

The New York Botanical Garden Collections Master Plan
Introduction

THE NEW YORK BOTANICAL GARDEN

Collections Master Plan

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Introduction

In 1891, an Act of the Legislature of the State of New York established The New York Botanical Garden:

for the collection and culture of plants, flowers, shrubs, and trees, and the advancement of botanical science and knowledge and the prosecution of original researches therein and in kindred subjects, for affording instruction in the same, for the prosecution and exhibition of ornamental and decorative horticulture and gardening, and for the entertainment, recreation, and instruction of the people.

The plant collections, gardens, and displays managed by The New York Botanical Garden are the living embodiment of this mission. They have served as both an outward expression of the institution's goals and a vehicle for their attainment since the Garden was established on its current site in 1895.

The gardens, displays, and plant collections that shape the landscape of The New York Botanical Garden have themselves been shaped by the Garden's botanists, horticulturists, and educators working in support of the institution's mission. Over more than a century the Garden has created a mosaic of 50 formal gardens, horticultural displays, and systematic plant collections that are as useful for research and education as they are beautiful. Many of these gardens and collections date back to the establishment of the Garden in the late 19th century. Others are more recent additions developed to address the changing role of the modern Botanical Garden.

In 1896, when founding director N.L. Britton and his colleagues created the "General Plan for The New York Botanical Garden," amassing and displaying the greatest possible diversity of the world's plants was a primary goal of botanical gardens. Intrepid explorers traveled to the far corners of the globe and brought back seeds and plants, many of which were unknown to Western science. Planted together in one site, these living collections would serve a botanical garden's mission in many ways. They would be a living laboratory where botanists could research geographically and taxonomically diverse plant groups without dangerous travel. They would include exciting new ornamental plants horticulturists could use for their gardens and displays. They would inform and inspire the public, providing opportunities for people to experience the botanical wonders of places they would never visit in person.

More than a century later the world has changed. While the goal of maintaining diverse living collections is still important, simple diversity is not sufficient to meet the research, educational, and aesthetic imperatives of the modern botanical garden. Modern botanists can more easily travel around the world to study plants in their native habitats. Programs like CITES and the Convention on Biological Diversity limit the international exchange of living plants and seeds. Many new ornamental plants are developed in the plant

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breeding and selection programs of commercial growers. Some introduced plants have become troublesome weeds, creating concern about future introductions. The public still visits botanical gardens to experience the beauty of the world's flora, but increasingly they come to learn about plants and practices they can use in their own gardens.

In 2002, The New York Botanical Garden began a Collections Master Planning process to address a fundamental question: How will the living collections of the Garden, conceived in the late 19th century, serve the Garden's audience into the 21st century and beyond? This two-phase process combines the knowledge and expertise of the Garden's Horticulture staff with that of experts from some of the world's great botanical gardens and the green industry to analyze the current state of the Garden's living collections and help plan their future development. The analysis phase of the Collections Master Planning process began in July 2002 with an initial meeting of the Collection Master Planning Committee. The planning phase began in 2004 and resulted in the publication of this Collections Master Plan in November, 2006. This plan will serve as a guide for future collections development.

In July 2002, the Garden invited specialists from around the world to come to the Bronx to begin analysis of the 50 core living collections, gardens, and displays curated by The New York Botanical Garden. Members of the Collections Master Planning Committee include:

Dr. Kenneth Cameron, Director & Associate Curator, The Lewis B. & Dorothy Cullman Program for Molecular Systematics Studies, The New York Botanical Garden

Dr. Peter Del Tredici, Research Scientist, Arnold Arboretum of Harvard University

