

THE ARNOLD ARBORETUM OF HARVARD UNIVERSITY
DIRECTOR'S REPORT 1993-1994





Cover photos of *Liriodendron tulipifera* (tulip tree) by Al Bussewitz.
Inside cover photos of the *Carpinus* (hornbeam) collection by Rácz & Debreczy.

THE DIRECTOR'S REPORT
Arnold Arboretum
1993-1994

Robert E. Cook, Director

The Arnold Arboretum of Harvard University
125 Arborway, Jamaica Plain, Massachusetts 02130



A view from Bussey Hill drawn by Henry Sandham. From "A Tree Museum" by M. C. Robbins, published in *Century Magazine*, 1893.

There has always been a tension between the humanistic goals embodied in the beauty of the Arboretum landscape and the management of a collection of trees to support the generation of new knowledge through research. This tension is intrinsic to the philosophical ideals of the two individuals who collaborated to create the Arboretum, Frederick Law Olmsted and Charles Sprague Sargent. In 1870, Olmsted wrote,

We want a ground to which people may easily go . . . where they shall, in effect, find the city put far away from them. . . . a simple, broad, open space of clear greensward . . . We want depth of wood enough about it not only for comfort in hot weather, but to completely shut out the city from our landscapes.*

Nine years later, Sargent assessed the challenge of designing the Arboretum in his Annual Report:

The site, while offering exceptional beauties, perhaps, for a public park, offers exceptional topographic difficulties for . . . a museum, in which as many living specimens as possible are to find their appropriate positions. In such a museum, everything should be subservient to the collections, and the ease with which these can be reached and studied.

In this, the fifth annual report written since I became director in 1989, I am giving primacy of place to our living collections in Jamaica Plain and their importance for scientific research. Yet, as you will see, these collections and the landscape in which they grow also provide a continuing context for giving people a new knowledge and appreciation of trees and their presence in our lives. The enjoyment and education we offer the public is inextricably bound to, and enhanced by, the quality of curation we bring to our collections.

This has always been so. In 1891, not long after the first scientific plantings were added to the landscape, Sargent asked John George Jack, manager of the collections, to provide popular instruction about trees and shrubs. For two or three hours every Wednesday afternoon and Saturday morning each spring and fall, Jack conducted excursions into the Arboretum's collections for thirty or so pupils. These "pupils" were most often teachers in the city's public schools seeking to learn more

* "Public Parks and the Enlargement of Towns." American Social Science Association. Cambridge, MA: Riverside Press.

about trees in order to improve their instruction in science. While today the Arboretum's programs are experiencing great growth and change, in essential ways they remain consistent with the substance and spirit of Sargent and Olmsted's vision for the Arboretum more than a century ago.

LIVING COLLECTIONS

Curation

During the past year our staff added 245 accessions representing 548 woody plants to the permanent collection; 61 of these accessions are new taxa. We continue to review closely our existing holdings and to deaccession plants that do not meet our collections standards. Presently, the permanent collection contains 5,016 taxa represented by 16,174 plants. This latter number is substantially larger than the one reported last year because we no longer recognize "massed taxon groups"; instead we now identify every individual plant.

Over the past decade, the importance of computer technology in managing collections information has grown dramatically. Last year saw two significant milestones. Our curatorial staff completed the transfer of our hand-drawn maps to a digital mapping system fully integrated with our collections database. This resulted in the first

The massive stone walls that line the Arboretum's perimeter along South Street have been in disrepair for many years.

Through the efforts of grounds staff members Luis Colon (left), Maurice Sheehan (right), Dennis Harris, and Patrick Willoughby, sagging chainlink fence was removed and a long section of the wall was rebuilt.



Peter Del Tredici

electronically produced map book of the grounds. In addition, we have greatly improved the usefulness of the database itself by upgrading our software to the “Advanced Revelation” language.

In recent years we have renewed our commitment to the beauty of the landscape without sacrificing the quality of curation by allocating greater resources to the maintenance of our grounds. The crew made significant progress in removing brush and debris at a number of locations, including the stone quarry site off Bussey Street associated with the Peters Hill renovation project (see below) and at the South Street tract. A very high standard of maintenance remains the norm for all our Arboretum grounds, thanks to the great dedication of our grounds staff and arborists.

