

MARSH BOTANIC GARDEN



View of the gently sloping hillside below Marsh Hall in spring ca. 1940. Historic photograph from the Marsh Botanic Garden collection.

Poised for the Future The Marsh Botanic Garden (1899–2004)

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One of Yale's lesser known assets—its botanic garden—is currently receiving renewed attention for its multiple roles in the research, teaching, and appreciation of plants by faculty, students, and the wider community. Othniel C. Marsh, Yale alumnus and professor responsible for the Peabody Museum of Natural History's (YPM) world-renowned collection of dinosaurs, also collected plants during his travels, displaying them in the gardens and greenhouses surrounding his home at the crest of the hill north of the campus. On his death in 1899, he bequeathed to Yale this tract

of nearly eight acres, bordered by Prospect Street, Hillside Terrace, and Mansfield Street, stipulating that it should be “used as a University Botanic Garden and for no other use or purpose.” In 1900, the Marsh mansion became the home of the fledgling Yale School of Forestry (now the Yale School of Forestry & Environmental Studies [F&ES]). Since then F&ES and Botanic Garden have shared the same grounds.

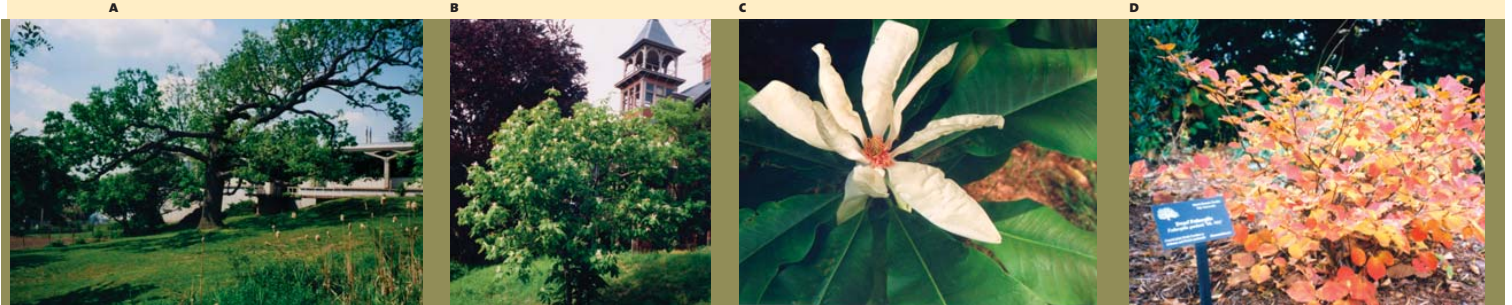
For most of the first two decades of the garden's existence, Dean of Forestry Henry

Graves served as its director. During this period, the gardener John Murray planted several systematically arranged beds with labels that enabled the forestry students to study plants and their relationships. Students also received instruction in propagating trees and shrubs. Thousands of white pines and other conifers were started and eventually transplanted throughout the state to reforest and protect the watersheds of public reservoirs.

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Above, from left to right:

A. The ancient white oak *Quercus alba* saved by Nichols and Graves nearly eighty years ago. The tree survived severe damage inflicted by a tornado in 1989 and two more recent storms.

B. Recent view of the hillside on the preceding page. Bigleaf Magnolia *Magnolia macrophylla* in bloom. Of the trees and flowering shrubs seen in the earlier photograph, only the European beech with copper foliage in the background remains.

C. Leaves and flower of Bigleaf Magnolia.

D. Dwarf fothergilla *Fothergilla gardenii* 'Mt Airy' is located in the border south of Marsh Hall. This native of the southeastern coastal plain from North Carolina to Alabama grows along edges of ponds and wetlands. The addition of botanical labels is a recent improvement.

E. Franklin's tree *Franklinia alatamaha* flowers in the fall. This species, named for Benjamin Franklin and now extinct in the wild, is one of a few American representatives of the mostly Asian family Theaceae of tea and camillas.