Mr. Ron Determann, Curator, Atlanta Botanic Garden

Mr. Jim Gardiner, Curator, Royal Horticultural Society, Wisley

Mr. Brent Heath, principle, Brent and Becky's Bulbs

Dr. Andrew Henderson, Curator, The New York Botanical Garden

Mr. Dan Hinkley, Plantsman and Garden Designer

Mr. Panayoti Kelaidis, Curator, Denver Botanic Garden

Ms. Susan Martin, Curator, United States National Arboretum

Mr. Paul Meyer, Director, Morris Arboretum

Dr. John Mickel, Senior Curator Emeritus, The New York Botanical Garden

Dr. Robbin Moran, Curator, The New York Botanical Garden

Ms. Kathy Musial, Curator, Huntington Gardens and Library

Mr. Stephen Scanniello, Rosarian and Garden Designer

Mr. Don Shadow, principal, Shadow Nursery

Dr. Nigel Taylor, Curator, Royal Botanic Gardens, Kew

Dr. Susan Weigrefe, Plant Breeder, Morton Arboretum

During this initial visit, each committee member volunteered to review the current composition and care of collections that fall within their area of expertise. Committee members returned to the Garden in 2002 and 2003 to get a more in-depth look at the collections and discuss their findings with the Garden's curatorial staff. Committee members presented detailed reports describing their findings at a third Committee meeting in July 2004. The Garden's curatorial staff compiled those reports to create this plan, which will serve as a guide for the development of the living collections for decades to come.

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A History of the Living Collections of The New York Botanical Garden

Early Development 1891–1932

The 1891 Act of the State Legislature of New York that created the Garden allocated “a maximum of 250 acres” in the Bronx to be granted when the Garden’s Board of Managers raised \$250,000 in subscriptions to support the new institution. That goal was reached in 1895, and the City of New York granted approximately 250 acres of land bisected by the Bronx River in the northern section of Bronx Park. Britton chose this site for its dramatic topography, exposed rock outcrops, wonderful native trees, and, most importantly, for the “Hemlock Grove,” a parcel of old growth mixed hardwood and hemlock forest at its heart.

In 1895, Calvert Vaux, then the landscape architect for the Parks Department, created an initial plan for a system of carriage ways through the Garden. In 1896, founding director N.L. Britton and his colleagues on the Plans Committee created the “General Plan for The New York Botanical Garden.” This detailed plan showed the future locations of the buildings, roads, displays, and living collections that would become the physical Garden. Britton’s vision for diverse, beautiful, and scientifically useful living collections can be clearly seen in the way the Plans Committee identified key horticultural features and allocated space for them in the Garden.

- Herbaceous Grounds (8 acres)
- Decorative Grounds (25 acres)
- Pinetum (30 acres)
- Deciduous Arboretum (70 Acres)
- Fruticetum (15 Acres)
- Viticetum
- Rockery
- Bog Garden (5 Acres)
- Lakes and Ponds (6 Acres)
- Economic Garden
- Permanent Nurseries
- Forest Areas (65 Acres)
- Meadows (10 Acres)

In order to maximize the scientific and educational utility of the living collections, Britton arranged the plantings within the Herbaceous Grounds, Pinetum, Deciduous Arboretum, and Fruticetum according to the phylogenetic sequence proposed by German botanists Adolf Engler and Karl Prantl in *Die Natürlichen Pflanzenfamilien*.

Work began immediately. Dead trees were removed and healthy native specimen trees were identified and labeled. Creation of nursery space and preliminary screening plantings began in 1895, and the first systematic plantings commenced in the Herbaceous Grounds in 1897. Planting of the Fruticetum and Pinetum began in 1898. That same year, Garden staff began keeping records of herbarium specimens collected from cultivated plants in the living collections. These records became the core of the Garden’s Plant Records system.

The Library Building and Conservatory Range 1 were completed in 1901 and 1902, respectively. Conservatory Range 1, now the Enid A. Haupt Conservatory, featured Old World and New World palms, desert plants, ferns, begonias, and tropical and subtropical plants grouped by genus. Construction of a second conservatory began on the northeastern

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section of the grounds in 1908. This glasshouse, later named the Guggenheim Conservatory, featured warm temperate plants, orchids, bromeliads, aroids, ferns, and cycads.

Over the Garden's first 20 years the development of the living collections proceeded apace. Each year the Garden's Horticulture staff added new taxa to the living collections and displays featured on the General Plan. While most of the planting occurred in the systematic collections, amenity plantings were installed along the Garden's perimeter and at its gates. In 1915, the living collections received a boost when the Garden received approximately 140 more acres of land from the City. This additional land provided the space for the first formal garden on the grounds: a rose garden designed by Beatrix Farrand in 1915. Over the next few years the Garden also added an extensive *Iris* planting, a separate lilac collection, an elaborate planting of tulips and peonies, and conifer plantations. At nearly 400 acres, the Garden was the world's largest urban botanical garden.

