



Annual Report 1955-1956

TO THE PROVOST OF THE UNIVERSITY:

SIR,

I would like to submit my annual report for the Arnold Arboretum for the fiscal year ending June 30, 1956.

Spring was late in its arrival at the Arboretum in 1956 and the flowering season was characterized by one of the most unusual mixtures of flowering periods on record for Jamaica Plain. With forsythia and lilacs in nearly full bloom at the same time and with the lingering flowering of magnolias and the normal flowering of various species of azalea, there were many combinations of color and beauty never before recorded on our grounds.

The ground staff was able during the fall and winter to complete a back log of pruning made necessary by the hurricanes of recent years, thus bringing the grounds to top condition. The cooperation of the [Boston Park Department](#) resulted in greatly improving the appearance of the walks and roadways and the staff joins in the often-heard public comment that "the Arboretum has never looked so attractive as it does now."

The progress I wish to report in the scientific program and the care of our research collections would indicate that the Arboretum staff is active and our responsibilities are being met.

THE STAFF

The staff was saddened during the past year by the death of its director emeritus, [Elmer Drew Merrill](#) on February 25, 1956. Dr. Merrill's long and active career and contribution to the knowledge of the Pacific area of vegetation was reviewed in the July 1956 [Journal of the Arnold Arboretum](#). A minute on his life prepared by Drs. Sax, Kobuski and Howard was read to the faculty on October 16 and published in the *Harvard University Gazette* on October 27.

It is also with regret, but with appreciation for their services, that I announce the retirement and resignation during the fiscal year of Miss Hariklia Yeranian and Mrs. Beatrix Farrand. Miss Yeranian, a moulder of specimens at the Arboretum for thirty-two years, saw the development of the herbarium to its stature today. Beatrix Farrand, noted horticulturist and long a Friend of the Arnold Arboretum, was appointed consulting landscape architect in 1945

and contributed valuable services in the necessary revamping of the grounds following the unavoidable neglect of the war years.

Two botanists were added to the staff of the Arboretum during the past fiscal year to work on special projects supported wholly or in part by special grants. Dr. Robert Bennie Channell joined the staff to work with Dr. Carroll Wood on the vegetation of the southeastern states. This work is supported in part by grants from the National Science Foundation and in part by the George R. Cooley Fund for work in the taxonomy of flowering plants.

Dr. Ding Hou received his doctorate from Washington University in St. Louis. Dr. Hou accepted a one-year appointment at the Arboretum to assist on the [Flora of China Project](#) which has been supported by grants from the China International Foundation.

Honors came to several staff members during the year. Professor I. W. Bailey was elected a foreign member of the Linnean Society of London and an honorary member of the Indian Botanical Society.

[Dr. Wyman](#) continued his services as a trustee of the Massachusetts Horticultural Society and was elected secretary of the American Horticultural Council. Dr. Howard was elected to serve a one-year term as one of the directors of the American Association of Botanical Gardens and Arboretums.

Dr. Kobuski was re-elected assistant curator of the herbarium of the New England Botanical Club and continues to serve on the council of that organization. Dr. Wood accepted the secretary ship of the Systematic Section, Botanical Society of American preparation for the meeting of the American Institute of Biological Sciences to be held in Storrs, Connecticut, in 1956. Members of the staff, both officially and informally, represented the Arboretum at horticultural and botanical functions on both sides of the Atlantic during the past year.

Dr. Howard attended the Fourteenth International Horticultural Congress held in the Netherlands. [Dr. Sax](#) and Dr. Wood attended the annual meetings of the American Institute of Biological Sciences in East Lansing, Michigan, in September. [Dr. Donald Wyman](#) represented the Arboretum at meetings of the American Horticultural Council and the American Association of Botanical Gardens and Arboretums. Mr. Coggeshall attended the meeting of the American Plant Propagator's Society in Cleveland, where he presented a feature paper on the propagation of Asiatic maples. Dr. Karl Sax was chairman of the opening session of the Brookhaven National Laboratory Genetics Symposium and attended the American Society of Horticultural Sciences Conference on rootstocks held at Monmouth, Maine. He also presented papers at the Northeast Regional Meetings of the American Society of Horticultural Sciences held in Cambridge.

The requests for staff members of the Arboretum to speak for meetings of garden clubs and groups interested in the work and resources of the Arboretum and its staff continued to

exceed our ability to fulfill. Such extension services must of necessity remain an extracurricular activity of the Arboretum staff members.

