



Annual Report 1983-1984

To the President of the University:

The Arnold Arboretum has experienced a challenging and difficult year under conditions of severe financial stringency. Nonetheless, important new initiatives, planned in previous years, began, while further improvements in and consolidations of the Arboretum's administration have been taken in hand.

In my report for last fiscal year, you will have read of the actions that need to be taken to reestablish our institution as a leading center for plant research, and as a major asset for botanical instruction. I am happy to report that a permanent Executive Committee for the Arnold Arboretum has been created, at the suggestion of President Derek Bok and Dean of the Faculty of Arts and Sciences Henry Rosovsky. Its purpose will be to establish closer and more consistent channels of communication between the Director and the Harvard Administration than have existed up to now. Day-to-day communication has also been greatly facilitated by creation of the Office of Allied Institutions within the President's Office, under the direction of Mr. Robert Rotner, Director of the University's Office of Budgets. The Executive Committee, on which the President, the Dean, and Mr. Rotner serve, met for the first time in March 1984. The pressing need for a fund drive dominated the discussion, and important steps have consequently been taken to review our needs. Particularly, Mr. Alan G. Fein, heretofore a senior analyst in the Office of Budgets, has been appointed as Associate Director pro tempore, charged to review our administrative and financial structures, and to assist in developing future strategy in these regards. Meanwhile, my recommendation that the Arnold Arboretum should proceed with a fund drive to reestablish the financial base for its existing functions, but also to appoint staff and provide facilities so that its living collections can be put more fully to use in the advancement of contemporary science, was endorsed by a committee of biology professors established to review our case by the Dean on behalf of the Faculty of Arts and Sciences. Later these proposals were unanimously approved at a meeting of the faculty of the Department of Organismic and Evolutionary Biology.

At the same time, I must also report that budgetary constraints led to the closing of two secretarial positions and one curatorial position, the first time such steps have been taken in recent decades. This now brings the number of unfilled, but in the long term essential, positions at the Arboretum to nine.

To return to a more optimistic vein, the arrival this year of John W. Einset has demonstrated the enormous potential of the living collections and their ancillary facilities for state-of-the-art research. Making use of the unusual plant material obtainable from the collections, he has already increased our understanding of the synthesis within plants of cytokinins, substances that regulate plant growth. His presence in the Propagation Department has provided intellectual stimulus to the staff, and effectively transformed an orthodox, albeit highly competent corps of plant propagators into a potent ancillary staff for basic research as well.

In the collections themselves, a strong start has been made in the implementation of the final part of the original Olmsted-Sargent plan, with bed preparation and a massive propagation program for the Eleanor Cabot Bradley Collection of *Rosaceae*. A new grant from the National Science Foundation, reported last year, has allowed us to begin verifying the identity of the entire living collections, a task that has not been consistently undertaken since the thirties, and to formulate standard verification procedures for the future. Thanks to strong lobbying from our neighborhoods, with support from Assistant to the Director Wendy Marks and Public Relations Coordinator Kathleen Nixon, not only was a decision by the City of Boston's new administration to abandon the [Boston Park Ranger Program](#) rescinded, but the program was strengthened at the Arnold Arboretum and extended throughout the Emerald Necklace.

Under the leadership of Professor Donald H. Pfister, major curatorial improvements have also been achieved in the Arboretum's herbaria. The Jamaica Plain herbarium has been a repository for undistributed duplicate specimens. It has this year been reorganized. Over 40,000 duplicates have been distributed to other herbaria, more than in any single year in the past three decades. The Jamaica Plain facility is now reestablished in its original primary purpose as a reference collection for the living collections, and is acting as the nerve center for the verification project. Reorganization of curatorial procedures in Cambridge is also under way, and the coming year should witness substantial improvements there also.

ADMINISTRATION

Last year the combined Arnold Arboretum, Gray, and Farlow herbaria and libraries were reorganized under a new Director of Administration. A principal objective was to achieve economies of scale and more effective administrative coordination among the institutions. The administrative officer responsible for financial systems within the Arboretum, Mr. Franklyn J. Stevens, was transferred to this new office, with our understanding that all day-to-day accounting would be similarly transferred. The new arrangement did not prove successful, however, and economies were not achieved. Further, the structure of the Arboretum's administrative services was weakened; in particular, lines of responsibility among the secretarial staff became confused, affecting particularly our administrative functions in Jamaica Plain. Early in 1984, Mr. Stevens resigned. In April, Ms. Nancy LeMay, who had worked for the

Arboretum for thirteen years, first as a receptionist and subsequently as a secretary, resigned, followed by Ms. Mary Byrnes, a staff secretary at Cambridge. Because of financial stringencies, the latter's position could not be renewed.

It was therefore, not a moment too soon when the University recommended the appointment of Mr. Alan G. Fein as part-time Associate Director for the Arnold Arboretum; he established his office at Jamaica Plain in April. Mr. Fein's responsibility will be to review the Arboretum's administration, financial systems, and staff structure and, in consultation with the Director, to plan and implement necessary improvements. Fein is seconded from the university administration. When his work for the Arboretum is completed, a permanent full-time Associate Director for the Arnold Arboretum will be sought. The need for such an appointment was recognized as early as 1979.

Through Assistant to the Director Wendy Marks, a number of significant achievements have been made in negotiation with public agencies. Ms. Marks is responsible for coordination and negotiation with the City of Boston, particularly the Department of Parks and Recreation, the Metropolitan District Commission, and the Southwest Corridor Project of the Massachusetts Bay Transportation Authority, whose railhead will be at our local stations Forest Hills. She serves on the newly created Boston Park Ranger Advisory Board, as does the Director, and on the board of the Franklin Park Coalition.

Following the Boston City elections and the inauguration of a new administration, we were fortunate that Commissioner of Parks and Recreation Robert McCoy, who has proven to be the most dedicated and effective occupant of that office in recent memory, was one of very few senior officials retained by the new administration. Nevertheless his department, along with others, suffered widespread cuts in an already inadequate budget, and the Boston Park Ranger Program, inaugurated only the previous year, was scheduled for cancellation. Thanks to very strong community reaction through the [Arnold Arboretum Committee](#), a neighborhood advocacy group, and work by Marks and our Public Relations Coordinator Kathleen A. Nixon in concert with other private city-parklands support groups, this decision was reversed. This year the Arboretum's contingent was entirely on horseback, and increased to three each day. Horse patrols were also extended to Franklin Park.

A small but highly significant step was taken this year when the Arboretum was included in the capital-expense budget of the parks department for the first time in many years. Department staff this spring also made extensive repairs of their furniture along the Arboretum's road system.

With permission from the Commissioner and financial assistance from the South Branch Foundation, five strong receptacles were placed on the grounds at the end of last fiscal year to attract voluntary donations for the general upkeep of walls, fences, roads, and other parks department responsibilities. The receipts, though modest, had covered the expense of installation by the end of the current year, and are growing.

Having received indication of approval by the Browne Fund of the City of Boston for a grant towards restoration of the now sadly dilapidated antique iron gates of the Arboretum, we obtained a matching grant from the Henderson Fund. Tenders have now been requested.

