, the government in London did not fund the garden, and neither of Melville's two successors as governor, Leybourne and Morris, was willing to assist in its maintenance. Nevertheless, by drawing on a variety of resources, Young was able to initiate the first program of plant introduction in the British West Indies. The War Department and the East India Company sent seeds and plants from tropical India and from British North Borneo, Sabah, and Sarawak in the East Indies, and others may have come from French horti-
by the many tourists and those who use the little chapel nearby. Although the small lawn around the giant is irrigated, this cannot replace the loss in humidity. In 1994, major changes were completed: the main road was diverted and the formal park with paths and flowerbeds around the trees extended. These have been major steps forward but by no means enough to secure the future of the giant in Oaxaca.

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The authors are researchers, Dr. Debreczy with the Massachusetts-based International Dendrological Research Institute and Dr. Rácz at the Hungarian Museum of Natural History. They are working on the Coniferae (Gymnospermae) volumes of their dendrological atlas with original field research, photo documentation, and connected conservation activity. For more information on their project, write IDRI Inc., P.O Box 812910, Wellesley, MA 02181, U.S.A., or find them on the WEB at http://world.std.com/~jegar/idri.html.

To assist the group dedicated to saving El Arbol del Tule, contact Patronado Estatal de Promotores Voluntarios, 604 Garcia Vigil Oaxaca de Juarez, Oaxaca, Mexico.
A treasure of Chapultepec Park, the once beautiful giant, El Sargento (or El Centinela), died in the 1970s. Like most of the massive bald cypresses that witnessed the fall of the Aztec empire, it succumbed to the rapidly changing environment in and around Mexico City. The species—Taxodium mucronatum, the Mexican, or Montezuma, bald cypress—was voted National Tree of Mexico during the celebration of the centenary of independence in 1910.
However, the crown, the foliage, and the cones were so strikingly uniform that we were doubtul of its multiple nature. Boone Hallberg of the Instituto Tecnologico de Oaxaca confirmed our doubts, noting that in the thirty years he has been observing the tree, the timing of budding, the development and color of the leaves and strobili, the shedding of pollen, as well as the leaf color after frost—all were the same. In con
test, he had watched another tree growing along a nearby stream, a fusion of two different seedlings. The two trees were easily distin
guished by subtle differences in both morphology and phenology.

To be three trees and one at the same time implies the union of sprouts of the same tree. The Taxodiaceae, including the genus Taxodium, possesses the ability to sprout from stumps following logging, as is often seen in the northern bald cypress, T. distichum, a very close ally of T. mucronatum. It is quite possible that the independent trunks that gradually “built” Arbol del Tule originated as sprouts from the trunk of a single damaged tree, or as layered branches from a tree whose single central trunk died out, after which the layers grew and fused together. The process by which the tree could have formed from several separate trunks has been illustrated by biologist Angel Salas Cuevas, using old descriptions, drawings, and photographs as a basis. His proposed scenario for the life history of the Tule tree from the appearance of the first tree, to its fusion with two of its suckers, and finally its coalescence with a later, third sucker can be seen on the preceding page.

In 1990 [Hall et al.], the results of enzyme analysis of samples taken from eight major segments of the tree provided undeniable evidence to support the theory of a single specimen, and as such, one of the world’s largest trees in circumference. These results were further supported in 1996 [Dorado et al.] by evidence of genetic uniformity from DNA analysis. The competing theories of multiple trees vs. a single tree were thus apparently resolved.

Epilogue

Before being leveled by the Europeans, the 300,000-person Aztec capital, Tenochtitlan, was a large, well-organized city, a place of spectacu
lar art, its market loaded with food brought from Xochimilco's floating gardens through a dense network of canals. Reaching almost 5,500 meters, the snow-covered peaks and rims of the sacred mountains, the Popocatepetl and his partner, Iztaccihuatl, hung like floating crystals above the city. The graybearded ahuehuetes were revered and planted everywhere along the canals, including areas that were later incor
porated into the beautifully nurtured parks of Texcoco and Chapultepec. Some of their biggest trees were still with us only two or three decades ago, and it sends a shiver up the spine to think that the Aztecs once walked in their shade.

Smog and especially the drop in water table—pressures of a dramatically changing world—finished Mexico City's El Sargento in the 1970s, as well as the famous Ahuehuete of Popotla, the Arbol de la Noche Triste, and the big tree near the temple of the Aztec king Netzahualcoyotl in Texcoco. With a leaf surface of 9,300 square meters, the Tule tree has a tremen
dous evapotranspiration rate. It is enough to look at the tree to see that something is wrong. Gone is the beauty of the light-green foliage drooping ten meters downward with no branches visible beneath it, as it was seen just a human generation ago. The entire circumference of the tree, but particularly its southern side, is now full of twisted, skeletal branches. The tree has begun to decline, losing crown size in response to the changing environment. Any
one who has ever dealt with conifers knows exactly where this will end if the process is not halted and reversed as soon as possible.

Just decades ago, in the 1950s, Oaxaca was still a peaceful town of 40,000 people: somewhat provincial, with friendly merchants, silent streets of colonial elegance, and mainly Zapotec and Mixtec vendors in the market. The city has expanded rapidly and is now ten times as large, and it is about to celebrate a half million inhab
itants. Water is used freely and El Tule's water table has dropped to its lowest level ever. Once a citizen of the swamp with a root system developed for a high water table and a crown adapted to higher humidity, Arbol del Tule and its neighboring, smaller giants, the Son and Grandson, are now clearly suffering. The soil is compacted.
and found a large enclosed place “which could serve as a habitation in case of need.” This observation convinced him that the trunk belonged to one individual and that the divisions at the base of the trunk, considered to stem from separate trees, are only parts of a sole specimen.

Another botanist, Casiano Conzatti, after a year spent studying the tree, published his findings in a 1921 article entitled in its English translation, “Monograph on the Tree of Santa María del Tule.” Conzatti drew on records from previous writers—Desiré Charnay (1863), Manuel Ortega Reyes (1884), and Manuel F. Alvarez (1900) as well as Bolaños (1841) and Villaseñor (1892)—to make comparisons. To get an idea of the growth rate of the species locally [without damaging the venerable one], he correlated size and age of bald cypresses in the area by measuring trunk sizes and counting annual rings of cut branches. He found that the species has a surprisingly fast growth rate, and that, as a rule of thumb, the diameter of the trunk in centimeters is about half the age of the tree in years. Using this number in conjunction with an average diameter of 8 meters [more than 26 feet] for the irregularly shaped trunk of the giant, his calculations suggested that the tree was between 1,433 and 1,600 years old [numbers which, interestingly, approach the planting time given in the legend of Pechoca].

Three or More, Yet One

Three trees, three genetically different organisms—as we stood before Arbol del Tule in 1990, the fusion of several trunks appeared plausible.

Biologist Angel Salas Cuevas proposed a scenario for the life history of El Arbol del Tule. The young tree is small and single. Its trunk is joined by a second trunk—a root sprout—about 2.5 meters (8 feet) away. When the third trunk appears, the original tree and its two suckers form an almost equilateral triangle. After their fusion, the newly enlarged trunk, with its deep ribs along the fusion lines, takes on a cloverleaf shape in cross section. These trunks become a single trunk scored with deep furrows and gaps, and a fourth trunk appears 3.5 meters (12 feet) away on the east side. The greatest change, however, is yet to come: the fourth trunk gradually joins the triad. The tree is now almost 5 meters (16 feet) in diameter, and the main section quickly expands to over 7.5 meters (25 feet) at its widest.
Ahuehuete gallery forest near Sola de Vega, Oaxaca. Note the root system weaving a protective lattice on the riverbank. Instead of adaptation to anaerobic swamps, Taxodium mucronatum is adapted to periodically high riverbeds and riversides. The fantastic root systems grasp the riversides, fencing the riverbed with such efficiency they seem to be created for that purpose. At Sola de Vega, the most beautiful riverbed habitat of the species is still untouched, providing dramatic views of trees 12 to 15 meters (40 to 50 feet) tall.
by E. W. Berry in 1923. An old legend among the local Zapotecs and Mixtecs tells us that the tree, along with several others nearby, was planted for the benefit of the people by Pecocha, a representative of the Aztec god of wind and storms, Ehecatl. This story puts the age of the tree at around fourteen hundred years.

Estimates, to be correct, should consider the tree's rate of growth, but in the case of the Tule tree, another question has been raised through the past two centuries: is it a single tree or a group of trees that have coalesced to form a single individual? Although the tree is thought to have been visited by Alexander Humboldt on his visit to Mexico in 1803, evidence suggests that he never reached Oaxaca and therefore never visited the tree. However, he wrote in his *Political Essay on the Kingdom of New Spain:*

In the village of Santa María del Tule, three leagues from the capital, there is an enormous sabino (*Cupressus disticha* [now *Taxodium mucronatum*]), the trunk of which is 36 meters [120 feet] in circumference. This old tree is even more corpulent than the cypress of Atlixco of which we have spoken above, than the Dragon tree of the Canary Isles and than any of the baobabs (*Adansonia*) of Africa. But examined closely, señor Anza has observed that, that sabino, which is such a surprise to travelers is not a single individual but a group of three trunks united (II: 45–47).

