

3.0 ARBORETUM COMMUNITY PROGRAMS AND BENEFITS

3.1 Introduction

Consistent with its unique mission, the Arboretum provides invaluable benefits to visitors who enjoy the landscape as a quiet, natural area in the midst of a highly urban environment, as well as to those who participate in classes, field trips, tours, and other educational programs. The following sections include descriptions of the main components of the Arboretum's programs that benefit the community.

3.2 The Arboretum Landscape

The Arboretum's most important community contribution is public access to its carefully maintained historic landscape and outstanding collections of woody plants. In a recent survey of members of the *Friends of the Arnold Arboretum* (described below) and participants in adult education programs, 70 percent of respondents rated care and curation of the plant collections as of the highest importance for the Arboretum. This strong interest in, and support of, the Arboretum as a living collection of woody plants open to the public began before the Arboretum was even opened. After an initial vote in support of the proposed City-Harvard venture failed to pass in the Boston City Council in 1882, a petition of support was circulated and signed by 1,305 people. The Herald covered the results in its December 1st issue:

The petition to the city council in favor of the Arnold Arboretum is probably the most influential ever received by that body. It includes almost all of the large taxpayers of Boston ... Nearly all of the prominent citizens are there, including ex-mayors and ex-governors ... The petition would be a prize to a collector of autographs.

As soon as it was open to the public, the Arboretum became a popular destination for carriage rides and strolling. The Arboretum's earliest "visitor services" effort was to provide a map of the grounds that highlighted the collections as well as the roads and paths, which was published in the early 1900s.

Today, the Arboretum reaches its broad public audience by providing not only a map of the grounds and other interpretive services, but also a range of educational programs that appeal to visitors, avid gardeners, professional horticulturists and arborists, teachers and students, and landscape designers and architects. The Arboretum's living collections and the mission directive to realize the educational potential of these collections are central to all of these programs.

3.2.1 Landscape and Interpretation

People come from around the world to visit the Arboretum's landscape. Each year more than 250,000 visitors enjoy the Arboretum's exceptionally well-maintained grounds and living collections of trees and shrubs. Visitors are invited to tour the grounds from dawn to dusk 365 days of the year, attend free landscape walks led by staff or volunteers, and attend other free events held annually at the Arboretum. Information about the Arboretum and its programs is available at the visitor center. Plant highlights (such as "what is in bloom"), events, programs, and formal educational offerings are described in *Silva*, the Arboretum's popular news magazine and guide to year-round programs and events; a web site; a telephone receptionist during visitor hours and an extensive system of recorded information via the telephone; a free monthly e-news; and regular calendar announcements in local and regional magazines and newspapers.

Visitor Center

Interpretive information about the Arboretum's work and living collections is available through permanent and changing exhibits in the visitor center at the Hunnewell Building, tours, and informational materials available in print and web-based media. The visitor center, used by approximately 20,000 people annually, houses an extensive exhibit about the Arboretum entitled "Science in the Pleasure Ground." The exhibit, opened in 1996 in celebration of the Arboretum's 125th anniversary, was the culmination of a five-year project, funded by planning and implementation grants from the National Endowment for the Humanities, to develop a permanent exhibit that introduces visitors to the landscape of the Arboretum and that traces the many uses to which the land has been put through time. The exhibit features five themes of importance in the history of the Arboretum: the design of the land by the Arboretum's first director, Charles Sprague Sargent, and landscape architect Frederick Law Olmsted; its changing landscape over the past hundred years; the introduction of plants from distant lands; the development of suburban horticulture for American homes in the middle years of this century; the economic uses of wood in our culture; and the Arboretum's involvement in forest conservation in America and abroad.

A large model of the Arboretum grounds helps to orient the visitor and instill an appreciation for the land and its history, including its history prior to the establishment of the Arboretum. The use of the Arboretum grounds by Native Americans during the pre-contact period is also highlighted by a special display of artifacts that have been found on the grounds.

In addition to the exhibit, the visitor center features a bookstore and restrooms and is attended by trained, interpretive staff. The visitor center also includes a website kiosk to enable visitors to access the Arboretum website to search the Arboretum's collections inventory and to view plant location maps during their visit. The Hunnewell Building is open to the public 9 AM to 4 PM on weekdays, 10 AM to 4 PM on Saturdays, and 12 noon to 4 PM on Sundays.

Tours, Events, and Lectures

Tours of the grounds are offered regularly to visitors and to organized groups. Tours focus on the Arboretum's living collections and their history as well as plants of seasonal interest, and are led by Arboretum staff or trained volunteer docents. In a typical year, the Arboretum sponsors approximately 70 tours, many of which are free to the public, serving more than 1,000 people.

Visitors are also invited to take four self-guided tours of particular aspects of the collections. Brochures for these tours are also available from the visitor center for:

- ◆ Lilacs at the Arnold Arboretum;
- ◆ Centenarian Trees and Shrubs;
- ◆ Conifers of the Arboretum; and
- ◆ Bradley Collection of Rosaceous Plants.

In addition, each year a different self-guided tour of accessions representing the plants offered at the annual plant sale for members of the *Friends of the Arnold Arboretum* is developed, and a brochure is produced.

Every year the Arboretum also sponsors special programs and events, the most well-known of which is Lilac Sunday. This event and others combine family enjoyment with learning about plants. On Lilac Sunday, visitors gather at the Arboretum to celebrate the sight and fragrance of a whole hillside of lilacs and to picnic on the grounds, the only official day on which to do so. A well-publicized Boston tradition since the turn of the century, Lilac Sunday continues to be a truly family event, with 10-20,000 visitors attending each year, depending on the weather.