HORTICULTURE

Again this year the weather of New England has varied from that expected and so has been an important factor in the growth and maintenance of plants at the Arboretum. During the summer sustained rainy periods, especially those associated with Hurricane Diane, produced flooding in many parts of the grounds and caused the Bussey Brook to run high and wash out its retaining walls in several places. The floods themselves did not do serious damage, but the saturation of the ground, with accompanying gusty winds, even though low in velocity, caused the loss of several trees which had been weakened in previous seasons by hurricanes. We noticed especially the loss of a specimen white oak across from the collection of mountain laurels which leaned for many years towards Bussey Brook. It was under this tree that a memorial service for Charles Sargent was held in 1927.

The high water table lasted into the fall and winter and the freezing and thawing of the early months in 1956 produced further standing water in parts of the Arboretum. The linden collection, located in a natural low spot along the Meadow Road, appears to have been affected by this standing water and several of the larger trees show signs of considerable damage. In addition, mold became prevalent in the turf of that area and required special treatment. One of the latest freezes on record occurred on May 25th in Jamaica Plain and was also felt in Weston. This late freeze caused minor damage to the leaves and flowers normally open at that time, but insofar as is known to the present, will have no lasting effects on the ornamental plantings in Jamaica Plain. The apple crop at Weston, however, is a total loss this year because of the freeze.

The appearance of the grounds, particularly near the lilac collection, was greatly enhanced this year when the [Park Department](#) found it possible to clean out the grass and soil from a portion of the cobblestone gutters which line the roads. This task has been neglected since before the war. The accumulation of silt and the encroachment of weeds made maintenance of the collections difficult, thus detracting from the appearance of the grounds. The Park Department also repaired the macadam sidewalks, thus improving the appearance and increasing the safety of the paths. Special attention has been given to the plantings at the summit of Bussey Hill. Many of these shrub plantings had become overgrown and filled with weed trees. The valueless plants were weeded out of these areas and many of the approaches to the turn-around area were planted in ground covers which will improve the appearance of the area while at the same time demonstrating many of the better ground covers in natural settings to contrast with the comparative row plantings in Weston. The collection of rhododendrons has responded so well to the applications of fertilizer and, in particular, to castor pumice applied in the past two years that additional supplies of this fertilizer were added to the mountain laurel collection and to various plantings of azaleas.

The collection of *Rhododendron calendulaceum* bloomed especially well this year, indicating that the treatments given have been correct. The overgrown collection of Ghent hybrid azaleas also received special attention during the fall. Both of these collections were outstanding in their excellent natural settings among the oaks. During the last year the Arboretum was troubled with a severe infestation of rhododendron scale which resisted the control with the usual sprays and methods of application. The scale was tentatively identified as one of the Kermes scales which invade the crevices of the bark. The mature scales are extremely difficult to kill. An experimental approach was used with wet table DDT and malathion in varying combinations and at various times of application. Three applications from June to August seemed to give almost complete control of this pernicious pest.

During the year applications of milky spore disease, under the trade name of "Doom," were made to the lawns and grassy areas within the Arboretum. It is hoped that this attack on the Japanese beetles will reduce their numbers within a few years. In the meantime, spraying with insecticide was continued to counter the ravages of these insects, primarily on members of the Rosaceae.

Two hundred and twenty species and varieties were added to the collections in the fall and spring planting program. Of these, seventeen seem to be completely new to American gardens and forty-nine additional ones have never been tried in the Arnold Arboretum. The remainder duplicate, in some cases, plants already in our collections, but represent additional clones for trial, while others represent taxa which have been grown at the Arboretum in the past but have died out or have been lost.

[Dr. Wyman](#) continued to act as coordinator for a group of American arboreta and botanical gardens by working in conjunction with the Horticultural Crops Research Branch of the U. S. Department of Agriculture in bringing into the United States for trial plants now on the "prohibited list." One hundred and forty-five plants have been introduced and grown for two years at Glendale, Maryland to satisfy the Bureau of Plant Quarantine regulations. They have now been released to interested arboreta for propagation and distribution. Fifteen taxa were released for the first time this year.

Requests for materials from the living collections came literally from all sections of the world and varied from pollen for identification and breeding programs to seeds and propagating material, to herbarium specimens and preserved or fresh material for scientific study. These requests are filled as time and personnel permit. During the past fiscal year the propagator distributed on request ninety-four shipments of seeds representing three hundred twenty-two species and varieties. These were sent to eleven countries besides the United States and Canada. In addition, one hundred fifty-one shipments of four hundred fifty-six species and varieties of whole plants or cuttings and similar parts for propagation were sent to four different countries outside of the United States. Such shipments involve time and, often, considerable routine labor for preparation and may also be expensive when shipments must be sent by air to insure the material of safe arrival in living condition.