Peters Hill Renovation Plan

The master plan studies by Sasaki Associates, Inc., which were described in last year’s report, included a series of recommendations for the 120–acre southwestern portion of the Arboretum known as Peters Hill. This summit rises to 237 feet and provides a magnificent panorama of Boston’s skyline emerging out of the green canopy of the Arboretum landscape. The Sasaki study called for improvements in the collections with special attention to planting plans that would shape short and long views consistent with the design of the remainder of the Arboretum. It also recommended improvements to pedestrian pathways and to the connections to the main grounds across Bussey Street.

During the past year we developed and began implementing a more detailed plan for managing the collections on Peters Hill. Supported by a grant of \$25,000 from the Institute of Museum Services’ Conservation Program, our curatorial staff evaluated and verified over 3,000 accessions on the Hill. This led to the removal or relocation of 240 plants to prepare for new additions to the collections consistent with the Sasaki recommendations. Future plans call for (1) the development of a system of grass pathways to facilitate movement through the collections; (2) maintenance of the naturalistic and orchard-like character of the slopes through appropriate plant establishment; (3) replacement of a road and turnaround that was added to the top of the Hill in the 1960s with plantings and pedestrian grass paths that will enhance the panoramic views.

The Olmsted Center for Landscape Preservation

Our growing collaboration with the National Park Service continues to yield successful grant support for projects of mutual interest. (See also "Junior Parkmakers" described on page 15.) The Olmsted Center for Landscape Preservation is a partnership between the Arboretum and the Park Service to provide technical analysis and related recommendations for the maintenance and protection of historic landscapes as cultural resources.

Such technical assistance depends critically on the horticultural, propagation, and taxonomic expertise resident in our Living Collections staff. For instance, over the past year staff from both institutions prepared a detailed cultural landscape report that will guide future landscape management for "Fairsted," the home and office of Frederick Law Olmsted in Brookline, Massachusetts. This work involved extensive plant identification from historic photographs, an inventory and horticultural assessment of existing specimens, and propagation services for historically important plants and cultivars. Similar research reports for other Park Service sites are currently in preparation.

Equally important is our collaborative program to define and review philosophical, policy, and pragmatic issues faced by all managers of historic landscapes and cultural properties. One cannot simply apply the preservation standards that have been developed for historic or architecturally important buildings to the management of historic landscapes. As any gardener knows, landscapes present unique management problems not confronted by building preservationists because plants grow and change over time, naturally resisting preservation. The intellectual and practical issues surrounding cultural landscape preservation are of great national interest right now, and the Olmsted Center has embraced an analysis of the entire range.

Last year Congress created the National Center for Preservation Technology and Training within the Park Service to support innovative projects related to historic preservation. Under this new program, the Olmsted Center recently received a \$40,000 grant, one of two landscape-related projects that were awarded funds in the first year of the program. These funds will allow us to work with Park Service staff to produce a manual for the management of historic plants and other vegetation. This project promises to place the Olmsted Center in a role of national leadership promoting the preservation of cultural landscapes.



Margie Coffin

Kristin Claeys and Gary Koller recording a massive black locust (*Robinia pseudoacacia*) as part of a historic plant inventory of the Franklin Delano Roosevelt National Historic Site at Hyde Park, New York.

Research

Last year's Report cited thirteen different botanical research projects around the country that were based on plant material from our living collections. This year eighteen projects could be listed, of which thirteen are new. Six of these research projects are using molecular techniques to investigate the evolutionary relationships of plants. Five other studies employ more traditional morphological and biochemical approaches to plant systematics. Three are investigating questions related to disease resistance in species of horticultural interest. Dr. Nicholas Wheeler, a phytochemical researcher working for the Weyerhaeuser Corporation in Washington State, requested seed material from a number of *Taxus* species and cultivars to begin breeding studies for enhanced taxol



Peter Del Tredici

An ancient redwood (*Sequoia sempervirens*), growing in Santa Cruz, California. Peter Del Tredici visited this site as part of his investigation of burl development.

production. Taxol is a biochemical substance in yews that has been found to be very effective in inhibiting the growth of cancer cells.

Through the generosity of the Putnam family, the Arboretum established the Katherine H. Putnam Fellowship program several years ago to support work with the living collections. Last spring we awarded a two-year fellowship to Dr. Kim Tripp, who is conducting horticultural research on conifers and alders. She has come to us after several years at the North Carolina State Arboretum where she collaborated with Professor J. C. Raulston in plant evaluation studies. She will continue her research here on the allocation of nutrients and energy between the roots and shoots of horticultural cultivars.