The Arnold Arboretum is associated with two revenue-generating ventures. The shop in the Visitor Center at Jamaica Plain, which was opened in 1982, had a very successful year, with an increase in net income from \$4,000 to slightly over \$10,000. The fruit- and vegetable-growing venture at the Case Estates, operated under contract to another not-for-profit institution based in Weston, Land's Sakes, Inc., showed disappointing results. This was partly due to the abnormally dry season, but also to poor marketing and to labor shortages. A new manager has been appointed, and no further expansion of the 15 acres currently under use is envisaged until the 1984 growing season has been evaluated.

RESEARCH AND INSTRUCTION

The arrival of Professor John Einset at the beginning of the year heralded the Arnold Arboretum's entry into new and important areas of comparative biology, in which the newest concepts and techniques are being applied to theoretical and applied problems in tree biology through the use of our comprehensive and superbly documented living collections.

During the last year, Professor Einset's laboratory was equipped at the Dana Greenhouse facility. Through experiments involving thousands of tissue cultures with over 100 species of woody plants in 35 families, he has developed a solid foundation for future research in two areas: the physiological study of tissue-culture propagation, and biochemical research on plant hormones.

The work on tissue-culture propagation aims to assess the usefulness of this technique in relation to systematic classification of plants, especially woody species. Most previous research on propagation by tissue culture has concentrated on plants in a very few taxonomic groupings. It has already become apparent to Professor Einset that characteristics crucial to the success of conventional methods of tissue-culture propagation are not universally distributed among plants, and that systematic relationships established on the basis of other characteristics provide a basis for predicting the response of plants to tissue culture. Conversely, tissue culture is disclosing new biochemical and physiological characters of value to the systematist. His detailed study of a broad range of plant species will not only identify groups in which tissue-culture methods may be particularly applicable, but will give us a greater appreciation of growth regulation in plants, generally. For species in three families *Amaryllidaceae*, *Oleaceae* and *Bignoniaceae* Einset's research group is currently refining methods so that specific propagation procedures can be recommended for nurseries and individuals interested in multiplying these plants through tissue cultures.

The research on plant hormones concentrates on the plant hormones called cytokinins. Research on cytokinin biochemistry is critical for understanding the basic mechanisms of plant growth, as well as for advances in tissue-culture techniques. Normally, cellular proliferation in tissue culture requires the addition of cytokinin to the medium. Einset has found, however, that tissues of several woody species can proliferate without cytokinin supplements and that they do so by generating their own cytokinin supplies internally. On the basis of biochemical evidence, he can separate these species into three groups with different patterns of cytokinin metabolism. Species in the genus *Actinidia* (kiwifruit) growing at the Arboretum have proven particularly interesting in this respect because their cytokinin biochemistry can be studied with fairly simple methods. His current focus in cytokinin research involves studies using *Actinidia* as a model to understand basic aspects of cytokinin metabolism in plants.

Investigators working with Professor Einset in the tissue-culture laboratory this year include Dr. Julie E. M. McGeoch, Sharon Soltzberg, and Professor Hamza Q. Hamza, a Visiting Scholar from the University of Aleppo in Syria. During the Spring term, Professor Einset taught a new course, Biology 166, Plant Growth and Development. This new course deals in depth with all aspects of the physiology of growth in plants, and includes lectures on the basic biochemistry of growth processes, phytohormones, morphogenesis and molecular biology. In addition, Professor Einset gave guest lectures in Biology 104, Professor Schultes's economic botany course, and in the plant physiology course taught by Professors Arthur R. Ayers and Lawrence L. Bogorad of the Department of Cellular and Developmental Biology.

Professor Peter Ashton's research has this year concentrated in three areas. In collaboration with Dr. C. V. S. Gunatilleke, University of Peradeniya, Sri Lanka, who completed a year at the Arboretum as a Mercer Fellow, he completed two papers on the historical and ecological biogeography of Sri Lanka. With Dr. Richard Primack, Boston University, who was formerly research fellow on a project in Sarawak supported by the U. S. Forest Service of which Ashton was Principal Investigator, he has prepared two papers on the growth characteristics of tree species in Far Eastern rain forests. Also, he continues work on three papers which compare the ecology, including the community dynamics and primary production, of three lowland forests on contrasting soils in Borneo whose performance he and his colleagues have been measuring now for twenty years.

During the year, Professor Ashton undertook a one-month consultancy to India on behalf of the Ford Foundation, where he reviewed the state of research in forest biology; and two weeks in Indonesia, on behalf of the Government of Indonesia and the Harvard Institute for International Development, to review the present state of forestry research concerning the management of lowland evergreen forests, with particular reference to Borneo and Sumatra.

Ashton served on a review panel to establish priorities in the conservation of plants in the tropics for the World Wildlife Fund, U. S.; and on another to review future plans for the Institute of Ecology of the New York Botanical Garden. He presented a paper at a symposium of the International Society of Plant Systematics at McGill University, Montreal, and another, in

Kuala Lumpur, at a symposium on conservation of rain forests in the Far East sponsored by the International Union for Conservation of Nature and Natural Resources and the World Wildlife Fund, and participated in a planning session for the "Decade of the Tropics" sponsored by the International Union of Biological Sciences, in Paris.

This year Professor Ashton again collaborated with Professor Rolla A. Tryon in their course Biology 147, Biogeography. Currently he advises three graduate students. Steven Rogstad is completing fieldwork in Malaysia towards his thesis research. His investigation of niche partitioning among three morphologically similar congeneric rain-forest tree species has proven to be exceptionally productive. Paul Rich, who is jointly advised with Professor Barry Tomlinson, is developing research into the mechanical characteristics of palm-tree architecture, and has been carrying out field studies in Costa Rica. Alex Moad is preparing his thesis topic, which concerns the comparative physiological ecology of the seedlings of co-occurring and closely related species of rain-forest trees. He made a preliminary visit to the Far East to gain field experience. Moad has been awarded a Fulbright Scholarship to continue his fieldwork.

In collaboration with Harvard Professors Thomas M. Givnish, Mark Leighton, and John Einset, and colleagues in Boston University and the University of Massachusetts, Boston, Ashton has formed a tropical discussion group, whose aim is to provide a forum for communication among graduate students active in this field within the Boston area. The group met four times during the year.

In October 1983, Dr. David E. Boufford joined the Arnold Arboretum as a curatorial taxonomist, following the resignation of [Dr. Richard Weaver](#). During the past year he prepared treatments for four families, the *Aristolochiaceae*, *Fumariaceae*, *Piperaceae*, and *Urticaceae*, for the *Vascular Flora of the Southeastern United States*. These treatments are to appear in volume two of the Flora, which is scheduled to be published late in 1984 by the University of North Carolina Press. In progress is an expansion of the treatment of the *Urticaceae* of the Southeast that will account for the family for all of North America north of Mexico. Another project, begun with Ray Angelo, Curator of the New England Botanical Club Herbarium, is the preparation of an atlas of the New England flora. This atlas will provide an updated taxonomy and nomenclature for the flora of New England, and will also map each plant species growing in New England, on a county-by-county basis. The goal is not only to display the distribution of the plants, but to stimulate field activity in areas that have been under-collected, so that the New England flora eventually can be mapped on a scale that will provide meaningful ecological and biogeographic information.

Boufford has agreed to serve as a regional coordinator and editor for a new Flora North America Project. Dr. Nancy R. Morin is the overall coordinator of the project, which will be based at the Missouri Botanical Garden. The Flora will provide keys, descriptions, comments on distribution and habitat, cytological and chemical data, and other pertinent information on all of the plants of North America north of Mexico, including Greenland, Baffin Island, and the islands of the Canadian Arctic archipelago. The herbaria and libraries of Arnold Arboretum and

the Gray Herbarium will be indispensable to this project. Because of their importance, the herbaria will serve as both an editorial and a research center for this major floristic project, which will produce the first complete flora for North America.