Winter is the season for the Arboretum's Horticultural Lecture Series, sponsored jointly with the Massachusetts Horticultural Society, the New England Wildflower Society, Tower Hill Botanic Garden, and Wellesley College Friends of Horticulture. The annual lecture series hosts four speakers prominent in their fields on topics of garden design and horticulture. Lectures held in winter 2005-2006 included:

- ◆ Paula Panich on *Tales of Passion, Obsession, and Other Firsthand Reports from the Garden*;
- ◆ Bill Cullina on *Exceptional Native Perennials for Creative Gardening*;
- ◆ Larry Weaner on *Natural Landscape Design: Meadow, Woods, and Water*; and
- ◆ Julie Moir Messervy on *Outside the Not so Big House: Creating the Landscape of Home*.

Another popular, year-round lecture series is for Arboretum volunteers and features Arboretum staff and researchers. A few of the lectures held this past winter included:

- ◆ David Boufford and Susan Kelley on *The 2005 Expedition to Western Sichuan*;
- ◆ James Doyle on *The Proof is in the Pictures: Beating Hearts of the Arboretum*; and
- ◆ Kevin Stevens on *Azalea Border: A History of the Design*.

The Arboretum trees and landscape have long been favorite motifs of local artists, and the Hunnewell Building lecture hall is becoming a popular place to exhibit artwork inspired by the grounds. This past fall Kyle Larabee exhibited “Peak Color,” a series of collages made of fallen leaves collected in part at the Arboretum. The artist even held an afternoon “Family Leaf Workshop” for families with children to try their hand at making leaf collages. During the winter, the Arboretum hosted “An Ever Changing Moment,” a series of paintings by Michael Noyes that celebrates the spirit and beauty of trees.

Throughout the year, the Arboretum hosts gatherings of a variety of professional organizations, lending its buildings and landscape, often providing programming, such as training, tours, or introductions to the library, and sometimes co-organizing these landscape- and horticulture-related events. Groups that the Arboretum has hosted over the past few years include: American Nursery and Landscape Association; Arboretum Park Conservancy; Boston Parks Department; Boston Society of Landscape Architects; Community Outreach Group for Landscape Design; Ecological Landscape Association; Friends of the Frederick Law Olmsted National Historic Site; Harvard Graduate School of Design; Harvard University Environmental Action Committee; Historic New England Friends Group; Jamaica Plain Street Tree Volunteers; New England Landscape History and Design Association; New England Society of Botanical Artists; North American China Plant Exploration Consortium; UMass Extension Service; Urban Ecology Institute's Community Forest Partners; and various local garden clubs and plant societies.

3.2.2 *Landscape Improvements*

For much of its history the Arboretum has focused its horticultural efforts on the care and documentation of individual plants. Indeed, the great value of the Arboretum’s living collections lies in the quality of the records that document the identity, origin, and location of each specimen. These specimens grow in a landscape system that supports their survival and enhances their appreciation by Arboretum visitors. The most important natural elements in this system are the hydrology and the soils, with their differing nutrient and water retention qualities; other natural elements, such as topographic diversity and rock outcrops, give shape and add geological interest to the landscape. However, most of the landscape infrastructure is manmade: the stone walls, roadways, gates, pathways, and visitor amenities such as benches, signage, and water fountains. It is essential that the historical emphasis on individual accessions be balanced with increased attention to the overall landscape system that sustains the collections and shapes the experience of visitors.

During the past fifteen years, increasing attention has been paid to undertaking needed improvements to the landscape and physical infrastructure, as well as to more systematically monitoring the environmental conditions of the grounds. Given the historic responsibility of the City of Boston to maintain the public infrastructure (stone walls, gates, roads, benches), the Arboretum continually consults with the Department of Parks and Recreation on landscape improvements, and a number of projects have been done in direct and close collaboration with the Department and other City agencies.

The Arboretum itself has invested in numerous landscape improvement and preservation projects on the Arboretum grounds. Recent projects include improvements to the 24-acre Bussey Brook Meadow, restoration of the Bussey Street and Peters Hill gates and the historic Walter Street gate, and the installation of the award-winning Leventritt Garden of Shrubs and Vines. These projects, described briefly below, cost in excess of \$5 million and serve to enhance the Arboretum landscape and facilities for the benefit of the general public.

- ◆ **Restoration of Bussey Brook and Creation of Linda J. Davison Rhododendron Path** – Through a generous donation, the Arboretum re-constructed and greatly improved a large part of its rhododendron collection affectionately known as the dell. The 1990-1992 restoration of the area began with addressing underlying ecological instability problems within the reach of Bussey Brook that flows through the collection. Approximately 200 feet of bank and channel were ecologically restored from long-term erosion damage and stabilized against future erosion; a stone wall, a terraced seating area, and several stepping stone paths were constructed; and more than 500 feet of path were re-built. Curatorial staff undertook a review of the collection, resulting in the removal of poor specimens and the planting of new rhododendrons and woodland understory plants. The overall effect was to create a naturalistic setting for the rhododendron collection that blends well with the natural state of Hemlock Hill.

- ◆ **Eleanor Cabot Bradley Collection of *Rosaceous* Plants** – This exuberant, seven-acre collection of trees and shrubs from the rose family was designed and installed in the early 1980s in an area of the Arboretum previously used for nurseries and the first shrub and vine garden. By the early 1990s its exuberance had become a maintenance challenge, and a three-year project was undertaken to improve its situation. A total of more than 5,000 feet of granite cobble stones were installed as edging to the planting beds (about 240 tons) and to more crisply define the bed/lawn border. A fieldstone retaining wall 90 feet in length was installed on either side of the Bradley Memorial Bench to create an even more pleasing area of repose and contemplation for visitors. Some planting beds were reconfigured and the lawn was re-sown throughout. This collection, located adjacent to Dawson Pond and the Arboretum's collection of cherry trees, is a favorite strolling and sitting spot for visitors, especially in spring.