In 1892, Alejandra Villaseñor summed up nearly a century of controversy:

The trunk of the tree of Santa María del Tule, far from being compact and almost cylindrical, is, on the contrary, rough-barked, unequal, and fissured, covered with senile excrescences [burls], some of large size, with bold projections which made a certain Sr. Anza suppose that it was not a single tree but three united; but later observations by Dr. J. Bolaños in 1840 and by other people have shown the error of the supposition.

Botanist Juan Bolaños climbed the tree to the point where the common trunk ends and the primary branches begin.
Taxodium mucronatum differs little from its northern relative, T. distichum. C. S. Sargent in his Silva of North America (1896) wrote that “it may prove to be a mere geographical form of our tree.” Others, like Harper in 1902, consider it a “Sonorized” form of the northern species. Except for its “knees,” which are absent or short and roundish, the differences lie mostly in phenological characters: the growth of the southern tree is more compact; its cones are smaller and leaves shorter, often pruinose gray (“bloomy”) and semipersistent. These two old trees grow in the highlands near Oaxaca.
Although the tree is not particularly tall, it takes seventeen people with outstretched arms to encircle its gigantic trunk. Fascinated at first by its enormous dimensions, we soon turned to the details of the tree. Each limb, towering upward, could itself be an independent tree of huge size. Like a gothic cathedral, arches rise above arches as the limbs disappear into the jungle of the crown 40 meters (130 feet) above, simultaneously reaching outward an incredible distance. Dramatically fluted in outline, the trunk has an air of mystery: sunlit ribs alternate with deeply shadowed recesses that are partly curtained by a veil of fine, light-green foliage.

The Inevitable Question

A correlation between the age and size of trees, at least within a species, would seem logical: the bigger the tree, typically the older it is. Seeing the almost 60-meter (200-foot) circumference of our giant, one assumes that this tree must be thousands of years old. Poets, politicians, scientists, and the technically ingenious have tried to answer the inevitable question: how old is it? Estimates have varied; some have gone as high as three thousand years, as suggested by A. Villaseñor in 1892, or even six thousand, as put forward...
El Arbol del Tule: The Ancient Giant of Oaxaca

Zsolt Debreczy and István Rác

The famous tree that has puzzled travelers and botanists for hundreds of years with its legends now raises new questions about its future.

Outside the city of Oaxaca, on the ancient lands of the Mixtecs and Zapotecs in southern Mexico, stands a tree, perhaps the most famous and most frequently measured among the giants: a unique specimen of the fast-growing southern bald cypress, Taxodium mucronatum, known by the Aztecs as an ahuehuete, the “graybeard of the swamp.” What “General Grant” is to the giant sequoias, El Arbol del Tule is to the bald cypresses.

The Mexican bald cypress is a member of the Taxodiaceae, the family of giant sequoias, California redwoods, and bald cypresses, which, excluding tropical species, has the greatest potential of all tree families for achieving both great age and enormous size. Amazingly, this family of giants, like other conifers, is described as primitive because of its elementary conducting system of single-celled tracheids. In fact, this simple system can carry water and minerals to heights over 110 meters (366 feet), even under extreme conditions such as those found on the slopes of the Sierra Nevadas of western North America, which remain dry for many months at a time, and those in the waterlogged, oxygen-deficient swamps, the habitat of Glyptostrobus of southeast China and Taxodium of the southeastern United States and Mexico. Taxodium mucronatum represents the southernmost species of the genus, which was once found all over the Northern Hemisphere but is now restricted to North America.

The giant tree grows in the town of El Tule, little more than fifteen kilometers from the city of Oaxaca, the capital of the southern Mexican state of the same name. The highlands where it is located, at an elevation of about 1,550 meters (5,100 feet), form a wide valley up in the Sierras. The area has only two distinct seasons: a humid, often cloudy, hot, rainy season typical of the “summer-rain tropics” south of the Tropic of Cancer, and a warm, dry “winter” season with bright sunny days, cool nights, and frequent frosts in the mountains. Near the city, frost has been reported only once a decade or so.

At one time, the tree ruled over wide fields of the brown-headed cattail—Typha domingensis, a close ally of T. latifolia of the north temperate regions of the world—called the tule in the native Zapotec tongue. Today, instead of an extensive swamp supplied by such rivers as the Atoyac and its tributary, the (local) Rio Grande, flowing down from the nearby Sierra de Juárez, the tree is surrounded by a neatly maintained lawn, colorful flowerbeds, and a wrought iron fence. The growing village of Tule has swallowed the swamp, its buildings and yards gradually encircling it, forming a lethal noose around it.

Our First Encounter

Having seen giant sequoias and redwoods in both the higher Sierras and the Coast Ranges of California, we were accustomed to the drama of large specimens. However, when engulfed by the spreading arms of Arbol del Tule, we experienced a totally different degree of awe, not comparable to anything we had previously encountered. While the big trees of California are majestic, like the skyscrapers of downtown New York they are out of reach. Arbol del Tule is an accessible “seated giant,” welcoming us with broad, sweeping branches that extend almost the length of two tennis courts.

El Arbol del Tule, near Oaxaca City, Mexico.
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Front cover: El Arbol del Tule, a venerable giant of the species Taxodium mucronatum, the Mexican bald cypress. Photograph by Rácz & Debreczy.


Inside back cover: Magnolia macrophylla, the large-leaved cucumber tree, photographed at the Arnold Arboretum by Peter Del Tredici.

Back cover: A mature stand of Taxodium mucronatum, just north of Sola de Vega, Oaxaca, Mexico. Photograph by Rácz & Debreczy.
culturists in the area. Since by 1770 Young had received only two plants of the cinnamon promised by Melville, he traveled to Guadeloupe himself to obtain ten more; in 1771 he obtained 1,200 seeds from a tree in Grenada from which he grew an additional 130 plants.

Proof of Young's success in spite of limited resources is found in a 1773 publication by John Ellis, an English botanist with interests in the Caribbean, entitled Some Additional Observations on the Method of Preserving Seeds from Foreign Parts, for the Benefit of our American Colonies, with an Account of the Garden at St. Vincent, under the Care of Dr. George Young (1773), in which Ellis states:

Dr. Young has favored me with a catalogue of what plants are now growing in this garden, and of the plants he has lately collected here to carry out with him; which I take the liberty to insert, for the satisfaction of the public.

Ellis listed those plants and added, "Besides these articles, there are several without names that have been raised from Chinese and other seeds." A second list indicated those plants Young would be able to get from the royal and other botanic gardens in and about London.

In the same year, London's Society for the Encouragement of Arts, Manufacture and Commerce awarded its Gold Medal to Young, "for the

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Lithographs by Reverend Lansdown Guilding, 1824, from his Account of the Botanic Garden in the Island of St. Vincent (1825)

1. House of the Superintendent
2. View of the Botanic Garden St. Vincent, taken from the Superintendent's House
3. Botanic Garden, from the bottom of the Central Walk
Plants of the St. Vincent Botanic Garden, 1773

The following plants were reported by John Ellis in 1773 as growing in the St. Vincent Botanic Garden due to the efforts of Dr. Young. Over half are of reported medicinal value, reflecting Young's service as a physician to the military forces in the Caribbean.

MEDICINAL PLANTS

- safflower: *Carthamus tinctoria*
- turmeric: *Curcuma longa*—an aromatic
- scammony: *Convolvulus scammonia*—a
- colocynth: *Citrullus colocynthis*—a powerful
- simarouba: *Simarouba amara*, a source of
- spigela: *Spigela marilandica*
- citron *Citrus medica*, a source of candied
- bergament orange: *Citrus bergamia*, a source
- Italian senna: *Senna italica*—a strong
- aloes: *Aloe vera*—a healing sap for treating
- balsam capivi: * Copaifera officinalis*, a resin
- Cassia fistula—a laxative
- guaiacum: *Guaiacum officinale*—a cure for
- China root: *Smilax china*, a medicine—an
- gum galbanum: *Ferula galbaniflua*, a source

EDIBLES

- cinnamon: *Cinnamum vera*, a spice,
- East Indian mango: *Mangifera indica*, a fruit
- rhubarb: *Rheum rhaponticum*, a vegetable
- Tobago nutmeg: *Virola surinamensis*, a
- coniander: *Coriander sativa*, a fruit used for
- vanelloes: *Vamlla planifolia*, a tonic and flavoring in cooking
- nopal: *Opuntia cochenillifera*, an edible fruit, host plant for cochineal insect
- sesame: *Sesamum indicum*, a source of cooking oil made from the seed
- dates: *Phoenix dactylifera*, a fruit
- annatto: *Bixa orellana*, a food or cosmetic coloring agent
- China tallow tree: *Sapum sebiferum*, a source of vegetable oil burned in candles

OTHER PLANTS

- logwood: *Haematoxylon campechianum*, a dye
- paper mulberry: *Broussonetia papyrifera*, a source of bark fiber for tapa cloth or writing paper
- bamboo cane: *Arundinaria macrostachya*, a building material used for furniture and construction
Botanic Garden, for superintending its cultivation, and for relating the event of some trials and proposing further attempts."\(^{20}\)

The Garden Under French Administration

Early in 1778 hostilities between the French and the English were renewed in the Caribbean. In June of that year, when it became clear that the French would again occupy St. Vincent, Dr. Young was ordered by the chief of the British forces to move to St. Lucia to head the military hospital there. He left the botanic garden in charge of a Mr. Swartz (or Zwartz), who later obtained a position as secretary to the commanding officer of the French forces. Swartz was to later claim that this officer had given him title to the garden.