From June 15 until mid-September 1984, Dr. Boufford [took part](#) in the second Sino-American Botanical Expedition. He was expedition leader for the American team. This expedition, which is funded by the National Science Foundation, will collect herbarium specimens and living plants and seeds on the eastern edge of the Himalayas in northwestern Yunnan Province. Three other botanists, Dr. Bruce Bartholomew, California Academy of Sciences, Dr. Dan H. Nicolson, Smithsonian Institution, and Dr. Paul L. Redfearn, Southwest Missouri State University, will make up the remainder of the American team. The area to be visited, Chang-shan, was last explored botanically by the French missionary J. M. Delavay around the turn of the century. Joseph Rock, who also collected specimens for the Arnold Arboretum, explored adjacent areas in the first half of the twentieth century.

Dr. Richard A. Howard has made substantial progress towards the next (fourth) volume of the *Flora of the Lesser Antilles*, of which he is editor. In this he has been assisted by postdoctoral fellow Elizabeth Kellogg, formerly a graduate student under Professor Wood, and his own current graduate student, George Staples, during the summer. Professor Howard has continued his interpretation of the unpublished Hortus of Alexander Anderson (c. 1810), and is preparing a biographical sketch of this early botanist of St. Vincent. A manuscript on the Reverend Lansdown Guilding as a botanist, reported last year, will be completed in the fall of 1984.

He has tabulated all species described in Grisebach's flora of the former British West Indies, in preparation for a search he is making this summer for types in European herbaria. Also, he has prepared a complete number list and index for the collections that Charles Wright made in Cuba during 1856 to 1867. This task, necessitated by a recent misunderstanding of the numbering system by botanists working on the Cuban flora, will allow typification of names based on these collections to be correctly established. Extensive correspondence of Wright's apparently never previously examined by scientists, has been discovered in the Connecticut College archives. Howard hopes to have an itinerary of Wright's travels ready for publication in the coming year.

Work also continues, in cooperation with French botanists, on a Dendrologie des Petites Antilles, and on a revision of *Icacinaceae* and *Polygonaceae* for the Flora of Venezuela, Flora of Nicaragua, and Flora Mesoamericana.

Professor Howard supervised one undergraduate for a Biology 90 research course, as well as continuing to advise graduate student George Staples. He also gave his anatomy research course Biology 310, and was guest lecturer in Biology 104, Economic Botany.

Dr. Bernice E. Schubert, Curator of the Arnold Arboretum Herbarium and Senior Lecturer in Biology, retired at the end of the current year, having served the Arnold Arboretum

and the Gray Herbarium since 1935, with short periods in other institutions. She received her Ph.D. from Radcliffe in 1941, having done research on the taxonomy of the leguminous genus *Desmodium*. It is characteristic of the consistency and continuity of her work that, this year, she remains actively pursuing work in this genus, undertaking revisions of it for Sri Lanka (Ceylon), Oaxaca State in Mexico, the whole of Mexico, and Nicaragua.

While working with the New Crops Research Branch of the U. S. Department of Agriculture at Beltsville, Maryland, in the early 1950's she started work on the difficult genus *Dioscorea*, the true yams. Currently, she is concluding one treatment for the Vascular Flora of the Southeastern United States, and is assisting others with revisions for the Flora de Veracruz, Flora of Nicaragua, and Flora Mesoamericana. During this year, Cecilia Xifreda from Argentina and Oswaldo Tellez V. from Mexico have visited the Arboretum to work on this genus with Schubert.

Dr. Schubert, who took up an interest in Begoniain the 1940's and has contributed much on this genus, mainly in collaboration with Dr. Lyman Smith, is completing a treatment for Flora de Veracruz and updating an earlier revision, with Smith, of the Flora of Colombia.

The third number of volume 65 of the [*Journal of the Arnold Arboretum*](#) has been dedicated to Dr. Schubert, to commemorate her retirement and distinguished service to the Arnold Arboretum. It is prefaced by a more extensive biography than that given here. Dr. Schubert will be continuing her researches at the herbarium in the years ahead.

The appointment of Dr. Stephen A. Spongberg as Chairman of the Living Collections Committee inevitably diverted him, this year and temporarily, from his research to the important and demanding task of overseeing the reevaluation of curatorial policies in those collections, and in setting curatorial policies for their impending restoration. His taxonomic research continues to center on the simple-leaved species of Asian *Sorbus*. Also, he was able to complete two articles, one, with Dr. David E. Boufford, on eastern Asian - eastern North American phytogeographical relationships, the other on C. S. Sargent's contributions to the conservation movement in the United States.

This year Professor Peter F. Stevens' work has emphasized three aspects of systematics. In his historical analysis of present systematic practices he has focused on evolutionary systematics. His studies have confirmed that the usefulness of many evolutionary classifications is less than had been thought, because the actual way that the classifications are made can be traced back to early nineteenth century, pre-Darwinian assumptions about the world. A number of modern systematists have falsely concluded that phylogenetic relationships are unlikely to be discoverable because they have used a methodology that was not designed to produce such relationships.

More theoretical investigations led to a review paper on homology, one of the central concepts in comparative biology, that has been accepted for publication in *Systematic Botany*. In the paper, homologies are discussed as similarities between taxa at similar rank that arose as

a result of a unique event or set of events in the past. The goal of systematics is to find the homologies that characterize various systematic levels, and to work out the various relationships among them.

Towards the end of this year Stevens returned this work on the tree genus *Mesua* (*Clusiaceae*) in preparation for a trip to several localities where it grows in Malesia. In this recent work, he has been able to analyze decisions that he had made in his earlier work in the genus, and this has made him aware of the problems caused by some of the apparently very simple assumptions and reasoning procedures systematists use in working on tropical plants. In addition, he prepared an account of the whole of the tribe *Calophylloideae* (to which *Mesua* belongs) for New Guinea.

Finally, he prepared a report on the status of collecting in New Guinea for the World Wildlife Fund. The report emphasized how little we know about the flora of the whole of the island, even in areas we think we know well. For instance, it is quite possible that fewer than half of the species of *Mammea* that occur on the island are described. The report called for increased collecting that focusses on the poorly collected areas of the island; if the collecting is not carried out, many habitats will be destroyed and we shall find it very difficult ever to understand the evolution of one of the key tropical floras of the world.

Brent Mishler (currently jointly supervised by Stevens and Professor C. E. Wood, Jr.) finished his thesis, "Systematic Studies in *Tortula* (*Pottiaceae*)" this year, and has accepted a position as Assistant Professor of Botany at Duke University, North Carolina.

Stevens continues to supervise graduate students Elizabeth Taylor and Anna Weitzman. Taylor is currently working on a careful analysis and description of Neotropical species of *Sterculia*, based in part on the numerous specimens that she has collected in earlier trips to South America. Preliminary scanning electron microscope surveys suggest that there is much variation both in pollen and hairs that has previously not been analyzed in this genus. Weitzman visited Venezuela in the fall of 1983, supported in part by a grant from the Atkins Fund. She was able to collect a number of the local representatives of *Freziera*, the genus in the *Theaceae* that she is studying. Since her return, she has begun an extensive survey of the leaf and stem anatomy of the genus, and has found, for example, unexpected variation in the nodal anatomy of species of the genus.