- ◆ **Peters Hill Restoration** – A larger scale project, the summit of Peters Hill was restored in 1997-1998. Over time the paved drive to the hilltop had led to overuse by vehicles and degradation of the site. During this project the Arboretum removed the existing road surface, leaving just a paved walkway from the main Peters Hill Road. Rustic stone blocks were partially buried in the hillside near the summit to create seating that overlooks the Arboretum and the Boston skyline. A variety of oaks and native understory shrubs were planted to extend the natural woodland that lies on the southeastern slope of the hill.
- ◆ **Bussey Brook Meadow** – In 1996 the Arboretum, the City of Boston, and the Arboretum Park Conservancy worked together to add 24 acres of land in Bussey Brook Meadow, east of South Street, to the City-owned land under lease. Master planning for habitat restoration and public amenities began immediately, followed by implementation. By 2002 several projects with an overall value of \$1 million were completed in the Bussey Brook Meadow. Improvements included new entrance gates on Washington Street and South Street (donated by the Arboretum Park Conservancy), puddingstone walls, an improved pedestrian crossing over South Street, and a multi-use path (funded by a federal ISTE A grant), named in honor of John Blackwell, connecting the Washington Street entrance with South Street and the rest of the Arboretum grounds.
- ◆ **Bussey Street Gate, Peters Hill Gate, and Walter Street Gate Restoration** – In 2002 the Arboretum took on improving pedestrian and vehicular movement between Hemlock Hill and Peters Hill, across the publicly traveled Bussey Street. In this extensive project, the Arboretum realigned the north entrance on Bussey Street so that people and vehicles could cross more safely, repaired and constructed the stone piers and walls, and installed new vehicular and pedestrian wrought iron gates. The vehicular road to the Walter Street gate was removed and converted to a smaller, pedestrian stonedust path. After the re-alignment of the roads and paths, several acres of land became newly available for collections, and the grounds were restored to a more natural condition. The cost of this project was \$1.13 million. In addition, the Parks Department contributed approximately \$40,000 from its Edward Ingersoll Browne Fund to fabricate a reproduction of the original historic gate for the Walter Street entrance.
- ◆ **Leventritt Garden** – Created at a cost of \$3.2 million and dedicated in the fall of 2002, the Leventritt Garden of Shrubs and Vines is a newly created three-acre garden that offers an outdoor exhibit of outstanding shrub and vine specimens for the New England landscape. An emerging program of tours and interpretive signage at the Leventritt Garden will explore educational themes including plant exploration, plant conservation, plant introduction, plant physiology, exemplary horticultural specimens, and seasonal changes. Elements of the Leventritt signage system are freestanding and easily moved within the Garden and throughout the seasons. This flexible signage system was installed as a way to provide repeat visitors with fresh new information as the plants and seasons change. The Arboretum also recently constructed a new pedestrian, stonedust path to the Leventritt Garden from Meadow Road at a cost of \$84,000.

As described below, in addition to these recent capital improvements, the Arboretum is currently undertaking signage and wayfinding improvements across the Arboretum grounds and a study of options to improve the appearance of the Arboretum's perimeter. The Arboretum is working closely with the Parks and Recreation Department on these projects and planning studies.

- ◆ **Signage and Wayfinding Project** – The intent of the signage and wayfinding project is to create distinctive, helpful graphics to enhance the visitor experience of the Arboretum's landscape. The new informational system, once implemented, will include perimeter signs, directional signs, trail blazes, panels with maps, destination markers, a means for temporary and mobile signage, and a new map and site brochure. These improvements will result in better directional indicators to the visitor center at the Hunnewell Building, improved patterns of access and circulation within the Arboretum, clearly marked destinations, and improved interpretation. These signage and wayfinding improvements will provide information to assist both the casual visitor and the researcher to easily access the site's important areas, collections, elements, and structures.

The Arboretum is currently working on a pilot program for the signage project to test key elements in the landscape. The focus area for the test program is the visitor center, and elements such as wayside and directional markers will be placed primarily between the Arborway Gate and Chinese Path, including the Leventritt Garden markers. Implementation of the comprehensive signage program will then follow. Included in this project is a new map and visitor brochure.

- ◆ **Perimeter Improvements** – The Arboretum is undertaking a study of the border vegetation and physical structures that comprise the perimeter of the grounds. This study is intended to help evaluate the image conveyed to the public from the primary roads that surround the grounds and from which many people know the Arboretum. Based on the study results and with collaboration with the Parks and Recreation Department, the Arboretum hopes to develop appropriate landscape initiatives that would create a clear and consistent physical identity along the property's edge and possibly offer greater visibility into the grounds. Possible initiatives may include changing the management of the existing vegetation at the property's edge; extending and improving existing stone walls bordering the property; and creating strong visual thresholds at key locations along City streets. Other initiatives could be developed in collaboration with neighbors, such as undertaking new plantings along Centre Street to re-establish its parkway character. As noted in Chapter 2, maintenance of the stone walls and sidewalks along the Arboretum's perimeter is the responsibility of the City of Boston, hence strong collaboration will be critical to this project.

3.3 Public Education

Throughout most of its history the Arboretum has engaged in educational activities that serve the public directly. The first regular publication for the general public was started in 1888 by Sargent and called *Garden and Forest: An Illustrated Weekly Journal of Horticulture, Landscape Art and Forestry*. The plantsman J.G. Jack held the first public lectures beginning in 1891 using the living collections and grounds of the Arboretum.

Today, the Arboretum invests more than \$1.6 million annually in serving school children and adult learners with instruction in botany, landscape design, horticulture and the gardening arts. Education activities are based on the singular resources of the Arboretum, utilizing its living collections, cultural landscape, information resources, and staff expertise to inform and teach in life science, plant biology, horticulture, and related disciplines.