In exchange the Arboretum received one hundred forty shipments of plant parts representing five hundred sixteen species and varieties. During the past year it has been possible to establish a working procedure with several gardens and arboreta in the southeastern United States and in the Caribbean. Now, when seed shipments are received, sizeable quantities are divided and portions of the seed lots are shipped to more southern institutions for trial. If seed lots are small the plants are started in our greenhouses and the quantity of young plants are divided, a portion to be tried for hardiness in our own area and others to be sent for trial further South. By this method we hope to carry through to maturity many of the species and varieties sent to us for trial which in the past have frequently been lost when the young plants were killed by severe winters. At the same time, the chance of a hardy strain able to survive the New England climate has not been eliminated. For our own collections, for distribution and for experimental purposes the propagator increased by cuttings, grafts and budding 15,516 individual plants representing four hundred seventy-five species and varieties. As the plants propagated were often in excess of our own needs, many were distributed informally for testing purposes through the educational program. Some of the surplus plants grown at the Arboretum find a place around the grounds of the Harvard University buildings in Cambridge. Surplus shrubs ranging from three to eight feet high and trees six to ten feet high were selected by the Department of Buildings and Grounds from a list of ninety-two species which we felt were desirable for campus plantings. This distribution of surplus plants was mentioned in the original indenture establishing the Arboretum. Such plantings not only beautify the Harvard campus but increase the student interest in horticulture and the proper selection of plant materials for landscape and garden design.

We continued a program of renovation of buildings belonging to the Arboretum in Jamaica Plain and Weston. During the year the Administration Building required repairs to the heating system and received new downspouts of heavy copper, as well as a complete outside painting of all exposed wood surfaces.

The Fourteenth International Horticultural Congress was held in Scheveningen, the Netherlands, during August of 1956. Dr. Howard, who attended as a representative of the Arboretum, was also able to visit many other botanical gardens and arboreta in Europe. The Congress itself offered the director the opportunity of meeting many horticulturists from remote sections of the world for the first time and of renewing acquaintances with others. The visits to the botanical gardens allowed discussions with the directors and curators in these organizations regarding the problems of maintenance, exhibit, identification and scientific study of the plants within the gardens. It was obvious that American gardens such as the Arnold Arboretum can never compete in appearance with the English gardens where meticulous hand labor is more available and more reasonably priced. Also obvious was the difference in the consideration of the general public for the plants and plantings generally seen in Europe in contrast to our own experience in New England.

Nevertheless, the Arnold Arboretum can definitely be proud of the scope of its collections, the quality of the plants and especially the standards of labelling and accuracy of names in living collections. The full use of the living collections, as well as the research materials of the Arnold Arboretum stood out in contrast with the utilization of European gardens by the scientific staffs attached.

The experimental work of the Arboretum staff dealing with ornamental plants on the grounds and in the greenhouse continued. Experimental and comparative methods of weed and brush control are always possible and, in fact, necessary to maintain the plantings. Special attention was again given to control methods for *Cynanchum nigrum* and species of *Convolvulus*.

Dr. Wood has under observation selected clones of *Robinia*, the rose acacia both for the basic information of the species relationships of the clones and for the possible ornamental value as individuals and as breeding stock. In the greenhouse Mr. Coggeshall continued his experiments on control of germination of seeds, propagation by cuttings, compatibility of stock and scion and evaluation of propagation techniques. The intermittent mist propagation system given to the Arboretum for experimental purposes last year has been established and used for comparative propagation experiments with the plastic "tent" technique and other selected methods. Finally, mention should be made of a development which will affect both the appearance and the problems of maintenance of the Arnold Arboretum in the future.

During the year the City of Boston sold the land known as Joyce Kilmer Park which is at the junction of Walter and Centre Streets. This was deeded directly to the City of Boston and has never been a part of the Arnold Arboretum. This piece of wooded land is across from the conifer collection on Walter Street and adjoins the Weld Walter Street tract of the Arboretum. The park was sold to the trustees of the Dorchester Home for the Aged and, although the sale was protested by residents of the area, the sale was approved by the Supreme Judicial Court of Massachusetts. The trustees plan to erect on this site a large building tentatively known as the Hebrew Home for the Aged in West Roxbury. The large building will occupy most of the space available in the plot. As construction proceeds in the coming year the traffic problem will be accentuated and when completed, the service traffic and visitors to the home will present additional problems to the Arboretum staff. It is hoped that this building and its surrounding area can be landscaped so that it does not clash with the natural beauty of the adjacent Arboretum properties. The director of the Arboretum plans to remain in touch with the contractors and the trustees to work out mutual problems which will arise due to this significant change along Centre Street.

