



### Annual Report 1937-1938

TO THE PRESIDENT OF THE UNIVERSITY:

SIR,

Extra-budgetary restricted and unrestricted gifts from the friends and supporters of the Arnold Arboretum received during the year amounted to \$16,346.03 which enabled the institution materially to amplify its research, exploration, and publication program. A grant of \$750.00 from the American Philosophical Society resulted in the completion of the work on a revision of the Bornean species of *Eugenia*, while a grant of \$1,500 from the Milton Fund enables [Dr. Raup](#) to undertake an extensive exploration trip in northwestern Canada. This field work is projected for the summer of 1939, but detailed plans had to be worked out and the necessary supplies shipped a year in advance.

The usual program in reference to maintenance of the extensive grounds and plantings has been followed, for it is only by constant attention to details that the existing plantings can be maintained and improved. An outstanding accomplishment has been the practical completion of an entirely new detailed survey of the grounds and the preparation of 74 compartment maps, on which is shown the exact location of each planted tree and shrub. The area covered by each of these maps is 400 X 600 ft. Supplementing these 74 compartment maps 26 additional ones, on a large-scale, have been prepared to cover the crowded shrub plantings. Thus for the first time in the history of the institution we now have complete detail planting maps, and these will be kept up to date by indicating all future changes as new plants are placed and old ones removed or changed in position.

The horticultural and landscape features of the grounds, consistently developed in a masterly manner through many years, are among the Arboretum's greatest assets. Every effort is made to maintain and to strengthen these features. During the year 2,762 living plants, cuttings of 72 additional ones, and 315 packets of seeds were received. In the same period we distributed 1,671 living plants, 611 cuttings, and 1,404 packets of seeds. Over 400 plants, many new to the permanent collections, were transferred from the nursery to their permanent positions, and a new temporary nursery was established to take care of the new plants received and yet to be placed in the grounds.

A notable acquisition in the autumn of 1937 was the famous [Larz Anderson collection of Japanese trees](#). This unique collection was delivered to the Arboretum by Mrs. Anderson, a gift

from the late Mr. Larz Anderson as a memorial to his friend [Charles Sprague Sargent](#). Some of the dwarf trees are over 200 years old. This very attractive collection was placed on display in the spring of 1938 in a specially designed and constructed shelter house generously provided by Mrs. Anderson.

The usual number of public lectures to horticultural, garden, and service organizations have been given, which have been made more attractive and instructive by a magnificent series of natural color lantern slides, and a series of natural-color films featuring the attractions of the Arboretum at various seasons. To this collection about 250 Leica slides and 2,500 feet of film were added during the year.

Supplementing the regular work of the Arboretum, [Dr. Wyman](#) and [Professor Rehder](#) have devoted much time to a cooperative project involving a revision of Standardized Plant Names, working with the American Joint Committee on Horticultural Nomenclature. The net result is the addition of about 40,000 additional names to this reference work.

Cytological analyses of X-ray effects have been completed during the past year, under the direction of [Dr. Sax](#) and his associates. These results have thrown some light on the effect of irradiation on both chromosome structure and gene mutation. The irradiation work is being continued, using heat, X-rays, and neutrons.

The irradiation of seeds and seedlings of ornamental shrubs has given interesting results. High dosage with X-rays produces gross chromosome aberrations which result in an immediate effect on plant growth. Dwarf and spreading types of cherries have been produced; and dwarf types of roses, lilacs, and apples were obtained. Second generations of these X-rayed plants should also show additional variation caused by gene mutation. This work is being continued on a larger scale, since we now have adequate nursery space for growing experimental plants.

Crossing work with ornamental shrubs and trees has been continued, with successful results in the cherries, lilacs, roses, and apples. Open-pollinated seeds have also been planted, with the hope that natural hybrids will be obtained.

To facilitate the work of Dr. Bailey, the entire Arboretum wood collection, about 5,600 specimens, was transferred to the Biological Laboratory, and incorporated in the collections of the Bussey Institution and the Biological Laboratory. There new quarters have been provided and equipped to house the combined collections now approximating 22,000 specimens, supplemented by nearly 17,000 microscope slides.

During the year Dr. Bailey devoted much time to the study of the comparative structure of xylem in various plant families as a basis for a contemplated monograph on the cambium and its derivative tissues. During the year about 1,200 photomicrographs, with accompanying lantern slides, were made in connection with the several research projects. All work accomplished by Dr. Bailey and his associates is closely coordinated with that of the staff members of the Division of Biology working in the same general field, and all available collections of anatomical and histological specimens, photographs, and microscope slides have been catalogued and rendered available for general use.

The specialized herbarium in the plant pathology laboratory serves a two-fold purpose, the general collections needed for constant reference and for the use of students, and the

specialized collections as auxiliaries to or subjects for research. The herbarium has been steadily increased in both fields since the department was established in 1928. During the past year notably important additions were made as the result of a collecting trip made by Dr. Faull in November and December, 1937, to Mexico and Guatemala.

The utilization of the extension services afforded by the laboratory continues to expand. Inquiries during the past season have been particularly numerous because of the prevalence of certain contagious plant diseases due to the unusually humid conditions. Work continues to be done on the Dutch elm disease, for the Arboretum is cooperating in the attempt to eradicate this threatening pest in America. Dr. Faull recently made an independent survey of the present situation in reference to this serious menace to our elms, visiting infected areas in New York, Connecticut and New Jersey. Maps and records of the Dutch Elm Disease Eradication offices were examined, Federal and State officials interviewed, and critical parts of the infected areas were inspected. Generally speaking, there has been no significant spread of the disease except in New York. There an area of about 900 square miles has been added by the detection of the disease in Dutchess County. In many places in New York and elsewhere the infected areas have been notably reduced as a result of the eradication and sanitation campaign now being actively prosecuted. There is still hope that complete eradication can be accomplished. Progress is being slowed up and success threatened by continuing the project as a W.P.A. activity. It is emphatically believed that the project should be turned over immediately to the United States Department of Agriculture, to be supported from the regular appropriations of that unit.

