



## Annual Report 1944-1945

TO THE PRESIDENT OF THE UNIVERSITY:

SIR,

The institution was operated during the year within the limits of its income, and a modest addition was made to its departmental balance from unexpended unrestricted income. It was expected that a deficit might develop partly because of a rather radical increase in the labor payroll, as we had to meet the University standards as to daily wages of skilled and unskilled labor, and no budgetary provision had been made to meet this increase. Also, in April, 1945, title was taken to the Marian Roby Case estate in Weston, mentioned elsewhere in this report, and the Arboretum assumed the rather considerable maintenance costs involved, although the addition to income from Miss Case's generous bequest to endowment funds is not yet available as the estate has not yet been settled.

In addition to its income from its restricted endowment, the extra budgetary Gifts for Cultural Purposes Fund was increased by \$2,360 in the form of voluntary gifts from forty-eight individuals, while the special Publications Fund was increased by \$10,120 from eighty-five contributors, including a very generous grant of \$3,000 from the Trustees of the Morton Arboretum, Chicago, in appreciation of the cordial relationships that have existed between the two institutions since that institution was established in 1921.

Because of the situation in reference to [Professor Rehder](#)'s long continued work on his *Bibliographic Index* project it was felt that the least the Arnold Arboretum could do would be to underwrite the cost of publication of the extensive volume that will result. He has devoted practically full time to the preparation of the manuscript since his retirement from active service on reaching his seventy-fifth birthday in 1940.

Under the will of the late Miss Marian Roby Case of Weston, the Arnold Arboretum was indicated as her beneficiary to the extent of \$150,000 to capital, and her real estate in Weston consisting of about ninety acres adjoining the estate of her sister, Miss Louisa W. Case, which was presented to the institution in 1943, with all the buildings, farm equipment, etc. The buildings are insured on the basis of a valuation of \$79,000.00. For tax purposes the land was assessed on the basis of a valuation of about \$37,000.00 In addition, she indicated the Arnold Arboretum to be the recipient of all of her residuary estate after certain specific bequests had been paid. This may prove to be the largest single gift to the institution in the seventy-three years of its existence. The other large bequest is that of Mrs. Katherine T. Balch, wife of the late John Balch of Milton, who made the Arnold Arboretum the beneficiary of one-half of her residuary estate, which may amount to more than \$100,000.

The conditions of gift are interesting. Mrs. Balch indicated that her gift should be utilized as far as possible for the support of practical horticulture and "for such uses as may reasonably add to the interest and enjoyment of the average visitor and the general beauty of the Arboretum." Miss Case stipulated in her will: "In connection with the gifts herein contained to the President and Fellows of Harvard College for the use of the Arnold Arboretum I impose no restrictions whatever except that the land or its proceeds and the pecuniary bequests shall be used for the general purposes of the Arnold Arboretum. It is, however, my earnest hope that the estate may be maintained and the bequests utilized to further the development of my land and the adjoining land recently presented by my sister, Miss Louisa W. Case, as an adjunct to the Arnold Arboretum in order that the work of that institution maybe amplified in a non-urban center, and yet one that is reasonably close to the City of Boston."

The Arboretum suffered a very severe loss in the death of Mr. Louis V. Schmitt, Superintendent of Buildings and Grounds, November 16, 1944. Mr. Schmitt was associated with the institution continuously since 1905, was thoroughly conversant with his duties, very efficient, and always had the best interests of the Arboretum in mind. The place made vacant by his untimely death was filled on January 1, 1945, by the appointment of Mr. Robert G. Williams, a graduate of Cornell University, and former Superintendent of Parks, Greensboro, North Carolina. The technical staff remained as in the previous year, with Dr. Clarence E. Kobuski in active military service, still on leave of absence.

Special courses have continued to be given by [Professor Karl Sax](#), [Associate Professor H. M. Raup](#), and Associate Professor I. M. Johnston, to help out on the teaching situation in the Department of Biology.

As was the case last year, the plantings have suffered from lack of care due largely to the acute labor shortage, supplemented by a combination of circumstances beyond our control. At no time within the history of the Arboretum are signs of neglect more apparent than now. Unless constant attention be given to such items as trimming, pruning, removal of overgrown or malformed shrubs, trees, and vines and their replacement by others, weeding, spraying, fertilizing, grass cutting, and other standard maintenance practices, plantings quickly get out of hand. Until more labor is available, we cannot cope with this situation. It is a concomitant circumstance of the unsettled conditions brought about by the war, and we shall have to bear with it until after the close of hostilities.