By 1920, the Garden had incorporated more than 49,000 accessions into its living collections. Its landscape included all the major elements Britton and his colleagues believed necessary in a modern botanical garden. The Garden had two glorious glasshouses stocked with exotic tropical, subtropical, and warm temperate plants, a morphological garden, a systematic garden of herbaceous plants, an interpreted display of economic plants, and diverse and well-labeled collections of hardy trees and shrubs. The Garden also featured many decorative plantings of flowering trees and shrubs and dwarf conifers, particularly at its entrances and along its perimeter. The living collections were the focus of active research in systematic botany, plant breeding, and pathology. The Garden was as much a living classroom and laboratory as it was an oasis at the edge of the expanding City.

In 1923, Frederick Lee, the President of the Garden's Board of Managers, invited the Olmsted Brothers landscape architecture firm to analyze the Garden's 400-acre site and make suggestions for improvements. Their 1924 report concluded that while the Garden was endowed with an incomparably beautiful natural setting, much work was necessary to allow the Garden to achieve its true aesthetic potential. Some of their suggestions included improving maintenance, establishing "model gardens" and other purely aesthetic features within the Garden to appeal to a growing suburban clientele, limiting car traffic through the Garden, and reworking the Garden's labyrinthine network of paths to create more natural movement through the landscape.

The Garden began implementing some of the proposed improvements almost immediately. A lake in the southeastern corner of the grounds was filled in preparation for a new "Rhododendron Glade." Thirty seven thousand daffodils were planted in the southwestern portion of the Garden (near the present site of Daffodil Hill) in 1924. In 1925, the Garden held a nationwide competition for designs of small gardens. In 1926, Garden horticulturists installed the first-prize winning design submitted by Archie Will of Wauwatosa, Wisconsin. In 1928, the Garden planted flowering cherries, pears, and crabapples along the Garden's southern perimeter to entice potential visitors driving by on Pelham Parkway. In 1930, the Herbaceous Grounds, which had never caught the fancy of the public, were dismantled.

The Advisory Council, established in 1914 as the Women's Advisory Committee, supervised these aesthetic improvements. The Advisory Council also spearheaded the creation of the Garden's first mixed border. This border, designed by Ellen Biddle Shipman, was planted along the eastern side of the Conservatory in 1933. This new planting represented a shift from the long tradition established by Britton and his colleagues of emphasizing discreet systematic collections. Instead of grouping plants by family or genus,

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the plants in this border were arranged purely for aesthetics in the British tradition of the mixed border.

The Second Phase of Development: 1932–1949

In 1932, the Garden hired T.H. Everett to manage the living collections. Everett was a sophisticated plantsman, trained at Kew, who recognized the great potential of the Garden's plant collections and displays. He understood that the living collections could only serve the institution if they were as beautiful and well-maintained as they were diverse and scientifically useful. Everett's most lasting legacy is the Rock Garden, which he began building soon after he arrived at the Garden in 1932. Today the Rock Garden, with its artfully constructed rock features and beautifully planted displays, is the apotheosis of The New York Botanical Garden's effort to combine horticultural skill, scientific knowledge, and educational value in its gardens and collections.

One of Everett's contemporaries at the Garden was Dr. Arlow Burdette Stout, who was a plant-breeder and geneticist at the Garden from 1911 until 1947. Stout's focused on ornamental and economic plants, including avocado, grapes, and lilies. He is perhaps most famous for the pioneering work he did with daylilies. In 1934, he introduced *Hemerocallis* 'Theron', the first truly red daylily. Stout planted many of his daylily seedlings at the Garden and established the Garden's first formal daylily display garden on the slope west of the Museum building in 1933.

In the late 1930s, the Garden's living collections suffered a setback at the hands of Robert Moses and the Bronx River Parkway Commission. The extension of the Bronx River Parkway, North America's first limited access multi-lane parkway, into the Bronx began in 1931. In 1937, the Garden agreed to relinquish land east of the Bronx River for the extension of the Parkway south. At the same time the Garden surrendered additional acreage north and east of Twin Lakes to the City for the creation of a park and playgrounds. In return, the City granted the Garden the Snuff Mill, the Stone Cottage, Lorillard stable, the Propagation Range, and adjacent land that had been the property of the Parks Department.