3.3.1 Children's Education

Support of science education for children in public schools is among the most important educational activities of the Arboretum. While the programs are open to all metropolitan Boston school districts, students in Boston public schools participate free of charge and are also provided with free bus transportation for specific programs. The Arboretum's core program, called "Field Study Experiences," is for class groups of third through fifth grade students. A pre-school program for class groups from Head Start centers is a more recently developed program that is still in its pilot phase.

To make these programs possible, the Arboretum recruits and trains a group of volunteer school program guides that work with the class teachers and students. The Arboretum currently has approximately 30 school program guides, including several retired academics, former teachers, and professionals involved in science education with children.

Field Study Experiences

Arboretum field studies are designed to complement classroom life science curricula in line with the local and state school curricula. Programs include investigations of flowers and pollination, seeds and seed dispersal, and the historical roles of various tree species in Native American culture (see descriptions below). The two-hour programs are designed to encourage the investigation of plant science in the meadows and woodlands of the Arboretum. Lessons that begin in the classroom can be explored and enlarged through these outdoor learning adventures. The programs emphasize student inquiry and direct interaction with natural phenomena. Students work in small groups with a volunteer school program guide to explore and discuss science-oriented questions. Pre- and post-visit materials help teachers plan a challenging learning opportunity.

Examples of field study programs for children are described below.

- ◆ **Flowers Change** – In spring, the field study “Flowers Change” provides opportunity for students to look closely at the development of a flower as it changes from flower to fruit. Students practice looking for the parts of the flower that make seed production possible, in particular the male part that holds the pollen, and the female part where pollen is received and seed production takes place. Using the rich variety of flowers and developing fruits found on Arboretum plants, students discover the stages of a flower's transformation. The pre-visit activity asks students to dissect and draw a flower. The post-visit activity asks them to continue their exploration of the development of flowers into fruit in their schoolyard and neighborhood.

- ◆ **Native Trees, Native Peoples** – In both spring and fall, students may take the field study “Native Trees, Native Peoples.” For many years, native peoples of the Eastern Woodlands lived on the land that is now the Arboretum. In this field study, students learn to identify the trees that supported a culture. Using clues, students first seek out the trees and then create a collection of plant materials, drawings, and written descriptions of each species. Students look carefully at the characteristics of specific trees and use their observations to determine what makes one kind of tree different from another. The intent is to teach the students to differentiate between evergreen and deciduous trees. This program takes place entirely outdoors in the conifer collection.

- ◆ **Plants in Autumn** – The fall-based field study, “Plants in Autumn,” lets students focus on the fall phenomenon of seed dispersal and the strategies that plants use to distribute their seeds, examining the structure of the seed package for evidence of this strategy. Exploring the grounds of the Arboretum, students assemble a seed collection and group their findings into two categories: seeds that travel by wind and seeds that travel via animals. A post-visit activity supports a variety of uses for this seed collection.

- ◆ **Hemlock Hill, A Changing Ecosystem** – A new field study experience called “Hemlock Hill, A Changing Ecosystem” intended to serve the specific educational needs of fifth-grade students in nearby elementary schools in Roslindale, Jamaica Plain, and Roxbury was pilot tested in fall 2004/spring 2005, and full implementation is now underway. Designed in collaboration with an advisory group of Boston teachers, the new program supports life science curricular goals as well as strengthens skills in literacy and math. In fall 2004, eleven classrooms from seven schools came for the Hemlock Hill program; in spring 2005, five classrooms from four schools came for the program. Sixteen schools will participate in 2005-2006, including three new schools (Otis, Philbrick, and Curley) for the first time in spring 2006. All classrooms were provided bus transportation by the Arboretum.

On average, 2,500 public elementary school students participate in these programs annually, with school visits evenly divided between the fall and spring seasons. During the school year 2004-2005, the programs served 110 classrooms from seven different public school districts.

Pre-school/Head Start Program

The Arboretum's education program for pre-school children, initiated in 2004, serves two Head Start centers in Jamaica Plain and Roslindale, each of which has approximately 150 children. This program includes teacher training and a series of three Arboretum visits for each Head Start class that participates. In June 2005 the Arboretum trained 20 teachers in both centers and then hosted 12 explorations of the landscape for preschool classes over the summer. The current program plan is to bring all the children to the Arboretum three times (twice in summer and once in fall) in classes of approximately 30 children each. The Arboretum funds bus transportation for the classes to facilitate participation.

Teacher-led Programs

In addition to Arboretum-hosted classes, many other school classes visit the Arboretum for science education, either using Arboretum interpretive materials or their own. Although it is difficult to track the number of students that visit in this way, the Arboretum estimates that over 5,000 children participate each year in teacher-led activities utilizing the Arboretum landscape and collections.

Future Initiatives

In the future, the Arboretum intends to continue its work with the Boston Public Schools, possibly expanding programs to middle school students to offer science immersion programs at a more advanced level. The Arboretum also plans to increase services to the Head Start centers with which it is working. In addition, the Arboretum will continue to explore the creation of new programs for families.

3.3.2 Adult Education

The Arboretum offers an extensive adult education program that serves the general public with an annual offering of more than 100 courses, lectures, and hands-on workshops in horticulture, ecology, botany, landscape history, botanical arts, and related subjects, with a core emphasis on woody plant identification, propagation and care. Classes are held in the Hunnewell Building lecture hall and the Dana Greenhouse classroom on Centre Street. To accommodate work and family schedules, programs are offered year-round, on both weekdays and weekends, and during evening and daytime hours. The Arboretum's course list is available through the Arboretum's website, www.arboretum.harvard.edu.

Roughly 1,200 students each year attend the Arboretum's adult education classes. Students come from over 175 communities in Massachusetts and from throughout New England.

