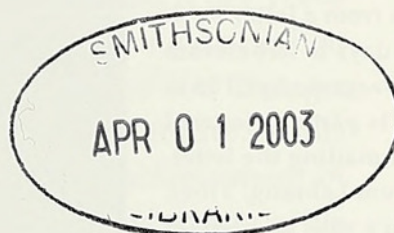


The Arnold Arboretum

DIRECTOR'S REPORT 1999-2002

Robert E. Cook, Director



ARNOLDIA • VOLUME 62 • NUMBER 1

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In October 1999, the Arboretum Library was awarded a grant from the Harvard University Library Digital Initiative to digitize images, letters, and maps from both historical and contemporary plant-collecting expeditions to China and Tibet. Included are the 1997, 1998, and 2000 expeditions led by David E. Boufford to China's Hengduan Mountains Region (see <http://maen.huh.harvard.edu:8080/china>) and the Arboretum's 1924-1927 expedition to China and Tibet (see <http://oasis.harvard.edu/ajp.html>) led by Joseph F. Rock, photographed here in Tibetan dress.



Joseph F. Rock, Archives of the Arnold Arboretum

Sheet 2

Apr 29, 1926

which could not be carried by the mules I sent in 18 Yak carts from Chouin to Old City Taochan. There we tied everything on to the waiting 17 mules, and on the 24th we left Taochan for Labrang via Ankor, Hetao, & Rongwar. 5 stages from Chouin to Labrang. We are now repacking everything once more as the Yaks can carry only about 2/3 of what a mule can carry. Each Yak will carry 150 catties, we have engaged 60 Yaks. We are

The excerpt above is from a letter Rock wrote over several days to Arboretum director Charles S. Sargent, April 26 to May 4, 1926. Below is part of a journal entry made after mailing the letter.

He wrote both from Labrang, Tibet, where the expedition's yaks and horses were assembled (top right).

Today as I sit alone in the mission room, the clock ticking away, no other sound audible, I feel oppressed and lonely; as I sent my last letter to Prof. Sargent, I held it in my hand and thought: fortunate piece of paper, I wish I could join you, whither thou goest there is comfort, here bleakness, a raw climate, if not snowing or raining a gale of dust blows, and west of here the country is still less hospitable as one is open to attacks by bandits and roving nomads.



Archives of the Arnold Arboretum

[T]he Arboretum . . . should be a center of dendrological investigation and research.

— Charles Sprague Sargent, Letter to the Corporation, Harvard University, 1879

However, [the Arnold Arboretum] does not serve merely as a plant collection of high horticultural merit and a fine public amenity; it has an international reputation as a university institution for research and education.

— Peter Shaw Ashton, A Message from the New Director, *Arnoldia* (1979) 39(3): 67

What is the Arnold Arboretum and what should it be? These questions featured prominently in the yearlong discussion that produced a document called "A Time for Change: A Plan for the Arnold Arboretum's Next Quarter Century." This document, perhaps the Arboretum's most important achievement of the past three years, outlines a long-range plan that by virtue of its significance will be the primary focus of this report. Other accomplishments since my last report, for the fiscal years 1997–1999, include the successful completion of a ten-million-dollar fundraising campaign, the initiation of several major capital projects on the grounds, and the construction of a three-million-dollar garden for a collection of sun-loving shrubs and vines.

The long-range plan responds to two major challenges that confront the organization at the turn of the new century. First, for a growing number of individuals, education is increasingly seen as an activity to be continued throughout one's life, building on the foundation established during one's youth and reflecting the changes in values that often accompany middle age. The Arboretum possesses unique resources with which to address this need.

Second, although scientific research was central to the Arboretum's original mission, changes in our research activity in recent years portend

a long-term decline. Without concerted action, the Arboretum's reputation as a scientific institution could be greatly diminished and its standing within Harvard University and among its peer organizations compromised.

I have therefore chosen to write as much about the future in this report as about the accomplishments of the past three years. "A Time for Change" will be cited again and again as the foundation for new initiatives that will transform the institution and allow it to meet the challenges of this new century. We are a strong, confident organization, dedicated to a mission begun 130 years ago, but we must build on this strength with new energy to ensure the future significance of our work.

LIVING COLLECTIONS

Between July 1, 1999, and June 30, 2002, 509 accessions totaling 916 plants were added to the permanent collections; of these, 76 were taxa new to the Arboretum. At the end of June, the collections included 14,734 plants belonging to 4,345 taxa: 1,930 species, 557 infraspecific taxa, 1,598 cultivars, and 260 hybrids.

Five years ago the Arboretum began a series of landscape construction projects that have now been completed. Beginning with the restoration of Peters Hill in 1998, these projects also include a pedestrian pathway through a wetland recently added to the Arboretum's leaseholdings with the City of Boston; gate restoration and other improvements on Bussey Street; and a four-acre facility for a sun-loving

shrub and vine collection, now named the M. Victor and Frances Leventritt Garden. Smaller projects, undertaken in collaboration with the Boston Water and Sewer Department, have begun to address long-standing drainage problems on the grounds.

The "Blackwell Footpath," formally dedicated in May 2002, recognizes the work of John Blackwell, whose patient efforts resulted in the addition of 25 acres

The Blackwell Footpath,
a new route from the
Forest Hills train station
to the Arboretum.



Phyllis Andersen

of degraded wetland to the Arboretum. Last winter we initiated projects to restore the site's natural character and enhance its educational value.

The Leventritt Garden, sponsored in memory of M. Victor Leventritt (Harvard Class of 1935) by his wife Frances and his son Daniel, was dedicated in early September 2002. The completion of construction will be followed over the next two or three years by extensive plantings of shrubs, vines, and small trees. The garden's many significant features include beautifully crafted stone-walls that define a series of terraces containing planting beds, and a wood-covered steel pavilion that overlooks a sweeping central lawn bisecting the terraces. The collections in this garden will constitute a major resource for our teaching and professional programs in the future.

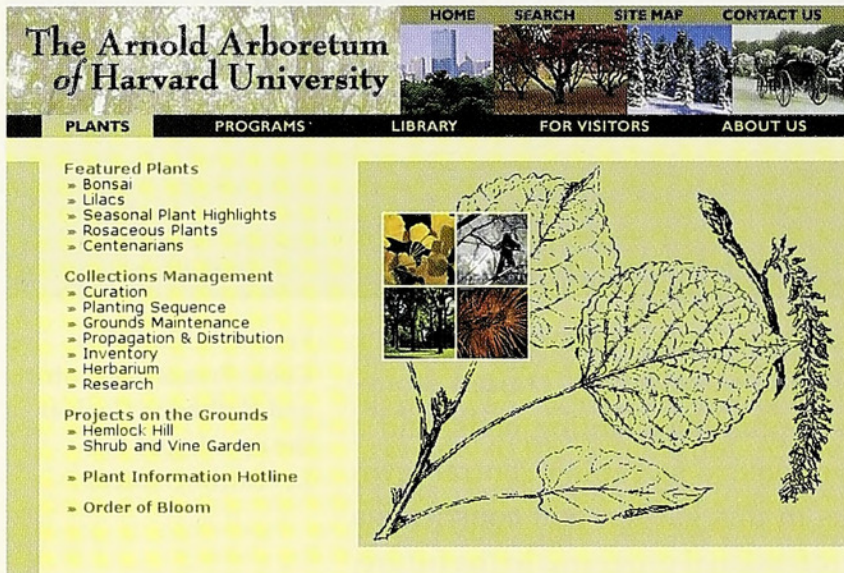
The Landscape System

For much of its history, the Arboretum has focused most of its curatorial energy 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. Yet these specimens grow in a landscape system whose infrastructure—both natural and manmade—support their survival and enhance the appreciation of our visitors. The most important natural elements in this system are the hydrology (the movement of water by rainfall, stream flow, irrigation, plant transpiration, evaporation) and the soils, with their differing nutrient and water retention qualities. Other natural elements, such as the topographic diversity and the many rock outcrops and boulders, give shape and add geological interest to the landscape. However, most of the infrastructure is manmade: the stonewalls; the roadways, gateways, and footpaths; visitor amenities such as benches, signage, and water fountains; and the diverse patterns of growing plants that reflect the cumulative decisions of the horticulturists who have chosen locations for each individual.



From left, Christina Cook, Frances Leventritt, and Katherine Cook at the opening of the Leventritt Garden.

After careful consideration during the long-range planning process, we concluded that our historical emphasis on curating individual specimens needs to be balanced with increased attention to the overall landscape system that sustains the collections and shapes the experience of our visitors. Our stewardship will be enhanced through two initiatives. First, we will establish a program of environmental monitoring to



A page from the Arboretum's newly redesigned website: <http://arboretum.harvard.edu/>

document natural variations in ecological processes that affect the collections. This data can guide decisions about maintenance practices, restoration and repair priorities, and planting plans. It will also provide a foundation for research projects involving the living collections and related ecological elements.