Unfortunately, the land the Garden lost represented a large portion of the Garden's original systematically planted living collections. Lost were the entire Fruticetum, the Guggenheim Conservatory, and most of the Deciduous Arboretum, including the popular Japanese flowering cherry collection, and the maple, willow, elm, walnut, and ash collections. In all, roughly 120 acres were returned to the City, leaving the Garden near its original 250-acre size and permanently disrupting the original Engler and Prantl planting sequence. Nearly 40 years of active collections development were lost forever.

The Garden worked hard during the late 1930s and 1940s to replace some of the collections and features lost in 1937, particularly the ornamental woody plants. The maple and ash collections were reestablished near the current site of the Benenson Ornamental Conifer Collection between 1937 and 1942. A large planting of crabapples was installed near Fordham Road in 1939. Other new collections were established during this period as well. In 1940, Charles O. Dexter donated hundreds of hybrid rhododendron seedlings he had grown at his estate in Massachusetts. These were planted along the Forest edge near the Library Building in 1942. An Azalea Garden was established in the southern portion of the Garden along Azalea Way in 1943. An Herb Garden, with a central knot of santolina, violets, and thyme, was built in 1948. The Montgomery Conifer Collection, a Marian Cruger Coffin-designed landscape featuring dwarf and ornamental conifers donated by R.H. Montgomery, opened in 1949. Coffin also designed an expanded lilac collection just north of the Rose

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Garden, incorporating more than 500 lilac specimens from the estate of T.A. Havemeyer. In spite of labor shortages due to World War II, the 1940s were a very busy period at the Garden.

The Second Half of the 20th Century: 1950–1989

The permanent living collections received little attention during the late 1950s and into the 1960s. Annual reports from head gardener Louis Politi indicate that the energies of the Garden's horticulturists were disproportionately focused on seasonal displays and flower shows on the grounds and in the Conservatory. Economic conditions in the Bronx declined during this period, and incidents of vandalism and theft increased. The most significant changes to the living collections during this time were the expansion of the Native Plant Garden in 1964, the establishment of the Lyndon Brown shrub collection in 1965 (now the site of the Home Gardening Center), and the creation of a new collection of Japanese flowering cherries in Cherry Valley in 1969. Smaller projects included the creation of a daylily collection in 1957, the installation of peony beds along what is now Daylily/Daffodil Walk in 1965, and the expansion of the azalea and rhododendron collections along Azalea Way in 1969. In 1967, the Garden was named a National Historic Landmark.

In 1971, the Garden established the Cary Arboretum in Millbrook, New York. The addition of this 1,800-acre site in the Hudson Valley allowed the Garden to significantly expand the scope of its woody plant collections by providing a location for wild-collected accessions of taxa poorly represented in the Bronx. In contrast to the Garden, which since Britton's time had not had the benefit of a well-defined collections policy, the living collections of the Cary Arboretum had a specific direction from the very beginning. The Arboretum's deed called for "growing a complete collection of hardy woody plants" and echoed the Garden's commitment to combining scientific research, horticultural display, and education. The Cary Arboretum remained an important venue for living collections development until 1993 when the Institute of Ecosystem Studies, established as a division of The New York Botanical Garden, became an independent organization and assumed stewardship responsibility for the site.

With a new outlet for more traditional collections development, Garden horticulturists focused on improving the vitality of the gardens, collections, and displays in the Bronx. In 1972, the Rose Garden was relocated from its original location to a new site adjacent to the Conservatory in response to concerns about poor growing conditions and inaccessibility to visitors. The Jane Watson Irwin Garden, designed by Dan Kiley as an order garden, was planted adjacent to the Herb Garden in front of the Conservatory in 1978. In 1979, the Garden commissioned an ecological study of the Hemlock Forest to determine what steps should be taken to ensure its continued health. This study concluded that the hemlocks that had defined the Forest for generations were in serious decline and that invasive exotic species were gaining a foothold. This conclusion led to the creation of the Forest Project, a joint research project between the Garden and the Institute of Ecosystem Studies, in 1984. From 1984 to 1994, ecologists in the Forest Project studied the impact of the urban environment on the Forest's vegetation. Their findings were an important source of information for the Forest Management Plan created in 2001.