Abnormal seasonal conditions and other circumstances added to our difficulties. There was little winter injury due to low temperatures, and there were but few, and not at all destructive grass fires in the fall and spring because of the abundance of rainfall. A very heavy fall of wet snow on February 8 caused an extraordinary amount of limb breakage, it taking the entire grounds crew three weeks to take care of only the most obvious places by the necessary and often heavy pruning. Many of the shrubs were crushed to the ground and some of them will need to be heavily pruned before they again become attractive in form. This delayed the normal spring rehabilitation campaign, but here again the season was against us, for the period

of bloom commenced a full month ahead of the normal time. Following this unseasonably warm weather, there was a protracted wet season lasting into the summer months, thus favoring a most unusually lush growth of grass and coarse weeds. Again, without our knowledge, a large addition had been planned to the State Serum Laboratory building in the [Bussey Institution](#) grounds. The architect's plan had been finished and the contract let before we were informed. It so happened that the area selected for the building was fully occupied by our extensive nursery. Thus, on very short notice we had to prepare a new nursery site, and transfer all of the valuable stock from the old nursery. Because of the abnormally advanced season, we had but about a week in which to make this radical change. A week or two later it would have been impossible to move the stock with safety as the spring growth had commenced or was about to commence. It was most fortunate that we learned of this projected building plan in time, otherwise our losses invaluable selected stock would have been very great. As it was, it put an additional strain on our relatively small grounds crew at a most critical time and further prevented them from giving proper attention to other maintenance matters.

Special attention was given in the fall to the extensive shrub collection near the Forest Hills gate, as it had become badly overgrown. Each alternating grass walk was removed, the soil was limed and heavily fertilized. All the shrubs were heavily pruned and the labels were replaced by new ones, these being set back from the walks so as to permit of machine cultivation. It is evident that this thorough renovation was justified, for the annual cost of maintaining this large collection was reduced by about one-half, because of the saving of hand labor. It is planned to continue this concentration of work for several years or until all of the large special collections have been renovated. The next one in line is the very large lilac collection, some clumps of which have become badly overgrown, while others have developed altogether too many sucker shoots.

A new nursery was established on prepared land between South Street and the railroad track, but this is only a temporary expedient. The nursery on the Case estate in Weston was enlarged, and some of our valuable stock in the old nursery, that had to be abandoned because of the projected building mentioned above, was transferred there.

In spite of war conditions, 447 living plants were received and established in our nurseries. At the same time, we received also nine lots of scions and eighty-nine lots of seeds. During the year 496 living plants were distributed, as well as forty-eight lots of scions and twenty-two packages of seeds. One hundred seventy-five trees and shrubs were presented to the Harvard Business School to be utilized in a planned improvement of its grounds.

In order to keep maintenance charges at a minimum on the Case estate until such time as income may be received from the Marian Roby Case bequest, certain changes are being made on the Weston property, chiefly in the elimination of certain types of plantings that scarcely fall within the field of the Arboretum. Thus one planting of about 700 named varieties of *Iris* has been eliminated, but the plants were not destroyed. A complete collection of these

was sent, through Garden Clubs Services, Incorporated, to the Essex Sanatorium in Danvers, for use in beautifying the grounds and to assist in the retraining of disabled veterans, chiefly psychiatric cases. A selected lot of about 700 of the better varieties was sent to the Rutland Training Center of the Central New England Sanatorium for the same purpose. About 500 varieties were presented to the Boston Park Department.

As previously reported, the estate of Miss Louisa W. Case in Weston, consisting of about 60 acres of land, a large residence, barns, and a very excellent and commodious greenhouse, was presented by her to the Arnold Arboretum in December, 1942. In the year before her death her sister, Miss Marian Roby Case, redrew her will in favor of the Arnold Arboretum as mentioned in the opening part of this report. This comprises about 60 acres of land adjoining that of her sister, and eight buildings of one type or another. Our desire is to develop these two adjoining estates as an adjunct to the Arnold Arboretum and to concentrate there most of our experimental work, including some of that of the Bussey Institution and of the Cabot Foundation for Botanical Research, and a part of Dr. Mangelsdorf's corn breeding project, as excellent farm land is now fortunately available. It is expected that much of our propagating work will also be done at the Weston site, and the material moved in to the Arboretum proper as needed. This development will also permit of an expansion of certain types of research prosecuted by staff members of the Department of Biology, where availability of a reasonable amount of good land is essential to this or that project.