Dr. Peter Del Tredici, Assistant Director for Living Collections, conducted further research on the ecology and morphology of burl development in ginkgos, California coastal redwoods (*Sequoia sempervirens*), and two ericaceous species, *Kalmia latifolia* and *Rhododendron maximum*. We thank the support of the Highstead Foundation for making this work possible.

Collecting

With a collections policy that puts first priority on plants of wild origin, the Arboretum depends upon staff expeditions to acquire new accessions. Last year Tom Ward, manager of the Dana Greenhouse, collected specimens in the mountains of western North Carolina, returning with material of *Rhododendron vasseyi*, *Abies fraseri*, and *Leiophyllum buxifolium*. Jack Alexander, our Senior Propagator, brought back accessions of *Viburnum cassinoides*, *Betula pumila*, *Shepherdia canadensis*, and *Prunus pennsylvanica* from their far-northern range in Newfoundland.

Following a long tradition of Arboretum collecting in China, Dr. Peter Del Tredici travelled to Wudang Mountain in Hubei Province as part of the North American-China Plant Exploration Consortium. In all, 127 collections of seed were brought back to the Dana Greenhouse to be processed for germination, including diverse germplasm of *Acer griseum*, *Castanea henryi*, *Hamamelis mollis*, *Emmenopterys henryi*, and *Sinowilsonia*

henryi. We can anticipate that a new generation of Chinese plants will be flourishing at the Arboretum well into the next century.

Beyond their value as a critical research resource, our living collection of trees and the expertise that they inspire are also important resources for many different forms of education. Last year, for instance, we received eighty-six applications for our summer Horticultural Training Program. Fifteen interns were chosen for three to five months of hands-on work with our staff and sixty hours of staff-taught classes in such topics as propagation, plant identification, pests, and disease. Three of these interns, Todd Forrest, Irina Kadis, and Kirsten Thornton, have been hired as, respectively, Curatorial Assistant responsible for our database system, Laboratory Technician, and Landscape Preservation Assistant working with the National Park Service partnership.

Last year also saw the appearance of *New England Natives: A Celebration of People and Trees*, researched and written by Sheila Connor, our horticultural research archivist, and published by Harvard University Press. The book recounts the natural history of New England's forests and examines the ethnological and economic importance of native trees in the many cultures that have developed around them. It also discusses the historical role of the Arboretum in the conservation of these wooded landscapes. During the coming year we anticipate the publication of *Science in the Pleasure Ground*, the last volume in a trilogy of books about trees by Arboretum staff.

Finally, it is with sadness and a sense of great loss that we note the death of Jennifer Quigley, the curatorial associate who was responsible for maintaining our living collection records. She succumbed to cancer last March after eighteen years of employment at the Arboretum.

INTERNATIONAL RESEARCH AND RESEARCH SUPPORT

Southeast Asia

Professor Peter Ashton, in collaboration with the Center for Tropical Forest Science of the Smithsonian Tropical Research Institute, continues to develop a network of research sites throughout the southeastern regions of Asia. New research plots were established in Sri Lanka and on the island of Palawan in the Philippines. Older sites in mainland Malaysia, Sarawak, and Thailand have yielded data that is undergoing statis-

tical analysis for use in computer simulations of forest growth. A number of graduate students and postdoctoral fellows are also working with Professor Ashton on the ecology and resource management of tropical forests.

A long-term research project conducted by Professor Peter Stevens has this year reached fruition with the publication of his book entitled *The Development of Biological Systematics: Antoine-Laurent de Jussieu, Nature and the Natural System*.

Our research program in Indonesia achieved a major milestone last summer when a contract for \$2,375,103 was awarded to the Arnold Arboretum to provide technical assistance as part of a larger \$12,000,000 project for biodiversity conservation and natural resource management. Based on the research supported by earlier grants from the National Science Foundation, the Biodiversity Collections Program is funded by the Global Environment Facility (GEF) of the World Bank in collaboration with the Government of Indonesia. This technical assistance program has evolved from a planning document developed by the Arboretum in 1993. The project is being conducted by an international team that includes the Natural History Museum, London; the Nationaal Natuurhistorisch Museum/Rijksherbarium, Leiden; and the CSIRO of Australia. The project will reverse the deterioration of Indonesia's botanical and zoological collections and begin to restore and expand these critical resources. It will also establish a national biodiversity database and institute a program of training and scientific exchanges.