A second initiative will undertake needed improvements to our physical infrastructure, an

issue that is complicated by the historical responsibility of the City of Boston for maintaining certain elements (stonewalls, gates, roads, benches) that are used by the public. The reaction of visitors to our landscape is unfavorably influenced by infrastructural elements that are inadequately maintained. This is especially true at the Arboretum's boundaries, where the physical infrastructure dominates the face that we present to our neighbors.

To address this problem, we will conduct a comprehensive inventory of all infrastructural elements and each one's contribution to the public's image of the Arboretum. With this inventory in hand, we will review with the City of Boston the responsibilities for maintenance and repair and draw up a long-term plan for restoration.

RESEARCH

"A Time for Change" calls for a major investment in research over the next decade. This recommendation grew out of a historical analysis of research at the Arboretum* and a concern about the sustainability of our reputation as a scientific institution if no new actions are taken. As

* "A Brief History of Scientific Research at the Arnold Arboretum," prepared by Robert E. Cook for the Long-Range Planning Committee, January 15, 2002.

implied by the quotations at the start of this report, it involves issues that are central to our mission and the identity of the institution.

For Charles Sprague Sargent, our first director, and for each of the directors who followed, the Arnold Arboretum was fundamentally and unambiguously a research institution even though its grounds were open to the public as part of the Boston system of parks. Scientists on the Arboretum's staff used the collections for their research and enjoyed reputations within their peer community commensurate with their positions at a major research institution managed by Harvard University. One measure of the Arboretum's stature was the number of the published writings listed in the director's report. Most of these writings were by Harvard faculty members who held appointments on the Arboretum staff; their salary was paid with income from our endowment under the supervision of the dean of the Faculty of Arts and Sciences (FAS), who also appointed the director. As research faculty these staff members applied for peer-reviewed grants from federal agencies that awarded funds to support research, including the costs of graduate students and postdoctoral fellows.

Over the past half century, this picture of the Arboretum has slowly changed to an extent that one must ask: Is the Arnold Arboretum still primarily a research institution? I believe the answer is no. Today it operates largely as a curatorial and educational organization whose collections, particularly its living collection of woody plants, provide material for research conducted by individuals who are not staff members. Professors are no longer on the staff, and critical elements of infrastructure required by research (laboratories, herbarium collections, library collections) are no longer under the control of the director. Only a handful of our staff members would claim expertise in research; most are curators, educators, or administrators. While our curators maintain the collections in an exceptional state of curation, only a few conduct research that is supported by grants and that yields peer-reviewed publications.

A Short History

The current situation has its historical roots in three critical junctures in the past. First, in the decade following Sargent's death in 1927, botanical research at the Arboretum shifted its focus from investigations of temperate species to the richer and largely unknown floras of tropical regions. Since tropical plants cannot be grown in the open air in Boston,

such research was necessarily based on fieldwork and on the extensive collection of dried specimens in the herbarium. At the same time, in 1935, Donald Wyman was appointed staff horticulturist. His prolific writings about the living collections began to transform the Arboretum's identity as a resource for botanical research into that of a display collection and a source of horticultural information for the general public. This diminished the perceived value of the living collections for botanical research.

A second critical junction occurred in 1954 when the bulk of the library and herbarium holdings of the Arboretum (at the time referred to as "the research collections") was transferred from Jamaica Plain to Cambridge. This move was vigorously but unsuccessfully opposed by the many friends of the Arboretum who believed that it violated the intentions of Sargent and of the trustees who had originally established the Arboretum through an endowment gift to Harvard University. Over time, these collections have become fully integrated into a unified library and herbarium within the Harvard University Herbaria (HUH). It is within this facility that the Faculty of Arts and Sciences has constructed modern research laboratories for its professorial appointments.

The final juncture occurred in 1988. Following an extensive review of the Arboretum's mission, the Harvard Corporation approved the administrative transfer of the Arboretum from FAS to the central administration of the University under the office of the Vice President for Administration. Concurrent with this transfer, the Corporation decided that any future professorial appointments in FAS should no longer draw salary from the Arboretum's endowment income. Consequently the Arboretum would no longer have professors on staff once current commitments ended. In addition, the director would be an administrative, not professorial, appointment beginning in 1989. These decisions reflected an implicit judgment about the declining value of the living collections in Jamaica Plain for research by FAS faculty and students, and the conclusion that the important "research collections" in Cambridge were effectively under FAS control.

Where We Find Ourselves Now

At Harvard, it is usually professors, rather than administrators, who define the nature of research projects because it is they who are able to compete successfully for large federal grants and attract students and

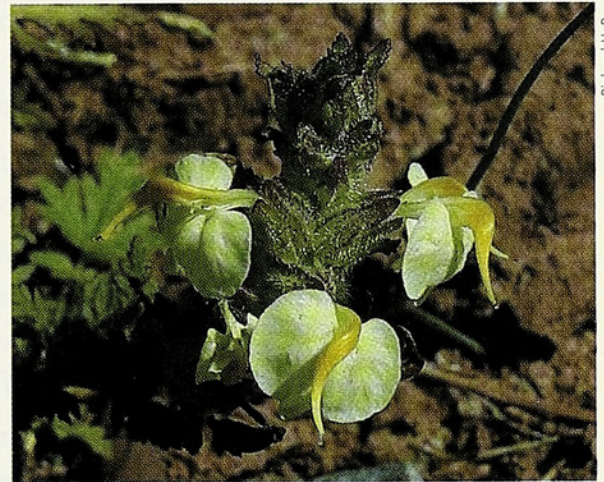
research fellows. The resulting research is published in journals and books after rigorous review by peer researchers. Over many years the Arboretum's reputation as a scientific institution was largely built by professors on staff, along with their students, research fellows, and collaborators. With the departure of Professor Peter Stevens, who left Harvard in 1999, and the retirements of Professors Carroll Wood, Richard Howard, and Peter Ashton in the last decade, the Arboretum no longer employs research professors.

To complicate matters further, HUH is itself undergoing significant change. The last decade has seen the departure of several important members of the botanical faculty with whom we collaborated. Having no voice in their replacement, the Arboretum will be greatly challenged to establish successful new collaborations. Even the Arboretum's future access to the laboratory facilities housed in HUH is uncertain. As part of a larger plan for the future of science at Harvard, the collections and laboratories housed in HUH are to be relocated to a new facility where research space for professorial appointments is at a premium; the 50-year-old herbarium building will then be torn down. Since research space in the new building will be limited and allocated preferentially to Harvard faculty, the Arboretum may no longer have access to the collections and laboratories housed in HUH; in that case, the Arboretum's connection to professorial research interests may be completely severed.

The problem created by these changes are demonstrated by our most recent list of published writings. The last director's report identified 102 publications for the two-year period between July 1997 and June 1999. The research described in the majority of these papers was conducted by individuals whose offices and laboratories were located in the HUH building in Cambridge, a building now managed by FAS under its own director rather than by the Arboretum. Over half of these publications were authored by faculty members who have left (or soon will) or by their students and research fellows.



David E. Boufford



Richard H. Ree



David E. Boufford

From top to bottom, *Corydalis* sp., *Pedicularis scolopax*, *Dracocephalum bullatum*, inventoried on the 2000 field trip to China's Hengduan Mountains (<http://www.huh.harvard.edu/research/china/China.html>).

In summary, then, the loss of faculty as staff members, the transfer of the Arboretum to the central administration, and the uncertainties of research facilities associated with HUH in Cambridge all threaten our future as a scientific institution. Major investments in research activities are required to counteract this threat. We will probably need to establish strategic collaborations with new professors at the University and with researchers elsewhere. We may need to create independent research facilities under Arboretum management. And we will undoubtedly need to continue conversations with FAS regarding the future of our library and herbarium collections in HUH.

Research Renewed

Overcoming the challenges described above will require administrative and political assistance from our colleagues in the central administration and in the Faculty of Arts and Sciences. The long-range plan calls for the development of new research initiatives that hold the promise of securing peer-reviewed grant funding. Three particular opportunities have been identified.

- First, the Arboretum, with its exceptional living collection of trees, can become the center of a multi-institutional program to examine the changes in diversity and distribution of North Temperate floras that have occurred in response to the movement of continents and changes in climate around the globe. This initiative would use modern phylogenetic systematics, paleobotany, and comparative reproductive ecology to analyze the species distribution patterns of today and the probable patterns of the past. The Arboretum's longstanding interest in the flora of temperate east Asia and its relationship to the flora of eastern North America make this research program particularly appropriate for Arboretum leadership.
- A second opportunity builds on the studies of Asian tropical forests begun by E. D. Merrill in the 1930s and expanded by my predecessor, Peter Ashton, in partnership with the Smithsonian Tropical Research Institute. Designed to increase our understanding of tropical forest dynamics, this research is based on multiple demographic censuses of all the trees that are in 50-hectare (124-acre) plots in the forests of five different countries of Southeast Asia. By forming a strong collaboration with the Smithsonian Institution, we will ensure continued support

for this important, long-term ecological research program.