CASE ESTATES

The horticultural work of the Case Estates in Weston continued without interruption during the year. Damage from floods, windstorms and frost was minor, excepting only the loss of the experimental apple crop due to the late May frost during the flowering period. Several of the

buildings on the grounds were given additional attention during the year and one large house on adjacent land left for the use of Mrs. Theodore Chandler by the will of Miss Marion Roby Case reverted to the Arboretum when vacated by Mrs. Chandler in February of 1956. With the approval of the Corporation this house is currently being renovated and will be occupied by the directors of the Arboretum in the fall.

The spring season was very slow in developing at Weston and the Open House scheduled on the grounds for May 5th did not show the plants and plantings to the same advantage as did the comparable date of a year before. However, with excellent publicity the attendance was high, despite the inclement weather.

EDUCATION PROGRAM

The informal education program of classes for adults held at the Arboretum was continued in two semester sessions during the past year. The interest in these courses remained high and the classes probably had the highest perfect attendance ratio of any education program in Boston. Drs. Wood, Wyman, Sax and Howard, as well as Mr. Coggeshall, all of the Arboretum staff, offered courses in this program.

Mr. Albert C. Burrage, well known to New England horticulturists for his work with economic horticulture of garden vegetables, offered an informative course entitled, "Gardening with Vegetables." In addition to this program of courses the staff joined in other types of instruction. During the spring guided tours of the grounds were offered to any group bringing a minimum of twenty-five persons and scheduling the trip in advance. Garden clubs in particular are familiar with this service and used these trips as programs and sources of information. The staff cooperated with the Massachusetts Horticultural Society in presenting their Annual Field Day at the Arnold Arboretum on Saturday, May 19th.

An Open House was held on the Arboretum grounds on Sunday, May 20th and although the flowering season was delayed the large attendance indicated the interest of the general public in visiting the Arboretum at a time when questions could be answered by staff members. Among the groups of visitors to the Arboretum was a study group of horticulturists and nurserymen from Europe. This group of well-known students of ornamental plants included seventeen Germans, one Austrian and one Swiss with an American specialist as guide and interpreter. The staff was pleased to have these men visit the collections in Jamaica Plain. One of the highlights of the year was the venture by the Arboretum staff into education by television.

During the summer months the staff was invited to present a series of experimental programs on WGBH-TV, Channel 2. The time was selected so that it did not conflict with important network shows and so that the staff of the television station could work closely with the novices in this field from the Arboretum staff.

During July and August the Arnold Arboretum presented four weekly hour long programs entitled "Notes from the Arnold Arboretum." The staff was in agreement as to the excellence of the medium for presenting information about plants and the fine cooperation received from the studio technicians. However, each program required such a major effort in preparation that with the regular work program before the staff we reluctantly decided against further regular programs. Staff members have appeared as guests on other programs and the staff attempts to cooperate as fully as possible with the educational television station in supplying materials as background scenes or demonstrations when so requested.

EXHIBITS AND DISPLAYS

For the past several years the Arnold Arboretum has had an exhibit at the Spring Flower Show of the Massachusetts Horticultural Society. During the past year considerable time and effort went into the preparation of an exhibit demonstrating methods of increasing plants. This proved to be an outstanding exhibit which again won for the Arnold Arboretum a first prize and a gold medal. In the exhibit room of the Administration Building in Jamaica Plain the staff offered an annual Christmas Show of plants and greens. In addition to the more common evergreens the show displayed a collection of dried plant materials bought in advance from the florist markets in Boston. The correct botanical names for these plants and some information about them was supplied on labels.

During the spring the Arboretum was honored with a colorful billboard display along U.S. Route I on a sign sponsored by the Boston Envelope Company and under the title, "The Boston Envelope Company salutes the Arnold Arboretum, America's Greatest Garden," there appeared a colorful reproduction of the Forest Hills Gate and the cherry and apple collections inside. Since the sign is located at the junction of Jamaica way and Brookline Avenue and is illuminated at night, it drew many phone calls and sent additional visitors to the grounds this spring.

