A Literary Trilogy
Completed

Robert E. Cook, Director

In the summer of 1840, William Henry Channing became close friends with the transcendentalist Margaret Fuller, disciple of Ralph Waldo Emerson and editor of the transcendental journal, Dial. Channing later wrote of one visit with her:

It was a radiant and refreshing morning.
. . . She proposed a walk in the open air.
She led the way to Bussey’s wood, her favorite retreat during the past year, where she had thought and read, or talked with intimate friends. We climbed the rocky path, resting a moment or two at every pretty point, till, reaching a moss-cushioned ledge near the summit, she seated herself. For a time she was silent, entranced in delighted communion with the exquisite hue of the sky, seen through interlacing boughs and trembling leaves, and the play of shine and shadow over the wide landscape.

Thirty-two years later, Bussey’s wood became the Arnold Arboretum. It seems that Benjamin Bussey, gentleman farmer of Jamaica Plain, opened his entire estate to the community from the time he acquired the land in the early 1800s until he bequeathed it to Harvard University. In this sense, the Arboretum has been enjoyed by the public for many more years than those since its founding in 1872; the formal establishment of the institution simply recognized what was a widely appreciated but informal practice of excursions to enjoy the beauty of the setting.
The occasion for my discovery of this fact, and of the quote from Channing above, was the recent publication of *Science in the Pleasure Ground*, the third of a trilogy of books by staff members about the scientific and cultural importance of the Arnold Arboretum. *Science in the Pleasure Ground* is skillfully authored by Ida Hay, formerly Curatorial Associate here, and it recounts in rich detail the changes in the Arboretum landscape over time and the history of the institution as expressed in those changes. The earlier two volumes, *A Reunion of Trees* by Steve Spongberg and *New England Natives* by Sheila Connor, spun narratives about the importation of exotic woody plants from the Far East into North America and about economic and horticultural uses of the native species and forests by the several cultures that have occupied the land of New England.

The publication of Ida's book completes a magnificent project, begun over ten years ago and supported by several grants from the National Endowment for the Humanities, that has provided us with a much deeper understanding of the humanistic dimensions of the Arboretum and the critical importance of our living collection of trees to the scientific and cultural developments of the past century. I congratulate all three authors for the high quality of their work, and for the heritage they have rendered accessible to us all.

### MHS Honors John H. Alexander III

The Massachusetts Horticultural Society bestowed the prestigious Jackson Dawson Medal on Arnold Arboretum propagator John H. Alexander III in recognition of his skill and thoroughness in developing and disseminating propagation techniques. Jack, whose career at the Arboretum began in 1976, is well known for his work with the Arboretum's lilac collections and his extensive teaching as well as for his many contributions to the propagation of woody plants. He is seen here at the 1994 Honorary Medals and Awards Ceremony with, on his right, Walter M. Pile, Jr., Chairman of the MHS Board of Trustees, and Executive Director John C. Peterson.

The Jackson Dawson Medal itself honors an Arboretum propagator, master plantsman, and longtime superintendent whose forty-three-year career here began in 1873 as founder Charles S. Sargent's first staff member.

### Friends of the Arboretum Gain Free Admission to More Than 100 Arboreta & Botanical Gardens

We are pleased to announce a new benefit for Friends of the Arnold Arboretum: free admission and gift shop discounts at over one-hundred arboreta, botanical gardens, and conservatories across the United States and Canada. Among the many institutions participating in this reciprocal admission program are the Brooklyn Botanic Garden, New York Botanical Garden, the Strybing Arboretum & Botanical Gardens, Missouri Botanical Garden, Denver Botanic Gardens, and the Royal Botanic Gardens in Hamilton, Ontario.