Biology 148, Systematic Biology, was again given by Stevens in fall 1983. Stevens has continued to give 300-level courses to both botany and zoology graduate students. During the year, Professor Melanie L. J. Stiassny (Ichthyology) took over the running of the Systematics and Biogeography Discussion Group that Stevens had helped to run since its inception in 1964. Stevens organized an occasional series of speakers in the Seminars in Botany series, held in the HUH Seminar Room. This year the speakers have been of especially high quality and covered subjects in cellular and developmental as well as organismic botany.

For Carroll E. Wood, Jr.'s long-term project The Generic Flora of the Southeastern United States, which is supported by the National Science Foundation, this has been a milestone year. The publication of three papers in the July 1983 issue of the *Journal of the Arnold Arboretum* brought the number of papers published in the series to 100 and marked the 25th anniversary of the beginning of publication in the Journal.

The century of papers comprises 2,467 pages and includes treatments of 130 of the 193 families of seed-bearing plants in the Southeast. Fifty collateral papers and notes complement various aspects of the research. Four hundred ninety-one plates, 1 to 27 for each of 180 families, have also been prepared. The 100 papers are the work of 33 botanists, 12 of whom have worked at Harvard on the Flora, and the illustrations are the work of 11 artists. Dr. Wood has edited all of the papers in the series and the last 13 have also been edited by Dr. Norton G. Miller. Dr. Miller began collaboration on the Flora at Harvard in 1981 and is continuing that collaboration at the New York Biological Survey in Albany.

During the year Dr. Wood, Dr. Ihsan Al-Shehbaz and Dr. George K. Rogers continued work on the flora Rogers' treatment of the *Phytolaccaceae* is in press, and he is currently doing research on the genera of the family *Loganiaceae*. Dr. Al-Shehbaz's research continues on the difficult Mustard Family (the *Cruciferae*). His paper on the seven tribes of the family, and papers on the genera of the tribes *Thelypodieae* and *Brassicaceae*, are in press in the *Journal*. Dr. Wood's paper on the genera of *Menyanthaceae* is the one hundredth in the series. Dr. Wood is continuing with research on the families *Haloragaceae* and *Aristolochiaceae*.

Dr. Wood taught Biology 103, Systematics of Seed-bearing Plants, in the spring semester, 1984, with graduate student Mark Skinner and Dr. Jeffrey Hart in charge of the laboratory sections. The class visited the Arboretum in February to study the conifers and again the last week of the April to see the early spring-flowering plants. Many of the preserved specimens that are used as examples of plant families come from the living collections. Dr. Wood, as usual, offered Biology 313, Taxonomy of Vascular Plants, in both semesters.

Dr. George K. Rogers, postdoctoral student on the generic flora project, taught Winter Botany at the Arboretum and will offer the same course again in an expanded version this coming year.

Professor Chao-Luan Li, from the Chengdu Institute of Biology, Academia Sinica, Sichuan Province, arrived at the Arnold Arboretum in February of 1982 and held an appointment as Mercer Fellow until August 15, 1983. Professor Li remained in the United States until February 1984, and continued to base his monographic studies of New World *Prunus* (*Rosaceae*) at the Arboretum. During this period, Dr. Spongberg served as staff advisor to Professor Li. Li returned to China with a personal computer, with which he hopes to continue his cladistic approach to the study of *Prunus* and the genera of the *Rosaceae*. Professors I. A. U. Nimal Gunatilleke and C. V. Savitri Gunatilleke, Bullard Fellows at the Arnold Arboretum whose work during the year they

spent here was reported on previously, returned to the University of Peradeniya, Sri Lanka, in September 1984.

Professor Colin Johnson, from the University of Transkei, South Africa, has spent nine months as a Mercer Fellow of the Arnold Arboretum. He has been working in collaboration with Dr. Howard on a taxonomic revision of the genus *Securidaca* (*Polygalaceae*) prior to pursuing anatomical research. He also prepared the ground for a review of the genus *Polygala* in Africa.

PUBLICATIONS

Dr. Stephen A. Spongberg continues to act as Scientific Editor of the *Journal of the Arnold Arboretum*, with Elizabeth Schmidt, Publications Officer, as Managing Editor. D. E. Boufford, R. A. Howard, G. K. Rogers, B. G. Schubert, and C. E. Wood Jr., were Arboretum staff members who published in the *Journal* during this period. Other Harvard affiliates whose papers were included are present and former staff members R. C. Rollins, P. B. Tomlinson, and M.H. Zimmermann; former Mercer Fellows C.-Y. Cheng and T.-S. Ying; and present and former students/postdoctoral fellows S. P. Darwin, J. S. Sperry, G. W. Staples, J. R. Vincent, and J. L. Zarucchi.

The prices on many of the Arboretum's publications were raised to bring them closer to those for comparable products. In addition, dealer commissions on our publications have been reduced from 40 percent to 20 percent. Income from page charges has increased and we anticipate that it will increase further during the coming year.

CURATION

The Libraries

During the year, the Librarian, Barbara A. Callahan, planned with Director of the Herbaria Professor Donald H. Pfister, Geraldine C. Kaye, and Wesley Wong of the Economic Botany Library, the relocation of the latter. On the basis of a report prepared by the Librarian, the need for a defined collection-development policy for the botanical libraries was given priority, as was that to study the overlap between these libraries' collections and collecting practices.

The library will serve as a repository for authors' lists of specimens examined for their publications. These lists are accessioned chronologically and filed alphabetically by author in the Reference Room. Requests for copies of these lists will be handled through our interlibrary loan services.

During the year, Mary E. Thomas, Library Assistant, resigned. Barbara A. Callahan was reappointed as a member of the Harvard University Preservation Committee on July 1, 1983, where she continued to work on the Library Security Subcommittee.

Statistics for Arnold Arboretum Libraries

Accessions

Monographs: Purchased	154
Acquired through gifts or exchange	223
New continuation volumes (e.g., journals):	
Purchased	19
Total volumes and pamphlets added	633
Microfilms added	16
Microfiche added	0

Processing

Titles: Catalogued	364
Recatalogued	27
Total, titles catalogued and recatalogued	391
Volumes bound: Monographs	186
Serials	256
Total volumes bound	442
New volumes added after cataloging and binding:	
Subtotal for Cambridge	348
Subtotal for Jamaica Plain	285

Inventory, June 30, 1984

Total number of volumes and pamphlets in the Arnold Arboretum libraries at Cambridge and Jamaica Plain	84,869
Total, microfilm reels	249
Total, microfiche	10,867
Number of continuation titles:	
On order	613
Received through gift or exchange	372
Total, continuation titles received	966

Service

Total volumes used by visitors	1,492
Photocopies supplied in lieu of interlibrary loans (pages)	2,101
Interlibrary loans received	239

The Jamaica Plain Library, under Assistant Librarian and Horticultural Research Archivist Sheila C. Geary, experienced a considerable increase in outside use, from 126 to 215 visitors, and an increase from 120 to about 300 telephone inquiries. Volunteers, working under Geary's direction, have continued to make a substantial and valued contribution. The Arboretum's collection of horticultural expedition photographs is an important resource to scholars throughout the world, as well as to our own staff. Volunteer Marylou Anrhein has provided cross-referencing, allowing access by the name of the photographer as well as the location. This permitted accurate compilation of our holdings for the recent publication *Photographs at Harvard and Radcliffe: A Dictionary*. Carin Dohlman, another volunteer, has completed her careful, exhaustive work on the E. H. Wilson archive. All materials, including journals, seed lists, manuscripts, correspondence and ephemera are organized; an inventory is available at the Arboretum archive office.