LIBRARY

The librarian, Mrs. Lazella Schwarten, and her staff of regular and temporary help were active during the year in the organization and integration of the books housed in the Harvard University Herbarium Building. Work was divided between much needed physical care of the bindings, changes in cataloguing and actual integration and was carried on in addition to regular services to staff, students and visitors. The air-conditioned and filtered environment has made easier the care of the library volumes. Thus bindings treated or replaced during the year show better retention of quality than ever before. The integration and cataloguing work of the year concerned primarily the volumes of periodicals. Individual volumes and sets were compared and selected on the basis of condition, origin as gifts or autographed copies, as well as for annotations and usefulness. Complete active sets are now maintained and the duplicates are being held in reserve. The final selection of sets for current use required changes in cataloguing and listings on the volumes and in the main catalogue, the shelf-list cards and the

Kardex guide. Lists are also maintained of the reserve volumes. With the completion of work on the periodicals, efforts were directed to an examination of the monograph collection. It is planned to integrate and consolidate this collection from the Gray Herbarium and the Arnold Arboretum and the duplicates are to be shelved in the herbarium adjacent to the appropriate family. The monographs will be numbered according to the Dalla Torre and Harms system of Genera Siphonogarum with the Arnold Arboretum supplementary listings and the authors' numbers according to Cutter. This task was about seventy percent complete at the end of the fiscal year.

Changes were made in the section shelving of horticultural books housed in the Administration Building in Jamaica Plain. Portions of the library were shifted to the second floor along with the back numbers of periodicals to allow room for expansion in the main library room. The system of arrangement was changed, involving a complete shift of nearly all books in the library, but resulting in a more workable organization for those visitors not thoroughly familiar with the scientific classification of categories of books. During the year three hundred books were added to the library, including forty-three specially selected books to complement the horticultural holdings.

The total accessioned bound volumes is now 49,509. Pamphlets received and added to the library total two hundred eighteen numbers, making a grand total of 15,968. Five hundred catalogue cards were added to the main file, eight hundred shelf cards were prepared and one thousand cards were added to the Gray Herbarium species index. Requests for books on inter-library loan continued high, numbering one hundred thirty-six individual shipments during the year to all parts of the country. The librarian continues to assist where possible in supplying photocopies or microfilm reproductions. If the request is reasonable, the librarian often checks a reference or verifies a page or date in preference to sending a book on loan. Such services characterize and are a credit to our librarian.

HERBARIUM

The plans described in previous reports for the integration of the herbarium collections moved to Cambridge and housed in the Harvard University Herbarium were the basis for the work of most of the herbarium staff during the past year. The curator, Dr. Kobuski, directed the progress of the integration and by the end of the year considerable and very satisfactory progress had been made in placing the combined herbaria in first-class condition. During the past year the families of plants represented in the collections of the Gray Herbarium and the Arnold Arboretum which were in proximate arrangement received further adjustments. Two major steps are involved in the handling of each family. In the first step the component genera are placed in sequence and in the second step actual integration at the species or sub-species level is accomplished. Each of these moves may involve considerable work, but in small families both steps can often be accomplished in one operation. Old genus covers are replaced. New generic boards are prepared. Type or authentic specimens are separated. In large families such as the Leguminosae and Rosaceae, even the first step can be complicated and time-consuming.

When both the Gray Herbarium and the Arnold Arboretum followed the same generic order and divisions, the task was mainly a physical one of shifting several thousand compartments of specimens. Where different generic order was used or where different generic concepts were recognized, the consistent organization of genera in successive order required careful planning and execution. The decisions to recognize segregate genera or where to place in sequence recently described genera were made after staff consultation so that all staff members taking part in the move were aware of the location and the treatments to be followed. A test case involved the family Verbenaceae, where all available staff members of both institutions, twelve in number, worked on one family at the same time to do complete integration. More recent practice has been to work in teams of two individuals on the generic integration and as individuals on the species integration. Two workers, therefore, were able to shift and rearrange the genera of the Leguminosae with little confusion and little wasted effort after the initial decisions of generic limits were made and the work planned. Integration within the genus involves the arrangement of species and sub specific units, the writing of new covers, the geographic arrangements and segregations and the selection and separation of type material. Type or authentic specimens are being placed at the end of the genus or generic geographic unit; e.g., Am. Bor., Ind. Occ., etc., and indication that the type has been removed is made in the species arrangement. Types are being placed in individual species folders for the first time. Unidentified materials in the herbaria are placed where possible with the genus and the proper geographic unit. Material identified only to family is sorted geographically and filed at the end of the family. The arrangement of geographic areas for the Eastern Hemisphere is that followed by the Arnold Arboretum herbarium and the arrangement for areas of the Western Hemisphere (and particularly the United States) is that used by the Gray Herbarium.