Arboretum members also benefit from the reciprocity arrangement by receiving free admission to the Massachusetts Horticultural Society's annual New England Spring Flower Show, taking place this year March 11 through 19. All current Arboretum members will receive a new membership card and a complete list of participating institutions. Simply present your Arboretum membership card to take advantage of the new program. If you have questions, or would like to open or renew membership, please contact Lisa Hastings at 524-1718, ext. 145.
Hemlock Hill—The End of an Era

Peter Del Tredici, Assistant Director for Living Collections

Hemlock Hill has always occupied a special place in the history of the Arnold Arboretum as a little piece of wilderness in the heart of the big city. E. H. Wilson summarized the pride felt by Arboretum staff members in his 1925 book, America's Great Garden, “Within the hemlock grove reigns the stillness of primeval forest broken only by the babbling of the waters which wash its feet... within the limits of no other city can such a grand and inspiring bit of natural forest be found.” Research published by Hugh Raup in 1935, however, made it clear that Hemlock Hill was far from being a “primeval” wilderness—it had been heavily lumbered during the late 1700s and early 1800s, and the hemlocks that dominated the landscape when the Arboretum was founded in 1872 had grown up after this logging. Regardless of its origin, however, Hemlock Hill has always had a wild feeling, very different from the rest of the Arboretum.

Unfortunately, a large portion of Hemlock Hill came crashing down during the great hurricane of September 21, 1938, when over 400 trees were blown over, mainly on the southeast slope. These included some of the largest, which dated back to at least 1780. In the two or three years following the hurricane, the hill was replanted with new hemlock seedlings to help stabilize the slopes and to restore the forest, with Donald Wyman bleakly predicting that “It will take the better part of a century before the magnificent grove of Hemlock Hill will again approach its perfection of September 1938.”

By the time I started working at the Arboretum in 1979, however, Hemlock Hill had once again achieved the feeling of a wild forest, with a few old specimens interspersed among a mass of much younger trees. Seedling regeneration has always been virtually nonexistent on the hill, a function of the dense shade that hemlocks cast, of their highly absorptive root systems, and of the heavy foot traffic that parades up and down the slopes. Periodic storms and hurricanes since 1938 have continued their relentless program of tree removal, culling specimens with rotten cores or weak roots. This combination of ongoing mortality and lack of seedling recruitment has been a source of concern for the staff for many years, with no obvious solution in sight.

The big nor’easter that struck Boston on December 24, 1994, was yet another reminder that the problem of Hemlock Hill will get worse before it gets better. Two of the biggest trees left on the top of the hill were blown down. Both were there before the Arboretum was founded, and both were totally hollow at the base. One of the trees, approximately 80 centimeters in diameter, had 125 rings at 15 feet above the ground, suggesting an age of at least 150 years. The other tree was over 90 centimeters in diameter and appeared to be of about the same vintage. Along with these two giants, five smaller trees, probably planted after the hurricane of 1938, also came down.

From a management point of view Hemlock Hill has always been problematic. On the one hand, it receives minimal maintenance because we like to think of it as a “natural” area. On the other, it is heavily trafficked, and erosion and vandalism (mainly fires) can become very serious problems if not treated or prevented. And just to make matters worse, a new pest, the hemlock woolly adelgid, has recently been found on Arboretum property. This insect, whose arrival had been anticipated for several years, has devastated hemlock populations, both wild and cultivated, throughout the mid-Atlantic region. More recently, the insect has been spotted in hemlock forests throughout southern New England.

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While the pest can be controlled by spraying dormant oil, it is difficult, if not impossible, to control its spread in dense stands of tall trees. Only the Chinese species, *Tsuga chinen.sis*, appears to be fully resistant to damage from the adelgid.

These factors have led the Living Collections Committee to revise its management program for Hemlock Hill. The first change has been to allow as much organic matter as possible to remain on the hill in an attempt to encourage natural seedling regeneration. This translates into a policy that calls for chipping up the branches of the tree (thereby minimizing the fire hazard) and leaving the trunks where they fall to act as "nurse" logs. The second step will be to plant open areas with *Tsuga chinen.sis* in an effort to head off total devastation by the adelgid. This species is rarely cultivated in North America. While we have a few old specimens at the Arnold Arboretum, we have begun assembling specimens from various parts of its natural range. With a little luck they will be ready to plant out in three or four years.