The French maintained the garden during most of the five years that they held the island, but when they realized that it would be returned to the British as part of the latest peace treaty, they abandoned the garden and it grew up in weeds. By the time Dr. Young was able to return to St. Vincent in 1784, he was no longer interested in resuming the directorship of the Botanic Garden, and with good reason: portions of the garden had been given over to the cultivation of cotton and tobacco by local people and the remainder had deteriorated badly; Swartz was pressing his dubious claim to the land, leading to legal wrangles, and the military was also competing to resume full control of the land; and finally, the financial operations of the garden were no more secure than before the war.\(^{14}\) Young recommended that an acquaintance from St. Lucia, Alexander Anderson, be appointed as his successor; his recommendation was approved in 1785 by Sir Joseph Banks, acting in his capacity as scientific advisor to the king and liaison with the Royal Botanic Garden at Kew.

Unlike his predecessor, Anderson had the full support not only of Banks and General Melville, but also of General Robert Adair, Inspector-General of the regimental hospitals, as well as the War Department and the East India Company. It was during the period of his administration—1785 to 1811—that the garden made its most significant contribution to the world's knowledge of tropical American botany.

The Botanic Garden Under the Management of Alexander Anderson

Alexander Anderson was born in Aberdeen, Scotland, and studied for a period at the university in Edinburgh although he did not complete the work for a degree. He was employed briefly at the Chelsea Physic Garden by a fellow native of Aberdeen, William Forsyth, at that time head gardener at the Physic Garden and later at St. James's and Kensington Palace Gardens. In 1774 Anderson went to New York to seek employment as a gardener, taking up residence with his brother John, a printer.\(^7\) During this period he sent botanical specimens and seeds from Long Island and York Island (now Manhattan) to Forsyth. At the same time he listed other plants he could send and asked for plants from England in exchange.

Being a loyalist, Anderson sailed for Surinam when the American revolution began, rather than be pressed into military service.\(^1\) By 1783 he was on St. Lucia, employed as an orderly in the military hospital then headed by Dr. Young. Young asked Anderson to search for local

The only known portrait of Alexander Anderson, engraved by Stephen H. Brelett from a drawing made by Anderson's nephew in 1798 in St Vincent.

From Benson J Lossing, A Memorial of Alexander Anderson M.D., The First Engraver on Wood in America (New York, 1872) By permission of Houghton Library, Harvard University
medicinal plants, particularly one that could provide quinine for treating malaria. One of the plants he found, called *quina*, or *china*, was sent to London for testing and was eventually described and named as *Cinchona santaeluciae*, a relative of *C. officinalis*, the source of quinine, but although it tasted as bitter as quinine, it did not contain the cinchona alkaloids and was eventually placed in the genus *Exostoma*.4,15

Anderson also traveled to other British-held islands, with Dr. Young or at his direction, and accompanied Young on his return to St. Vincent in 1784. When Anderson became the first person known to climb the Soufrière of St. Vincent (at 4,048 feet, the highest peak on the island), Young realized that he was not only an experienced naturalist but an active field man as well and recommended him as his successor in the superintendency of the garden.2,10,11

Along with the formal notice of his appointment by Sir Joseph Banks and the War Department in 1785, Anderson received orders to submit a list of the plants then growing in the Botanic Garden and to report new introductions or other developments at quarterly intervals, which he did, but if they were preserved, few have been located. In *A Catalogue of Plants in His Majesty's Garden on the Island of St. Vincent*, dated June 1, 1785, and now preserved in the British Museum (Natural History), Anderson listed at least 348 different

*Anderson was first to climb St. Vincent’s Soufrière and to see the crater of this volcano. His report to the Royal Society was published in 1785, giving credit to the wrong Anderson. Above is his sketch of the volcano circa 1780. Below is the author’s 1972 photo of the volcano, which evaporated the lake and left a residual cinder cone. Soufrière has erupted once again since then.*
kinds of plants, his heritage from Young, including all 31 plants of economic importance mentioned by Ellis in his 1773 publication. The top portions of several pages of the manuscript were charred in the World War II bombing of London, but it appears that Anderson categorized the plants as commercial, medicinal, esculent, ornamental, or timber species. He is not known to have made subsequent reports until around 1800, when he compiled a manuscript entitled *Hortus St. Vincentii*, which describes the plants then found in the garden. Each of its nearly 2,000 taxa is identified not only by its Latin, English, and French names, but also, where possible, by its Carib and “Negroe” names, showing that Anderson had fulfilled General Melville’s instructions to Dr. Young by seeking out native plants. Each taxon is also given a description, along with data on propagation and culture as well as uses and sources of the plants.9

Anderson was a prolific letter-writer, with virtually a worldwide network of correspondents. Most extant correspondence was with William Forsyth, but there are also letters to an assortment of others in England as well as in the United States, where his most important contact was William Hamilton of the Woodlands in Philadelphia. Hamilton provided Anderson with many plants of the eastern United States for trial in St. Vincent and helped him establish exchanges as far away as Calcutta. Anderson also had correspondents in the French islands of the Caribbean as well as in Jamaica, the Bahamas, and Barbados, where his closest contact was Governor Lord Seaforth (1801–1806). He regularly sent plants to Seaforth for transshipment to England, with the result that the introduction into Europe of many plants that Anderson had obtained in the wild are credited instead to Lord Seaforth.1,3

*First-day cover and postage stamps in commemoration of the two hundredth anniversary of the St. Vincent Botanic Garden. The talipot palm is shown here in flower, meaning that it would die shortly after.*
The Breadfruit Tree Arrives in St. Vincent

Great expectations were attached to the cargo of the H.M.S. Providence. A Jamaican newspaper declared: “The introduction of the breadfruit into this island will constitute a remarkable era in its annals. In less than twenty years, the chief article of sustenance for our negroes will be entirely changed: —plantains, yams, cocos, cassava, will be cultivated only as subsidiary, and be used merely for change; whilst the bread-fruit, gaining firm hold in the earth . . . will afford in the greatest abundance, for nine months in the year, the choicest and most wholesome food.”

The excitement that greeted the ship's arrival in St. Vincent is evident in Alexander Anderson’s account. Imagine years of waiting for the H.M.S. Bounty to arrive, only to learn that a mutiny had put an untimely end to the expedition; then, after months of uncertainty about the Providence, to have it suddenly appear, quickly unload the least healthy of the plants in its cargo, and depart again just as suddenly. Anderson’s account of the events shows an admirable willingness to put the best light on what must have been a rather disappointing outcome to the affair.

About nine o’clock of night of the 23rd of January 1793 arrived in Kingstown Bay the long wish’d for Providence, Captain Bligh, from the South Seas with the breadfruit and other useful and curious plants. The voyage was remarkably short and in every respect prosperous. Such a number of live plants were never before seen on board a single ship. On her arrival she was one of the most beautiful objects of the kind it is possible to conceive. Such a number of live plants of many different kinds brought from the remotest parts of the globe in such a state of preservation and carried through nearly all the climates of it was surprising to behold. Too much praise cannot be given to Captain Bligh for his great attentions to the chief object of his mission nor to the two young men who had the collecting and immediate management of them. Nor is it less surprising that the share of them allotted to the Garden have arrived to such perfection in so short a time in it. Some of the breadfruit plants began to produce fruit at the end of eighteen months from their arrival. In two years and three months all the fifty plants reserved in the Garden produced a large crop. This will appear the more surprising as the half left here were the smallest and the most sickly looking plants. The largest and most healthy in appearance went to Jamaica. In this division there appeared partiality, however, I conceived it just and could not with propriety object to it, as there was still the risk by sea of ten or twelve days passage from St. Vincent to it. Therefore necessary for the preservation, the weakest and the most probable to suffer by continuing them in their confined situation should be landed as soon as possible, and I was confident that out of the number of 300 plants I should be able to preserve sufficient as a nursery for the Windward Islands.
Anderson collected not only on St. Vincent but also in the other Lesser Antilles, the Spanish Main, Trinidad, Tobago, and the Guianas, sometimes traveling on the schooner of William Lochhead of Antigua. The garden's collection was also augmented by plants Anderson received from sea captains, from other gardeners, and from Kew. In return, as noted in its Garden Record Book, Kew received several shipments from Anderson between 1787 and 1798, of which the largest and best known was the one containing the breadfruit trees, *Artocarpus altilis*, brought by Captain William Bligh on his return from the Providence expedition in 1793.

The Introduction of Breadfruit

Bligh had been a lieutenant on the first of Captain James Cook's expeditions to the Pacific in 1768, the voyage on which Joseph Banks traveled as a naturalist. When Cook's enthusiastic report on the role of breadfruit in the diet of Polynesians induced planters in St. Vincent and Jamaica to ask for breadfruit trees of their own, Banks persuaded King George III to order a collecting expedition and was instrumental in choosing Bligh to command the *Bounty*. St. Vincent was to be the first stop for dropping off breadfruit on the return trip, but the infamous mutiny occurred only a few days out of Tahiti, and the *Bounty* never reached St. Vincent.