At the end of the year the rearrangement of over one hundred families was under way or was completed. The fruit and seed collection and the photograph and negative collection received additional work during the year. Two college students were employed during the summer to continue the task of arranging the negatives and prints of the type and authentic specimens represented in our herbarium or photographed by staff members elsewhere. The fruit and seed collections were placed in boxes, rather than bottles, and are to be arranged in a system comparable to that used in the herbarium. The boxes of specimens will be stored in special trays and units on the first floor of the building where these collections will be equally available for use by the taxonomists of living plants and the students of the fossil seeds and fruits of paleobotany.

Work on the herbarium of cultivated plants has been limited to checking the coverage of the herbarium in relation to *Rehder's Manual* and other handbooks of cultivated plants and to mark and separate types of cultivated taxa and cultivars. During the past year 6,060 specimens were mounted and added to the herbarium, bringing the total accession count to 687,807 specimens in the Arnold Arboretum.

The herbarium of the Arnold Arboretum received during the year 19,850 specimens by gift, purchase or subsidy, and exchange. The vast majority of these, 16,599, represented the flora of Malaysia and Asia and 6,056 of these were purchased by residual commitments. During the year the Arboretum sent out in continuation of exchange 23,460 specimens, of which nearly all went to herbaria and botanical gardens in Europe and Asia.

One of the major services which the Arboretum staff renders to the botanical and horticultural fields of research is the loaning of specimens from our herbarium. The large number of types and authentic specimens in our herbarium indicates both the excellence of the collections and the activity of the staff members of the organization who have described new plants and placed in our herbarium the type specimen of the new unit.

During the year the Arboretum received requests for the use of its material from forty-eight institutions in twelve different countries. Because of international or internal local disturbances and postal regulations, it was not possible to fill all of these requests. In total, eighty-seven loans were shipped out to forty-six institutions, half of them in the United States. The loans varied in size from single sheets to loans of 1,498 and 1,674 specimens.

A total of over 14,000 specimens was sent out for the use and study of other students of plants. The research activities of the herbarium staff were reduced again this year as the members devoted the majority of their time to work in the herbarium. Dr. Howard worked on his collections of plants associated with bauxite soils from Jamaica and continued his studies of the genus *Coccoloba* in the West Indies. With the assistance of a technician, Miss Kathryn Greer, his research on the vascular structure of the petiole was expanded to include more tropical families and genera and involved some material from herbaria. Dr. Wood worked actively with the organization of a project on the flora of the Southeastern States. Along with Dr. Reed C. Rollins, director of the Gray Herbarium, he received support for this work through a three-year grant from the National Science Foundation. Surveys of bibliographies and indices are being made to classify recent literature references dealing with plants found in that area. Dr. Wood has continued his interest in the genera *Robinia* and *Drosera*, utilizing techniques of cytology and taxonomy in his study of each genus.

Dr. Channell, who has been working with Dr. Wood on the flora of the southeastern states, made a special study of the genus *Rynchospora*, as well as devoting a portion of his time to a completion of studies in progress of *Marshallia*. Although much of his time is given to his regular work as editor of the *Journal of the Arnold Arboretum* and curator of the herbarium, Dr. Kobuski was able to devote a little time to the Theaceae, a family of his specialty. Dr. Perry has accepted responsibilities for many phases of the work in the herbarium and was able to complete the preparation of labels for the collections made by [L. J. Brass](#) on the [Fourth Archbold Expedition to New Guinea](#). Mr. Canoso's work as curatorial assistant has been essential in the smooth functioning of the organization. During the year many collections have been received and accessioned. A major effort was the distribution of duplicate specimens on hand which had to be separated, packed and mailed.

COMPARATIVE MORPHOLOGY

Professor I. W. Bailey, Professor of Plant Anatomy Emeritus, has served voluntarily as the curator of the wood and pollen collection following his retirement. His efforts in arranging these collections and servicing requests for materials from the collections materially assisted the herbarium staff. Professor Bailey continues his anatomical studies and during the year completed several papers which will be published in the coming issues of the [*Journal of the Arnold Arboretum*](#).