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**Mercer Fellow**

Lisa Curran has been granted a two-year Mercer Fellowship to work with the Arboretum's Indonesian Biodiversity Collections project. Since receiving her undergraduate degree from Harvard University in 1984, Lisa has been investigating the ecology, use, and management of tropical forests in Kalimantan (Indonesian Borneo). She assisted the Indonesian government with biodiversity surveys and research programs in two forest reserves that were later upgraded to national park status. She also conducted a number of field courses in tropical botany while in Kalimantan, and on several occasions served as a forestry consultant to the government of Indonesia. In field surveys and investigations of over seventy Kalimantan timber concessions and affiliated wood-based industries, she evaluated the ecological, economic, and social impact of government policies and timber company practices on forest resources and local village communities.

In July 1994, Lisa received her Ph.D. from the Department of Ecology and Evolutionary Biology at Princeton University with a thesis entitled "The ecology and evolution of mast-fruiting in Bornean Dipterocarpaceae: A general ectomycorrhizal theory." It was based on her eight-year study of the reproductive biology and regeneration of the prominent family of Southeast Asian commercial timber trees and their insect and vertebrate seed predators. Her current research interests center on the impact of forest policies and practices on biodiversity in tropical canopy trees and the effects of seedling recruitment fluctuations on the maintenance of species diversity.

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**Lichens: Fine Details of the Natural Landscape**

Lichens—actually symbiotic associations between fungi and algae or cyanobacteria—are among the most ubiquitous forms of life across the globe. From February 21 to May 15, the Arboretum will present a photographic exhibit that explores the natural history of this fascinating group of organisms. "Lichens: Fine Details of the Natural Landscape" will be available for viewing in the Arboretum's Hunnewell Building at 125 Arborway in Jamaica Plain.

The Arboretum will also offer a free lecture, "Lichens, a Special Biological Interaction," by Donald H. Pfister, Asa Gray Professor of Systematic Botany, Harvard University. The lecture will be held on Tuesday, April 4, at 7:30 pm in the Hunnewell Building. To register, please call 617/524-1718 ext.162.
What Is Landscape? . . . “A piece of land which is old or has nature” . . . “How the land works” . . . “What you can see through your eyes”

Richard Schulhof, Assistant Director for Education and Public Affairs

Over one hundred 6th-grade students at the Doherty Middle School in Andover ventured a response to the key question addressed in the new Arboretum program, Junior Parkmakers: What is landscape? Supported by grants from the National Endowment for the Arts and the National Park Foundation, the Arboretum and the Olmsted National Historic Site are working together to introduce Boston-area children to the concepts of landscape and landscape history. Development of the program began this past fall with focus groups comprised of local teachers and museum educators.

Mary Chmielecki, a teacher at the Doherty School, tested the power of the word landscape with her students. She asked them to define their idea of it in one sentence and then to draw it. Their responses underscored the word’s ability to evoke a wide range of personal interpretations. Although the highly varied responses made categorization difficult, roughly 25 percent thought of it as a verb (“making the lands look better”), 30 percent interpreted it as a natural or aesthetically pleasing place (“beautiful, fresh-looking scenery”), and 40 percent as a quantity or unit of land (“land for about a mile”). While all of the participants included trees in their drawings, a few children described landscape as construction sites or areas for dumping and included bulldozers or abandoned cars in their drawings.

These descriptions provide an extremely useful snapshot of the diverse perspectives that participants will bring to the program. We extend our many thanks to Ms. Chmielecki and her students for their creative and enlightening contribution. Junior Parkmakers will be field-tested later this year; it will include classroom activities and visits to the Arboretum designed to connect kids with Boston’s rich heritage of historic and designed landscapes.
Trees in cities have much to contend with. Restricted rooting areas, high winds, severe temperature fluctuations, extremes of drought and flooding, compacted or contaminated soils with high concentrations of salt, and repeated mechanical damage affect the tree’s ability to maintain actively growing and functional roots. Moreover, they must cope with these extreme conditions immediately following one of the most stressful perturbations that managed woody plants are subjected to, namely, transplanting. No tree in nature is subjected to this kind of disturbance—seedling trees may be chewed on, crushed by fallen limbs, stepped on, or attacked by disease, but they are not uprooted to be replanted miles away in an alien, stressful environment.