Scientists from the Arboretum continued collecting plants in the tropical forests of Irian Jaya (New Guinea), Sulawesi (Celebes), and other remote islands of Indonesia in a search for anti-cancer and anti-AIDS pharmaceuticals. Additional collecting expeditions were sent to Kalimantan (Borneo) for floristic studies. Together these efforts have yielded more than 32,000 specimens comprising 4,475 separate collections. These expeditions also train Indonesian scientists in documenting wild-collected material, constructing databases, and developing identification keys, florulas, and botanical manuals.

Harvard University Herbaria (HUH)

As a critical resource for the support of research, the botany libraries of HUH, supplemented by the horticultural and archival collections in Jamaica Plain, serve a growing demand for books and periodicals. The

number of volumes increased by 1,361 over the past year to a total of 261,688; in addition, 1,216 journals are received each year. During the year nearly 3,500 books or journals were paged from the closed stacks for researchers, representing a 20% increase over the year before.

With funding from the National Science Foundation, HUH staff continued creating electronic database files of critical collections. Over 50,000 type specimen records were converted to gopher format and made available to national and international researchers through the worldwide network called the Internet. A second database file, which compiles the authors of plant names, has accumulated over 27,000 verified records that are now available on the Internet through the HUH server.

Following the expansion of the compactor storage system reported last year, the Herbaria staff continued to reorganize the collections to bring all vascular plants into closer proximity, to integrate tropical collections transferred from Jamaica Plain, and to assimilate the temperate collections of the New England Botanical Club. The fruit and seed collections were subsequently moved into newly renovated and compactorized space in the basement.

Dave Boufford, Assistant Director for HUH, conducted fieldwork with Chinese and Japanese colleagues in Henan Province of eastern China, in north-central Inner Mongolia, and in northern Japan to sup-



Dave Boufford

Chinese colleagues photographed by Dave Boufford in the course of their botanical survey of the Baotianman Nature Reserve, Henan Province, China. The forests of western Henan bear a remarkable resemblance to those in the southern Appalachian Mountains and contain many of the same genera of plants.

port his research on the evolutionary relationships between the floras of Asia and eastern North America.

PUBLIC PROGRAMS

From the early years of the Arboretum, public education has been an important part of our mission. Inevitably this education is largely based on the living collections, on the aesthetic and scientific qualities of our landscape, and on the expertise that is required to curate these collections and preserve this landscape. Today our institution is an important part of the community surrounding us, and we will continue to shape our public programs in a way that recognizes this essential fact.

Community Science Connection

For more than a decade, the Arboretum has opened its gates to formal classroom visits by schoolchildren. The Field Studies Program, created in 1983, annually brings approximately 3,000 individuals in grades 2 through 5 to participate in a sequence of four outdoor study activities that introduce students and teachers alike to natural history. Last year 158 teachers and 241 parents accompanied these visits.

Over the past six years, our programs in science education have been expanding to provide greater support for teachers. In collaboration with other Boston-area museums, we have participated in MITS (Museum Institute for Teaching Science) for over seven years; two years ago we built upon this experience by offering a series of teacher-training workshops each summer. These workshops are centered around a plant-based curriculum called LEAP (Learning About Plants), which I helped create when I worked at Cornell University prior to my arrival as director in 1989. In July and August of 1993, fifty-three teachers attended workshops supported by funds from the Dwight D. Eisenhower Mathematics and Science Education Program. These workshops were followed with direct support from Arboretum staff for teachers in their classrooms.

Last year we began planning to integrate and expand these efforts into a new program. Key to this initiative is my belief that the Arboretum, both as a landscape and as an institution, should become a center for science education and school reform in our community. This agenda is consistent with our mission, responds to a pressing community need,



and places us at the forefront of a new, university-wide program at Harvard called Schooling and Children.