On the second attempt Bligh commanded the H.M.S. *Providence*, with the armed brig *Assistant*, manned by twenty marines, as escort to prevent another mutiny. When the *Providence* arrived in St. Vincent in 1793, it carried about 1,300 Polynesian plants, of which it left 559 plants (including 331 breadfruit trees) for the Botanic Garden. Anderson noted that many of these were in poor condition; Bligh had kept the healthiest for Jamaica and Kew. The arrival of the *Providence* caught Anderson unprepared, but he hastily potted 350 plants from his garden to send with it to Jamaica and Kew. As Bligh was preparing to leave Jamaica for England, he received orders to join a Honduras convoy. When he finally left Jamaica for England several months later, he carried a large number of plants, but the list of those delivered to the Royal Gardens at Kew does not identify the ones from Anderson and many were mistakenly credited to the horticulturists at Jamaica.

In his *Hortus St. Vincentii* Anderson described eight varieties of breadfruit trees received from Bligh. He propagated these and other plants brought by the *Providence*, distributing them throughout the Caribbean from the Bahamas to Trinidad and the Guianas.

The Unpublished Manuscripts

In addition to his work in the Botanic Garden and his voluminous correspondence, Anderson also made time to write a number of unpublished manuscripts; they are all now in the archives of the Linnean Society of London. Two of these have been transcribed by the author and Elizabeth Howard and were published in 1983. *The St. Vincent Botanic Garden* is the history of the early years of the development of the garden, and *The Geography and History of St. Vincent* is a firsthand account of Anderson's travels around the island. Also of great interest to botanists and horticulturists are the manuscripts that describe the plants of St. Vincent and the garden. Anderson may have had two separate publications in mind: a *Flora Caribbea* as well as the *Hortus St. Vincentii* already mentioned. In many cases the plant names used by Anderson differ from the modern names: he named, but did not publish, plants that were new to him. This author has identified most of the plants in the *Hortus* by their modern names and organized them into families and genera, aided in some cases by watercolor illustrations made by Anderson's associate John Tyley (which are now preserved at the Linnean Society or, in a few cases, at the Hunt Institute for Botanical Documentation). Though as yet unpublished, this transcription may be useful to botanists.

The textual material of the *Hortus*, still untranscribed, gives brief descriptions of each plant as well as its origin or source. Many of the botanical specimens prepared by Anderson and shipped to Forsyth in London are now in the herbaria of the British Museum (Natural History) or the Royal Botanic Gardens, Kew. While it is often difficult to associate the specimens with Anderson's descriptions, the *Hortus* remains valuable as the earliest record of
This temple houses a fountain in the form of an allamanda flower. The garden still maintains many historical medicinal plants such as the source of chaulmoogra oil, which is used in treating leprosy, and the lignum vitae, long thought useful in treating symptoms of syphilis. The collection of palms is especially notable, and a new inventory is much desired. The garden's largest breadfruit trees represent three of the varieties introduced by Bligh on the Providence. All are vegetative propagations of an earlier plant. The original superintendent's house is now a museum that specializes in artifacts of the Caribs and other indigenous groups.

The last printed inventory of the plants in the garden was one drawn up by Anderson in 1806 and published in 1825 as part of the History of the St. Vincent Botanic Garden compiled by the local chaplain, Lansdown Guilding. It also included letters and other lists of plants that may have been among the Anderson manuscripts.8,12

Anderson died in St. Vincent in 1811 and was succeeded for a short time by his friend and associate William Lochhead, who died unexpectedly in 1815 and was in turn succeeded in 1816 by an Australian, George Caley. Caley's tenure on St. Vincent was marked by his constant dissatisfaction with everything on the island, including the garden, and upon his departure in 1822 the garden was returned to local administration and began a long decline.

So great a wealth of plant material has never again been assembled in the American tropics. Anderson was a master plantsman, to be remembered for his dynamic program of introduction, propagation, and distribution. He is commemorated in the names of one genus—Andersonia of the Epacridaceae was named for Alexander and two other Andersons—and at least six species. However, although over 100 of the plants he collected were new to science, none was published under the name he applied to it; had the Hortus been published in his lifetime, many common plants of the Caribbean flora—perhaps as many as 75—would now carry the names he proposed. One hopes that the botanical information in his manuscripts and his records of plant introduction will one day be salvaged and published as a tribute to this worthy man of science from the King's Botanical Garden of St. Vincent, once the horticultural capital of the Western Hemisphere.
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Painting by John Tyley, protege of Alexander Anderson, of fruits said to have been introduced by the St. Vincent Botanic Garden.
Molecular Analysis: A New Look at Umbrella Magnolias

Richard B. Figlar

Taxonomists have long been frustrated in their attempts to decipher the complex evolutionary relationships within the genus Magnolia. Recent molecular research has shed new light on the problem and helped to clarify the long-standing confusion.

The magnolias of section Rytidospermum—one of sixteen categories that subdivide the 128 species of the genus Magnolia—have always been an intensely interesting group, not only for their large flowers and enormous whorled leaves, but because several species occur in both eastern Asia and eastern North America. Within the genus, this intercontinental distribution is shared only with section Tulipastrum, but in that case the two species involved, our native cucumber tree, Magnolia acuminata, and M. liliiflora, the famous Mulan magnolia from China, share few characteristics beyond the same number of chromosomes and the presence of reduced outer tepals.

The Rytidospermum section, according to most taxonomists, consists of six species: Magnolia tripetala, the umbrella magnolia; M. fraseri, the mountain magnolia; M. macrophylla, the big-leaf magnolia; M. obovata (M. hypoleuca), M. officinalis, and M. rostrata—the first three native to southeastern United States into Mexico and the latter three native to eastern Asia, from the

These three closely related magnolias share large, whorled leaves, ranging from a foot to two feet in length, and large, white flowers with diameters in the range of six to twelve inches. The flowers, which open after the leaves have developed, are strongly scented. Magnolia tripetala, above, unpleasantly so. A native of the Allegheny region of the eastern United States, it seldom exceeds forty feet and is uncommon both in the wild and in cultivation.

At top right is the Japanese Magnolia obovata. It grows to eighty feet in its native damp, rich, highland forests, and is one of the hardest Asian magnolias (zones 6 to 9). Its slightly less hardy Chinese sister, M. officinalis var. biloba, at bottom right, also grows at altitudes from 2,000 to 5,500 feet, and achieves heights up to seventy feet. Its bark is so highly valued as medicine that the tree has been nearly extirpated in its native provinces of Hubei and Sichuan.
Like other members of the subgenus Magnolia (one of three within the genus), the fruits of M. tripetala tend to be bright red and showy. They persist for several weeks in late summer.

Kurile Islands and Japan westward to southwest China. Among the various morphological characteristics shared by members of this group, the most distinctive are the enormous whorls of deciduous leaves, which are crowded in parasol fashion at the ends of the branches. For this reason, the Rytidospermum magnolias are often referred to as umbrella trees. Indeed, to the uninitiated, the first impression of these plants is often more reminiscent of the houseplant known as the umbrella tree—the giant tropical Schefflera—than it is of a Magnolia. However, unlike Schefflera, whose compound leaves represent true whorls, the leaves of Rytidospermum magnolias are arranged in false whorls; that is, the individual leaves actually emerge in alternate fashion but with very little stem growth (internodes) between successive leaves.

The pattern of many leaves emerging almost simultaneously is called flushing. Apparently, Rytidospermum magnolias adapted this flush-type leaf-emergence pattern in order to compete effectively in the gaps of forest understory during early spring. By producing more leaves more or less simultaneously, such plants are better able to compete with other species for scarce sunlight. And since little stem growth is produced, the process itself is very energy efficient. Later in the spring, the growth reverts to the more typical pattern, where leaves are produced one at a time along longer stem shoots, as in other magnolias. Flush-type leaf-emergence patterns are common in many other plant species of the understory; for instance, some of the deciduous azaleas, although because of their much smaller leaves, the umbrella effect is less noticeable than in the Rytidospermum magnolias.

Clearly, among the magnolias this trait is unique, and for that reason taxonomists have suggested that, despite their intercontinental distribution, they all form a natural group and should be very closely related. This provokes several questions. Did today’s species evolve from a common ancestor? If so, how and when did its descendants cross the Pacific Ocean? Which one of the North American species is the most closely related to its Asian counterpart(s)?