- Finally, the size and diversity of specimens in our living collections make the Arboretum an excellent site for collaborative research with new faculty at Harvard on the comparative physiology and development of woody plants. Of particular interest would be studies of the leaf and canopy development that leads to the distinctive architectures of different tree species and the diverse patterns of greening seen each spring.

To encourage these new initiatives and provide additional administrative support, the Arboretum implemented a number of organizational changes as of July 1, 2002.

- A new research department has been created and will be led by a director to be appointed at a later date. This department will become one of four forming a restructured organization chart (see page 14).
- The Institute for Cultural Landscape Studies and the membership department will be merged with the education department to form a new public and professional programs department, as described below.
- A newly created position of deputy director has been filled by Richard Schulhof, recently director of Descanso Gardens in Los Angeles and formerly a Putnam Fellow and director of education and public affairs at the Arboretum. He assumed the position in September 2002. For the foreseeable future, the deputy director will also serve as the director of public and professional programs.

Additional organizational changes to be undertaken over the coming years include the following:

- We will review our collections policy to determine whether modifications are needed for the collections to play a greater role in future research programs.
- We will evaluate the potential of existing staff positions to contribute to ongoing and new research. I also anticipate that new positions dedicated to research will be created.



Peter S. Ashton

Inventorying plants in Lambir Hills National Park, Sarawak, possibly the world's most species-rich forest.

- Finally, new research initiatives will likely require new facilities to provide space for laboratories, offices, and meetings.

The personal research activities of existing staff members continue to make contributions to the institution's reputation (see Staff Publications on page 27). The development of new research programs promises to create even greater opportunities for such contributions.

PUBLIC AND PROFESSIONAL PROGRAMS

Throughout most of its history the Arboretum has engaged in educational activities that serve the public directly. In 1891 the plantsman J. G. Jack first began to provide public lectures, largely attended by schoolteachers, using the living collections and grounds of the Arboretum. For a decade beginning in 1888 C. S. Sargent published *Garden and Forest: An Illustrated Weekly Journal of Horticulture, Landscape Art and Forestry*; this was followed by the *Bulletin of Popular Information* (1911) and *Arnoldia* (1941). In the 1990s, the Arboretum began publishing information on its own internet website and on that of the Institute for Cultural Landscape Studies.

These publications bring high-quality botanical and horticultural information to our friends and supporters, with the costs largely borne by the institution. Ever since the Hunnewell Building opened in 1892, the Arboretum's exceptional library collections have also been available without cost to the public. Perhaps our greatest contribution has resulted from the generous willingness of the Arboretum's staff to answer queries from individuals interested in learning about trees.

During its first century, the Arboretum's educational activities were an adjunct to the primary work of research. Staff members were hired to curate collections, conduct scientific studies, and publish technical articles that were largely intended for other scientists; they were also asked to create lectures and publications for popular audiences. With the approach of the centennial in 1972, the Arboretum began hiring nonresearch professionals whose training and experience were appropriate for managing full-fledged programs in public relations, membership services, adult education, popular horticultural information, and children's programs. Research staff, always protective of their research time, were now free to moderate their public service contributions and spend more time curating their collections.

These many educational endeavors grew into programs in a relatively independent and self-defined way. The number of educational and public service staff has continued to grow over the past three decades. Today the Arboretum engages in a broad range of activities that serve multiple constituencies in diverse ways:

- Education programs for children, adults, teachers, docents, and interns
- Teaching in Harvard's professional schools (education, design)
- Lectures, symposia, and roundtables (Institute for Cultural Landscape Studies, Landscape Design Program)
- Publications (*Arnoldia*, internet website, brochures, maps)
- Membership events and benefits (plant sale, plant dividends)
- Public events and exhibits (Lilac Sunday, New England Flower Show)
- Visitor's Center exhibit, bookshop, and information desk
- Interpretive signage and labels
- Tours

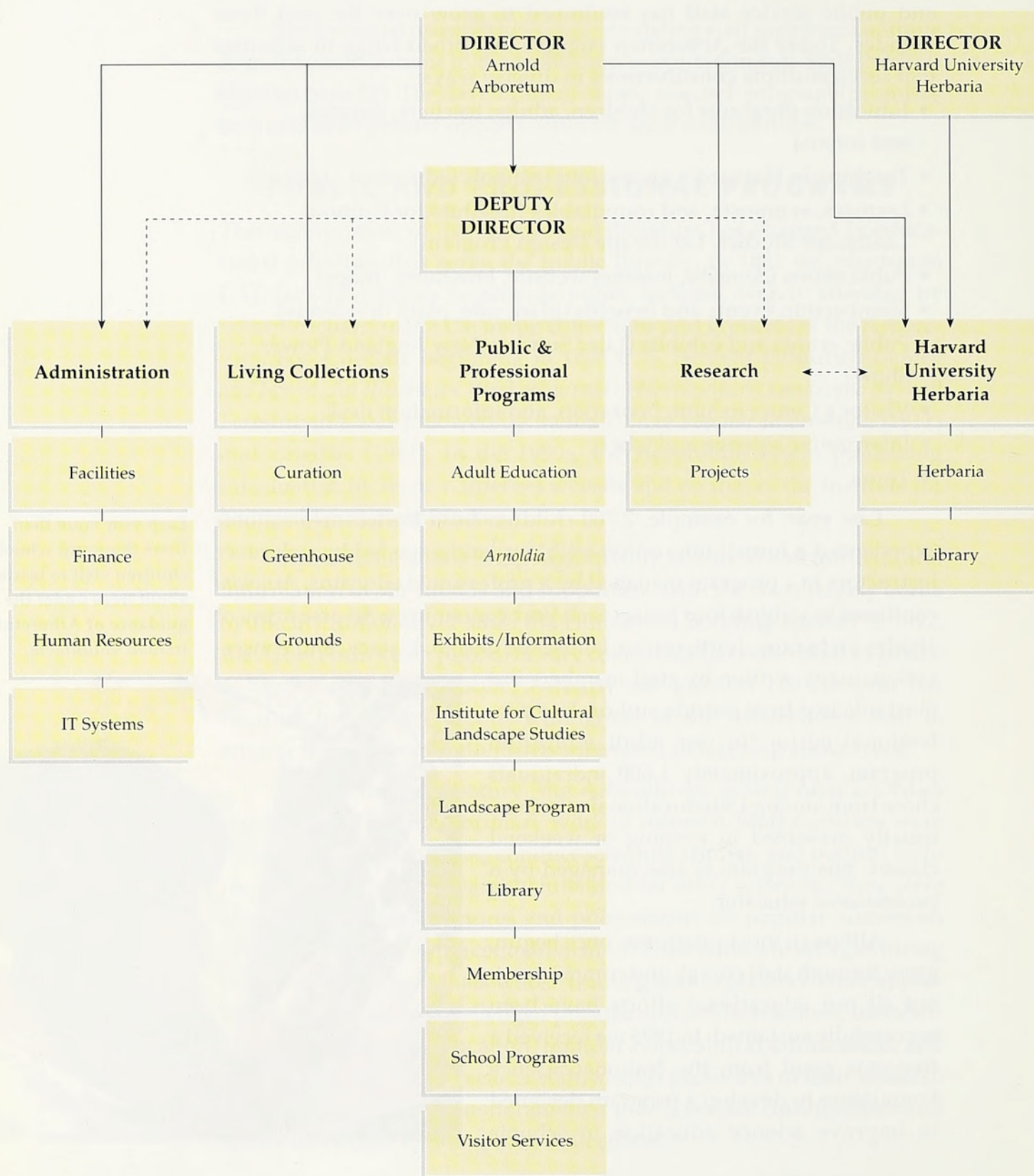
Last year, for example, 2,700 children from Boston area schools experienced a formal interaction with our landscape led by volunteer instructors in a program managed by a professional educator. *Arnoldia* continues to publish four issues each year containing a diverse array of articles on botany, horticulture, landscape design, history, and conservation, many written by staff members but most solicited from outside authors by a professional editor. In our adult education program, approximately 1,600 individuals chose from among 150 educational offerings, usually presented in evening or weekend classes; this program is also managed by a professional educator.

Although most programs, once begun, grow through staff energy and commitment, not all our educational efforts have been successfully sustained. In 1995 we received a five-year grant from the National Science Foundation to develop a program designed to improve science education in schools

Each year more than three thousand school-children visit to learn about trees under the guidance of Arboretum-trained volunteers.