My vision for this new initiative at the Arboretum is best expressed in the modern metaphor of the “network,” with its multiple connections. At the center of this network lies the Arboretum, providing information and resources for classrooms linked together in a community dedicated to learning. In our modern age, these information connections are facilitated by electronic cables and computers that support teachers in their classrooms and promote conversations among children exploring science. Through the Arboretum and its electronic connections to a world of educational resources available on the Internet, teachers and their classrooms will gain access to a rich array of educational information. These electronic explorations are then reinforced by classroom expeditions to the Arboretum to gather data and construct observations of nature. Finally, we will initiate a new program to encourage family

The Field Studies Program in action: children from a neighboring school with their teacher and a volunteer Arboretum leader.

support for school science. We want parents to be actively involved in their children's learning endeavors.

To help me realize this vision in a new program, I was joined in the planning process by Dr. Candace Julyan, a graduate of Harvard's School of Education and a recent director of the National Geographic Society's Kids Network. This project, funded by the National Science Foundation (NSF) six years ago, demonstrated that a network of linked classroom computers could greatly enhance science learning in elementary-aged children. Together Candace and I drew up a proposal that was submitted to NSF last March; the program is called "The Community Science Connection." At the end of the summer we were awarded a grant for \$1,218,422 to develop a model program for science education.

The Community Science Connection (CSC) will consist of four elements. At the heart of the program will be class expeditions to the Arboretum to introduce children to science through careful observation and data-gathering activities. Second, we will create summer work-

Boston's skyline seen
from Peters Hill.



Rácz & Debreczy

shops, to be conducted prior to these expeditions, to introduce teachers to the program and the resources of the Arboretum and to provide a platform for future support during the school year. Third, we will create a vehicle for parental involvement such as take-home exercises and activities, Arboretum field days for families, and an annual science conference for families and children. Finally, through a telecommunications network centered at the Arboretum, we will create linkages among participating teachers and their classrooms for sharing their data and observations and for conducting conversations about science. Initially

we will be working with neighboring schools in the diverse communities of Boston, Brookline, and Newton.

The CSC program will be supplemented by a second NSF-funded project, called "The Rainforest Connection," that will be based on our international scientific experience, especially in Indonesia. Working with an educational software company called Tom Snyder Productions, our scientists are providing technical advice for a new classroom teaching program based on a curricular narrative about the discovery of anti-cancer substances in tropical plants. Classroom children will be divided into teams of "experts" who will work together cooperatively to search for appropriate species to test. Using the wide array of information resources available on a CD-ROM disk designed for classroom use, each team will plan and conduct an expedition to the forests of Borneo which, to be successful, will require knowledge of geography, ecology, anthropology, and history. The program will also offer the opportunity for similar expeditions in temperate forest settings such as the Arboretum. "The Rainforest Connection" will be made available to teachers one year from now.

Finally, our Children's Program has received a third grant of \$25,000 from the National Endowment for the Arts to develop a curriculum module around the concept of landscape and its design. Called "Junior Parkmakers," this project will be carried out in collaboration with the staff at the Frederick Law Olmsted Historic Site with support from the National Park Foundation. It will create a series of hands-on activities that promote the observational powers of children, that encourage imaginative but careful illustration of these observations, and that teach the complex aesthetic and ecological relationships that characterize natural and manmade landscapes.

Planning, Visitor Services, and Arnoldia

During 1994 the Arboretum received several awards for its planning and renovation projects (for the latter, see page 5). One of these came from the Boston Society of Landscape Architects, which gave a Merit Award for the Master Plan Studies completed by Sasaki Associates, Inc., last year. This plan, discussed in my last Director's Report, will provide guidance for land-use and visitor-related services well into the next century.

Following last year's re-opening of the Hunnewell Building to the public, we have been working to improve our interpretive services for visitors. We hope to design a more effective introduction to the landscape of the living collections and the rich history behind its creation. This effort has been given a strong vote of confidence by our colleagues through the award of a \$200,000 grant from the National Endowment for the Humanities to create exhibits and a system of landscape orientation.

To provide a comprehensive overview of the landscape and its defining features, a large scale model of the Arboretum will greet visitors at the center of our exhibit room. The model will be supplemented with a short video film and a new map, as well as a system of signage on the grounds. Additional interpretive exhibitry will focus on the themes of plant exploration, collections for scientific research, the design of the landscape, and the story of the Arboretum as a cultural institution in Boston. We anticipate opening this project to the public in the autumn of 1995.