An excellent opportunity is thus afforded for a general expansion of our experimental work, and at the same time a judicious planting of ornamental and useful trees and shrubs in Weston to augment those of the Arnold Arboretum. For many years it has been evident that the present Arboretum site is not suitable for certain types of work. It can and must be maintained as an attractive park, but with the very limited amount of really good land available, the present crowded condition of its plantings, the pressure of the population, for the Arboretum site adjoins a densely populated part of Boston, and a certain amount of vandalism that it is practically impossible to control properly, we are badly handicapped. With this opportunity now open in the strictly residential town of Weston, and only twelve miles from the Arboretum in Jamaica Plain, we have the opportunity of greatly amplifying our experimental and propagating work, and of initiating lines of research that it has hitherto been impossible to develop on the original site. Again, in Weston we shall not be subject to the population pressure, vandalism will be at a minimum, and the plantings will not be damaged by the smoke and dust of the city.

Cooperation with different government agencies in work on various botanical problems with which representatives of the armed services became involved has been continued, particularly in reference to the South West Pacific area, Micronesia, the Philippines and Burma, and in preparation for projected operations in China, Formosa, and other oriental countries. *The Native Woods for Construction Purposes in the Western Pacific Region*, compiled by Dr. J. H. Kraemer, was issued by the Bureau of Yards and Docks, Department of the Navy, May, 1944,

and a greatly amplified edition appeared in September, 1944, both restricted. The illustrations were prepared at the Arnold Arboretum and the basic lists were prepared here. A third volume, *Native Woods for Construction Purposes in the South China Sea Region*, unrestricted, appeared in January, 1945, in the preparation of which we also cooperated, although some of its illustrations were prepared at the Smithsonian Institution, in part based on material that we loaned for the purpose.

Associate Professor I. M. Johnston made two special trips to the tropical base of the Chemical Warfare Service in connection with certain problems with which that organization was concerned in connection with its tropical operations. This field work cannot at the present time be discussed further because of its confidential nature, but the large collections assembled by him will be the basis of a future technical paper when restrictions shall have been modified.

We have continued to receive and to report on botanical collections made by service men stationed here and there in the Old World tropics, shipments coming in all the way from Upper Burma to New Caledonia. It has so far been possible to report upon each lot within a day or two after the packages were received. Most of this work has fallen to the undersigned, who has also continued to lecture every two months to each group of trainees in the intensive course on tropical medicine at the Army Medical School in Washington. Work on the manuscript of *Plant Life of the Pacific World* was completed, and the proofs were finished before the close of the year. The sales edition of this work is published by the Macmillan Company, but simultaneously a special unabridged Fighting Forces edition, pp. 298, 256 fig., was issued by the *Infantry Journal*, Washington, D. C., in its series of standard military books. This book is one of a series of various phases of natural history of the Pacific region, including individual volumes on the native peoples, mammals, fishes and shells, reptiles, insects, birds, etc., following the publication of *The Pacific World*, edited by Fairfield Osborn, President of the New York Zoological Society, under the auspices of the American Committee for International Wild Life Protection. Each volume was oriented towards the needs of our service men stationed here and there in the Pacific region.

A second season's work was projected along the Alaska Military Highway during the preceding year and the plans were outlined in the report for 1943-1944. The personnel of the party, sources and amounts of funds (\$5300) provided to take care of field expenses were also indicated. The party of seven, under the leadership of [Associate Professor H. M. Raup](#), left for the field at the end of May and returned about the middle of September. The military authorities extended the same privileges as those provided during the summer of 1943, that is, free transportation on the road and commissary privileges. The results obtained in botany, ecology, geology, and archaeology are significant. Work was concentrated on the upper part of the road from Fairbanks to White Horse, as the 1943 operations covered the southern part of the road from Dawson Creek to White Horse, but at the end of the season, the party came out via Dawson Creek, thus covering the entire length of the road, some 1500 miles. Approximately 13,000 botanical specimens were prepared, and this large collection, combined with the even

larger one (15,000 specimens) made in 1943, will be studied as a whole and thus form the basis of a comprehensive report on the vegetation of the previously little known region traversed by the road.