Arnold Arboretum Organizational Chart



through new computer technology and teacher training (see the discussion of the Community Science Connection in my last director's report). We learned a great deal from the experience; but the program did not receive the favorable peer reviews required for renewed funding in 2001; and it failed to produce any peer-reviewed publications. Last year we closed down its website, and we are re-evaluating our commitment to research on science education in the schools.

The long-range planning process of the past year raised a number of questions about our educational activities and our services to the public.

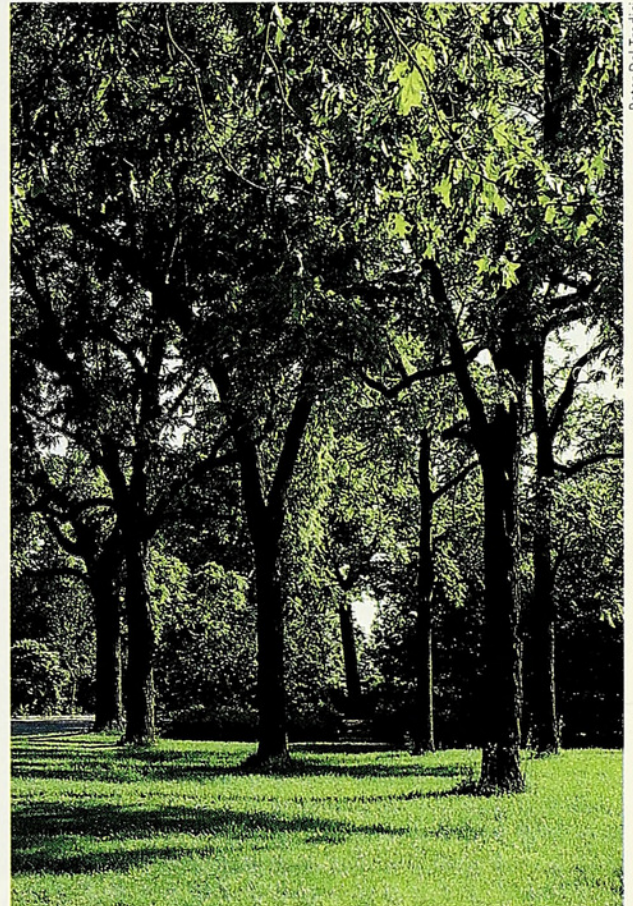
- Is education an important part of our mission and how should it relate to research?
- How do we balance the allocation of resources for education with our commitment to the collections and to scientific research?
- What goals should we establish for educational programs and public service?
- Should these diverse activities represent a more unified, coherent approach to achieving defined educational objectives?

These questions were not completely answered in the planning process. Education, including public education and related support services, is clearly an important part of our mission. Less clear is the philosophy that guides our educational efforts and prioritizes the allocation of resources.

Nor are we clear about who we should be educating and how this can be accomplished efficiently. As a consequence, the long-range plan has initiated a continuing review of all educational and public service activities under the management of the new deputy director.

The Landscape Design Program

In the midst of our planning, an opportunity appeared that promised to answer some of these challenging questions. In 1999 Radcliffe College merged with Harvard University to become the Radcliffe Institute for Advanced Studies. The Institute's mission focuses its resources on postgraduate research in a wide array of scholarly fields and away from the set of traditional educational programs called the Radcliffe Semi-



Black walnuts, *Juglans nigra*, between Valley Road and Oak Path.

Peter Del Tredici



Working foreman
Maurice Sheehan
spreading compost in
the oak collection.

and land-use planning. Wishing to place the program in a setting that would sustain its excellence, the Radcliffe Institute suggested in the fall of 2001 that the Arboretum undertake its management. The offer required an immediate decision. In December the Arboretum accepted responsibility for the landscape design program, and it, along with its director, were officially transferred to us on July 1, 2002.

Although the Arboretum has never offered a formal degree, it has a long history of support for education in the fields of landscape design and planning. C. S. Sargent worked closely with Frederick Law Olmsted, the father of landscape architecture, on the design of the Arboretum and encouraged professional training in "landscape art" throughout his life. The decision to transfer the landscape design program presented the long-range planning committee with the question of how it might fit with the array of other educational activities we currently offer. At the same time, it presented an opportunity to use this professional program as a guide to organize and unify our overall approach to education and public service.

The Creation of a "Professional School"

Out of this opportunity has evolved the concept of a professional school with the landscape design program at its center. This will not be a formal, degree-granting school in the sense of Harvard's School of Public Health, but rather an institution—unified by its educational philosophy and the content of its curriculum—that provides advanced education to diverse audiences. The term *professional school* reflects a

nars. One of its programs offered an advanced certificate in landscape design and landscape design history. Over the thirty-four years since its creation in 1968, this program has acquired a national reputation for excellence, particularly in the last twenty years under the leadership of John Furlong. Many of its graduates have developed professional careers in landscape design

commitment to intellectual rigor based on scholarship and a disciplined approach to learning, qualities usually associated with professional degree-granting organizations. At the same time it acknowledges the educational value of the practitioner who also teaches.

During the past year we have been preparing for the transfer of the landscape design program and the creation of the professional school. We have developed new software to manage the registration of students, and we have conducted a marketing survey among alumni and students to gain insight into the factors that have led to the program's success. We have also begun preliminary planning for the facilities that will be required to accommodate the program's students in the future.

In the coming year we will focus on integrating three Arboretum programs in accordance with our concept of a professional school.

- We will review the class offerings of our highly successful adult education program to establish the most appropriate relationship between those classes and the courses of the landscape design program.

- We will also review the mission of the Institute for Cultural Landscape Studies in light of our plans for a professional school. Over the past three years, the Institute has steadily expanded its program of public lectures and roundtable discussions, the substance of which is then published on the Institute's website (www.icls.harvard.edu). In 2000 we evaluated the needs of the Institute's target audience by interviewing two dozen staff or board members of not-for-profit and public agencies engaged in conservation, historic preservation, and land-use planning in New England. This assessment confirmed the importance of the Institute's interdisciplinary approach to landscape issues, but left uncertain whether a website alone can successfully build a community of landscape practitioners. The creation of a professional school may provide an opportunity to merge the goals of the Institute with those of the landscape design program.



Vitis coignetiae.

Michael Dosmann

- We will review the operations and collection policies of the library in Jamaica Plain in light of the transfer of the landscape design program. The influence of changing electronic technology must also be taken into account. During the past two years, we have participated in Harvard University's Library Digital Initiative. Our project, "Western China and Tibet: Hot Spot of Diversity," involves digitizing a diverse array of historical and contemporary material from the collections of the Arnold Arboretum, the Botany Libraries, the Harvard University Herbaria, the Harvard Map Collection, the Harvard-Yenching Institute, and the Museum of Comparative Zoology. The historical component focuses on the work of legendary plant collector and anthropologist Joseph Rock. His plant specimens, correspondence, maps, and photographic images will be linked to materials that describe the accomplishments of contemporary Arboretum collecting expeditions in the same floristic regions of China. Once completed, this project will connect students, researchers, and the general public via the

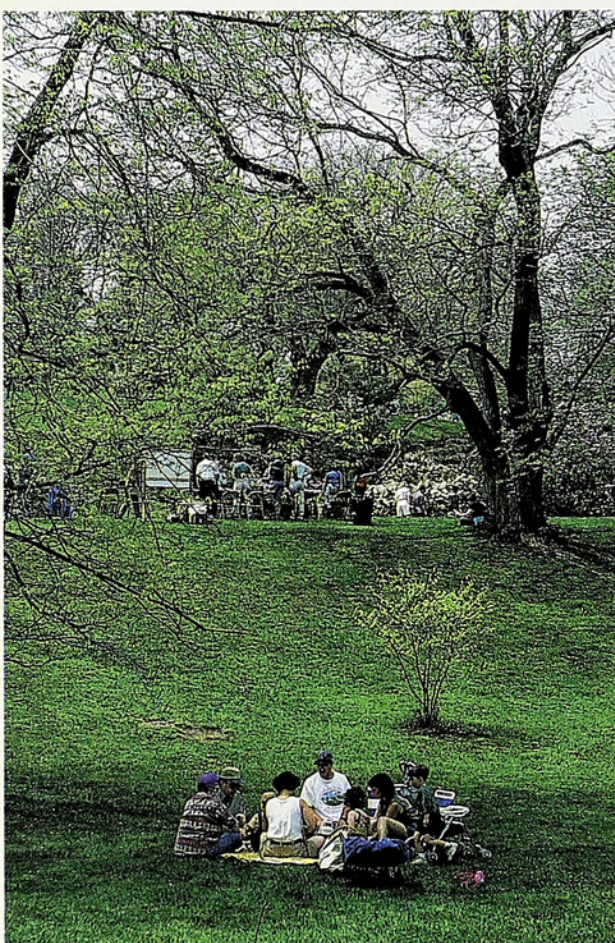
Picknicking on Lilac Sunday, now held on the second Sunday in May.

internet to an integrated database of the area's natural and ecological resources, as well as the social and cultural history of the region.