During the 1980s, historic plant collections were expanded and new gardens and displays were added. The Murray Liasson Narcissus collection, a systematic planting of cultivated *Narcissus*, was planted in 1982. New peony beds were planted along Perennial Garden Way in 1986. Also in 1986, garden designer Lynden Miller was invited to redesign

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and expand the Jane Watson Irwin Perennial Garden. The mixed border of *Hemerocallis* and *Narcissus* along Daylily/Daffodil walk was installed in 1987. That same year, the Demonstration Gardens were built adjacent to the Conservatory, near the spot where 60 years earlier the first model garden had been constructed. In 1988, the Peggy Rockefeller Rose Garden reopened in its original location in the southwestern corner of the grounds. Elements of Beatrix Farrand's original 1915 design that had never been constructed, including an iron fence and central gazebo, were finally built. These improvements increased the diversity of the living collections while creating beautiful garden features, and expanded opportunities for education and interpretation.

The Renaissance of the Living Collections and Landscape: 1990–2006

The past 20 years have been the most active period for the landscape and living collections since the early development of the Garden. The renaissance of the Garden began in the 1990s with a period of major infrastructure improvement. One of the central recommendations of the Olmsted Report was finally addressed in 1990 when the Garden prohibited automobile traffic on its interior roads. This decision, along with the decisions to limit picnicking to certain areas, exclude dogs from the grounds, and charge admission, set the tone for the Garden's rebirth. For the first time in its history, the Garden recognized that it could best serve its visitors by being the best possible steward of its landscape and living collections.

The first of a long list of significant improvements to the living collections that began during the 1990s was the restoration of the Enid A. Haupt Conservatory, which reopened in 1997 after a four-year restoration. The displays within the Conservatory were reconfigured to evoke a variety of natural habitats, including lowland tropical rain forest, montane rain forest, and Old World and New World deserts. The new configuration embodies the balance between collections development, horticultural display, and education that the Garden strives for in all of its gardens and living collections. A visit to the Conservatory transports Garden visitors to tropical biomes and, through interpretive signs and an audiotour, teaches them about the diversity of the tropics and the fragile balance between people and their environment.

The new millennium has been the most active period in the stewardship of the landscape and living collections and the development of new facilities and programs that serve the living collections since the initial development of the Botanical Garden in the late 19th century. New collections and displays added since the turn of the 21st century include the Delores DeFina Hope Tree Peony Collection, a collection of Chinese tree peonies established in 2000, and the Ladies' Border, a display of tender plants in a south-facing border designed by Lynden Miller in 2001.

Historic collections that have been renovated and expanded since 2000 include the Arthur and Janet Ross Conifer Arboretum, originally the Pinetum, and the Benenson Ornamental Conifers, originally the Montgomery Conifer Collection. Seasonal exhibitions in the Conservatory, including *Momijigari*, which began in 2000, and the Orchid Show, which began in 2003, have provided a venue for expanding the diversity of the permanent collections while increasing the public's interest in plants. The opening of the Nolen Greenhouses for Living Collections in 2005 has provided opportunities for improved stewardship, an expanded exhibition program, and further collections development. The Home Gardening Center, which opened on the former site of the Demonstration Gardens in 2005, has provided an accessible and inspiring venue for educating the public about plants

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and horticulture. A program of in-depth interpretation has accompanied each of these new endeavors, allowing the Garden to more deeply engage the public in its living collections, gardens, and displays.

Conclusion

The Garden's living collections have changed significantly since their establishment in the late 19th century. The primary aim then was to maintain discrete systematic collections of the world's plants for study and comparison. This goal was in keeping with the spirit of exploration and basic research that defined the great American museums established in the late 19th century. While this spirit has always remained, limited resources, shifting priorities, and changing institutional leadership have impacted the evolution of the Garden's plant collections.

Today, the Garden features a mix of discreet generic collections and collections integrated into gardens and displays. There are many reasons for this. The primary reason was the loss of much of the original systematic plantings in 1938. Another reason is the Garden's increasing emphasis on maintaining a compelling and beautiful landscape, which can be traced back to the 1924 Olmsted report and the hiring of T.H. Everett in 1932. Some of the Garden's most important collections were amassed as part of the research interests of specific botanists (e.g., the tropical Ericaceae) or horticulturists (the daylilies) that have worked at the Garden over the past century. Others are of obvious aesthetic value (e.g. the flowering cherries and roses). Still others are remnants of the Garden's original efforts to have the most diverse and representative living collections possible (the woody legumes).