Using modern molecular systematics, researchers Yin-Long Qiu, Clifford Parks, and Mark Chase analyzed the chloroplast DNA (cpDNA) of all section Rytidospermum species. (CpDNA is the part of the DNA chromosome that is responsible for photosynthesis.) By com-
paring the differences in the cpDNA of the various species, they were able to quantify the amount of evolutionary change, measured as molecular divergence, that had taken place between them. The underlying assumption or theory in this method is that the amount of genetic difference is proportional to the amount of time elapsed since the species diverged from their common ancestor, relative to other pairs or groups of organisms being compared. The results of the study team were published in two separate papers in the American Journal of Botany, both in 1995. This article attempts to summarize the findings of these researchers and to interpret how molecular data, when used in conjunction with traditional morphological studies, can lead to better understanding of the evolutionary relationships among plants. No attempt will be made in this article to decode the complexities of their analytic techniques, the details of which are treated in the study team's original papers.4-s

CpDNA Restriction Site Analysis
Qui, Parks, and Chase used three different laboratory techniques to assess the divergence among Magnolia obovata, M. tripetala, M. fraseri, M. macrophylla, and M. officinalis var. biloba (a variety of M. officinalis with notched or bilobed leaves; shown in the tables as M. biloba). The first method, cpDNA restriction site analysis, randomly samples changes (between all combinations of pairs of species) over the entire chloroplast genome. The analysis counts the number of site changes encountered, then calculates the cpDNA sequence divergence (as a percentage of sequence divergence) between all species pairs. The results are shown in Table 1.

This analysis clearly shows that Magnolia tripetala from eastern North America has diverged far less from the Asian species M. obovata and M. officinalis var. biloba than it has from other North American species. It also indicates that the other North American species have diverged just as much from each other (including M. tripetala) as they have from the two Asian species.

Allozyme Electrophoresis
The study team used a second method, allozyme electrophoresis, to examine genetic variation of enzyme-coding genes. This analysis results in the calculation of a parameter called Nei's unbiased genetic identity for each of the species pairings. The numbers are from zero to one, with one being a perfect genetic match. One of the authors, Clifford Parks, suggests that as a rule of thumb, readings greater than 0.90 suggest populations of the same species, while readings less than 0.67 indicate distinctly different species. The results can be seen in Table 2. Though not shown in the table, it should also be noted that Nei's genetic identity for intraspe-
cific comparisons was nearly 1.000, as would be expected: the values ranged from 0.993 for *M. obovata* vs. *M. obovata* to 0.932 for *M. macrophylla* vs. *M. macrophylla*.

The results of this second method almost mirror the results of the restriction site analysis, giving very strong evidence of a close relationship between *Magnolia tripetala* and the Asian species and relatively distant relationships among the rest of the species. It is interesting to note that in both analyses the relationship between *M. fraseri* and *M. macrophylla* is the most distant of any of the pairs. Ironically, some texts on North American trees refer to these two species as closely related on account of their similar auriculate (earlobe-shaped) leaf bases.

**Chloroplast Gene rbcL Sequencing**

Finally, the study team compared *Magnolia tripetala*, *M. macrophylla*, and *M. obovata* to each other by analyzing (i.e., sequencing) a specific segment of the chloroplast gene called *rbcL*. This analysis involves comparing the 1,432 base pairs of the *rbcL* gene for each pair of species in the analysis, which in this case is three (*M. macrophylla* vs. *M. obovata*, *M. macrophylla* vs. *M. tripetala*, and *M. obovata* vs. *M. tripetala*). The results, once again, confirm the findings of the first two analyses, which suggest that *M. tripetala* and the two Asian species form a clade, or "sister group." In fact, the sequencing of the chloroplast gene *rbcL* yielded no divergence between *M. tripetala* and *M. obovata* for that portion of the DNA strand.

The researchers believe that since the results from all three methods have yielded the same pattern of divergence, they can be considered reliable for determining divergence among those *Magnolia* species. They emphasize that "the molecular divergence between *M. tripetala* and its Asian sister taxa, *M. officinalis* var. *biloba* and *M. obovata*, is extremely low—the lowest divergence ever reported for any eastern Asia–eastern North America disjunct taxa." For example, the sequence divergence over the entire chloroplast genome (cpDNA) between *Liriodendron tulipifera* and *L. chinense* was found to be 1.24 percent (as compared to 0.083 percent between *M. obovata* and *M. tripetala*), which is a remarkable difference in that many taxonomists long considered both *Liriodendron* taxa to be varieties of the same species.

The study team speculated how and when *Magnolia tripetala* and its sister species became separated from their common ancestor. One hypothesis is that the common ancestor could have migrated between the continents via the Bering land bridge during one of the earth’s warm periods in the middle Miocene (17 to 15 million years before the present) or early Pliocene (6 to 5 million years before the present).

**TABLE 3**

<table>
<thead>
<tr>
<th>Species Pair</th>
<th>% rbcL Divergence</th>
<th>% cpDNA Divergence</th>
</tr>
</thead>
<tbody>
<tr>
<td>obovata</td>
<td>A vs. tripetala</td>
<td>NA</td>
</tr>
<tr>
<td>tripetala</td>
<td>NA vs. macrophylla</td>
<td>NA</td>
</tr>
<tr>
<td>obovata</td>
<td>A vs. macrophylla</td>
<td>NA</td>
</tr>
</tbody>
</table>

The shared earlobe-shaped bases of their leaves notwithstanding, molecular analysis has shown that *Magnolia macrophylla* and, seen here, *M. fraseri* are the most distantly related of the magnolias of section *Rytidospermum*. 
Molecular analysis of Magnolia macrophylla var. macrophylla (above) and M. macrophylla var. ashei (below) revealed no differences between the two varieties, despite the greater size of the variety macrophylla, which attains sixty feet, as compared to that of variety ashei, at twenty-five feet.
Above are the leaves of Magnolia fraseri var. fraseri, and below, those of M. fraseri var. pyramidata. Molecular analysis of these taxa revealed very little separation between them.

Expanding the Scope of the Study

In a second paper, Qui, Chase, and Parks expanded their phylogenetic study to include restriction site analyses of many pairs of magnoliaceous species, including Magnolia officinalis var. officinalis, M. rostrata, M. macrophylla var. ashei, M. macrophylla var. dealbata, M. fraseri var. dealbata, M. fraseri var. pyramidata, as well as many others. One result was an extension of the sister relationship among M. tripetala and the Asian M. officinalis var. biloba and M. obovata to include M. officinalis var. officinalis and M. rostrata in the group. Summaries of other findings follow:

1. Though Magnolia officinalis var. officinalis and M. officinalis var. biloba are closely related and part of a sister group, they are separated by four restriction site changes, whereas only one restriction site change separated M. officinalis var. officinalis and M. rostrata. This suggested to the team that “full species status for M. officinalis var. biloba is justifiable,” but since delineation of a species depends on examination of samples from across a plant’s entire range, they recommend a detailed study of wild populations of all four Asian taxa before any decision is made.

2. Only one restriction site change separated Magnolia macrophylla var. dealbata and M. macrophylla var. ashei, and no change was found between these two and M. macrophylla var. macrophylla. In this, the study team agrees with the 1979 judgment of botanist Dorothy Johnson Callaway and rejects species status for the varieties dealbata and ashei.

3. Similarly, the team rejects species status for Magnolia fraseri var. pyramidata since they found only one restriction site change between it and M. fraseri var. fraseri. Also, separate allozyme profiles established in an earlier study of wild populations of M. fraseri at low elevations in north Georgia indicated that those plants were intermediate between the varieties fraseri and pyramidata.

For some, the major finding of this work—the sister relationship between Magnolia tripetala
and the Asian species (especially *M. obovata*), comes as no surprise, since these three are the only species that share grooved seed coats (the name *Rytidospermum* means "wrinkled seed") and are highly compatible when cross-pollinated. Phil Savage, an experienced magnolia breeder, has found that of the many crosses he has made between species within section *Rytidospermum*, only those within the sister group were vigorous, worthy hybrids. In fact, where *M. tripetala* grows in close proximity to *M. obovata*, there have been many cases of putative hybrids occurring spontaneously.\(^8\)\(^9\)

Other crosses made by Savage—*M. tripetala* x *M. fraseri*, *M. obovata* x *M. macrophylla*, *M. tripetala* x *M. macrophylla*, and *M. obovata* x *M. fraseri*—generally produced smaller leaves and flowers than their parents, and all lacked vigor.

Other affinities have been addressed using different morphological characters. Savage speculated that *Magnolia obovata* and *M. fraseri* may be closely related because of their long-beaked, carpelled fruit, which are nearly identical.\(^7\)

Some have agreed with that point of view, but others have argued that because all *Rytidospermum* magnolias share a very striking morphological feature—the false whorls of leaves produced at the branch tips—they all must be closely related. However, since molecular analysis suggests a close relationship for only *Magnolia tripetala* and its Asian sister species, perhaps the responsibility for the similar false whorls produced by *M. fraseri* and *M. macrophylla* as well as the similarities in the fruit of *M. fraseri* and *M. obovata* lies in convergent evolution—that is, similar characteristics may have developed in unrelated, or distantly related, plants as each responds to similar conditions.

Molecular analysis as a taxonomic tool is still relatively new, and it brings with it the allure of results that can be stated in precise numbers. But taxonomy is far from a cut-and-dried procedure: no matter how many characters are examined and how much evidence is marshalled in support of a particular position, a taxonomic decision is always a judgment call. As the case with *Magnolia* demonstrates, molecular analysis does promise to help distinguish similarities that result from genetic affinity between species from those that merely reflect similar responses to similar environmental variables, such as climate. But lest false hope be raised, be warned that molecular analysis will not resolve the arguments among taxonomists, nor, certainly, does it offer respite from the frequent name changes that have become such a predictable part of botanical taxonomy.