In the future, the library will increasingly be called upon to serve the needs of the landscape design program. This will inevitably require a comprehensive assessment of the role of technology in support of instruction as well as access to scholarly resources for education and research.

Undergraduate Education

In formulating the long-range plan we also examined the Arboretum's role in the education of undergraduates, particularly those at Harvard College. Although formally a part of Harvard University, the Arboretum has only sporadically participated in undergraduate coursework. At a time of enormous interest in botanical science and environmental education, the Arboretum should not ignore the value to college students of instruction about trees and their natural history. Therefore, in



the near future we will evaluate the possibilities for expanding our role in the coursework and campus life of Harvard undergraduates. To do so will require a closer working relationship with Harvard faculty.

Informal Education

In this and earlier director's reports, I have written about the enormous investments in our buildings and grounds made over the past ten years—the Hunnewell Building renovation, the creation of the exhibit "Science in the Pleasure Ground" with its large-scale model of the Arboretum, the restoration of Peters Hill, the construction of the pedestrian Blackwell Path, and the creation of the Leventritt Garden of sun-loving shrubs and vines. All of these projects have produced new opportunities for educating our visitors both formally in classes, and informally through interpretation with brochures, signage, and tours.

Despite these investments, the Arboretum has never articulated a coherent philosophy to guide our offerings of noncurricular instruction and information to our audiences, which range from school groups to the casual visitor. It is especially important for us to do so because the public image of the Arboretum is shaped by the many ways we offer information about our landscape, our history, and our work. Therefore the long-range plan calls for creating a master plan for informal education that includes four objectives.

- To clearly identify our most important educational values
- To articulate a coherent philosophy for the delivery of educational information
- To describe how the public's image of the Arboretum is shaped by the content of informal education
- To establish priorities among the many possible ways to reach the public

This master plan will define the messages we want important constituencies to receive and the means for managing their design and



A tour of the Bradley Garden of Rosaceous Plants with Peter Del Tredici, living collections director, and the collection's gardener Kit Ganshaw.

Karen Madsen

delivery. A coherent philosophy of informal education will also provide guidance for allocating investments to ensure that public amenities support our educational programs and enhance our image as an institution committed to public service.

ADMINISTRATION AND INFRASTRUCTURE

"A Time for Change" presents an ambitious agenda and will require dedicated resources to support planning and execution. Fortunately, the Arboretum is in a healthy financial position, with sufficient reserves to undertake implementation of the plan. Major steps have already been taken: transfer of the Radcliffe landscape design program; creation of a new organization chart; appointment of a deputy director. Further organizational changes may be anticipated during the coming year. All of this has been made possible through the generosity of the past and present friends of the Arboretum, who have sustained the growth of our endowment with their continuing financial support.

Summary of Operations

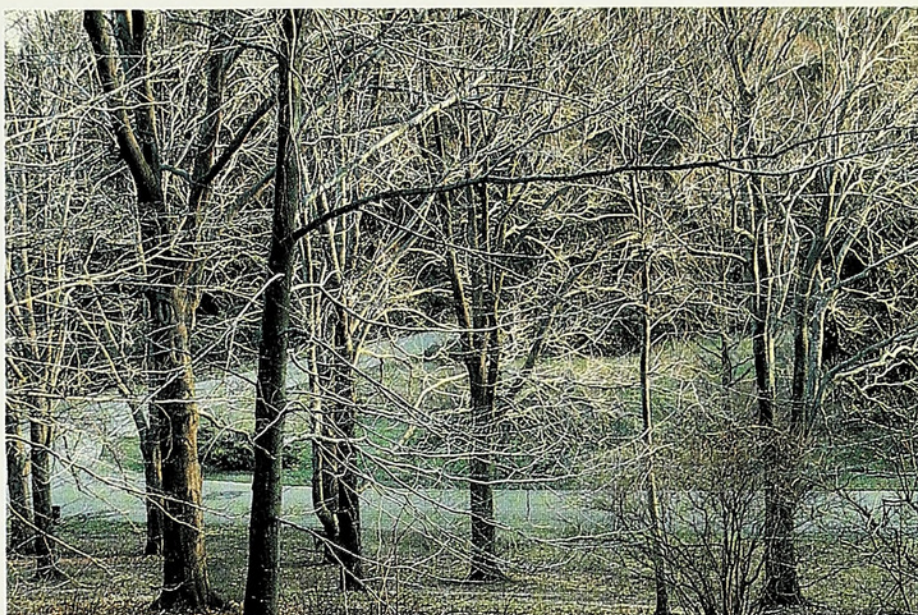
	FY 1999	FY 2000	FY 2001	FY 2002
Income				
Endowments	4,645,500	5,808,483	6,602,010	7,666,661
Membership/Gifts	897,435	749,587	587,588	644,972
Enterprise	134,832	182,824	176,284	116,774
Grants	386,612	210,585	85,496	112,446
Education/Publications	77,434	69,684	66,654	70,799
Total Income	6,141,813	7,021,163	7,518,033	8,611,652
Expenses				
Salaries	3,201,930	3,271,492	3,531,698	4,162,438
Supplies/Equipment	508,228	556,407	496,478	429,101
Facilities/Operations	497,321	833,713	666,543	717,645
Services	653,478	642,269	594,402	771,907
University Subvention	73,523	84,135	197,873	256,483
Travel	53,697	48,263	61,527	66,934
Total Expenses	4,988,177	5,436,279	5,548,522	6,404,508
Excess (Loss)	1,153,636	1,584,884	1,969,510	2,207,144
Debt Payment	312,416	312,416	312,416	312,416
Total Excess (Loss)	841,220	1,272,468	1,657,094	1,894,728
Total Fund Balances	2,026,791	2,817,354	2,939,557	4,045,228

Over the past three years, income from investments made by the Harvard Management Company, stewards of our endowment, has increased by 65 percent (see table 3, Summary of Operations). Expenses over the same period increased by 24 percent. As a consequence, we have each year netted substantial surpluses that have been added to the endowment's reserve funds.

Annual gifts have returned to the levels that we experienced before the most recent fundraising campaign. As noted in the last director's report, grant support has continued to decline; but I hope that a significant investment in peer-reviewed research will reverse this trend in the future.

A decade ago, the Hunnewell Building was completely renovated, and the additional staff space created by that project is now fully occupied. As early as July 2003, the landscape design program may need to leave its temporary quarters in Cambridge in search of a new home. New research programs, especially those based on the living collections, will require high-quality research facilities that might appropriately be located adjacent to the collections. In short, our most immediate need will soon be new facilities to house expanded staff, new students of landscape design and botany, and a growing research program. We have taken preliminary steps to define a plan for these facilities.

Throughout the long-range planning process we have examined the way we as a staff relate to each other and work together as a team. Self-critical examination of this sort is consistent with a larger university initiative to improve the quality of the workplace for all employees and to acknowledge the value of everyone's contribution. To support the vision embodied in "A Time for Change" and its core values of stewardship, respect, and citizenship, we have created a new position at the Arboretum, director of human resources, and hired Lisa Toste to fill it.



Ethan W. Johnson

Fagus grandifolia in winter.

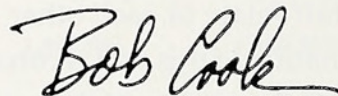
She will be working closely with me and the deputy director to facilitate the continuing improvement of the working culture.

Successful achievement of the ambitious goals of the long-range plan—the creation of a professional school, enhanced stewardship of our landscape, revitalization of our research mission, a master plan for informal science education—will require changes to the existing culture of the institution. The deep commitment of our staff to the collections and landscape and to their historical significance has sometimes obscured our dependence upon and service to the larger community, whether this be our immediate neighbors, our colleagues at the University, or the many friends around the world who regard the Arnold Arboretum with the highest respect. Implementing our plans will require that we balance our introspection with a measure of greater worldliness and an expanded perspective.

I shall end with another quotation from my predecessor, Peter Ashton, who over twenty years ago set out the intellectual foundation for the changes we are about to undertake. Shortly after arriving as director, he said:

The Arboretum has been and always will be in the first instance a University museum: a collection of living and preserved woody plant species which, with its libraries and in combination with the other University herbaria, provide Harvard with the outstanding facilities of their kind in the world for research and education. Only if it maintains its preeminence in research and education can the Arnold Arboretum continue to develop its complementary function as a unique public amenity and an authoritative source for information on the culture of woody plants.

—The Director's Report, *Arnoldia* (1979) 39(6): 330.

A handwritten signature in black ink that reads "Bob Cook". The signature is fluid and cursive, with the first name "Bob" and last name "Cook" clearly distinguishable.