In modern horticulture, tree seed, cuttings, and young trees are brought from a range of climates around the world to nurseries where they are grown with nearly optimal fertilization and irrigation. In field-production nurseries, plants may lose as much as eighty to ninety percent of their root systems when they are dug for shipping to a new site. The advent of the mechanical tree spade has made it virtually impossible to transplant large trees without losing most of their mass of fine roots—those roots most important for water and nutrient uptake in support of the whole organism. This means that, once replanted, trees must be able to regrow significant masses of fine roots as quickly as possible in order to survive. That ability, which varies widely among species and even among cultivars and hybrids with shared parentage, becomes a dominant factor in determining survival.

My research project at the Arnold Arboretum addresses this issue in two ways: Which ornamental woody plants in the diverse living collections of the Arnold Arboretum have over time demonstrated good potential for surviving in stressful managed environments? And among these successful plants, are there similarities in root growth patterns that permit us to generalize about what leads to successful root development and long-term survival in stressful environments, and thereby better predict which trees might thrive in such sites?

The first question is readily answered by straightforward evaluation of the collections with reference to the invaluable records that detail source, age, and prior management. Over the past year I have had the great pleasure of discovering many interesting and unusual ornamental woody plants that show great potential for urban use. I am currently working to document optimal propagation techniques for these plants and to promote them for commercial production.

I have addressed the second question by investigating how woody plants invest in root growth relative to shoot growth. My previous work and that of others has uncovered a clear coincidence between success in environments hostile to root growth and allocation of significantly greater proportion of overall growth to roots than to other parts of the plant. This pattern holds up even among closely related plants. For example, if we grow two closely related hollies from rooted cuttings—one that performs well in stressful root environments and one that doesn’t—we find that the successful holly consistently allocates much more of its growth to its root system than to its aboveground parts. This preference for investment in root growth versus shoot growth remains consistent throughout early development from rooted cuttings, through the container-grown stage, and on through two seasons in the field.

These findings help us understand urban tree growth and development. They may also allow us to develop relatively rapid screens for successful urban plants simply by rooting cuttings and growing seedlings of untried species and cultivars. This two-fold project is a unique opportunity for me to take advantage of the great diversity and excellent documentation of the living collections at the Arnold Arboretum in service to both practical and theoretical horticulture.
Spring and summer are prime seasons for gardeners, and the Arboretum offers many short courses in horticulture and botany. Begin your gardening career with introductory courses, or improve your skills with advanced courses in horticultural techniques and plant study. A selection is shown below.

For a complete catalogue of programs and events at the Arboretum, call (617) 524-1718, ext. 162. Please note that course fees printed in boldface are for Arboretum members.

**APRIL**

HOR 327 Starting and Running a Home Nursery
*John H. Alexander III, Chief Plant Propagator, Arnold Arboretum*

Are you growing so many plants that you sometimes feel you might as well be running a nursery? Would you like to sell some of the plants you produce? In this workshop for the serious amateur, your questions will be answered. Is a greenhouse required? Where should you buy supplies, stock, liners, equipment? What are the legal aspects of starting a nursery? What about irrigation? How should you inform customers of your offerings? Can you manage without a catalog? Extensive handouts are included. Bring a lunch.

Fee: $117, $134
2 Saturdays, April 1, 8/ 9:00 am–3:30 pm (Dana Greenhouse)

HOR 195 Successful Tree and Shrub Planting
*James F. Martin, Professional Arborist and Horticultural Instructor*

Establishing young trees and shrubs is an important spring gardening task for the homeowner and garden professional. Learn planting techniques that will give a new tree or shrub the best chance of survival. This course will cover decisions to be made at the time of purchase, transportation, planting hole preparation, settling the plant in, finishing touches, and maintenance. The course is appropriate for both novice and experienced gardeners as well as for horticultural professionals. Please dress for the outdoors.