Our quarterly journal, *Arnoldia*, is also a very important vehicle for informing our members about the living collections. Last year we published 21 articles and book reviews totaling 200 pages with such titles as:

- Stone Magnolias
- Sustainable Trees for Sustainable Cities
- Willows: the Genus *Salix* (a review)
- Introducing *Weigela subsessilis*
- Restoring the Harvard Yard Landscape
- Punctuating the Skyline: Alternatives to the Lombardy Poplar

Volunteers

Individuals who dedicate their time to support Arboretum programs make a tremendous contribution to our success. Over 5,500 hours of work were given by 114 volunteers last year, ranging from service on our plant information phone line to mounting herbarium specimens. A team of volunteers worked with our curatorial associate, Susan Kelley, and contributed immensely to the curation of our living collections by field checking individual plants and collecting herbarium specimens. On behalf of Susan and our entire Living Collections staff, I want to thank



Amy L. C. Wilson

Leading a tour of the Arboretum, Michael Dirr of the University of Georgia highlights outstanding ornamental plants. He's seen here with long-time volunteer guide Al Bussewitz.

especially Ann Gamble, Mary Harrison, Sheila Magullion, Bob Reynolds, and Mima Weissman.

ADMINISTRATION AND DEVELOPMENT

Facilities

Over the course of the past year, our staff has adapted to and begun to enjoy the newly renovated spaces of the Hunnewell Building. Despite a few problems that surfaced during this process, the renovation has been universally judged an immense success. Testament to this came when the Hunnewell Building received a Preservation Award from the Boston Preservation Alliance. The new, more accessible front entrance and landscape designed by Carol R. Johnson Associates, Inc., was also given two awards, an Honorable Mention from the Boston Society of Architects and the Urban Landscape Award of the Massachusetts Horticultural Society.

A major challenge was presented by the need to reshelve our herbarium and library collections, which are critical for the work of the Living Collections department. Our entire library holdings underwent reorganization and a complete shelf reading by staff and volunteers to ensure that each monograph and journal was in the proper sequence and location.

The Arboretum experienced a number of additional expenditures associated with the renovation, including interior signage, computer network equipment, and office furnishings. With all expenses combined, the renovation cost \$3,973,293. In April we borrowed \$3,000,000 from the University for twenty years at a fixed rate of 8.5%. Our annual payment will be \$312,416 until we are able to retire this debt through Campaign contributions.

Finances

The Arboretum's financial condition continues to be strong. In this year's Summary of Operations, I have separately identified our new expense item, Debt Payment, to distinguish it from ongoing operational expenses and to highlight its impact on the deficit. Because our loan from the University was issued late in the fiscal year, this repayment expense was relatively small; as noted above, it will be over \$312,000 next year.

<i>Summary of Operations</i>			
	FY 1992	FY 1993	FY 1994
INCOME			
Endowments	2,718,957	3,039,819	3,210,132
Membership/Gifts	431,312	240,611	260,043
Enterprise	318,483	178,155	195,096
Grants	535,230	540,760	669,367
Education/Publications	249,553	103,784	114,058
TOTAL INCOME	4,253,535	4,103,129	4,448,697
EXPENSES			
Salaries	2,255,426	2,240,783	2,593,398
Supplies/Equipment	665,530	442,558	587,524
Facilities/Operations	287,734	516,796	478,220
Services	627,539	689,467	695,373
Travel	73,581	158,837	118,947
TOTAL EXPENSES	3,909,810	4,048,441	4,473,461
EXCESSES (LOSSES)			
Unrestricted Excess (Loss)	81,719	82,762	15,045
Restricted Excess (Loss)	262,004	(28,074)	(39,810)
Operating Excess (Loss)	343,723	54,688	(24,765)
Debt Payment			52,069
TOTAL EXCESS (LOSS)	343,723	54,688	(76,834)
TOTAL FUND BALANCES	1,656,221	1,650,630	1,761,322

Largely as a consequence of this item, the overall balance this year was in deficit by the amount of \$76,834. However, our Total Fund Balances increased by \$110,692 to \$1,761,322. In addition, we added \$625,620 to our endowment.

As can be seen from this summary, all sources of income began to increase following the renovation. Expenditures in salaries, supplies, and equipment also increased as new staff were hired and the full business of the institution was resumed.