The more promising new hybrid trees and shrubs are being propagated for further testing and for distribution. Among the more recent productions are species hybrids of maples, honeysuckles, forsythias, lilacs, roses, apples and cherries. Triploid forsythias have been produced by crossing the artificially induced tetraploids with diploids. Experimental work on polyploidy has been continued.

The more important genera of the Pomoideae are being used in an attempt to obtain rootstocks which will produce dwarf trees or otherwise modify the normal growth habit of the grafted stock. The grafting compatibility of generic combinations in this subfamily of the Rosacea has long been known but no systematic study has been made. *Crataegus*, *Chaenomeles*, *Cydonia*, *Aronia* and *Sorbus* are being grown on *Malus* rootstocks and many more combinations are being made. Many of these will grow, as grafts, only for a year or two but some of the progeny may prove to be of horticultural value. The large temporary orchard of hybrid crab apples established a few years ago on the Walter Street tract has served its purpose. The promising new hybrids have been segregated and the worthless stock removed.

Professor I. W. Bailey and Dr. C. G. Nast have continued their morphological investigations of the ranalian families in collaboration with Dr. A. C. Smith. Detailed anatomical and histological studies have been made of the stem, roots, leaves, floral organs, pollen and seeds of the taxonomically puzzling genera *Tetracentron*, *Trochodendron*, and *Euptelea*. Although superficially dissimilar, *Tetracentron* and *Trochodendron* exhibit fundamentally significant similarities in their vesselless xylem, in their peculiar stomata, ovules, seeds, pollen and internal floral structure. The genera should be placed in two separate, but closely related, families. *Euptelea* differs from these genera in the morphology of all of its organs and should be maintained as an independent family. There are no evidences of close genetic relationships between the Tetracentraceae, Trochodendraceae or Eupteleaceae and such families as the Magnoliaceae, Winteraceae or Schisandraceae.

During the year 14,281 specimens were mounted, of which 12,193 were inserted into the herbarium, which now contains a total of 630,137 specimens. In continuation of the arrangement with the Gray Herbarium mentioned in the last report--the mounting of some of the accumulated Old World collections belonging to that institution--2,276 specimens were returned to that institution mounted. Incoming specimens numbered about 27,945. The bulk of this material was obtained by subsidy, purchase, or by collections of staff members, but some of it came through exchanges (3,545), gifts (1,154), or for identification by your staff (2,190). Especially noteworthy collections were about 13,000 specimens obtained by [Associate Professor H. M. Raup](#) during his second season along the Alaska Military Highway, about 3,500 specimens gathered by Associate Professor I. M. Johnston on San Jose Island, Panama, and

2,491 specimens sent by Dr. J. Cuatrecasas from Colombia as the result of a trip partly financed by the Arboretum.

A total of 17,274 duplicates was distributed to other American institutions; the bulk of this material going to other departments of Harvard University as inter-institutional transfers. To the Gray Herbarium were transferred 14,083 specimens, of which 9,648 were mounted; this last figure includes 7,835 Argentine specimens received from the Instituto Miguel Lillo, Tucuman, and mounted at the Arboretum over a period of two or three years. A total of 1,281 mounted illustrations of herbaceous plants and ferns was transferred to the Gray Herbarium for incorporation into the collections there.

Staff members and students of ten American institutions requested and were granted 20 loans from the Arboretum, totalling 3,207 specimens and 97 clippings and illustrations. For study by members of our own staff, 33 loans consisting of 2,284 specimens were borrowed from eleven institutions.

The individual research programs of the various staff members in the taxonomic and bibliographic fields have been continued and amplified. [Associate Professor H. M. Raup](#) has devoted much time to an intensive study of his very large assembled collections from various parts of northwestern Canada in preparation for the completion of his final reports. Dr. C. K. Allen completed her study of the Central American and Mexican Lauraceae. Dr. L. M. Perry's excellent translation of H. J. Lam's *Fragmenta Papuana* was completed and published, her efforts otherwise being devoted to an intensive study of our large collections of Rubiaceae from New Guinea and the Solomon Islands. Associate Professor I. M. Johnston concentrated his efforts on a study of the material collected on two trips to San Jose Island. Dr. A. C. Smith having completed his studies of certain of the smaller ranalian families has commenced an intensive study of the Schisandraceae. In the bibliographic field, [Professor Rehder](#)'s long continued work on his *Bibliographic Index* approaches completion as does my own on the complicated *Index Rafinesquianus*. The publication of Dr. Frans Verdoorn's *Plants and Plant Science in Latin America*, finished with the cooperation of numerous collaborators, is a significant achievement. In connection with his major project, the *Index Botanicorum*, about 15,000 sheets were added to the master file during the year.