In spite of greatly increased use by staff as well as visitors, routine tasks are on schedule at Jamaica Plain. Forestry journals, transferred from the Widener Library, have been incorporated and are in process of being catalogued.

The Herbaria

The increasing involvement of the Arnold Arboretum, as the leading resource in North America for research into the flora and vegetation of Asia, in research directed towards the productive yet sustained management of the astonishingly diverse forests of that region, includes a program to rapidly increase the rate of botanical inventory and documentation while these forests yet remain. This year, over 15,000 new collections were received into the Arboretum herbaria, confirming the upward trend which started in the previous year.

With our current staff shortages, duplicate material for distribution to other herbaria had meanwhile accumulated. The organization and execution of herbarium activities had gradually decreased in efficiency during the previous decade. The problem has been compounded because the position of curator of the combined collections of the Arnold Arboretum and Gray Herbarium has not seen continuity; while the herbarium staff, whose salaries are largely paid by grants from the National Science Foundation, is very small for such a large collection. The result is that no real attempt has been made to improve the productivity and morale of the staff, who had at times been uncertain to whom they should be reporting. The status of a number of the older accessions to the collections has become unclear because nobody has assumed responsibility for seeing that they were processed. On these accounts, and in anticipation of further substantial increases of activity over the next decade, a major reorganization of staff and work procedures is being planned, and will be implemented in the coming year.

Largely owing to the activities of Curatorial Assistant Emily Wood, and with the help of Curatorial Associate Ida Hay and volunteer Nicki Langsdorf at the Jamaica Plain herbarium, far more duplicates have been sent out in the last year than in any year in the recent past. The active exchange program has allowed us to begin a reevaluation of our exchange policy, and to target more carefully the institutions with whom we exchange. Much of the material currently

being sent on exchange is from the Southeast Asia mainland, and new exchanges have been initiated with a number of institutions from that area.

The curatorial staff, ably assisted by Nadine Gerdts and David Black, two work-study assistants from Harvard, have brought the insertion of recently mounted specimens up-to-date. Meanwhile the reinsertion of returned loans lagged behind, but this final residuum from the recent congestion of the herbaria is expected to be inserted by the end of the calendar year.

At Cambridge, The Bailey-Wetmore Wood Collection and anatomical laboratory has been moved from its previous home in the basement of the Botanical Museum into the Herbaria Building. Although this collection is not strictly part of the herbaria, many wood collections in it are cross-references of herbaria specimens, and the discipline of anatomy itself is of great importance in systematics. The wood collection and laboratory moved into what was left of the original main storage room for herbarium supplies, plus a room that was created when the extension to the herbaria building was built in 1979. Dr. David Michener, curatorial taxonomist assigned to the Living Collections Verification Project under a grant from the National Science Foundation, actively uses the Wood Collection for his personal research and has volunteered to curate the Collection.

The move of the Wood Collection made the provision of new areas for storage of herbaria supplies essential. Two existing small storage areas were extensively modified. A third room, previously housing old publications, was reorganized and converted to an herbarium supply room.

A program to remove type collections from the general collections at Cambridge and Jamaica Plain, and place them in their proper places in the type collections at the end of each family at Cambridge has begun. Most active in this has been Dr. Richard A. Howard, who has removed over 1,600 types from the general collection in the course of his work on Charles Wright's collections, and Dr. David Boufford, who has annotated 339 types of *Crataegus* at Jamaica Plain prior to moving them to Cambridge.

Curatorial Assistant Vernon Bates has designed and implemented a soft are package for the computerization of the type information. With it all 1169 *Lamiaceae* types have been formatted into a new database.

There has been a particular resurgence of activity at the Jamaica Plain herbarium. Dr. David Boufford joined the staff of the Arnold Arboretum in October 1983 as a curatorial taxonomist, and was made responsible for planning the reorganization of that herbarium spurred on by the impending start of the project, supported by the National Science Foundation, the verification of the identity of our living collections. The herbarium vouchers resulting from this project, which will take six years, are to be deposited in the Jamaica Plain herbarium and their sorting, labelling, and distribution of duplicate material will be undertaken there. A policy for the collections at Jamaica Plain was formulated. The grounds staff completely washed and repainted the second-floor herbarium. Lighting was improved. Storage space for supplies was reorganized. Specimen mounting techniques have been streamlined and productivity increased. The latter has been enhanced also by volunteer Lillian Hagopian who, we hope, will be only the first of a group of volunteers who will help in this important work.

A noteworthy new project has been the establishment of a procedure for vouchering seedlings which are being grown at the Dana Greenhouses for the living collections. Mrs. Melville Chapin, volunteer, has taken charge of this project. Curatorial Associate Ida Hay has

spent one day each week working at Cambridge, thereby achieving much needed coordination between the two herbaria.

Statistics for the Arnold Arboretum Herbaria

Accessions

Specimens received during the year:

By exchange	7,646
As gifts	7,260
In exchange for identification	1,097

Total accessions (all to the Cambridge herbarium)	16,003
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Provenance of accessions:

America north of Mexico	5,020
Rest of continental America	910

Subtotal		5,930
Temperate Asia	3,308	
India	1,918	
Western Malaysia	1,043	
Eastern Malaysia	1,614	
New Caledonia	17	

Subtotal		7,900
Polynesia	1,110	
Australia	467	
Africa	13	
Europe	377	

Processing

Number of sheets incorporated:

Through mounting	9,979
Through direct incorporation	128

Total number of sheets incorporated	
10,107	

Number of sheets removed	449
Number of sheets repaired	170

Inventory, June 30, 1984

Number of sheets in herbaria:

Cambridge	1,142,895
Jamaica Plain	172,480
Combined total	1,315,375
Service	
Number of sheets sent out:	
On loan	37,350*
On exchange	29,752
As gifts	682
Number of specimens received on loan:	
For staff	5,182*
For students	1,148*
Total received on loan	8,648*
Number of loaned specimens returned	22,696*
Number of orchid specimens placed on indefinite deposit in the Oakes Ames Orchid Herbarium	44

* Combined figure, Arnold Arboretum and Gray Herbarium

The Living Collections

Dr. Stephen A. Spongberg, Horticultural Taxonomist, was this year made Chairman of the Living Collections Committee. This change has been made in view of the increasing use of the living collections for research, the initiation of the taxonomic verification project with support from the National Science Foundation, and the need to implement major restoration of the living collections, of which the Eleanor Cabot Bradley Collection of Rosaceous Plants is the first substantial manifestation.

A major staff objective, to be achieved within six years and before the termination of the verification project, is to compile a procedural manual for the curation of the living collections.

In the short term, Spongberg is charged to review curatorial procedures within the living collections, including closer definition of accessions policy, and procedures for planning and implementing restoration and new plantings, those for the spring and fall plantings, and those for horticulturally, esthetically, and economically optimal maintenance procedures. Gary Koller, Managing Horticulturist, has thereby become responsible to Spongberg for all aspects of his work other than his contributions to public programs.