A particularly significant increase in income is shown in the category labelled Grants. It reflects our success in submitting competitive, peer-reviewed proposals to federal agencies. Such federal grants all receive administrative oversight by the University's Office of Sponsored Research. Not included in this category are foundation grants, which generally fall outside the purview of this Office and are therefore included under the category Membership/Gifts. Much of the change in this latter category between FY1992 and FY1993 reflects a strategy to shift funding of certain projects, such as the Children's Education

<i>Grant Support From Federal Agencies</i>				
	1989-1992	1992-1994	1994-1996	TOTAL
Department of Education	0	73,254	0	73,254
Institute of Museum Services	300,000	25,000	0	325,000
National Cancer Institute	143,462	357,589	0	501,051
National Endowment for the Arts	0	40,000	25,000	65,000
National Endowment for the Humanities	0	199,507	200,000	399,507
National Park Service	76,200	193,463	96,250	365,913
National Science Foundation	275,360	591,479	1,682,669	2,549,508
U.S. Agency for International Development	147,730	165,344	0	313,074
The World Bank	0	200,916	2,375,103	2,576,019
TOTAL	942,752	1,846,552	4,379,422	7,168,326

Spring's harbingers are found underfoot in the Arboretum as well as overhead. *Symplocarpus foetidus* (skunk cabbage) is one of the earliest.



Margot Balboni

program, from foundations to federal agency sources. The table on the preceding page provides a five-year listing of federal grant funds that we have received from federal or state government agencies. They are the best measure available of our peers' judgment of our work.

Development

Last year we renewed our efforts to increase the number of Friends of the Arboretum, and this has begun to yield results. The number of members now stands at 2,826, an increase of nearly six percent over the previous year. We added 334 new members, and our renewal rate for standing members has remained steady at 75% for the past three years. The increase in membership can be partly attributed to an attractive new brochure that we sent to all lapsed members last summer. We plan a similar mailing this spring to prospective new members.

Anticipating the participation of the Arboretum in the University Campaign, we created a formal development program last year by hiring a Development Director and an associate Development Officer. These new staff members have devoted much of the past year to expanding our base of knowledge about Campaign prospects and positioning the Arboretum within the larger campaign strategy of the University. On May 14, 1994, we participated in the kickoff ceremonies

for the University's campaign, at which time the University Campaign Case Statement was distributed. For the occasion, we created a special insert for the Harvard University *Gazette* that articulated a vision of the Arboretum for the new century. Entitled "A New Relevancy," it stated in part:

Today the institution faces a new challenge. . . . Much more than in the past, [our] resources are being asked to address urgent social, economic, and international issues through direct service to society. The Arboretum has heard this call, and we are in a unique position to respond. On one hand, as part of Harvard University, we curate the collections and cultivate the knowledge that will be required for the resolution of pressing problems. On the other hand, as part of the urban fabric of Boston, we experience an added obligation to transform this knowledge into service for the community around us Because this service to society is an amplification of our historical mission, it places new demands on our financial resources. We must continue our traditional role of curating our collections and fostering scholarship. At the same time we must confront a challenge . . . [H]ow can we ensure that our present commitment to apply our knowledge to urgent societal problems will not erode in the face of future financial pressures? The Arboretum Campaign calls forth the confidence and support of our friends to invest in the future of our augmented mission. At a time when our children and our world look to us for leadership, the challenge is clear and our obligation unambiguous. With [your] help, we shall meet this challenge again.



Robert E. Cook, Director

1 February 1995



Flowering dogwood (*Cornus florida*) and *Rhododendron vaseyi* in flower in the North Woods.

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J. H. ALEXANDER

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Rácz & Debreczy



A path through the maple (*Acer*) collection.

STAFF OF THE ARNOLD ARBORETUM*

ADMINISTRATION

Rose Balan, *Receptionist*
Donna Barrett, *Accounting Assistant*
Kenneth Clarke, *Custodian*
Sheila Connor, *Facilities Manager*
(*appointed 7/1/93*)
Robert Cook, *Director, Arnold Professor*
Frances Maguire, *Assistant Director for Administration*
Patricia Marinick, *Receptionist (left 10/29/93)*
Steven Nelson, *Development Director*
(*appointed 12/6/93*)
David Sieks, *Staff Assistant, Membership*

HERBARIUM

David Boufford, *Assistant Director for Collections, HUH*
Susan Hardy Brown, *Curatorial Assistant*
(*upgrade 8/1/93*)
Linda Fahey, *Curatorial Assistant*
(*left 8/27/93*)
Paul Groff, *Curatorial Assistant*
(*hired 12/15/93*)
Carolyn Hesterberg, *Secretary*
Pamela White, *Curatorial Assistant*
Emily Wood, *Manager of Systematic Collections*