F. Witchhazel *Hamamelis virginiana* blooms in the fall. It grows in a moist area of the rock garden. This species along with many others in the garden are being used by Professors Michael Donoghue, Vivian Irish, Leo Hickey, and their students in studies of the evolution of early groups of flowering plants.

G. While most hydrangeas are native to Asia, oakleaf hydrangea *Hydrangea quercifolia* is a handsome shrub native to southeastern United States and the Gulf Coast. Along with viburnums and winterberry, it screens the fence surrounding the experimental garden plots. Oakleaf hydrangea blooms in late summer.

H. The showy outer florets of doublefile viburnum *Viburnum plicatum* var. *tomentosum* 'mariesii' flowers are sterile; the smaller inner ones are fertile.

The year 1922 was important for the garden. To recognize Marsh's generosity and perpetuate his memory, the Yale Corporation agreed to add his name to the botanic garden. A plan for its reorganization was finally presented, with the goal that "the Botanic Garden will be an institute for research in plant life also containing a systematic display of plants as an educational feature for students and the general public".¹ Also in this year, the highly regarded landscape architect Beatrix Farrand was appointed Consulting Landscape Gardener to the university. In 1923 when the Forestry School moved down Prospect Street to newly completed Sage Hall, the Botany Department took charge of the Marsh garden. Shortly thereafter botany professor George Nichols became director of the garden.

Nichol's interest in plant ecology on the succession and formation of plant communities in nature led him to experiments in the Marsh garden on the conditions for germination of seeds and growth of native plants. In time he focused on a simpler question more suitable to a botanic garden: Could native species adapt to cultivation in conditions that local gardeners could duplicate? In 1927, Nichols inaugurated a seed exchange program and was soon sending seeds of 340 different species of native American plants, amounting to over 1,500 packets annually, to 37 different botanical gardens in 20 different countries. This enormous effort continued until his death.

The work of Beatrix Farrand and George Nichols is the principal reason for considering the Marsh Botanic Garden a historically

significant botanic garden. Farrand trained with Charles Sprague Sargent at Harvard's Arnold Arboretum and traveled widely, schooling herself in European gardens. In 1899, she had been the only woman among eleven founders of the American Society of Landscape Architects. When she began to design the Yale landscape, the campus was a sea of construction.

Beatrix Farrand was ahead of her time in advocating the use of native American trees, shrubs, and perennials on the campus. She strove to group plants as they might be found in natural communities. Species were chosen for their fall foliage, the winter interest of their architecture, shape and color of bark, and persistence of colorful fruits attractive to birds and wildlife. She created settings for the new buildings—surrounding the YPM with dogwoods, maples, witch hazels, and deciduous hollies, and Sage Hall with viburnums and blueberries. She conceived of the whole campus as an arboretum, an outdoor museum of trees and shrubs.

Marsh was Farrand's first commission for the design of a botanical garden, and she struggled to reconcile the requirement for a public display of diverse species of plants and their systematic relationships with an artistic vision that unified the whole site. Her proposed resolution was to replicate the first botanic garden, built for display of medicinal plants at Padua in 1545, as the centerpiece for the formal gardens on the level ground at Marsh.

The first two quadrants of the Padua design covered half an acre and were filled with native American species collected by Nichols, the new director. But Nichols and Graves halted completion of the remaining

¹ from the Graves' Report 23 Nov. 1922 YU/TR Series III Box 256, Folder 1462 cited by Catherine Phillips (2000) in "The Marsh Botanic Garden, 1900–1939: A History".



quadrants by refusing to allow removal of the venerable white oak on the hillside and rerouting of the brook. Overruled, Farrand turned her attention to working the natural features of the spring, wetland, and vernal pool into the rock garden. The rock garden took over six years to complete. Rocks, some weighing half a ton and hauled in from the Yale Natural Preserve in Westville, were placed to appear as natural outcrops, and more than a thousand native North American and exotic plants were arranged among them and along the brook and paths. Some 700 native herbaceous perennials were tested in the formal beds, of which 400 to 500 survived, prospered, and demonstrated their ornamental qualities.