The program has benefited from collaboration with peer institutions, such as the New England Wild Flower Society, the Wellesley College Friends of Horticulture, and the Massachusetts Horticultural Society. The highly popular annual Winter Horticultural Lecture Series and symposia are co-sponsored events that allow the Arboretum to bring

prominent local and national speakers to New England garden enthusiasts. The programs attract an audience of garden and landscape professionals, as well as hobby gardeners, and serve as vocational training for area property management companies and landscape crews.

The adult education program owes its success in large part to the quality of its instructors and lecturers. Many classes are led by recognized authorities in their fields. Students have recently immersed themselves in the microscopic world of flowers with Harvard botanist Kanchi Gandhi, for example; others have debated the impact of climate change with Boston University professor Richard Primack. Many Arboretum staff members teach courses on their occupational expertise, from pruning ornamental shrubs to plant identification using the best methods currently known.

Over the past five years, the adult education program has extended an invitation to non-English speakers to explore the Arboretum via tours in Spanish, French and Russian. In March 2006, an all-day adult class in basic landscape maintenance was offered in Spanish for the first time.

In keeping with its educational mission, the Arboretum heavily subsidizes the adult education program to encourage broad participation. In addition, a series of free lectures each semester enhances education in plant research, collections, management, and environmental issues.

3.3.3 Landscape Institute

The Landscape Institute provides approximately 250 part-time, adult students with professional training in landscape planning and design, garden history, and cultural landscape preservation. The Institute was formed by combining the Arboretum's activities in cultural landscape preservation, implemented in part through a strong collaboration with the National Park Service and through the activities of the Arboretum's Institute of Cultural Landscape Studies, with the Radcliffe Seminar Landscape Design Program, a nationally known program offering a Certificate in Landscape Design and a Certificate in Landscape Design History. The administration of the landscape design program was transferred from Radcliffe to the Arboretum in 2002.

Classes are offered on weekdays during evening and daytime hours. While most classes are held in Harvard facilities in Cambridge, field labs are taught regularly at the Arboretum. A description of the certificate programs and listing of the Landscape Institute's course offerings are available on-line through the Arboretum's website.

The Landscape Institute promotes ongoing student outreach that provides broader community benefits. Studio and individual senior projects often serve the needs of non-profits and community groups seeking the assistance of landscape design students.

3.3.4 *Arboretum Library*

The Arboretum library serves the general public as well as approximately 600 researchers and students annually. Arboretum program participants, students, and researchers from across the country utilize the collection of more than 35,000 volumes with particular strength in botany, horticultural science, and landscape history. The library is open 10 AM to 4 PM Monday through Saturday year-round. An additional 60,000 volumes of the Arboretum's library holdings, as well as the combined holdings of the Harvard Botany Libraries (total of 280,000 volumes and 900 current scientific journals) are housed in Cambridge and are also available to the public, students, and researchers.

The library also contains the Arboretum's collection of more than 25,000 photographs that date from 1870 to the present. Many of these images document the Arboretum's living collections and record the development of taxa within the collections. In addition to images of specific genera growing at the Arboretum, the collection includes views of the Arboretum's landscape. Historic images of eastern Asian plants capture the extraordinary travels of the Arboretum's plant collectors. Undertaken with special funding from the Harvard University Digital Initiative, 5,000 images, letters, and maps from both historical and contemporary plant-collecting expeditions to China and Tibet have been digitized. Included are the 1997, 1998, and 2000 expeditions of David Boufford to China's Hengduan Mountains region and the Arboretum's 1924-1927 expedition to China and Tibet led by Joseph Rock.

These digital historic images, as well as many of the images of the Arboretum's landscape, are now available on-line through Harvard's public Visual Image Access (VIA) catalog, <http://via.harvard.edu>.

Beginning in 2003, Arboretum library staff developed additional resources and programs to ensure the collection reflected the needs of the Landscape Institute's faculty and students. To enable students to gain better access to the collection, the library's weekly schedule and overall hours of operation were increased. Each semester the library staff conducts an information session that includes a description of the library collection, an overview of useful reference tools, e-resources, visual resource holdings, and the scope of the Arboretum's extensive archives. Landscape Institute students use the Arboretum library to access their class readings and resources.

3.3.5 *Publications*

Although the publications have continually changed, the Arboretum has always produced serial publications as well as special reports, studies, and informational materials. Currently the Arboretum publishes *Arnoldia* and *Silva*. *Arnoldia*, published quarterly, contains articles on plant science, ecology and conservation, parks and open spaces, landscape design and history. Begun in 1911 and first called the Bulletin of Popular Information, *Arnoldia* is the Arboretum's longest standing contribution to providing horticultural

information. *Silva* is published twice a year and serves as a combined publication of Arboretum news, adult education class catalog, member events, and visitor information. Circulation of *Arnoldia* is slightly more than 3,000 per issue and *Silva* is approximately 10,000 per issue.

The Arboretum has also engaged in developing interactive teaching software for science education. Based on Arboretum research in the tropical forests of Indonesia, the Arboretum produced an electronic-based science curriculum "Rainforest Researchers" that won a prestigious Codie Award as the best piece of software for middle-school students produced in the United States in 1996.

In addition, a paperbound plant inventory of the living collections is available to the public. It lists alphabetically, by both genus and species, all the 4,448 different kinds of plants (excluding nursery holdings) that were growing in the Arboretum's collections in 2003. The continually updated plant inventory is also available via the Arboretum's website.

3.3.6 *Arboretum Website*

In September 2002, the Arboretum launched a redesigned website (www.arboretum.harvard.edu), offering extensive information on the Arboretum. Website visitors can search the Arboretum's collections inventory, view plant location maps, and access the plant information hotline. Photographic collections also can be viewed, and a link to Harvard's photographic collections is provided. Many of the Arboretum's publications are also accessible through the website. In 2005 there were more than one million "page views" or "hits" on the site.