This year, Dr. David Michener has been appointed curatorial taxonomist, charged to organize the verification of the identity of, and to document by herbarium voucher, our living collections. This project is funded by the National Science Foundation, with the Director as Principal Investigator. This is the second grant awarded by the Foundation for curation of our living collections. Dr. David Boufford has assumed executive responsibility for the project. Early in 1984, Ms. Sandra Elsik was appointed Curatorial Assistant to the project. Through the winter a detailed strategy was developed, and the documentary and extant herbarium voucher records were reviewed in order to identify priorities for collecting. It was found that between 10 percent and 40 percent of the collections are already vouchered, depending on the family. Specialists were solicited to assist in checking identifications. With assistance from Volunteer Coordinator Cornelia McMurtrie, 33 volunteers were recruited, and received training from Elsik in methods of botanical collecting. Daily through the 1984 spring flowering season, two parties led by Elsik, Michener, and Curatorial Associate Ida Hay, collected herbarium vouchers whenever the weather was clement. By the end of the year under review, 4,702 specimens, representing 1,468 accessions, had been obtained. This represented 56 working days, and it is thereby estimated that it will take about six years to collect vouchers from those 8,778 accessions that represent taxa occurring in nature.

The verification project is indirectly achieving two other benefits. It is providing a stringent review of the scientific value of all individual accessions at the very moment when major restoration is being planned, and thereby assisting in the definition of future accessions policy. Also, through close coordination with Jennifer Hicks, Curatorial Assistant for Plant Records, it is providing a means to greatly increase the rate of map revision and label checking.

During the year, 15 grounds maps were revised and redrawn, and an additional 9 maps were updated. Special thanks are due Bruce Hegna and volunteers Robert Siegel, Betty Jacobson and Nell Walker for their efforts in field checking and label replacement.

The Onyx computer acquired, under the first National Science Foundation grant for the curation of the living collections, for records maintenance for the permanent collections,

proved not to be up to the task. Eventually, the computer suffered major failure and, in view of the poor servicing record experienced, it was decided to abandon it. In the short term, accessioning will be recorded on the Digital Rainbow word-processor facility purchased for the living collections secretary; but another, and inevitably more expensive, computer will have to be acquired.

Each year, we receive numerous inquiries from individuals, schools, garden clubs, and other organizations and institutions regarding plant-identification labels, and from other botanic gardens and arboreta regarding both manual and computerized plant-records maintenance.

Spongberg has been able to review procedures leading up to and during the plantings, and to recommend improvements and economies. Also, a new form was devised for accessioning seeds acquired from *Index Semina* that specifies the rationale for the addition of an accession to the living collections. This same form is being utilized for other plant materials, and the rationale will become a part of the permanent record for each accession.

Dr. Spongberg devoted much of Spring 1984 to developing the Bradley Collection of Rosaceous Plants that is to occupy the site of the old shrub collection in Jamaica Plain. A listing of all rosaceous taxa potentially hardy in the arboretum was compiled, and synoptic representation for all arborescent genera was made. Together with Koller, the areas to be occupied by the four subfamilies was determined. Spongberg has devised a planting plan for the subfamily *Maloideae*, and has prepared a listing of plants currently in the living collections that need to be propagated for inclusion in the Maloideae area. This planting plan follows a contour plan for the collection developed by Koller. Planning for this sector of the collection area has been completed.

In the collections themselves, the first part of a circulation and bed design for the Bradley Collection, constructed by Koller, was laid out under his direction. A large collection of rosaceous plants, representing both repropagated material and new accessions, was moved to a temporary holding site at the Case Estates.

Gary Koller designed, and the grounds staff began the implementation of the initial phase of a new path, linking visitor traffic patterns from the South Street Gate up to Beech Path through the lilacs and forsythias, and to connect to Bussey Hill Road. Development of this path will also improve visitor access once the new Forest Hills subway station is completed in September 1986, and the Arboretum gains anew access route to the grounds via its South Street tract of land. Undocumented trees and shrubs were removed. Important plants in the way of the path were repropagated. All is ready for the grading which should be done during the summer of 1984.

Koller planned, and the grounds staff installed, anew access path near the top of Bussey Hill. This path, to be known as Enkianthus Path, runs above Oak Path and below the Chinese Path, and cuts across a steep bank that had become overgrown. This path will allow upgrading of the surviving collections there. It will serve as a reference point for collections mapping, and will reduce the risk of fires, which have periodically swept up this hillside and through its plantings.

Agreement was reached with De Matteo Construction Co., of Quincy, Mass., to use fill resulting from subway construction under the Southwest Corridor Project, to build a berm between the railroad track and the collections on Peters Hill. When completed, the berm will be

10 feet higher than the rail bed, and on the arboretum side will gently taper into the natural contours. Its purpose is to prevent the incursion of stolen vehicles; to upgrade the contour for ease of maintenance; to enhance the esthetics of the area, and to act as a noise barrier for future high-use rail traffic. Once the mound is finished it will be planted with meadow grasses and evergreens. This project is the largest single physical change made to the arboretum in many years.

August 1983 was extremely dry, and caused the loss of new plantings, as well as the wilting and decline of many established and mature specimens. Late in March 1984 a severe snow storm led to massive damage both at Jamaica Plain and the Case Estates. The snow was backed by strong gusting winds that, combined with soft soils, uprooted many trees. Damage was particularly severe on conifers, several old and magnificent trees being completely destroyed. Superb specimens of *Abies concolor*, *Picea abies*, *Pinus virginiana*, and *Tsuga caroliniana* were lost. Most conifers suffered some damage and many had tops or major branches snapped.

It is particularly gratifying to record that vandalism has declined still further this year, presumably through the presence of the [Boston Park Rangers](#) in the Arboretum. Also, thanks to the bottle bill, litter collection now occupies only two man-days a week, instead of five days as formerly.

The work of the Propagation Department is in part summarized in the table. In addition to the taxa propagated for botanical research by the staff, a further 146 accessions were propagated for horticultural experiments.

In September 1983, Assistant Propagator Robert Nicholson collected in the Siskiyou Mountains of California. He returned with 50 accessions, including *Darlingtonia californica*, *Juniperus communis* var. *jackii*, *Lilium bolanderi*, *Kalmiopsis leachiana*, *Picea breweriana* and *Achlys triphylla*; and also 150 herbarium collections. Propagation research by Assistant Propagator Robert Nicholson included continued rooting trials with species of *Enkianthus*, and with five other genera, and germination trials in *Enkianthus*, *Ostrya*, and with *Cupressus dupreziana*, the celebrated relict and now endangered conifer of the central Sahara. His rooting work with *Enkianthus* yielded 200 plants which were made available to the Fall plant sale.

Head Propagator John H. Alexander has continued his work on the hybridization of lilacs in a search for genotypes resistant to leaf-roll necrosis. With Drs. William J. Manning and William A. Feder of the University of Massachusetts, Amherst, he has performed laboratory experiments which suggest that high concentrations of atmospheric ozone, a common condition in city environments, is the cause. Field comparisons between Amherst and Jamaica Plain are now under way.