Fee: $40.00, $46.00
2 Saturdays, April 1, 8/ 9:30–noon (Case Estates)

HOR 172 Bamboos in the Home Landscape
*Chris DeRosa, Owner, New England Bamboo Company*

Bamboos add movement, grace, and elegant form to your garden. Beautiful as they are, gardeners know that some bamboos can become invasive garden problems. Join Chris DeRosa, a recognized bamboo expert, to learn about the variety of hardy bamboos suitable for New England gardens, their culture and uses in the landscape.

Fee: $12, $15
Thursday, April 6/ 7:00–8:30 pm (Case Estates)

HOR 110 Fundamentals of Gardening
*Laura Eisener, Landscape Designer*

Whether you are a novice starting your first garden or an old hand looking for a firmer foundation, this practical course will satisfy your quest for basic gardening information. In four sessions this course will cover basic techniques of gardening, including site analysis and soil preparation, irrigation, drainage, watering, plant selection, and horticultural requirements of plants. Weather permitting, there will be some hands-on work at the site, in addition to lectures and demonstrations.

Fee: $85, $100
4 Fridays, April 7, 14, 21, 28/ 10:00 am–12:30 pm (Case Estates)

**MAY**

Identification of Temperate Woody Plants
*Arnold Arboretum Staff Members Gary Koller, Stephen Spongberg, Chris Strand, and Kim Tripp. Marcia Mitchell, Course Coordinator*

This introductory course, taught by Arnold Arboretum staff members, is designed to provide a solid foundation for the identification of woody plants hardy in New England. Students may begin the two-semester curriculum in either fall or spring.

HOR 101 Identification of Temperate Woody Plants (Spring) includes deciduous shrubs, small flowering trees, and the spring characteristics of larger landscape trees and conifers.

HOR 102 Identification of Temperate Woody Plants (Fall) includes the autumn aspect of these genera and species, and presents conifers, broadleaf evergreens, and other plants whose key characteristics are best observed in the fall and winter.

Fee: $125, $150
7 Tuesdays, May 2, 9, 16, 23, 30, June 6, 13/ 10:00–noon (Dana Greenhouse)
New Staff at the Arboretum

Carol David brings five years of librarianship to her position as the new Library Assistant at the Horticultural Library. Her responsibilities include reference services, acquisitions, and technical services. At present ninety percent of the horticultural collection is not on HOLLIS, Harvard’s online catalog. Her immediate concern will be to continue to update online access in order to accelerate research efforts. Carol is a graduate student of library science at Simmons College and comes to us from the Lucien Howe Library of Ophthalmology and Otolaryngology at Massachusetts Eye and Ear Infirmary.

Lisa M. Hastings recently joined the Arboretum as Development Officer. Her responsibilities include managing the Arboretum’s membership and annual appeal efforts and planning and organizing events related to the Arboretum’s participation in the University’s Capital Campaign. She joins us from Worcester Polytechnic Institute in Worcester where, as Director of Young Alumni Programs, she was responsible for all aspects of fundraising and program management for WPI’s young alumni constituency of seven thousand. Lisa is a longtime volunteer at the Fisher Museum of Forestry at the Harvard Forest in Petersham and at the Worcester County Horticultural Society.

1995 Winter Lecture Series: The Nature of Cities

This winter marks the third year of collaboration among the Arnold Arboretum, Olmsted National Historic Site, the Harvard Graduate School of Design, and a number of other sponsors to present a lecture series exploring our changing relationship with the American landscape and natural environment. This year’s series will discuss the future of urban open space and examine the ongoing debate about how “nature” can best be shaped and managed as an integral part of the American city.

All lectures are free and begin at 6:30 pm in the Piper Auditorium of the Harvard Graduate School of Design at 48 Quincy Street in Cambridge. The Arboretum extends its thanks to the Massachusetts Foundation for the Humanities for its support of the series.

**February 9: The Future of the Garden in America—Beyond the Wilderness and the Lawn**
Michael Pollan, Author of Second Nature

**February 23: A Manifesto for the Charles River**
Sam Bass Warner, Jr., Urban Historian

**March 9: Regrounding Nature in the New City**
Catherine M. Howett, Professor, School of Environmental Design, University of Georgia

**March 23: Imagining the New Urban Park**
Diana Balmori, Principal, Balmori Associates