Several additions were made to the wood collection in the past year. The largest gift was a collection of wood samples from the forestry laboratory of British North Borneo. During the year Mr. Sherwin Carlquist, a National Science Foundation Fellow, studied the materials of the Compositae in the herbarium and the wood collection. Mr. Chen continued his interests in the anatomy of the Sapotaceae and utilized these collections and Dr. Abraham Fahn, visiting scholar from Hebrew University, Jerusalem, Israel, based his investigations on the Arnold Arboretum wood collections.

CYTOGENETICS

[Dr. Karl Sax](#), his assistants and students have reported the following contributions in the field of cytogenetics. It has been determined that the Sargent crab apple, *Malus sargentii* and its variety rosea, are facultatively apomictic. Some hybrids, however, have been obtained by crossing these plants with both ornamental and horticultural varieties of apple. The resulting hybrids are largely apomictic, suggesting that apomixis is a dominant character, at least in the hybrid swarms. If this is true, it should be possible to produce new varieties, both ornamental and economic in character, which can be reproduced from seed. Such work in selection continues. Earlier interest in the species and varieties of lilacs has continued as crosses are made between *Syringa vulgaris* and *S. laciniata* and between *S. laciniata* and *S. pinnatifolia*. Both crosses have produced hybrids which are sterile. The sterility is apparently due to failure of the chromosomes to pair at meiosis. One possible method of overcoming this sterility barrier would be to increase the chromosome number and the production of artificial polyploids is being attempted with the use of colchicine. One induced tetraploid of *Syringa vulgaris* has been produced and has flowered, but so far has failed to set seed when crossed with other clones. Additional grants have been awarded to Dr. Sax by the Atomic Energy Commission to support research in basic investigations of chromosomal structure and behavior. A study of X-ray-induced chromosome aberrations financed by these grants has indicated that the chromosomes become bipartite a full generation before the daughter chromosomes divide. Dr. Sax has also worked in collaboration with the scientists and directors of the Gamma-radiation field at the Brookhaven National Laboratories. The ornamental plants from the Arnold Arboretum which have been grown in this radiation field have not shown as yet any recognizable mutations.

INSTRUCTION

No regularly scheduled classes were offered by staff members during the year, although several took part in seminars and presented lectures for students in areas of their specialties. Two of Dr. Sax's former students completed their theses which were submitted and approved. On the basis of their work Dexter Sampson, now in the Department of Horticulture of the Ottawa Experimental Farm in Ottawa, Canada, and Gweneth Carson, currently a cytologist at the University of California, were awarded the degree of Doctor of Philosophy. Dr. Sax supervised the work of Mr. Claude Brown on bark regeneration and of Frank Santamour who is working on polyploidy in *Populus*. Mr. Tchang Bok Lee, a UNKRA fellow from Korea, continued his graduate work under the guidance of Dr. Howard and instigated during the spring work in hybridization of Korean and North American oaks in the Arboretum collection.

TRAVEL AND EXPLORATION

The Arboretum continued the policy of supporting its own staff members and other reliable collectors in field work and botanical exploration and collecting. A grant from the American Association for the Advancement of Science, through the American Academy of Arts and Sciences, enabled Dr. Wood to continue a study of the sundews in the Gaspé region of Canada and in northern Michigan. During the spring Dr. Wood collected additional woody materials for trial and study in the southeastern United States. Miss Kathryn Greer, assistant to Dr. Howard, collected morphological materials for anatomical studies in Cuba by means of special funds awarded to Dr. Howard by the American Philosophical Society.

Dr. Howard made two short trips to Jamaica to further his study of the vegetation on bauxite soils and the replacement of vegetation on mined-out bauxite pits. During one trip he was able to join botanists from the Institute of Jamaica in an exploratory trip into the John Crow Mountains in the eastern end of the island. This mountain range represents the largest and perhaps the most difficult unexplored area left in Jamaica. The goal of this exploration party was to locate a possible site for a base camp having reliable sources of water for further biological exploration of this important mountain chain. Such an area was located and it is hoped that the camp site can be developed for use by naturalists during the next few years.

Dr. Ivan Johnston made one collecting trip to Panama on contract with the U.S. Army Engineers during the fall and did extended work in the same area during a sabbatical leave of absence in the spring semester. His botanical collections from this rain forest will supplement those he made on San Jose Island of Panama during the war years.