As we move toward the future, the Garden must maintain a balance between diverse collections and inspiring displays. Moving too far in either direction would be an obstacle to fulfilling the Garden's tripartite mission of horticultural display, scientific research, and education. The primary goal of this Collections Master Plan is to guide the development of the collections so that a core of diverse, well-documented collections is available to serve the mission of The New York Botanical Garden well into the future. This plan is designed to be adaptive and flexible so that Garden horticulturists and scientists can both take advantage of new opportunities as they arise and adjust the composition of existing collections as changing conditions demand.

The Living Collections in 2006

In preparation for the Collections Master Planning process, the Garden's horticulture staff prepared a list of the core collections, gardens, and displays that currently form the living collections. Since the Garden has never had a formal collections policy nor a written history of the development of the living collections, the primary guide for this exercise was the Curatorial staff's collective sense of the Garden's priorities. The list of collections, gardens, and displays compiled in 2002 was used to guide the Collections Master Planning process. The experts on the Collections Master Planning Committee came to the Garden to see the collections firsthand and were asked to assess the collections based on their diversity, quality of display, quality of care, and level of interpretation. Each member of the committee prepared a report for each of the collections that fell within their area of expertise. The Garden's curatorial staff compiled these reports, added historical information, current statistics, and their own detailed evaluations to create the collections assessments below. These assessments have been used to create a Collections Master Plan that will be used to

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shape the continued development and improvement of the living collections of The New York Botanical Garden.

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Tree and Shrub Collections

1. Arthur and Janet Ross Conifer Arboretum: Susan Martin, Paul Meyer
2. Benenson Ornamental Conifers: Susan Martin
3. Conifer Plantations: Susan Martin
4. Landscape and Nursery Conifers: Susan Martin, Don Shadow
5. *Acer*: Dan Hinkley, Paul Meyer, Don Shadow, Susan Wiegrefe
6. *Magnolia*: Jim Gardiner, Don Shadow
7. *Malus*: Nigel Taylor
8. *Prunus*: Peter Del Tredici, Don Shadow
9. *Quercus*: Peter Del Tredici, Paul Meyer
10. *Rhododendron*: Jim Gardiner
11. *Syringa*: Peter Del Tredici
12. Tree Peony Collection: Nigel Taylor
13. Woody Legumes: Peter Del Tredici, Paul Meyer
14. Arboretum Collections: Peter Del Tredici, Dan Hinkley, Paul Meyer, Don Shadow, Susan Wiegrefe
15. Ornamental Shrubs: Jim Gardiner, Dan Hinkley, Don Shadow
16. Forest: Peter Del Tredici

Herbaceous Collections

17. *Hemerocallis*: Dan Hinkley, Panayoti Kelaidis
18. *Iris*: Dan Hinkley, Panayoti Kelaidis
19. *Narcissus*: Brent Heath, Dan Hinkley
20. *Paeonia*, Herbaceous Peonies: Dan Hinkley, Nigel Taylor
21. Hardy Ferns: Panayoti Kelaidis, Susan Wiegrefe, John Mickel

Gardens

22. Rock Garden: Panayoti Kelaidis
23. Native Plant Garden: Dan Hinkley
24. Jane Watson Irwin Perennial Garden: Dan Hinkley
25. Nancy Bryan Luce Herb Garden: Dan Hinkley
26. Ladies' Border: Dan Hinkley
27. Peggy Rockefeller Rose Garden: Stephen Scanniello

Glasshouse Collections

28. Aquatic Plants: Panayoti Kelaidis
29. *Begonia*: Ron Determann
30. Bonsai: Peter Del Tredici
31. Carnivorous Plants: Ron Determann
32. Cycads: Ron Determann, Kathy Musial
33. Glasshouse Ferns: Ron Determann, Robbin Moran
34. Orchids: Kenneth Cameron, Ron Determann
35. Palms: Kathy Musial
36. Tropical Economic/Medicinal Plants: Ron Determann

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37. Tropical Ericaceae: Ron Determann, Jim Gardiner
38. Lowland Rain Forest: Nigel Taylor
39. Upland Rain Forest: Ron Determann, Kathy Musial, Marc Hachadourian
40. Old World Tropicals: Kathy Musial
41. New World Desert: Cactaceae, Agavaceae, etc.: Kathy Musial, Nigel Taylor
42. Old World Desert: Aloeaceae, Euphorbiaceae, Lithops, etc.: Kathy Musial, Nigel Taylor