Robert E. Cook

11 September 2002



Visitors have long cherished the beauty and cool, quiet ambiance of the Arboretum's "primeval" forest, on Hemlock Hill, seen above in 1927. Like stands of hemlocks throughout New England, the Arboretum's have fallen prey to tiny, aphid-like insects known as hemlock woolly adelgids, shown in a cluster at top right. They desiccate the trees by sucking sap while injecting a toxin. At right, head arborist John Del Rosso sprays nontoxic oil on Hemlock Hill, hoping to slow the adelgids' progress.

STAFF OF THE ARNOLD ARBORETUM*

ADMINISTRATION

Rose Balan, Staff Assistant, H.U.H.
Donna Barrett, Financial Assistant
Sheila Baskin, Membership Staff Assistant
Kenneth Clarke, Custodian
Robert Cook, Director, Arnold Professor
Ann Marie Countie, Systems Administrator
William Hays, Database Applications Developer
Margaret Hedstrom, Development Officer (left 10.15.99)
Jon Hetman, Staff Assistant, Development (hired 4.12.99)
Andrew Hubble, Network Systems Manager
Anne Jackson, Membership Coordinator (hired 9.17.01)
Karen Madsen, Editor of *Arnoldia*
Frances Maguire, Director of Finance and Administration
Karen Pinto, Staff Assistant (hired 8.21.00)
Karen O'Connell, Membership Coordinator (left 5.18.01)
David Russo, Facilities Supervisor
Christine C. Santos, Director of Development (1.4.00–6.30.02)

EDUCATION

Ellen Bennett, Acting Director of Education
Kirstin Behn, Staff Assistant
Sonia Brenner, Staff Assistant (hired 7.17.00)
Candace Julyan, Director of Education (left 9.30.01)
Joseph Melanson, Staff Assistant (transferred to Library 7.1.00)
Sandra Morgan, Staff Assistant (hired 7.17.00)
Nancy Sableski, Children's Education Coordinator (hired 7.24.00)
Diane Syverson, Manager of School Programs (left 12.31.00)
Pamela Thompson, Adult Education Coordinator
Sheryl White, Staff Assistant (hired 7.24.00)

HERBARIUM

David Boufford, Assistant Director for Collections, H.U.H.
Noel Cross, Internet Server Systems Administrator (left 8.28.00)
Lihong Duan, Curatorial Assistant (hired 12.10.01)
Alexander Dukas, Secretary (hired 9.29.97)
Susan Hardy Brown, Curatorial Assistant
Maureen Kerwin, Curatorial Assistant (left 7.13.00)
Walter Kittredge, Curatorial Assistant
Kristin McDonnell, Curatorial Assistant (left 11.14.00)
Jude Mullé, Curatorial Assistant (hired 6.15.98)
Melanie Schori, Editorial Assistant (hired 8.27.01)
Emily Wood, Manager of Systematic Collections

LIBRARY

Sheila Connor, Horticultural Research Archivist
Carol David, Library Assistant
Joseph Melanson, Library Assistant
Cathleen Pfister, Serials Assistant
Christy S. Robson, Serials Assistant
Gretchen Wade, Library Assistant
Judith Warnement, Librarian
Elizabeth Wellborn, Archival Fellow (appointment ended 5.31.00)
Winifred Wilkens, Library Assistant

LIVING COLLECTIONS

Thomas Akin, Assistant Superintendent of Grounds
John Alexander, Chief Plant Propagator
Stacy Berghammer, Grounds Staff (hired 6.3.02)
Laura Tenny Brogna, Landscape Project Manager (hired 11.1.99)
Todd Burns, Arborist (left 3.17.00)
Julie Coop, Superintendent of Grounds
John DelRosso, Arborist
Peter Del Tredici, Director of Living Collections
Robert Famiglietti, Grounds Staff

* 1 July 1999 through 30 June 2002

Kirsten Ganshaw, Grounds Staff
 Donald Garrick, Grounds Staff
 Bethany Grasso, Grounds Staff (hired 6.5.00)
 Dennis Harris, Grounds Staff
 Irina Kadis, Curatorial Assistant
 Susan Kelley, Curatorial Associate
 Jianhua Li, Botanical Horticultural Taxonomist
 Daniel March, Grounds Staff (hired 9.4.01)
 Midori Matsuoka, Grounds Staff (hired 5.17.99–4.14.00)
 Bruce Munch, Grounds Staff
 James Nickerson, Grounds Staff
 John Olmsted, Head Arborist (left 3.1.02)
 James Papargiris, Grounds Staff
 Thomas Por, Grounds Staff
 Kyle Port, Curatorial Associate
 Stephen Schneider, Grounds Staff (hired 9.5.00)
 Maurice Sheehan, Grounds Staff, Working Foreman
 Mark Walkama, Grounds Staff
 Thomas Ward, Greenhouse Manager and Propagator

INSTITUTE FOR CULTURAL LANDSCAPE STUDIES

Phyllis Andersen, Director of Institute for Cultural Landscape Studies
 Sheryl Barnes, Web Project Manager (hired 4.10.00)
 Alice Ingerson, Associate Director of Institute for Cultural Landscape Studies (left 6.30.02)
 Kirsten Thornton, Landscape Preservation Assistant (left 1.17.00)

RESEARCH

Laura Tenny Brogna, Putnam Fellow (appointed 9.1.98–10.31.99)
 Thomas Campanella, Mercer Fellow (appointed 6.1.01–11.30.01)
 Yueqin Chen, Putnam Fellow (appointed 3.1.01–7.31.01)
 Zhiduan Chen, Mercer Fellow (appointed 6.1.02)
 Stuart Davies, Research Fellow (appointed 3.1.99), Senior Research Associate (5.1.01)

Ellen Doris, Mercer Fellow (appointed 9.1.00–8.31.01)
 Michael Dosmann, Putnam Fellow (appointed 9.5.00)
 Hans-Joachim Esser, Mercer Fellow (appointed 4.1.00–5.31.02)
 Maria A. Jaramillo, Mercer Fellow (appointed 1.16.02)
 Youngdong Kim, Putnam Fellow (appointed 8.1.01–2.28.02)
 Stuart Lindsay, Mercer Fellow (appointed 10.1.00)
 David Middleton, Tropical Plant Systematist (appointed 11.8.99)
 Reto Nyffeler, Mercer Fellow (appointment ended 9.30.99)
 Nallamilli Prakash, Mercer Fellow (appointment ended 10.31.99)
 Elizabeth Kolster, Information Systems Project Manager (left 12.16.99)
 Lisa Schultheis, Putnam Fellow (appointed 1.18.00–1.17.01)
 Wayne Takeuchi, Tropical Forest Biologist (appointed 5.1.02)
 Sonia Uytterhoeven, Putnam Fellow (appointed 1.1.02)
 Ellen VanScoyoc, Staff Assistant (hired 11.13.01)
 Campbell Webb, Mercer Fellow (appointed 8.11.99–8.10.00)
 Christopher Woods, Staff Assistant (10.14.99–7.31.01)
 Chang Chun Yuan, Mercer Fellow (appointed 10.1.01–3.31.02)
 Donglin Zhang, Putnam Fellow (appointed 6.1.01–8.31.01)

RESEARCH AFFILIATES

Peter Ashton, Charles Bullard Professor of Forestry, emeritus (retired 12.31.99)
 Alexander Brownlow, Arnold Arboretum Associate (appointed 6.28.99–12.31.99)
 Thomas Campanella, Arnold Arboretum Associate (appointed 2.1.02)
 Wei Cao, Arnold Arboretum Associate (appointed 3.1.99–9.1.99)
 Robert France, Arnold Arboretum Associate (appointed 5.1.01–4.30.02)
 Irwin L. Goldman, Arnold Arboretum Associate (appointed 2.1.02)

Richard Howard, Professor of Dendrology,
emeritus

Shiu-Ying Hu Hsu, Botanist, emerita

Gary Koller, Horticultural Fellow (appoint-
ment ended 2.29.00)

Timothy Laman, Arnold Arboretum
Associate

Norton G. Miller, Arnold Arboretum
Associate (appointed 1.1.00–12.31.00)

C. Donald Pigott, Arnold Arboretum
Associate (appointed 7.1.99–6.30.00)

Bernice Schubert, Curator, emerita (died
8.14.00)

Terry L. Sharik, Arnold Arboretum
Associate (appointed 9.15.00–9.14.01)

Stephen Spongberg, Curator, emeritus

Kim Tripp, Arnold Arboretum Associate

Richard Uva, Arnold Arboretum Associate
(appointment ended 3.31.00)

Campbell Webb, Arnold Arboretum
Associate (appointed 8.10.00)

Carroll Wood, Jr., Professor of Biology,
emeritus

Donglin Zhang, Arnold Arboretum
Associate (appointed 9.1.01)

VISITING COMMITTEE

Gregory J. Anderson

Henrik Blohm

Christopher S. Campbell

A. David Davis

Michael J. Donoghue

Francis O. Hunnewell

Joan Morthland Hutchins (chair)