Assistant Propagator Peter Del Tredici has continued his study of mutants of the Canadian hemlock. A paper on the history and nomenclature of the dwarf form, *Tsuga canadensis* "Minuta", is to be published by Theophrastus Books. He has also studied seasonal variability in the rooting of *Rhododendron calendulaceum*, (flame azalea) cuttings, and vegetative propagation of *Magnolia zenii*, the species recently introduced from China by Dr. Sponberg. The latter has resulted in plants which will be made available to the public at the Fall plant sale.

At the Case Estates, approximately 425 trees and shrubs were dug from the general nurseries and moved into Jamaica Plain during the autumn. No plants were moved this spring

from Weston. This winter, two volunteers sought out declining plants of scientific value for repropagation and transfer. The genus *Spiraea* was similarly checked and repropagated for the Bradley Collection.

The late-March snowstorm did much damage to the trees at the Estates and set work behind schedule by nearly three weeks. Nevertheless, the amenity areas of the Case Estates are exhibiting a much higher level of maintenance. The concentration of the amenity areas into an approximately 16-acre area, to the west of Wellesley Street, plus the American Garden to the east has helped, but the improvement is principally due to the high standards being achieved by Patrick Willoughby and his staff.

Two Radcliffe seniors, Elise Laurenzi and Angela Libby, studying landscape design, used the amenity areas of the Case Estates for their senior project. This area covers approximately 16 acres and includes the Street Trees, Rhododendron Display Garden, Ground Covers, Herbaceous Bed and surrounding area, and the Woodland Garden. An efficient, but aesthetic, path system was designed by them for this area. Many good new ideas were incorporated into the design while maintaining the best quality of what already existed.

Thanks to the Arboretum's excellent working relationship with the Massachusetts Chapter of the American Rhododendron Society, the major plantings of the first of the garden cells co-sponsored by them at the Case Estates is nearing completion. In just over a year, approximately 300 rhododendrons and companion trees and shrubs have been installed into the 1-1/2-acre area. Much of the native plant material continues to do very well, since it was disturbed as little as possible during construction. The Rhododendron Display Garden was officially opened at a reception on June 3.

Statistics for the Arnold Arboretum

Living Collections

Accessions

New accessions received into the nursery 1,677

Taxa represented in new nursery accessions 1,243

Processing

Plant accessioned into the permanent collections 822

Plants in the permanent collections repropagated prior to removal
486

Plants deaccessioned: missing or removed 491

Deaccessioned plants from which wood specimens were collected
100

Accessions representing taxa new to the permanent collections 110

Taxa occurring in nature represented in new accessions 364

Cultivars represented in new accessions 73*

Total number of taxa represented in new accessions
437

Accessions readied for verification through
collection of herbarium vouchers 1,468

Label replacements in permanent collections:

Record labels 2,540

Display labels 697

Total 3,237

Inventory, June 30, 1984

Total number of woody-plant individuals and
massed single-taxa groups in the permanent living collections 15,000

Number of species represented 2,625

Number of infraspecific taxa found in nature	1,124
Number of entities named as cultivars, including spontaneous forms	2,443
Total number of woody taxa in the Arnold Arboretum	6,192

Service

Taxa propagated for staff research	94
Taxa distributed to other educational and research institutions	309
Taxa distributed to private and commercial recipients	528
Total number of taxa distributed	837
Total number of shipments distributed	175

*52 of these represent plants acquired through collaboration with the American Rhododendron Society, and placed in their garden at the Case Estates.

Dr. Richard B. Primack of Boston University started research this spring at the Case Estates; he will study pollination and the setting of viable seed as well as other factors in a natural population of *Cypripedium acaule*, the pink lady's slipper. During the year, two more members of the ground staff, Timothy O'Leary and Vincent T. Antonovich, retired. Of the three positions which have become vacant in the last two years, it has so far only been possible to replace one: In Spring 1984, Robert Greene, who had been horticultural technician at the University of New Hampshire, joined the Jamaica Plain staff. At the Case Estates, Patrick Willoughby was formally appointed Managing Horticulturist at the beginning of the year.

Horticultural staff actively participated in national and regional meetings and in lectures to private societies. They made major contributions to the courses offered through the Public Programs of the Arnold Arboretum. Gary Koller has contracted to give two plant-identification courses at the Radcliffe Seminars in Landscape Design. Both the Jamaica Plain and Case Estates facilities have been used for these projects by students from the Department of Landscape Architecture. Dr. Spongberg continues to serve as International Registrar for cultivar names in several genera and, with Dr. Howard, added some 500 new references to the ongoing Rehder index of citations to temperate cultivated trees. This index forms an essential reference source to the verification project. Peter Del Tredici has become International Registrar for cultivar names in the genus *Magnolia*. John Alexander was awarded the Director's Award of the International Lilac Society for his work in the propagation and distribution of rare lilacs, for his

curatorial contribution to the lilac collection at the Arnold Arboretum, and for promoting the cultivation of the lilac.

PUBLIC PROGRAMS

This year the public programs have grown to maturity. This fourth year of a five-year program of expansion and development has seen the education program reach maximum potential capacity at present staffing levels. Relations with our neighborhood committees and the Parks Department moved into a period of solid achievement and mutual commitment; and Arboretum publicity focused on a more clearly defined market. A further grant, at maximum level, was awarded to our public programs by the Institute of Museum Services, and revenue from programs has continued to increase.

Barbara Epstein, Membership Coordinator, who had been on our staff for 12 years, retired, having seen significant expansion of her programs and of the membership. In December, Robin B. Pelzman was appointed to take her place, and the membership program is now being prepared for a further period of expansion. Under Volunteer Coordinator Cornelia McMurtrie, our volunteers have again increased by half; as have the Arboretum tours and facilities rentals, services for which she has been responsible.'

Public Relations

The two main public events at the Arboretum are the Arbor Day Festival, which is co-sponsored by the Arboretum Committee, our neighborhood advocacy group; and Lilac Sunday. Both experienced substantially greater public participation than in any recent year.

In October, the Arboretum participated in the Museums of Boston's annual Museum Goer's Month event at the Faneuil Market. There was a Christmastide event in the Hunnewell Building on December 11th. In conjunction with the Olmsted National Historic Site, the Arboretum mounted an exhibit on Boston parks in Symphony Hall in February and March 1984. Also in February, the Arboretum Committee hosted an Old-Fashioned Winter Day in the Park intended for cross-country skiing tours. The weather proved to be unusually warm, but many visited nevertheless for tours, slide shows, and story-telling. The annual members' plant giveaway and sale at the Case Estates became more of a public event this year, and was attended by record numbers, while the opening of the Rhododendron Garden at the Case Estates, which is jointly sponsored by the Massachusetts Chapter of the American Rhododendron Society, drew many visitors as well as members.

In May 1984, eighty representatives from thirty-seven garden clubs from throughout New England participated in a day-long briefing and tours, to explain the work and collections of the Arnold Arboretum as a regional resource.

Public Relations Coordinator Kathleen Nixon has given greater focus to Arboretum publicity. While publicity for events has been as extensive as ever, emphasis has been given to the educational opportunities and services offered by the Arboretum. Throughout the year, the

media carried pieces in which the Arboretum figured prominently. Spring and fall centerfolds continue to appear in the Harvard Gazette.