These included 30 species of goldenrods, 18 of asters, and numerous phlox, cacti, and ferns. During the late 1920s through the 1930s, some 10,000 visitors a year were coming to the Marsh Botanic Garden to view the seasonal displays. In spring, tulips, narcissi, and iris bloomed in the formal gardens and viburnums, azaleas, rhododendrons, mountain laurel, and lilacs on the hillside. In summer, roses, phlox, dahlias, gladioli, and asters were the attractions, and in fall, the foliage. Each fall thousands of bulbs and hundreds of irises were planted, carefully arranged by color. The showy, giant, bearded irises were the gift of the American Iris Society that each year sent new introductions to be evaluated. By any measure, the Marsh Botanic Garden and its public displays were a stunning success.

George Nichols died in 1939 and Beatrix Farrand did her last work at Yale, the Silliman College courtyard, in the early 1940s before retiring to California. Budgets were tight during the Depression and the war. Perhaps more important, subsequent directors and the fac-

ulty of the Botany Department were working in new research areas in development and physiology and had little interest in the educational and public aspects of the garden. Within two years of his death, all of Nichol's valuable collection of native plants had been dug up and given to Connecticut College. Years later, when I became director and wanted to learn more about designing gardens with native flora, I attended seminars on the subject offered by the Connecticut College Arboretum and frequented plant sales at Connecticut College in order to purchase trees and shrubs for the Marsh Gardens.

Without the interest of the faculty during much of the latter half of the 20th century, the grounds and their plantings were neglected. Grounds Maintenance took over the upkeep of the lawns as well as the garden's garage and parking area for storage and maintenance of their garbage trucks and equipment. With the contraction of the staff, the duties of the garden's manager and horticulturalist inevitably became limited to growing the plants needed in research and teaching. Despite Marsh's stipulation that the site be used only for the university's botanic garden, Greeley Laboratory, designed by Paul Rudolph, was built in 1958. Now the only remaining traces of Marsh's original garden and Farrand's later work are the magnolias, laurels, and rhododendrons found along Hillside Terrace east of the rock garden.

Along with Farrand's lists of perennials, we are fortunate to have a copy of her 1927 plan for the Marsh Botanic Garden. Following a tornado in 1989, I revived the advisory committee and consulted with interested faculty in (Faculty of Arts and Sciences) and F&ES about the garden's future direction. The advi-

sory committee agreed on a plan to restore the grounds in a manner consistent with the spirit of Farrand's 1927 plan but requiring less maintenance. Provost Alison Richard provided funds specifically for this restoration.

We began clearing overgrown areas of invasive exotics with minimal use of herbicides. Catherine Phillips and Michael Doherty spent the summer of 1998 carefully excavating the rock garden. To stabilize the opened areas, we quickly replanted with native shrubs—azaleas, buttonbush, elderberry, and sweet pepper bush—appropriate to a shaded wetland, along with six different species of ferns. Some native perennials, Jack-in-the-pulpit, Solomon's seal, false Solomon's seal, and Canada mayflower, have reappeared in profusion. Columbines, cardinal flower, and great lobelia were grown from seed in the greenhouse and planted.

On the hillside above the rock garden, brambles were removed, and a planting of the both high- and low-bush blueberries was established in the understory. Freed from competition, a stand of the delightful shrub bottlebrush buckeye sprang up. Arrowwood, viburnums, and blueberries were planted to provide a screen along the fence on Hillside Terrace.

On the steep banks that were left ungraded when Greeley was built, red osier dogwood, a wetland species, along with clumps of switch, Indian, and big and little bluestem grasses were introduced to reduce runoff and flooding. Bayberry and sweet fern, two woody species that fix nitrogen with the soil bacterium *Frankia* harbored in their roots, help improve the nutrient-poor glacial till that covers the hillside.

Collections are only useful for study if the plants are identified. Over the past decade, stu-

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Left to right:

A. A small stand of native cattails *Typha latifolia* grows intertwined with the invasive, exotic purple loosestrife *Lythrum salicaria*. Each of the dry, brown fruiting stalks of loosestrife produces as many as a million seeds.