The Arboretum website provides a wealth of information for potential visitors, including hours, interactive directions, maps of the grounds, and upcoming events and self-guided tours. The site also serves as an easy way for the Arboretum to communicate with the community at large about our facility needs and plans. The site also offers information about educational programs, publications, and online exhibits, as well as detailed information about our research initiatives and library resources and services. The site clearly details the many different ways that community members can get involved with the Arboretum's programs, either as volunteers, interns, class participants, researchers, or staff members. Finally, the site provides clear and easy access to contact information, encouraging interested parties to contact Arboretum staff by phone, mail, or email.

3.3.7 *Plant Hotline*

For over 30 years, the Arboretum has maintained a plant information telephone "hotline" (617-524-1718 x127) where the public can call with horticultural questions. Staffed by a team of five knowledgeable volunteers, the hotline is available for questions about woody plants hardy in the Boston area. The hotline is staffed February through December on Monday afternoons from 1 PM to 3 PM. In addition, voicemail messages received at other

times are checked and responded to several times each week. Hotline volunteers also respond to questions that come through the Arboretum's general email address, arbweb@arnarb.harvard.edu.

Over the course of a year, hotline volunteers respond to hundreds of diverse questions. In 2005, many questions related to the hemlock woolly adelgid, winter moth caterpillar, crabapple foliar diseases, tarspot on maples, and maintenance of peach and fig trees. Perennial topics are ways to control poison ivy and Japanese knotweed, how to outwit chipmunks and squirrels, and, each spring, questions about lilacs.

3.3.8 *Friends of the Arnold Arboretum*

The *Friends of the Arnold Arboretum*, a membership and Arboretum support organization, serves as a vital link between the Arboretum, its supporters, and the community at large. The most significant benefit of this relationship has traditionally been the Annual Fall Plant Sale, which relocated three years ago from the Case Estates in Weston to the Arboretum itself. By bringing members to the grounds and focusing on Arboretum-grown, woody plant material, the event has taken a more educational tone in keeping with the institution's mission. In addition to purchasing choice plant material at the Dana Greenhouse, participants are invited to join special tours of the Leventritt Garden, explore the art of bonsai with caretakers of the Larz Anderson Bonsai Collection, and view mature specimens of their purchases on a self-guided tour of the living collections. The plant sale in fall 2005 was the 25th anniversary of the first sale. Further opportunities to facilitate member interaction with Arboretum staff and the collections have been institutionalized by the creation of Members' Tour Day in spring, in which Living Collections staff members share their expertise and favorite accessions on rigorous walking tours of the Arboretum landscape. Throughout the year, special lectures for members are held by Arboretum staff and colleagues.

As a Friend of the Arboretum, members may also take advantage of the Arboretum's participation in the American Horticultural Society's Reciprocal Gardens program, which allows members free or discounted admission at more than 130 botanical gardens, arboreta, and conservatories in North America. Membership also provides discounted plant materials at 35 area nurseries and garden centers. Members at the sustaining level and above are also invited to participate in the Arboretum's annual plant dividend program, in which unusual or hard-to-obtain plants are delivered to members in time for planting in their own gardens. This program grew out of the Arboretum's horticultural objective of promoting exceptional native plants, plant introductions, and new cultivars and its practice of sharing seedlings to supporters who could then experiment with the material themselves and see how plants fared in a various climatic conditions in New England. The most recent new program for members is a developing travel program. This fall the first Arboretum group will travel to Sri Lanka, Borneo, and Thailand with Arboretum staff, including a former Arboretum director, to Arboretum research sites and to other remote areas of extraordinary plant diversity.

3.3.9 Summary of Program Participation

Table 3-1 below summarizes public participation in the Arboretum’s programs.

Table 3-1: Summary of Public Participation

Arboretum Benefit / Program	Approximate Annual Participation
Arboretum Grounds	250,000 visitors
Visitor Center	20,000 visitors
Tours	1,000 participants
Children’s Education – Arboretum-led	2,500 children
Children’s Education – Teacher-led	5,000 children
Adult Education	1,200 students
Landscape Institute	250 students
Publications	10,000 readers
Library	600 visitors
Website	1 million “hits”
Friends of the Arnold Arboretum	2,500 members

3.4 Employment and Workforce Development

3.4.1 Existing Employment

The Arboretum employs staff members who are based at the Arboretum in Boston, the Harvard University Herbaria in Cambridge, and the Landscape Institute in Cambridge; the Arboretum also has two employees based full-time in Asia (Papua New Guinea and Indonesia) conducting research. The Arboretum currently employs 100 people (not including summer interns).

Table 3-2: Existing Arboretum Employment¹

Staff Location	Full-time	Part-time	Total
Boston-based staff at Arnold Arboretum	52	6	58
Cambridge-based staff at Harvard University Herbaria	18	0	18
Cambridge-based staff at Landscape Institute	3	19 ²	22
Overseas-based staff	2	0	2
Total	75	25	100

1 Employment as of September 30, 2005. Does not include paid interns or volunteers.

2 Landscape Institute instructors.

Arboretum employees reflect a broad range of positions and responsibilities. Employees plan for and manage the landscape and living collections, propagate new plants for the grounds, research, and other botanical institutions, curate the living collections, curate the herbarium specimens (in Cambridge and Boston), develop and host continuing education classes for adults, develop and host professional training in landscape design and preservation for adults, develop and host children’s education programs for school classes, interpret the Arboretum for visitors, curate the library and archives (in Cambridge and Boston), conduct research, develop the Arboretum membership and raise funds from external donors, and manage the financial and administrative operations.