During the spring the [Fifth Archbold Expedition](#), under the direction of [Mr. Leonard J. Brass](#), left for field work in New Guinea. The staff of the Arboretum, under [Dr. Merrill's](#) directorship, assumed full responsibility for the identification of the botanical materials from the second, third and fourth expeditions. However, since identifications for the botanical collections of the fourth expedition are not yet completed, the Arboretum agreed only to assist financially this fifth expedition in exchange for one of the early sets of materials.

GIFTS AND GRANTS

The annual appeal to the Friends of the Arnold Arboretum was issued during the spring of the year and generous gifts indicated the enthusiastic support of the public. The director and his staff are grateful for the gifts from the Friends which are unrestricted and used for horticultural work on the grounds and in our laboratories. During the past year such gifts made possible a research assistant in the field of cytogenetics, additional help in the greenhouses for plant propagation and labor on the grounds to assist in cleaning and trimming along the paths and roads. Special gifts were also received from Friends for the support of collecting plant specimens and for the publication of writings by staff members.

Again during this year the largest single gift was received from the trustees of the China International Foundation for the support of work on the [Flora of China](#) carried on by Drs. Hu, Liu and Hou. Dr. Sax received additional grants from the Atomic Energy Commission for the support of his research and Dr. Howard received a grant from the American Philosophical Society to continue his investigations on the vascular structure of the petiole of higher plants.

An additional non-departmental gift from Mr. George R. Cooley for taxonomic work at the joint discretion of Drs. Rollins and Howard was used to support field work and research on the vegetation of the southeastern United States. We particularly appreciate the kindness of Mrs. Oakes Ames in giving permission to have reproduced her drawing of *Davidia involucrata*. Copies of this excellent print, suitable for framing, have been sent to the Friends of the Arnold Arboretum in acknowledgment of their gifts. Gifts in kind were numerous and equally appreciated. Gift volumes for the library were received from several sources and included a fine set of Louden's *Botanical Encyclopedia* of 1854 in excellent bindings presented by Mrs. Frederic Goodwin. The Arboretum received many gifts of plant materials from organizations with which we regularly trade materials and information and in addition received noteworthy gifts of material from individuals.

PUBLICATIONS

Special attention should be directed to the publications of the staff which have appeared during the past year. [Mrs. Susan D. McKelvey](#), research associate of the Arnold Arboretum and long a member of the Committee to Visit the Arnold Arboretum, completed the work on the proofs of her latest book and saw the first copy issued on March 26, 1956. The book is entitled, "*Botanical Exploration of the Trans-Mississippi West 1790-1850*" and represents a long and meticulous research in checking the routes and the botanical collections of the men of science who assisted in opening up the West.

Mrs. McKelvey's book contains several excellent maps drawn by Dr. Erwin Raisz. It was published by the Arnold Arboretum and was printed by the Anthoensen Press of Portland, Maine.

Dr. Sax's book entitled "*Standing Room Only*" was published by the Beacon Press during the year and has been widely reviewed and discussed as a continuing contribution to demographic study. In March the Macmillan Company issued Dr. Donald Wyman's latest book, "*Ground Cover Plants*." This book contains 175 pages, is profusely illustrated and is unique as a record of experience in growing ground cover plants.

Also during the year the revised edition of "*Crab Apples for America*" was published by the American Association of Botanical Gardens and Arboretums. Dr. Wyman was chairman of the committee which compiled the data and was responsible for its publication. A sample treatment of the Malvaceae was issued on behalf of the Flora of China project. This monographic treatment of the family was written by Dr. Hu and printed by the Tudor Press.

In 1953 Dr. Hu was awarded first prize in a Project Suggestion Contest sponsored by the Continental Development Foundation. The problems of preparing a flora of China was the subject of Dr. Hu's essay and the suggestion was considered by the committee to be worthy of further support. With grants from the China International Foundation, work was begun as proposed in the essay, using the library and herbarium resources of the Arnold Arboretum to compile in card catalogue form data on the occurrence, distribution and publication of vascular flowering plants of China. This card catalogue represents the most complete and up-to-date catalogue of vegetational records for the Asiatic mainland and will serve as the basis for future work in forestry, horticulture, floristics and agriculture. The catalogue is available for the use of all qualified visitors to the Arboretum and requests for information from other areas will be filled by photo copy or typescript at cost.

To demonstrate the type of work which can be done using these cards and as a possible format for future publications towards a flora of China, Dr. Hu prepared the recently published treatment of the Malvaceae. It is hoped that other botanists will utilize the card resources made possible by the generosity of the trustees of the China International Foundation and that additional family treatments can be published as manuscript and funds are available.

RICHARD A. HOWARD, Director