LIBRARY

Jennifer Brown, *Library Assistant*
(*hired 11/29/93*)
Sheila Connor, *Horticultural Research Archivist*
Kimberly Crandall, *Library Assistant*
Elzbieta Ekiert, *Librarian (upgrade 7/1/93)*
Karen Kane, *Library Assistant (left 10/29/93)*
Judith Warnement, *Librarian*

LIVING COLLECTIONS

John Alexander, *Chief Plant Propagator*
Phyllis Andersen, *Landscape Historian*
Kristin Claeys, *Landscape Preservation Field Assistant (hired 11/1/93)*
Luis Colon, *Grounds Staff*

Julie Coop, *Assistant Superintendent of Grounds*
Peter Del Tredici, *Assistant Director for Living Collections*
John DelRosso, *Arborist (hired 12/6/93)*
John Evers, *Apprentice (9/7/93–11/24/93)*
Robert Famiglietti, *Grounds Staff*
Donald Garrick, *Grounds Staff*
David Giblin, *Curatorial Assistant*
(*hired 10/18/93*)
Michael Gormley, *Grounds Staff*
Dennis Harris, *Grounds Staff*
Karlton Holmes, *Grounds Staff*
Susan Kelley, *Curatorial Associate*
Gary Koller, *Senior Horticulturist*
Joan Mullins-Mason, *Apprentice*
(*10/1/93–5/19/94*)
David Moran, *Arborist (left 8/27/93)*
Bruce Munch, *Grounds Staff*
James Nickerson, *Grounds Staff*
John Olmsted, *Head Arborist*
James Papargiris, *Grounds Staff*
Jennifer Quigley, *Curatorial Associate*
(*died 3/30/93*)
Maurice Sheehan, *Grounds Staff, Working Foreman*
Stephen Spongberg, *Horticultural Taxonomist*
Mark Walkama, *Grounds Staff*
Thomas Ward, *Greenhouse Manager and Propagator*
Patrick Willoughby, *Superintendent of Grounds*

PUBLIC PROGRAMS

Sheila Baskin, *Secretary (hired 1/10/94)*
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Annette Huddle, *Children's Program Assistant*
Karen Madsen, *Editor of Arnoldia*
Marcia Mitchell, *Adult Education Manager*
Richard Schulhof, *Assistant Director for Education and Public Affairs*
Chris Strand, *Outreach Horticulturist*
(*appointed 7/12/93*)

* 1 July 1993 through 30 June 1994

Diane Syverson, *Children's Program
Coordinator*

Pamela Thompson, *Staff Assistant, Education*

RESEARCH

Peter Ashton, *Charles Bullard Professor of
Forestry*

James Beach, *Manager of Biological Database
Systems*

John Burley, *Research Director*

Alison Church, *Research Assistant
(upgrade 1/16/94)*

Noel Cross, *Microcomputer Systems Specialist
(left 1/25/94)*

James Jarvie, *Research Associate*

Joseph Laferriere, *Research Associate
(left 12/31/93)*

James LaFrankie, *Research Coordinator*

J. Andrew McDonald, *Research Associate*

Cheryl Murphy, *Administrative Assistant*

Margaret Stern, *Research Associate*

Peter Stevens, *Professor of Biology*

Kim Tripp, *Putnam Fellow (appointed 2/21/94)*

RESEARCH AFFILIATES

Niranjala D. De Zoysa, *Arnold Arboretum
Associate*

John Freudenstein, *Mercer Fellow
(appointed 12/16/93)*

C. V. Savitri Gunatilleke, *Arnold Arboretum
Associate (ended 8/31/93)*

I. A. U. Nimal Gunatilleke, *Arnold Arbore-
tum Associate (ended 8/31/93)*

Richard Howard, *Professor of Dendrology,
emeritus*

Ida Hay, *Arnold Arboretum Associate
(appointed 9/1/93)*

Shiu-Ying Hu, *Botanist, emerita*

Candace Julyan, *Arnold Arboretum Associate
(appointed 11/1/93)*

Zack Murrell, *Arnold Arboretum Associate
(appointed 6/1/94)*

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Jun Wen, *Arnold Arboretum Associate
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