When it was realized that the budget cuts mandated by the new City of Boston administration would threaten Parks Commissioner Robert McCoy's plans for the continuation of the Boston Park Ranger Program into 1984, the strength of our neighborhood commitment and resolve became apparent. The Arboretum Committee contacted community groups throughout the Boston parks system, and together they successfully lobbied the City administration. Much of this success was due to support received from local City Councillor Maura Hennigan. Once the Ranger Program was funded again, the Arboretum Committee has been tireless in raising funds for its support, from markets and food sales at Arbor Day and other occasions and from parties and other events.

The Private Industry Council awarded the Arnold Arboretum grants to employ three Jamaica Plain High School students, in the summers of 1983 and 1984. The students worked with public programs staff and in the Jamaica Plain library.

Education

This year, under Education Coordinator Katherine A. Terzi's direction, the adult programs have been further consolidated, while a very encouraging start has been made to a new venture, the Children's Programs.

Attendance at the Adult Programs increased a further three hundred to 2,498 when the free Wednesday Lecture Series were included. The courses concentrate on basic skills in Practical Horticulture and Gardening, Botany and Ecology, and the Human Experience of Plants. Staff from all departments of the Arboretum have contributed. In general, the program has responded to demand by concentrating on short courses and hands-on workshops rather than lectures.

Once again, the All-day Symposia proved to be very successful. With assistance from Gary Koller, Managing Horticulturist, and working in association with the Massachusetts Arborists Association and the Boston Society of Landscape Architects, we jointly planned and presented "Perennials Tough Enough for Installed Landscapes" in October 1983, and "Trees for Urban Environments" in December. Both symposia attracted 150 to 250 participants.

An improved structure and schedule for the Summer Horticultural Intern Program was implemented. Owing to financial stringencies, the number of interns declined from 20 in 1983 to 13 in 1984. They worked on the grounds in Jamaica Plain and the Case Estates, in the greenhouses, mapping and labelling; helping the Education Program; and with exhibits, the library, tours, and visitor services.

The Plant Information Service continues to attract somewhat over one thousand inquiries annually.

Youth Programs

For many years, the science curriculum has been a low priority in the Boston public schools. In the fall of 1983, a new citywide Science and Health Curriculum was developed and distributed to elementary and middle schools in Boston, as well as to scientific institutions. Scientific and cultural institutions, the Arnold Arboretum among them, and universities have been approached by the Boston School Department and its agencies to assist in the implementation of these curriculum objectives. These institutions are equipped to help teach many of the areas of science with expertise and resources not available in the classrooms.

In response the Arnold Arboretum has begun a program of assistance to elementary schools which includes field study experiences, resources to teachers and a reference center. Ms. Terzi worked directly with teachers, coordinators, principals, administrators, and parent groups of the schools in Boston; collaborated with other scientific and cultural institutions; and trained and coordinated the corps of volunteers who actually conduct the program. A modest collection of resources has been assembled to assist teachers to use the Arnold Arboretum.

In addition an experimental minicourse was developed by Peter Del Tredici, Assistant Plant Propagator. Sixth-grade students from one class in a Brookline school came to the Arboretum three times for two-hour lessons, keyed to the season. The Brookline Schools Science Coordinator has subsequently contracted for all fourth-graders to visit the Arboretum for classes in natural history. The program has been applauded by school administrators, educators, and teachers, and, of course, the children.

Exhibits

Five exhibits were mounted this year. "Plants and Insects," showing the drawings and watercolors of Cynthia DeSando and Michael Grassi; "Forgotten Landscapes," photographs of the Back Bay Fens by Judy Banks; "Christmastide Decorations and Wreaths," put on by Back Bay Gardens; an exhibit from the Harvard Wood Collection organized by Postdoctoral Fellow and Curatorial Assistant Phillip M. Rury; and "Plants and Medicine, Some Photographs," by Aaron Lurie, M. D. Each exhibit was opened by a reception for members and guests of the exhibitor; Drs. Rury and Lurie presented lectures.

Guidebook Project

Work under a planning grant from the National Endowment for the Humanities, to prepare materials for an interpretive guide to the Arnold Arboretum that reveals a plant collection as a human cultural endeavor, was completed. A detailed outline has been prepared for an introductory, and volumes on native New England plants, plant exploration, plants in our lives, and plants in landscape design. Dr. Richard Weaver, who had been responsible for the project before his resignation, was replaced by Dr. Spongberg. The execution of the project has principally, however, been in the hands of Assistant Librarian and Horticultural Archivist Sheila Geary, assisted by Associate Curator Ida Hay and two Project Researchers on the grant, B. June

Hutchinson and Eugenia Frey. A Number of leaders in the fields covered were brought in as consultants.

Membership

At the end of calendar year 1983, Barbara Epstein retired as Membership Coordinator. Since she joined the staff of the Arnold Arboretum membership has expanded by more than 50 percent, and programs have become established upon a successful and professional basis. In December, Robin Pelzman, the new Coordinator, was appointed. During her first six months, Robin has undertaken a detailed review of programs and management systems, with a view to the possible restricting of membership benefits before embarking on further campaigns. At present, members receive as benefits our horticultural magazine *Arnoldia* and newsletter *plantSciences*, as well as a biennial plant dividend, an unusual plant gift at our two plant sales, reduced registration fees for classes, and invitations to a number of events throughout the year.

Coordinator Robin Pelzman has participated in the formation of a Membership Coordinators Working Group among a number of similar institutions, with the aim to exchange ideas and work together in increasing memberships and financial support.

The Arnold Arboretum Association

In May 1983, a group of 21 Friends met, and formed a working group responsible to the Chairman of the Visiting Committee, for the purpose of fundraising for special projects planned or being undertaken by the Arnold Arboretum. Mary Ashton was appointed provisional Chairman. Their first project was to inaugurate an Arnold Arboretum Plant Auction for the fall Plant Giveaway and Sale at the Case Estates, at which they also prepared a luncheon available to all participants. The enterprise met with great success, and \$7,300 was raised towards equipping Professor John Einset's Tissue Culture Laboratory at the Dana Greenhouses in Jamaica Plain. The support and goodwill extended by all involved has ensured that the event will become an annual one.

Volunteers

Comparison of the accompanying table with that of last year shows that there has been a further great increase in the number of volunteers, who provide assistance to every aspect of our work. The greatest increase has come as a result of the Living Collections Verification Project. Thirteen volunteers formed the team of instructors for the burgeoning new Children's Program within the Education Department of our public programs. The greenhouse continues to rely on an able cadre of volunteers. Volunteers turned out in record numbers at the Fall Plant Giveaway and Sale, at the New England Flower Show, on Arbor Day and on Lilac Sunday. In all of these activities, volunteers form the core of the workforce. Without them the projects would have had to be abandoned. Twenty-one new, five current and six summer interns attended a spring training session in April that ran for four consecutive days, including a weekend, in order

to attract prospective volunteers who have full-time work. Of these, seventeen new volunteers have joined the program.

Peter Shaw Ashton, Director

Summary of Volunteer Assignments

<u>Assignments</u>	<u>Number of Volunteers</u>
Public Programs:	
Education	6
Membership	9
Public Relations	8
Tours	12
Gift Shop—weekend reception	7
Children’s Program	12
Publications:	
<u>Arnoldia</u>	2
Living Collections:	
Propagation	12
Specimen collecting and verification	33
Mapping and labelling	4
Conservation	1
Case Estates gardening	9
Herbaria:	
Cambridge	4
Jamaica Plain	2
Wood collection	1
Libraries:	
Cataloging	1
Archives	2
Slide collection	7
Staff Research:	2