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Richard Figlar, a past president of the Magnolia Society, has been studying and collecting magnolias for 25 years. He grows more than 125 taxa in his personal arboretum in the foothills of the Blue Ridge Mountains of South Carolina.
Principles of Taste: Book Review

Phyllis Andersen


With the advantage of hindsight, it might be said that Mariana Griswold Van Rensselaer (1851-1934) led a life of quiet contradiction. She was a noted writer on art, architecture, and landscape subjects; the first biographer of Henry Hobson Richardson and Frederick Law Olmsted. She was thoroughly professional in her work, precise in her negotiations for a proper fee, and never hesitant to ask for timely payment. She was a friend of Charles Sprague Sargent and a valued contributor to his weekly, Garden and Forest. Yet Mariana Van Rensselaer was an active opponent of women's suffrage and wrote a popular pamphlet on that subject, “Should We Ask for the Suffrage?” (1894). Her answer was no, women should concentrate on their families and on educational and intellectual matters, leaving business and public affairs to men. Perhaps this was a comment on the politics of her day; to be fair, she was also concerned that new money interests would exploit working women who would be unable to defend themselves.

Until the publication of this collection of her writings, Van Rensselaer's work had fallen into relative obscurity. With the exception of her biography of H. H. Richardson, to which subsequent generations of Richardson scholars invariably pay homage, her work has been treated as that of a rather quaint lady writer who presented to the world the ideas of designers, whom she strongly promoted as “artists.” As evidenced by this collection, her work is much richer than that, more nuanced and original. If Van Rensselaer's work has not been given more prominence, it may be because of her commitment to the explication of taste, that illusive predilection for form (and fashion) tightly bound to social class that is just now engaging the attention of the academic community. In the world of serious critical writing, the consideration of taste has often been treated in a patronizing, if not outright contemptuous, manner. But if in popular literature the issue of taste has now become the domain of Martha Stewart and the shelter magazines, it has also become the territory of serious critical battle: Susan Sontag on kitsch, Martha Schwartz on the viability of bagels as garden ornament, and any number of writers on the sociological implications of well-clipped suburban lawns vs. their treatment as wildflower meadows.

Insofar as a concern with good taste is a characteristic of the upper middle class—since both the aristocracy and working class can afford to indulge eccentricity—Van Rensselaer was speaking for a world she knew well. But her writing on taste went well beyond the proper and the decorous to encompass appropriateness as well. Included in this collection is an important essay, “Architectural Fitness,” first published in Garden and Forest in 1891 (some say at the instigation of Charles Sargent). Her reflection on the quality of stonework and boulders in Central Park and Franklin Park predates the modernist dictum of “truth to materials” but is certainly on the same intellectual path.

Mariana Griswold Van Rensselaer was born in New York City in 1851 to parents well positioned socially and financially to give her a broad, sophisticated education, albeit by private tutor and extensive European travel. The family relocated to Dresden, Germany, when Mariana was still in her teens, and it was there that she met and married Schuyler Van Rensselaer, a young mining engineer and scion of the great New York family. The couple returned to the United States where their only child, George, was born. Sadly, Schuyler Van Rensselaer died.
in 1884, followed by their young son only eight years later, and Mariana found herself alone at the age of forty-three. While she had begun to write for publication during the years of her marriage—an activity not wholly supported by her husband—she now recast her life to include serious scholarship and travel in order to further her writing career.

Van Rensselaer’s position in American landscape history is firmly established by her 1893 book, *Art Out-of-Doors: Hints on Good Taste in Gardening*. With this publication she emphatically aligned herself with the naturalistic/pastoral landscape movement led by Frederick Law Olmsted, supported by Sargent and with a debt to Andrew Jackson Downing.

I have assumed that the naturalistic methods of gardening are the most interesting and important to Americans... for nature speaks to us more variously and naturally in America than in Europe.²

The enemy here was the ornamental style of gardening. The promulgators of carpet bedding (“ugly things of which no sensitive eye can approve”) had a strong voice in both public and residential horticulture. The use in public parks of bold-colored plants arrayed in tight, highly organized groups, with no respect for their natural form let alone their natural habitat, was beloved by the public, who borrowed these patterns for their home gardens. Beds of geraniums, coleus, lantanas, heliotropes—any plants that could be manipulated either by the designer or the hybridizer to take on a brighter hue—were filling the great lawns of Newport, the village squares in New England, and, to Van Rensselaer’s great dismay, Boston’s Public Garden.

Our public has seen too few good examples to know, theoretically, what it likes in the way of gardening art. Naturally it likes flowers and bright-hued plants of all kinds. When it sees them as they are shown in the Public Garden, it delights in them for their own sakes while it rarely thinks of the general effect of the place.

Mrs. Schuyler Van Rensselaer in 1927.

Van Rensselaer’s biographical essay on Olmsted, originally published in *Century Magazine* in 1893, and included here in its entirety, offers a much more vivid picture of the man than many later works. Suspicious of personal publicity and certainly not garrulous by nature, Olmsted nonetheless met with and maintained a vigorous correspondence with Van Rensselaer, providing her with rich material for her article.

In answer to a question asked not long ago, Mr. Olmsted said, “The most interesting general facts of my life seems to me to be that it was not as a gardener, a florist, a botanist, or one in any way specially interested in plants and flowers, or specially susceptible to their beauty, that I was drawn to my work. The root of all my work has been an early respect for an enjoyment of a more domestic order—scenery which is to be looked upon contemplatively, and is productive of musing moods.”⁴

The late David Gebhard, a noted architectural historian, has done a great service in editing this collection. His introduction surveys her life and gives her work a new importance in American design history, although in the space of an intro-
duction he was not able to delve deeply into the intellectual roots of her work. It is a minor criticism to say that he uses that oddly speculative manner of biographical writing that relies on "she must have...," "expected of upper middle class women," etc. The collection is divided into three sections: Architecture and the Decorative Arts, Recent Architecture in America, and Landscape Architecture and the Environment; while heavily slanted to her writings on architecture—perhaps a reflection of Gebhard's interests—her writings on the context of architectural practice transcend specific disciplines.

Architecture is a necessary trade as well as an art. Its work must be done, and as nature is not likely ever to give us geniuses in sufficient number to do the whole of it, the second or third rate architect is a very necessary and valuable citizen. All our architectural work cannot be great, but all of it ought to be good; and fair intelligence, earnest study, and conscientious effort may make it good, though only a high artistic gift can make it great.

Van Rensselaer was one of many voices at the end of the nineteenth century calling for the professionalization of many pursuits earlier seen as "crafts." In an important essay, "Client and Architect," she points out the need for an educated client and deplores the limitations placed on the designer by a client with a stubbornly limited vision. She is, as always, protective of the creative force.

Even apart from competitions, the public's conduct is not what it should be to encourage loyal service. Often enough in all his dealings the client shows a disregard for truth, honesty, and business methods which he would find very shocking were the architect the sinner and he the sufferer. And when the work is complete, he constantly takes credit for good ideas which do not belong to him, blames the architect for defects that his own ignorant demands have brought about, and, above all, cries out against an excess in cost that has been necessitated by changes from the original scheme which he himself has suggested.

In addition to the essay on Olmsted and the short but insightful "Landscape Gardening: A Definition," the landscape section reprints several pieces of local interest. Van Rensselaer summered in Marion, Massachusetts, and her piece on the protection of roadsides was prompted by a concern for the insensitivity of road commissioners and the dreaded linemen in clearing vegetation. ("There seems to be no science or art, no reason or plan in their work.") She acknowledges the difficulty in managing the publicly owned wild border with its thickets of rose, viburnum, and vines as it grows into privately owned lawns, but suggests that a simple appreciation of natural growth could create rural roads as beautiful as any English lane.

This collection of Van Rensselaer's writing has expanded our understanding of the maturing of America's design professions, the period when they cut their close ties with Europe and began to look to our own history and culture for reference points. For the landscape community, one hopes that the collection, positioning Mariana Van Rensselaer among the original thinkers of her period, will lead to the republication of Art Out-of-Doors, making this classic text on American landscape gardening accessible once more.

Endnotes
1 Henry Hobson Richardson and His Works (Boston and NY: Houghton Mifflin, 1888); on Olmsted: Accents as Well as Broad Effects, 284-299.
3 Ibid., 146.
4 Accents, 284.
5 Ibid., 38.
6 Ibid., 48.

For Further Reading

Phyllis Andersen is director of the Institute for Cultural Landscape Studies of the Arnold Arboretum.
“Open to All Real Plant Lovers”: Book Review

Judith Siporin


Beatrix Farrand’s Reef Point Gardens in Bar Harbor, Maine, were dismantled and her house torn down about forty years ago. The granite gate pillars and giant sentinel spruces that marked the entrance remain on the site, as does the gardener’s cottage beyond them, but the flowerbeds and the paths with their strategically placed benches are gone. Only the magnificent views of the Maine coast are unchanged. Farrand accepted the transitory nature of human creations with courage and a total lack of sentimentality: it was she herself who, fearing an uncertain future for the property when she was no longer there to look after it, put an end to her much loved gardens and house. But with the re-publication in one volume of The Bulletins of Reef Point Gardens, written by Farrand in the conviction that “words and illustrations outlive many plantations,” we can recover a vivid sense of what the garden once was.