Robert K. Jansen

Matthew J. Kiefer

Ellen West Lovejoy

Janine Evnin Luke

Paul W. Meyer

Edith Noyes Knight Meyer

Richard B. Primack

Richard Schulhof

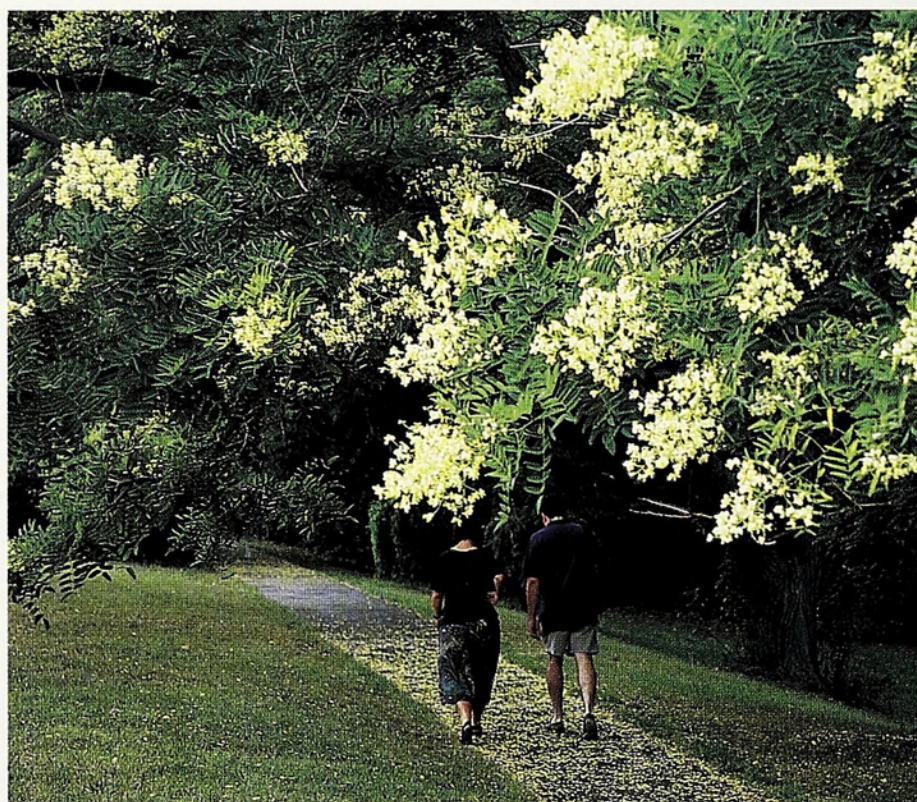
Roger B. Swain

Morgan D. Wheelock, Jr.

Paul J. Zofnass

Judith D. Zuk

Karen Madsen



Styphnolobium (formerly *Sophora*) *japonicum*, the pagoda tree, on Bussey Hill Road.

PUBLISHED WRITINGS OF THE ARNOLD ARBORETUM STAFF

J. H. ALEXANDER

- 1999. Honey Plant Propagation by Seed, Part 1: Procurement and Seed Biology. *American Bee Journal* 139(9): 700–706 (with T. Ward and G. Ayers).
- 1999. Honey Plant Propagation By Seed, Part 2: The Practical Practice of Propagating Honey Plants by Seed. *American Bee Journal* 139(11): 857–865 (with T. Ward and G. Ayers).
- 2000. Propagation of Woody Honey Plants by Budding, Part 1: The Preparation for Budding. *American Bee Journal* 140(5): 391–399 (with G. Ayers and T. Ward).
- 2000. Propagation of Woody Honey Plants by Budding, Part 2: The Art of Budding. *American Bee Journal* 140(7): 573–580 (with G. Ayers and T. Ward).
- 2001. Modified Nurse Seed Grafting of *Aesculus*. *The International Plant Propagators' Society Combined Proceedings*. 51: 51–54.
- 2001. Classification of tree lilacs (subgenus *Ligustrina*, *Syringa*, Oleaceae): morphology and DNA sequence tell a similar story. *Harvard Papers in Botany* 5: 543–555 (with J. Li and D. Zhang).
- 2000. NrDNA sequences and their taxonomic implications in the series Pubescentes. *Journal of the International Lilac Society* 29: 105–109 (with J. Li).
- 2001. One unusual lilac is indeed a privet: evidence from DNA sequence data. *Lilacs* 30: 47–49 (with J. Li and D. Zhang).
- 2001. Tree lilacs: evidence from morphology and DNA sequences supports McKelvey's taxonomic treatment. *Lilacs* 30(1): 9–14 (with J. Li and D. Zhang).

P. ANDERSEN

- 1999. Fitness, Taste, Harmony and Art: Charles Sprague Sargent and the Origins of Landscape Architecture in America. *American Society of Landscape Architects 1999 Annual Meeting Proceedings*. Washington, D.C.: ASLA (with L. R. Brogna).
- 2000. Master of a Felicitous English Style: William Augustus Stiles, Editor of *Garden and Forest*. *Arnoldia* 60(2): 39–43.
- 2000. Samuel Pike Negus, William Punchard, Charles Sprague Sargent. In *Pioneers of American Landscape Design*, ed. C. Birnbaum and R. Karson. New York: McGraw-Hill.
- 2001. *Mon cher ami: l'amitié entre Édouard André, Charles Sprague Sargent et Frederick Law Olmsted*. In *Édouard André: Un paysagiste botaniste sur les chemins du monde*, ed. F. André and S. de Courtois. Besançon, France: Les Éditions de L'Imprimeur.
- 2002. Of (Two) Gardens: Review of *The Greater Perfection: The Story of the Gardens at Les Quatre Vents*, F. H. Cabot, and *The Garden at Highgrove*, H.R.H. Prince of Wales and C. L. Green. *Arnoldia* 61(3): 30–32.

P. S. ASHTON

- 1999. Ecological theory of diversity and its application to mixed-species plantation systems. In *The Silvicultural Basis for Agroforestry Systems*, ed. P.M.S. Ashton and F. Montagnini. Boca Raton, FL: CRC Press.
- 1999. Dynamics of the forest communities at Pasoh and Barro Colorado: comparing two 50-ha plots. *Philosophical Transactions of the Royal Society of London: Biological Sciences* 354(1391): 1739–1748 (with R. Condit et al.).
- 1999. *The 52-ha forest research plot at Lambir Hills National Park, Sarawak, Malaysia*. Vol. 2: Maps and diameter tables. Kuching, Sarawak: Sarawak Forest Department (with H. S. Lee et al.).
- 1999. A global program in interdisciplinary forest research: The CTFS perspective. *Journal of Tropical Forest Science* 11(1): 180–204 (with M. Boscolo et al.).

1999. Phenology and fecundity in 11 sympatric pioneer species of *Macaranga* in Borneo. *American Journal of Botany* 86: 1786–1795 (with S. J. Davies).
1999. Phylogeny of the tropical tree family Dipterocarpaceae based on nucleotide sequences of the chloroplast *rbcL* gene. *American Journal of Botany* 86(8): 1182–1190 (with S. M. Dayandan et al.).
1999. Simulating effects of landscape context and timber harvest on tree species diversity. *Ecological Applications* 9(1): 186–201 (with J. Liu).
1999. Spatial and temporal impacts of adjacent areas on the dynamics of species diversity in a primary forest. In *Advances in Spatial Modeling of Forest Landscape Change: Approaches and Applications*, ed. D. Mladenoff and W. Baker. Cambridge, UK: Cambridge University Press (with J. Liu et al.).
2000. The Indo-Burma region. In *Hotspots: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions*, ed. R. Mittermeier et al. Mexico City: CEMEX Conservation International (with P. O. Van Dijk and J. Ma).
2000. Local and geographical distributions for a tropical tree genus, *Scaphium* (Sterculiaceae) in the Far East. *Plant Ecology* 148: 23–30 (with T. Yamada et al.).
2000. Mortality rate estimation when inter-census intervals vary. *Journal of Tropical Ecology* 16: 753–756 (with T. Kubo et al.).
2000. Predicting species diversity in tropical forests. *Proceedings of the National Academy of Sciences, U.S.* 97(20): 10850–10854 (with J. B. Plotkin et al.).
2000. Reproductive biology and genetic diversity of selected rain forest species of Sri Lanka: implications for management. In *Forests and Society: The Role of Research*, ed. B. Krishnapillay et al. Kuala Lumpur, Malaysia: 21st IUFRO World Congress (with I. A. U. N. Gunatilleke et al.).
2000. Spatial patterns in the distribution of common and rare tropical trees: a test from large plots in six different forests. *Science* 288: 1414–1418 (with R. Condit et al.).
2000. Species-area curves, spatial aggregation, and habitat specialization in tropical forests. *Journal of Theoretical Biology* 207: 81–99 (with J. M. Plotkin et al.).
2001. Sampling biodiversity: effects of plot shape. *The Malaysian Forester* 64: 29–34 (with M. D. Potts et al.).
2001. Standards on archiving and sharing data: a reply. *Bulletin of the Ecological Society of America* 82(3): 207 (with E. Losos et al.).