The research activities have been largely centered on the crown rot of the dogwood, wilt diseases of the elm, maples and honey locusts, and the rusts of conifers. The cause of the crown rot has been determined, and the research has been extended to various other broad-leaved trees. A new, highly virulent, wilt disease of the honey locusts has been discovered and its cause demonstrated. Attention is now being given to control measures.

The Arboretum herbarium has been increased by the actual incorporation of 25,252 mounted sheets bringing the total to 479,724 specimens of woody plants. These came largely from India, Indo-China, Malaysia, China, Japan, Siberia and other parts of Asiatic Russia, Japan, Australia, Africa, and North, Central and South America. Important as are these accessions, additional ones, not yet mounted and hence not available for study and comparison, received largely towards the end of the year, exceed 40,000 numbers. These are largely from Hainan, Kwangsi, Kiangsi, Kwangtung, Yunnan, and Burma. Also there were received the entire botanical collections of the second Archbold Expedition to New Guinea, about 2,500 numbers with abundant duplicates, and numerous and important exchanges from various European institutions, notably the Principal Botanic Garden, Leningrad, Kew, the Natural History Museum, Vienna, and other institutions. Loans to specialists in Europe, Asia, and America amounted to 3,866 specimens, and 45,521 duplicate specimens were distributed, in exchange, to numerous institutions in Europe, Asia, Malaysia, Australia, and North and South America. Supplementing this exchange distribution 21,366 mounted specimens of herbaceous plants and ferns were

transferred to the Gray Herbarium, 478 sheets of orchids to the Botanical Museum, and 358 specimens of cellular cryptogams to the Farlow Herbarium.

The Arboretum for some years, as funds have been available, has made modest grants to strategically located individuals to cover the cost of field work. This policy has been amplified in the past year, grants being made to institutions and individuals as follows: Fan Memorial Institute of Biology, Peiping; Lingnan and Sun Yatsen Universities, Canton; Nanking University, Chengtu; Judson College, Rangoon; Royal Botanic Garden, Calcutta; Madras Museum; Botanic Gardens, Singapore; Botanic Gardens, Buitenzorg; New York Botanical Garden for work in Colombia; Missouri Botanic Garden for work in Panama; University of Michigan for work in the Philippines; University of Minnesota for Dr. Abbe's projected trip to the east shore of Hudson's Bay; Botanical Museum for work in Louisiana; K. Uno, Kobe for work in Japan; Dr. A. Petelot, Hanoi, for work in Indochina; W. J. Thompson, Seattle, for work in British Columbia; and to Richard Archbold for explorations in New Guinea. These modest grants are proving to be most advantageous to the Arboretum and unquestionably represent the most economical method of prosecuting field work in these regions whence it is desirable that our reference collections be increased and strengthened.

Accessions to the library include 585 bound volumes, 300 pamphlets, 369 photographs. It now contains 43,557 bound volumes, 12,303 pamphlets, 18,178 photographs, 200 unbound volumes, 2,500 slides, and several thousand nursery catalogues. Fifteen new periodicals were added to the subscription and exchange lists.

Publications include the important Merrill-Walker Bibliography of *Eastern Asiatic Botany*, a quarto of 719 pages, containing in excess of 21,000 author-entries, covering the period from the beginning of printing in China to the end of 1937, and Mrs. McKelvey's *Yuccas of the Southwestern United States*, a beautifully illustrated monograph of this difficult group. Staff members actually published 72 technical and semi technical papers, approximating 2,000 pages, as listed in the bibliography attached to the more amplified report of the Arboretum operations (*Jour. Arnold Arb.* 19: 446-460. 1938). The usual numbers of the *Journal of the Arnold Arboretum*, and of the *Bulletin of Popular Information* have been issued as in previous years.

#### ATKINS INSTITUTION

At the Atkins Institution of the Arnold Arboretum, Soledad, Cienfuegos, Cuba many improvements have been made in the plantings, an extensive cactus garden has been established on a twelve-acre tract set aside for cacti and succulents. The old garden has been replanted with young palms and the old storm wrecked trees in the area are being removed as conditions warrant. The opening of the new road from Havana to Cienfuegos has greatly increased the number of visitors. The institution is attracting more attention from Cuban officials who apparently realize and appreciate its potential services to Cuba in the field of introduction and acclimatization of economic plants. Acting on the recommendation of the

Custodian, the Corporation has appointed the following Cuban citizens and officials as collaborators: Dr. Juan T. Riog y Mesa, Brother Leon (Joseph Sylvestre Sauget y Barbier), Dr. Gonzalo Martinez Fortun y Foyo, Dr. Julian Acuna y Galé, Dr. Alberto J. Fors y Reyes, Dr. Jorge Dechapelle, and Dr. Jose Perez Carabia.

Up to the end of 1937 about 700 species were added to the living collections, the planting list now approximating 2,750 species and varieties in cultivation at Soledad. Seven investigators from various parts of the United States were in residence at Harvard House for longer or shorter periods of time, including five staff members and students of Harvard University.

E. D. MERRILL, Director