The bulletins, seventeen in all, published between 1946 and 1956, were distributed worldwide and could be purchased by visitors to the gardens for ten cents each. Written for the most part by Farrand with help from four staff members who worked closely with her in the gardens, they share a clear, concise prose style grounded in detailed observation of plants and knowledge of their cultivation. They also express devotion to a mission, to creating “a place in the world where those who are moved by outdoor art may study or enjoy books, gardens, birds, and the beauty of sky, sea, colour, and the changing seasons—ever different and yet eternal.” The new compilation, a project of the Island Foundation of Bar Harbor, presents the bulletins in chronologically arranged facsimile with an informative introduction by Paula Deitz.

Farrand’s ambition at Reef Point was to adapt her parents’ picturesque garden and summer house, built at the end of the nineteenth century in the newly fashionable summer community of Bar Harbor, for use as a self-sustaining institution for the study of horticulture and landscape design.

Throughout her career, commissions (including the White House gardens during Woodrow Wilson’s administration, the Yale and Princeton campuses, and Dumbarton Oaks) took her away from Maine, but in 1939 the Farrands formally established the Reef Point Gardens Corporation, and her energies became increasingly focused on this personal project. Although her hopes for building an ongoing institution were never fulfilled, her creation became in its day the only public botanic garden in Maine and was said to contain “the finest collection of plants north of the Arnold Arboretum.”

Indeed, Farrand owed her own early education in horticulture to the private tutoring of Professor Charles S. Sargent at the Arnold Arboretum. He also encouraged her to enter the field of landscape design, which at that time ordinarily would have been denied to her as a woman, and he recommended her for her first commission. The Arboretum nourished a scientific and scholarly interest in plant collections, which in many respects determined the character of her own garden. Not only were a number of the unusual plants she grew at Reef Point propagated at the Arboretum, but in return she sent to its propagators cuttings from rare plants she had herself collected. She aimed to establish the proper classification and nomenclature, worthy of the best botanic gardens, and to accomplish this relied heavily on the advice of Arboretum staff, who identified more than eighty of her specimens from flowers.
The bulletins define the long-range plans drawn up by Farrand and her husband (a scholar and professor of history) and describe the steps she took toward establishing an institution that could serve a far-reaching community. Some of them focus on specific aspects of Reef Point Gardens: the site and its ancient geological history; the buildings and their redesign to accommodate public visitors; the plan of the grounds, a walking tour; the library with its impressive collection of more than 2,700 volumes, documents, and archival material; the herbarium with over 1,800 pressed and dried specimens collected from the grounds; and the print collection. Some bulletins are devoted to special groups of plants in the garden and their cultivation and maintenance: conifers, single roses, the climbing plants that created what Farrand
termed “vertical beds,” heaths and heathers, and native Maine woodland plants. They also include contemporary black-and-white photographs of the grounds and of the house and its interior; detailed plans of the gardens, paths, and roads; plant lists with comments on particular species; and a list of blooming plants month by month. The appendix provides miscellaneous additional material, such as a list of “treasured seeds still intact in envelopes” that Farrand collected from around the world.

The aesthetic aspect of Reef Point Gardens was often closely allied with a scientific one, apparent in the emphasis on exact order and classification, the organization of coherent collections of plants, and the inclusion of natural habitats and their plants. Farrand loved the simplicity and purity of single roses, which she likened to illuminations in a medieval book of hours or to the drawings from nature of Dürer or Leonardo. Nurserymen had told her that these beautiful roses were so far out of fashion that they no longer listed them in catalogs. Farrand’s collection was said to be “the most complete group of single hybrid tea roses in this country and abroad”; several varieties were to be found only at Reef Point, having been “almost lost to cultivation.” Such a collection could serve as a counterpoise to the dictates of fashion and preserve varieties for posterity.

Farrand makes clear in the bulletins that Reef Point Gardens were made for the serious student of nature and gardens rather than for the casual tourist. She nonetheless took pains to preserve the welcoming character of the house, with its comfortable library and the thirty-foot terrace where visitors could “spend a long afternoon with books and enjoy the quiet harbour view.” She offered her garden to the general public “in the hope they will glean some of the pleasure it has given the first owners for over fifty years.” Beyond her own property, she left her mark on the wider community by designing over fifty gardens in Bar Harbor, including that of the Rockefellers, and donated a great deal of her time to the planning of Acadia Park, consulting extensively with John D. Rockefeller, Jr., about the plantings to be used along the carriage roads.

In the last bulletin, written three years before her death and intended for use as her obituary, Farrand was at pains to place her accomplishments in the context of her collaborations and other strong alliances. It was especially fitting, then, that when Farrand declared her intention to destroy the gardens, friends found a way to perpetuate her exceptional collection of plants. Charles Savage, the owner of a local inn and a member of the Reef Point Gardens Corporation, designed two gardens in Northeast Harbor to which many of Farrand’s plants were moved—“a remarkable feat of plant preservation,” according to the introduction. One of these is an azalea garden modeled after a Japanese “stroll garden” with a pool that reflects the carefully composed sequence of colors of the azaleas; proceeds from the sale of The Bulletins of Reef Point Gardens will go to an endowment for this garden. Now called the Asticou Azalea Garden, it is, in the words of the sign that marked the entrance to Reef Point, “open to all real plant lovers.”

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Arnold Arboretum Weather Station Data — 1997

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Average Maximum Temperature 60°
Average Minimum Temperature 39°
Average Temperature 50°
Total Precipitation 34.91 inches
Total Snowfall 45.35 inches
Warmest Temperature 97° on June 23
Coldest Temperature -1° on January 19
Date of Last Spring Frost 16° on April 29
Date of First Fall Frost 30° on October 22
Growing Season 188 days

Note: According to state climatologist R. Lautzenheiser, 1997 was an extremely dry year, tying 1905 as the seventh driest year in 127 years of state weather records. By the end of the year the average precipitation for the state (32.07 inches) was 9.43 inches below normal, the lowest since the 29.39 inches of 1980.

Here at the Arboretum, the precipitation was average or above during only three months, and for six straight months—May through October—it was well below normal. When rain did come, all too often it was in the form of fast, hard showers that could not soak into the ground. Like 1997, 1995 was also a year of severe drought. Add to this the summer droughts of 1993 and 1994, when little rain fell throughout May, June, July, and August, and the result has been a great deal of stress on the living collections in four out of the last five years.

But the biggest weather event of 1997 in terms of records broken and direct effects on the Arboretum was the April Fool's Day Blizzard. Twenty-five inches of wet, cement-like snow driven by gusty winds wreaked havoc on the collections. This storm surpassed the Hurricane of 1938 as the most destructive in our 125-year history. Given the trials of the past year, we can only hope that the old saw about the changeability of New England weather—if you don't like it, wait a minute—will bring us entirely different and better weather in 1998.
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A New Director for a New Arboretum

Robert E. Cook, Director

In January, Dr. Stephen Spongberg, who for twenty-seven years has been the horticultural taxonomist at the Arboretum, announced his retirement at the ripe young age of fifty-five. Steve is not planning to collect sand between his toes on the beaches of St. Barbados. His early retirement was prompted by an offer few could refuse: he has been appointed director of a new botanical organization on Martha’s Vineyard, the Polly Hill Arboretum. Here he will have the opportunity to create a horticultural and educational institution built on the extensive private collections of the legendary and deeply revered horticulturist Polly Hill, who for decades has been establishing a unique landscape of plants around her home in West Tisbury. Visited by thousands of friends and lovers of plants since she began collecting in the 1950s, Barnards Inn Farm became the Polly Hill Arboretum in 1997, with plans to formally open to the public in 1998.

Steve will be greatly missed at the Arboretum, though he will retain a research appointment here and we anticipate calling upon his botanical expertise often. Steve began his career at the Arboretum in 1970 when he worked on the *Generic Flora of the Southeastern United States* project as a postdoctoral graduate of the University of North Carolina. Over the next two decades he edited and published numerous taxonomic review articles in the *Journal of the Arnold Arboretum*, now published as part of the *Harvard Papers in Botany*. He became especially interested in the close evolutionary relationship between the flora of eastern Asia and that of eastern North America, and he developed deep taxonomic expertise in the genera *Magnolia* and *Sorbus*. These interests culminated in three great achievements.

In 1980 Steve participated in the first cooperative venture between Chinese and American scientists, the Sino-American Botanical Expedition to western Hubei Province. Among its many collections, this excursion brought back *Magnolia zenzii*, *Heptacodium miconiodes*, and *Sorbus yunana* as new introductions to North America. In 1990 Steve published *A Reunion of Trees*, a rich and detailed history of the search for new botanical species around the world and the critical role of the Arnold Arboretum in discovering the botanical treasures of Asia. Seven years later he was honored by the Royal Horticultural Society with the award of the Gold Veitch Memorial Medal for contributions to horticulture. With this honor he joined previous staff members Ernest Henry Wilson, William Judd, and Donald Wyman, four of only fifteen Americans who have received the distinguished British award.