In addition to the employees described above, the Arboretum hires (paid) temporary assistants, especially over the summer, and is greatly assisted by a group of unpaid volunteers. During the summer period, the Arboretum also sponsors an internship program in horticulture and typically hires paid, full-time interns for the summer season (described in Section 3.4.3).

As shown in Table 3-3 below, of the Arboretum’s 58 employees in Boston, 54 are based at the Hunnewell Building and 4 are housed at the Dana Greenhouse. In the future, with construction of the proposed Research and Administration Building, the Arboretum expects to increase its employment in Boston by approximately 48 as a result of both new hires and the transfer of Cambridge staff to Boston. It is estimated that approximately 26 of the 48 new employees in Boston could be new hires.

Table 3-3: Existing and Future Arboretum Employment in Boston

Building Location	Existing ¹	Future	Change
Hunnewell Building	54	43	-11 ²
Dana Greenhouse	4	4	0
Research and Administration Building	n/a	59 ³	+ 59
Total ⁴	58	106	+ 48

1 Employment as of September 30, 2005. Includes full-time and part-time staff. Does not include paid interns or volunteers.

2 Includes 11 staff relocated from the Hunnewell Building.

3 Includes 11 staff relocated from the Hunnewell Building, up to 15 staff relocated from the Harvard University Herbaria to the new Research and Administration Building, and three faculty with offices in both Boston and Cambridge.

4 Approximately 26 of the 48 new employees in Boston could be new hires.

3.4.2 Boston Resident Employment

Of the Arboretum's 100 employees, 32 are Boston residents, representing 32 percent of the Arboretum's workforce, and over half of these employees (19 total) reside in Jamaica Plain and Roslindale. Of the Arboretum's 58 employees at the Arboretum (not in Cambridge or overseas), 24 are Boston residents. The Arboretum's annual Boston payroll is approximately \$1.6 million.

The Arboretum's Boston resident employees work in the full range of positions available at the Arboretum (for example, Research Assistant, Horticultural Technologist, Library Assistant, Gardener, Curatorial Assistant, Manager of Plant Records, Children's Education Coordinator, Landscape Institute Instructor, and Development Director/Assistant).

As reported in *Innovation & Opportunity: Harvard University's Impact on the Boston Area Economy* (November 2004), Harvard employs 16,128 individuals University-wide, of which approximately 2,900 (18 percent) are Boston residents. (See www.community.harvard.edu/economic-impact.)

3.4.3 Summer Internships and Volunteer Programs

The Arboretum sponsors a paid summer internship program, the Isabella Welles Hunnewell Internship Program, which combines practical hands-on training in horticulture with educational courses. In 2005, 14 intern trainees with experience, training, or a long-term interest in horticulture, botany, landscape design, or other plant-related fields participated in 12- to 24-week appointments. The Arboretum internship program is internationally known and over the past few years has drawn students from South Korea, Great Britain, Canada, Germany, and the United States.

The Arboretum also provides volunteer opportunities for people who wish to become more involved in its programs. Most volunteers work as docents or school program guides in the education and interpretive programs, but volunteers also work in propagation, the library and archives, curation, development, and research. The Arboretum offers special training by staff and a "Volunteer Enrichment Program," of special events and lectures.

In addition, each year Simmons library students intern at the Arnold Arboretum to fulfill the requirements for a 60-hour internship project in an archives or manuscript repository for the archives management concentration of the Master of Library Science degree within the Simmons Graduate School of Library and Information Science.

3.4.4 Harvard University Employment Opportunities

Detailed information on open positions at Harvard and the Arboretum is available on their websites. On the Harvard website, job applicants can search for positions by school or department, position type, location, and/or salary, as well as apply for positions on line. A large number and wide variety of positions are available at Harvard at any one time. As an

example, in February 2006, approximately 350 positions representing the full range of schools and departments were listed on the Harvard employment website with widely ranging educational requirements and salary ranges. The Arboretum also posts its job openings on its website.

The Harvard and Arboretum websites are, respectively: www.employment.harvard.edu, and www.arboretum.harvard.edu/aboutus/jobs.html. Jobs are also advertised in local papers or specific industry publications depending upon the position.

3.4.5 Harvard University Workforce Training and Development

The extensive employee development and training benefits offered by Harvard University are available to Arboretum staff, including tuition reimbursement and other programs.

Harvard's Center for Workplace Development (CWD) offers a wide range of courses designed to increase employees' knowledge, skills, and overall success. The range of offerings includes professional, managerial, career development, and computer courses, including hundreds of Web-based programs, for all employees. In addition, CWD offers the Bridge to Learning and Literacy program, described below. Roughly fifty different professional and career development courses are offered, often several times throughout the year, at minimal to no cost. During 2004-2005, 6,440 participants¹ took advantage of CWD training and professional development courses, with Harvard financial support totaling over \$1.2 million for this period². Descriptions of some of the courses and assistance offered to Harvard employees are listed below.

- ◆ **Computer Classes** – At CWD, experienced instructors offer hands-on courses in all levels of word processing, spreadsheets, database management and design, desktop publishing, and web page development. In total, CWD offers over twenty-five different computer courses, which are open to both the Harvard community and the general public.

¹ Includes persons taking multiple courses.

² Harvard financial support includes course and program fees paid by schools and departments and program components which are centrally funded by the University including costs associated with the provision of instructors and training venues.