D. E. BOUFFORD

- 1998–2002. *Biodiversity of the Hengduan Mountains Region, China*. <http://maen.huh.harvard.edu:8080/china> (with M. J. Donoghue et al.).
2000. Angiosperms, Monocotyledons [Alismataceae—Triuridaceae]. In *Flora of Taiwan*, 2nd ed. Vol. 5. Taipei: National Taiwan University (with C. F. Hsieh et al.).
2000. Atlas of the Flora of New England: Monocots except Poaceae and Cyperaceae. *Rhodora* 102:1–119 (with Ray Angelo).
2000. Cannaceae. In *Flora of Taiwan*, 2nd ed. Vol. 5. Taipei: National Taiwan University (with T. Koyama).
2000. Charles Sargent's type concept: a guide to interpreting his names in *Crataegus* (Rosaceae). *Harvard Papers in Botany* 5: 123–128 (with J. A. Macklin and J. B. Phipps).
2000. Cyclanthaceae. In *Flora of Taiwan*, 2nd ed. Vol. 5 (with T. Koyama).
2000. Marantaceae. In *Flora of Taiwan*, 2nd ed. Vol. 5. Taipei: National Taiwan University (with T. Koyama).
2000. Phylogenetic analysis of the Sonneratiaceae and its relationship to Lythraceae based on ITS sequences of nrDNA. *Journal of Plant Research* 113: 253–258 (with S. H. Shi et al.).
2000. Phylogenetic relationships of Magnoliaceae inferred from cpDNA *matK* sequences. *Theoretical and Applied Genetics* 101: 925–930 (with S. H. Shi et al.).

2000. South-Central China. In *Hotspots: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions*, ed. R. A. Mittermeier et al. 338–351. Mexico City: CEMEX Conservation International (with P. P. Van Dyck).
2001. Introduced species and 21st century floras. *Journal of Japanese Botany* 76: 245–262.
2001. Niju Seiki no Shokubutsu to Inyushu. In *Inyu Gairai Shinnyushu*, ed. M. K. Kawamichi et al. Tokyo: Tsukijishokan. In Japanese.
2001. Angiospermae; Dicotyledoniae; Archichlamideae. *Flora of Japan*. Vol. IIb. Tokyo: Kodansha, Ltd. (with K. Iwatsuki and H. Ohba).
2001. *Mahonia cardiophylla* Ying & Boufford, sp. nov. In *Flora Reipublicae Popularis Sinicae*, Vol. 29, ed. T. S. Ying. Beijing: Ke xue ban she (with T. S. Ying).
2001. *Mahonia imbricata* Ying & Boufford, sp. nov. In *Flora Reipublicae Popularis Sinicae*, Vol. 29, ed. T. S. Ying. Beijing: Ke xue ban she (with T. S. Ying).
2001. Plant diversity in the Hengduan Mountain region, China. *International Symposium on Man and Nature*. Kunming: Kunming Institute of Botany; Osaka: Commemorative Foundation for International Garden and Greenery Exposition (with R. H. Ree).
2001. Phylogenetics of *Buckleya* (Santalaceae) based on ITS sequences of nuclear ribosomal DNA. *Rhodora* 103: 137–150 (with J. Li and M. J. Donoghue).
2001. Phylogeny of the Altingiaceae based on cpDNA matK, PY-IGS and nrDNA ITS sequences. *Plant Systematics and Evolution* 230: 13–24 (with S. Shi et al.).
2001. Sino-Japanese-American Expedition to Tibet, 2000. *Newsletter of Himalayan Botany* 28: 1–2 (with S. Akiyama and S. G. Wu).

L. T. BROGNA

1999. Fitness, Taste, Harmony and Art: Charles Sprague Sargent and the Origins of Landscape Architecture in America. *American Society of Landscape Architects 1999 Annual Meeting Proceedings*. Washington, D.C.: ASLA (with P. Andersen).

T. J. CAMPANELLA

2001. Henry David Thoreau and the Yankee Elm. *Arnoldia* 61(2): 26–31.

Y. Q. CHEN

2001. Anamorph determination of *Cordyceps sinensis* inferred from the sequence analysis of internal transcribed spacers and 5.8S ribosomal DNA. *Biochemical Systematics and Ecology* 29(6): 597–607 (with N. Wang et al.).
2001. Identification of 10 novel SnoRNA gene clusters from *Arabidopsis thaliana*. *Nucleic Acids Research* 29(7): 1623–1630 (with L. H. Qu et al.).
2001. Sequence determination and analysis of 18S rDNA and internal transcribed spacer regions of red tide-related *Ceratium furca*. *Oceanologia et Limnologia Sinica* 32(2): 148–154 (with L. Zhuang et al.).

R. E. COOK

1999. *The Director's Report of the Arnold Arboretum: 1997–1999*. Jamaica Plain, MA: The Arnold Arboretum.
2000. Do Landscapes Learn? Ecology's "New Paradigm" and Design in Landscape Architecture. In *Environmentalism in Landscape Architecture*, ed. M. Conan. Washington, DC: Dumbarton Oaks.

S. J. DAVIES

2001. Tree mortality and growth in 11 sympatric *Macaranga* species in Borneo. *Ecology* 82: 920–932.
2001. Fires and smoke: effects on tropical rain forests in South-East Asia. In *Forest Fires and Regional Haze in Southeast Asia*, ed. P. Eaton and M. Radojevic. New York: Nova Science.

2001. Systematics of *Macaranga* sects. *Pachystemon* and *Pruinosae* (Euphorbiaceae). *Harvard Papers in Botany* 6: 371–448.
2001. An account and preliminary checklist of the angiosperms and gymnosperms of Crocker Range, Sabah. In *Crocker Range National Park Sabah [Borneo]*. Vol. 1: Natural ecosystem and species components, ed. I. L. Ghazally and A. Lamry. London: Asean Press (with A. Latiff et al.).
2001. Cospeciation in an ant-plant defensive mutualism. *Ecological Research* 16: 787–793 (with T. Itino et al.).
2001. Early stages of rain forest regeneration after logging and shifting agriculture in Sarawak, Malaysia. In *Tropical Ecosystems: Structure, Diversity and Human Welfare: Proceedings of the International Conference on Tropical Ecosystems*, ed. K. N. Ganeshaiah et al. New Delhi: Oxford-IBH (with N. R. Hashim et al.).
2001. Evolution of myrmecophytism in *Macaranga* (Euphorbiaceae). *Evolution* 55(8): 1542–1559 (with S. K. Y. Lum et al.).
2001. A new giant-leaved *Macaranga* (Euphorbiaceae) from the dry seasonal evergreen forests of Thailand. *Thai Forest Bulletin* 29: 43–50 (with S. Bunyavejchewin and J. V. LaFrankie).
2001. Standards on archiving and sharing data: a reply. *Bulletin of the Ecological Society of America* 82(3): 207 (with E. Losos et al.).
2001. Studies in *Macaranga* XIII: A novelty from northern Borneo. *Harvard Papers in Botany* 6: 269–272 (with T. C. Whitmore).
2002. Ethnobotany of *Macaranga* (Euphorbiaceae) among the Kedayan of Brunei Darussalam. *Harvard Papers in Botany* 7: 7–12.
2002. Floristic and structural diversity of 52 ha of mixed dipterocarp forest in Lambir Hills National Park, Sarawak, Malaysia. *Journal of Tropical Forest Science* 14(3): 379–400 (with H. S. Lee et al.).

P. DEL TREDICI

1999. Aging and rejuvenation in trees. *Arnoldia* 59(4): 10–16.
1999. Redwood burls: immortality underground. *Arnoldia* 59(3): 14–22.
2000. The evolution, ecology, and cultivation of *Ginkgo biloba*. In *Ginkgo biloba*, ed. T. van Beek. Amsterdam: Harwood Academic Publications.
2000. Plant exploration: a historic overview. In *Plant Exploration: Protocols for the Present, Concerns for the Future*. (Symposium Proceedings, March 18–19, 1999), ed. J. R. Ault. Glencoe, IL: Chicago Botanical Garden.
2000. Woody plants—a blast from the past. *American Nurseryman* 192(9): 56–63.
2001. Nature abhors a garden. *Pacific Horticulture* 62(3): 5–6.
2001. Sprouting in temperate trees: a morphological and ecological review. *Botanical Review* 67(2): 121–140.
2001. The Arnold Arboretum. In *Encyclopedia of Gardens: History and Design*, ed. C. A. Shoemaker. Chicago: Fitzroy Dearborn Publications (with S. A. Spongberg).
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