Steve will be greatly missed at the Arboretum and by his many colleagues and friends at the Harvard University Herbaria. We all wish him the greatest success in this challenging and exciting new endeavor.
Campaign Tops $5 Million

Lisa Hastings, Director of Development

The Campaign for the Arnold Arboretum passed the five-million-dollar mark as of January 31, 1998, a significant milestone in this first major fundraising effort at the Arnold Arboretum since 1927. Total cash and commitments reached $5,140,000 toward the campaign goal of $8 2 million, which was publicly announced last June. The campaign will end when the university-wide campaign concludes on December 31, 1999.

The five-million-dollar figure reflects several large gifts received during the last eighteen months and significant, steady growth in both the membership and annual appeal programs. In the category of gifts over $10,000, the Arboretum has received $1,468,334 from twenty-one donors since July 1, 1997. This compares with $285,000 received from ten donors in FY97 and $330,000 received from seven in FY96. The number of gifts ranging from $1,000 to $10,000 has also increased significantly. In this category, the Arboretum received 49 gifts totaling $120,000 in FY97, an increase of 80 percent over 27 gifts with a total of $67,000 in FY96. To date this year, we have received 36 gifts for a total of $96,861.

ANNUAL APPEAL APPROACHES $100,000

In his annual, year-end letter to members, Director Bob Cook admitted that his appeal—which didn’t ask for money—left the Arboretum’s director of development “turning white.” Nonetheless, the 1997 annual appeal has raised $88,000, an increase of 31 percent over total dollars received at this time last year. The number of gifts has increased 38 percent.

In spite of, or perhaps because of, Bob’s unorthodox approach to fundraising, the 1997 annual appeal has grown in several categories: The most notable growth is in the $100 to $999 bracket, with total dollars up 46 percent and the number of gifts at this level up 28 percent. Like membership dues, annual appeal dollars provide important unrestricted, current-use funds that support the Living Collections and other Arboretum programs and initiatives.

We are much encouraged by these generous responses. Bob Cook said, “The increase in overall giving on the part of both our most loyal members and many new supporters this past year represents a tremendous vote of confidence in the current work of the Arboretum. While the campaign has been a major undertaking, the success of this effort to date reflects a deep interest in the future of this unique institution.”

Flora of the Lesser Antilles

Copies of the six-volume *Flora of the Lesser Antilles*, a long-term project of Richard A. Howard, former director of the Arnold Arboretum, are still available in limited quantities.

These six volumes constitute the first comprehensive flora of the area, and the treatments present keys to the genera as well as the species for easy identification. For each genus and species a complete modern description is provided; it includes coloration as well as measurements of floral parts. The descriptions are followed by geographic distribution both within and without the Lesser Antilles. All volumes are abundantly illustrated with line drawings that are botanically correct and highly artistic. All species known in the Lesser Antilles, both native and introduced, are included.

The six volumes are available either individually or as a complete set. For the complete set a special price of $260 is offered that includes shipping and handling within the U.S.A. (Add $5 for shipping outside the U.S.A.) For volumes 4, 5, and 6 only, the special price is $205.

Individual volumes may be purchased at the prices given below, plus $2 per volume for shipping and handling:

- Volume 1: Orchidaceae .................. $20
- Volume 2: Pteridophyta .................. $25
- Volume 3: Monocotyledoneae ........... $35
  (other than Orchidaceae)
- Volume 4: Dicotyledoneae 1 .... ...... $75
- Volume 5: Dicotyledoneae 2 .......... $85
- Volume 6: Dicotyledoneae 3 .......... $85

Checks should be made payable to the Arnold Arboretum, and all orders should be addressed to the attention of Frances Maguire, Arnold Arboretum, 125 Arborway, Jamaica Plain, MA 02130, U.S.A.
A New Outlook on Peters Hill

Peter Del Tredici
Director of Living Collections

The drought of 1997 delayed the planting phase of the improvements to Peters Hill that have been underway since last May, but it is at the top of the list for the spring planting season. The plan is to enhance the pastoral character of Peters Hill as a passive public open space in the Olmstedian tradition of “scenery in the natural style.” Following the recommendations in the master plan prepared by the landscape architecture firm of Sasaki Associates in 1992, a series of short- and long-range views will alternate on the approach to the summit, with broad expanses of greensward broken occasionally by groves of trees and islands of mound-forming shrubs. The effect will be naturalistic, consistent with both the Olmsted/Sargent plan for the core area of the Arboretum and with Beatrix Farrand’s unrealized 1949 plan for Peters Hill. The visitor’s experience at the top of the hill, with its views of the Boston skyline and local surrounds, will affirm Olmsted’s goal of a spiritually restorative, “enlarged sense of freedom.”

Three distinct “communities,” or spatial/ecological types that refer to existing natural and planted groupings, will form the structure of the four-acre-plus hilltop. In keeping with Farrand’s recommendation that “no plants should be set out which are incapable of fighting their own battles against wind, cold and drought,” we have chosen a combination of native and imported species for their likely adaptability to the rigorous site conditions. As individual plants thrive or decline over time, dynamic interactions will gradually lead to a blurring of the edges.

- A mixed deciduous forest of trees and understory/edge shrubs will march up the southeast slope from the existing natural forest. Trees will include several species of oak, sassafras, sweet birch, hackberry, American hornbeam, and common persimmon. Some of the root-suckering understory and edge shrubs will be native viburnums, witch hazel, shadblow, meadowsweet, and low- and highbush blueberries.
- Mound-forming shrubs and groundcovers—all sun-loving and stoloniferous or root-suckering—will include sweetfern, bayberry, several sumacs, and bottlebrush buckeye.
- Woody legumes will fill out a savannah of leguminous trees. Among them will be American yellowwoods, Kentucky coffee tree, Amur maackia, and the Japanese pagoda tree.

New England Grows!

The annual convention of New England’s green industry, called New England Grows!, gives Living Collections and other Arboretum staff a welcome break in the midwinter routine. Held near the end of January at the Hines Auditorium in Boston’s Back Bay, it offered three days of lectures, demonstrations, and exhibits. Among this year’s lecturers were Arboretum Senior Propagator Jack Alexander, on lilacs, and Director of Living Collections Peter Del Tredici on “The Radical Underground: The Myths & Realities of Tree Root Systems.” The Membership staff set up a display and, along with other Arboretum staff, dispensed information on the programs of the Arboretum.
Demystifying Bamboos

Bamboos are invasive and not hardy. Or are they? From 7:00 to 8:00 pm on Monday, March 30, Ian Connor of England’s Sir Harold Hillier Gardens and Arboretum will demolish the myths surrounding this exotic and undervalued group of plants. His slides will demonstrate how beautiful and varied bamboos are, and Connor will show how they can be grown in your garden without acting the villains that they have been branded. Come be converted by this self-proclaimed bamboo fanatic and learn how to bring this plant group out of isolation and back into the garden.

The fee for members is $10, $12 for nonmembers. To register, call 617/524-1718 x 162. Connor’s booklet, A Cultivation Guide for Bamboo, will be available for sale at the lecture.

1998 American Landscape Lecture Series

THE LANDSCAPE OF STEWARDSHIP
Theory and Practice

This sixth year of the American Landscape Lecture Series takes up the subject of stewardship and the implications for contemporary conservation in a time of changing views of nature. The series is a collaboration among the Arnold Arboretum, National Park Service, Harvard Graduate School of Design, and other landscape-oriented sponsors.

All lectures are free and begin at 6:30 pm at the Harvard Graduate School of Design, 48 Quincy Street, Cambridge. For information, call the National Park Service at 617/566-1689 x 204.

Thursday, February 12: People and Nature: Can We Find a Balance?
Daniel B. Botkin, President, The Center for the Study of the Environment, Santa Barbara, California, and Professor of Biology, George Mason University

Thursday, February 26: Common Lands, Common People: Lessons from New England History for Contemporary Conservation
Richard William Judd, Professor of History, University of Maine, Orono

Thursday, March 12: A New Approach to Vermont’s Forests: Managing for Jobs and the Environment
Jeffrey Roberts, Vermont Land Trust
Brenden Whittaker, Northeast Vermont Development Association
Carl Powden, Vermont Land Trust
John Roe, The Nature Conservancy of Vermont

Thursday, April 9: Common Ground in the Range War: The Malpai Borderlands Group
John C. Cook, Vice President, The Nature Conservancy, and Co-Director, The Malpai Borderlands Group

Mark Your Calendars

The Arnold Arboretum’s two most popular annual events—Lilac Sunday and the Fall Plant Sale—have been scheduled.

May 17 is the day for enjoying a long-standing spring tradition in Boston. The lilacs should be in peak bloom, so come view the collection and plan to spend the day exploring the May landscape. Bring a picnic—only on Lilac Sunday is picnicking permitted at the Arboretum.

September 20—also a Sunday—is the date set for the Annual Fall Plant Sale at the Case Estates in Weston. The Plant Sale offers something for everyone, serious plant collector and novice gardener alike. As in the past, this year’s event will feature plant sales in the barn; live auction, silent auction, and straight sales tents; plant society row; and—due to their popularity last year—informal education sessions in the teaching garden. Members will receive their sale catalogs and free plant vouchers in the mail in advance of the sale. For information about plant sale benefits for members, call Kelly Harvey in the membership office at 617/524-1718 x 165.