- ◆ **Human Resources and Financial Systems Training** – CWD provides a variety of instructor-led and online learning opportunities for users of Harvard University's financial, human resources, and reporting systems. These courses, taught by Harvard staff, are designed to help employees become proficient in the Oracle and PeopleSoft systems used by the University.
- ◆ **Consulting Services** – CWD provides internal consulting services to all Harvard schools and departments, including professional, organizational, talent, multimedia, and career development consulting. CWD works with Harvard clients to assess needs and define strategies to enhance the performance of individuals, teams, and departments across the University.
- ◆ **Leadership Programs at Harvard** – CWD offers a series of four programs to help Harvard employees develop leadership skills and experience. Through the use of assessment instruments, large- and small-group exercises, and case studies, participants in these programs develop their leadership skills, gain a full understanding of their leadership strengths and development needs, and learn to influence and improve the performance of others. The four leadership programs are as follows:
 - Focused Leadership is designed to help high-performing senior managers and university executives successfully meet their current leadership challenges and fine-tune specific skills.
 - Leadership in Action is a program that helps high-performing mid- to senior level managers develop and refine their leadership potential.
 - Foundations of Leadership is open to all managers who supervise at least one permanent staff member and focuses on developing core leadership competencies.
 - Leadership Essentials is for high performing administrative support staff and teaches skills such as networking and working effectively with others in a diverse environment.
- ◆ **Web-based Training at Harvard** – To complement CWD's instructor-led and classroom-based training, Harvard employees also have the opportunity to obtain *Element K* web-based training licenses at substantially discounted rates. Once registered, employees can select from over 300 different online courses, including all levels of the Microsoft Office suite, Macromedia Flash, FileMaker Pro, Dreamweaver, Adobe Acrobat, and even more technical courses, such as Implementing Local Computer Security and Network Administration.
- ◆ **Bridge to Learning and Literacy at Harvard** – The Harvard Bridge to Learning and Literacy is a worker education program open to all hourly employees and to members of the Harvard Union of Clerical and Technical Workers. Employees interested in improving their skills in their current positions or gaining new skills for different

positions attend two-hour classes twice a week. Classes are offered on campus during work hours. The Bridge Program offers classes in the following subjects: literacy, English as a second language, General Education Development and Adult Diploma Program test preparation, college preparation, computers, and citizenship preparation.

Bridge students may request one-on-one tutorial sessions and career development services as well. Furthermore, the Bridge Resource Center, which is equipped with supplemental English language study books, computers, and audio equipment, is managed by CWD staff and made available to Bridge students before, during, and after typical work hours.

- ◆ **Continuing Education** – In addition, Harvard’s Division of Continuing Education Extension School offers a range of graduate and undergraduate courses to over 20,000 students each year.

Harvard encourages lifelong learning by granting subsidies for undergraduate and graduate-level courses taken at Harvard and elsewhere through the Tuition Assistance Plan (TAP). Available to professional, administrative, support, and teaching staff, TAP can help finance courses at most Harvard programs, as well as job-related courses at other institutions. Employees may also pursue a degree or certificate through TAP-eligible programs at the Harvard Extension School, the Graduate School of Education and the School of Public Health. Additional financial assistance is available through a separately funded Education Assistance Fund.

In addition to University-wide benefits, Arboretum employees may take any Arboretum adult education class for free.

3.5 Other Civic Benefits

The Arboretum contributes in many ways to stewardship and public service efforts in the City of Boston, especially related to planning and management of natural areas and parks. The Arboretum participates in a number of planning, management, and advocacy groups in the City, including groups that have ongoing work as well as groups that form around a particular project or initiative. Examples of the types of groups that frequently request the participation of the Arboretum are the Emerald Necklace Conservancy, the Boston Greenspace Alliance, and the Arborway Planning Committee. The Arboretum also provides institutional leadership for open space improvements including contributions to the Justine Liff Fund of the Emerald Necklace Conservancy and participation in the Heart of the City and Green Triangle initiatives.

In particular, the Arboretum provides assistance to the Parks and Recreation Department when requested, typically providing technical assistance in horticulture. For example, the Arboretum has provided training in horticulture to Parks and Recreation Department staff, and the Arboretum’s horticulturalist who oversees the Bradley Collection of Rosaceous

Plants regularly provides advice to the Department on the Rose Garden in the Fenway. In 2003 and 2004, significant Arboretum donations helped to support the Boston Park Ranger program, which was facing budgetary constraints and possible layoffs. The Arboretum has also donated and planted trees along the Arborway and assists, as possible, with snow removal on the sidewalk from the Arborway Gate to the Forest Hills MBTA station. Although the Arboretum generally does not allow other institutional events to be hosted on the grounds, the Parks and Recreation Department has often held events, fundraising galas, and various ceremonies on the grounds, with permission and assistance from the Arboretum.

The Arboretum also responds to requests from community groups to use the lecture hall in the Hunnewell Building for community meetings and is always willing to attend neighborhood meetings to discuss mutual interests with concerned residents.

3.6 Economic Benefits

A recent report entitled *Innovation and Opportunity: Harvard University's Impact on the Boston Area Economy* (see www.community.harvard.edu/economic/php) documents Harvard University's broad impact on the regional economy: generating more than 48,000 jobs at many levels, drawing new consumers to the region in the form of students and visitors, directly employing more than 16,000 workers, and being a major consumer of goods and services. Harvard's overall economic impact in 2002 was estimated at more than \$3.4 billion.

The report stated that Harvard's greatest impact may be as an economic stimulator, due to its large research enterprise. Harvard's research helps build the regional economy by drawing in hundreds of millions of dollars in research grants. In 2002, for example, research spending totaled \$522 million, more than 75 percent of which was from federal grants. Harvard's affiliated hospitals add to that total, bringing in \$750 million in 2001 alone. From 1998 to 2002, research spending at Harvard grew by 39 percent and further major expansions are under way. The strong research base attracts major corporations to invest in the region.

Discoveries made at Harvard help stimulate the economy when they are licensed to existing or new companies that develop them into useful products. By 2003, fourteen companies in the Boston area owed their creation at least in part to technology licensed at Harvard.