B. Blue flag *Iris versicolor* blooms along the brook.

C. Native shrubs planted following renovations to Greeley provide a display of fall foliage

All photographs by M. H. M. Goldsmith

dents in Terrestrial Ecosystems, Environmental Studies, and Biology of Plants have assisted me in preparing an inventory and computerized data base of the significant woody trees and shrubs, herbaceous perennials, grasses, and ferns present in the garden. In celebration of the centennial of both the garden and the F&ES, we installed several hundred sturdy metal labels that provide the common and scientific names, the family, and the distribution of the specimen. Now staff and students in F&ES's Urban Resources Initiative find inspiration in the garden for trees, shrubs, and perennials to use in helping local neighborhoods create green spaces.

Today, the Marsh Botanic Garden includes not only outdoor gardens and greenhouses at Marsh and Osborn Memorial Laboratories, but also controlled environmental facilities. The greenhouses contain collections of tropical and economically useful plants, lower vascular plants, insectivorous plants, cacti, and succulents. The collection of tropical plants—tree ferns, cycads, palms, bromeliads, and orchids—includes economically important species: coffee, cocoa, bananas, pineapple, cinnamon, ginger, and vanilla orchid. These plants, tended by horticulturalist David Garinger, are used for teaching and demonstration, but by arrangement may also be available for experimentation and research.

In 2002, Timothy Nelson, Professor of Molecular, Cellular & Developmental Biology (MCDB), was appointed director of the garden and with the advisory committee is revisiting the ever vexing balance between education and research at the garden. Almost immediately

Nelson and the advisory committee had the opportunity of appointing a new manager for the garden. Eric Larson arrived in the spring of 2003. Previously, Larson served as a working supervisor of Haverford College's 200-acre historic campus. He has increased our visibility in the university and wider community by introducing an online newsletter, Liquid Sunshine, and inviting small groups for garden tours along with tea, concerts, or picnics. Throughout the year, several undergraduate and graduate work-study students receive training in best horticultural practices under his direction. Other welcome innovations are the colorful borders of diverse annuals and perennials in the experimental garden, and this year's wildflower meadow below the north entrance to Greeley Laboratory. Two dozen young trees have been planted, including apples and other fruit trees, European beeches, bald cypress, and tupelo (sour gum).

In 2004, the faculty created two new courses that depend on the garden's outside and greenhouse collections. Although space is limited, Dianella Howarth, lecturer and postdoctoral fellow in the Department of Ecology & Evolutionary Biology (EEB), teaches the weekly laboratory for the E&EB course *Plant Diversity & Evolution* at Marsh. I use the collections in the Environmental Studies/MCDB/F&ES course *Plants and Agriculture in Temperate and Tropical Ecosystems*. For this course, we raise historic species of wheat and its wild relatives from seed obtained from the Wheat Genetics Resource Center at Kansas State University in order to demonstrate the hybridization and polyploidy involved in the evolution and domestication of wheat.

Once again, as in the 1920s, new construction is occurring on campus. With the restoration of Betts Hall for the Yale Center for the Study of Globalization and the Divinity School, more people come to the north end of campus. Aware of Beatrix Farrand's legacy, Yale's landscapers have endorsed the creation of a green space with Marsh Botanic Garden at the center of a continuous park including Sachem's Woods, William Farnam Memorial Garden, and the wetland lying north of Ingalls Rink and the proposed parking garage.

Botanical gardens, unlike museums of natural history, enable learning by observing living organisms. This is all the more important in a world where so many children and students grow up in an urban environment unconnected to and uninterested in the natural world. We are unlikely to be able to save what we do not know, value, and love. This is the foremost reason that Yale University should again honor Marsh's wish for a great living museum of plants in the Marsh Botanic Garden.

During the time she was a special horticultural assistant to the garden's director in 1998–2000, Catherine Phillips undertook a careful study of Farrand's role at the garden, using sources in the Marsh Botanic Garden files, the archives and manuscripts collection of the Yale University Library, and the Beatrix Farrand archive in the library of the Environmental School of Design, University of California, Berkeley. I am grateful to Catherine Phillips for permission to quote her manuscript, The Marsh Botanic Garden 1900–1939: A History prior to publication.