Crowding of specimens in the herbarium grows more critical each year, as no additional floor space or cases are available; as in the past few years only the most important material has been filed in the herbarium, the remainder being stored in a more or less inaccessible place. The usual number of clippings, typed descriptions, and illustrations was inserted into the herbarium. We rapidly approach the ultimate limit of expansion for both our unexcelled library and large collections of reference material, unless additional construction be undertaken in the not distant future. I repeat my previous recommendation that in my opinion any expansion of housing facilities for both the library and the herbarium should be planned for Cambridge in close proximity to the University Museum and the Biological Laboratory building, and in association with the other units concerned with special library and herbarium problems.

The library holdings were increased by 271 bound volumes and 144 pamphlets, making the totals in each group 45,834 and 13,606. Seven hundred and eleven typewritten cards were added to the main catalogue, 3,664 printed cards to the Gray Herbarium index, while 817 slips, supplementing the author and subject catalogue were added to the file. The very extensive series of photographs was increased by 200 items. Inter-library loans have been extensive, a total of 510 volumes being loaned to or borrowed from 34 libraries in all parts of the country. This interlibrary loan service is of great value to staff members of both this and other institutions, as well as to students, and the privilege is not abused. There have been no losses although various rare items have of necessity been involved. The very fact that the Arnold Arboretum library is so rich in rare volumes and in equally rare complete sets of early periodicals entails a rather heavy burden on our staff, because of the numerous calls for microfilming entire volumes and even more numerous calls for preparing typed or photostat copies of individual descriptions that are essential to monographic work in other institutions.

The usual numbers of the [\*Journal of the Arnold Arboretum\*](#) including thirty-eight technical papers, mostly by members of the Arboretum staff, and a fifth number of *Sargentia*, containing Dr. Perry's translation from the Dutch of Professor Lam's *Fragmenta Papuana*, with two maps and 32 text-figures taken from the original, were published. Several of the papers included in *Arnoldia*, the usual numbers having been issued during the year, have been highly commended for their practicability, including one number on rapidly growing vines available in the United States, an outgrowth of certain phases of our earlier camouflage investigations; the one on *The Park Arboretum* (how to establish a living memorial) which has been widely reproduced as well as the one on the building up of bird populations with food plants. A total of ninety-three technical and popular papers were prepared by staff members and published in various periodicals during the year.

Atkins Institution of the Arnold Arboretum, Soledad, Cienfuegos, Cuba

The limitations mentioned in the report for the previous year prevailed, the plantings unfortunately being allowed to develop into a somewhat deplorable condition during the war years. One factor here was the increased cost of labor combined with the condition that the general plantings had been extended to such an extent that it was impossible to give them all proper care within the limits of the available income. No students were in residence because of war conditions, but a number of individuals interested in research and in economic problems visited the institution to secure information of one type or another.

About thirty new seed beds with cement borders were constructed to keep the soil from being washed down by heavy rains. Some of these were planned for vegetable growing, others for the development of seedlings of timber trees. In June there was delivered to the Soledad Company somewhat over 1,000 young teak trees to be used in the extension of its timber plantings. Seedlings of other important timber trees are available for future plantings.

During the year, 162 packages of seeds and 50 living plants were received from abroad, and seeds from 123 different species were collected in the garden to be used there. Distributions included 230 packages of seeds and 652 living plants. Of the latter, over 300 were sent to the Marine Corps base at Guantanamo to be used for landscaping the grounds, and 136 were presented to the Cuban Ministry of Agriculture. The entire problem of the future development and utilization of the facilities available at Soledad for instruction, research, practical horticulture and forestry has received considerable attention, one special short report having been prepared expressing my personal ideas on the subject, and the matter is further considered in the area survey report prepared for the administration by Professor I. W. Bailey. Mr. David Sturrock resigned his position as Superintendent, effective at the close of the year, and Mr. Frank G. Walsingham was promoted to fill the position effective July 1, 1945.

E. D. MERRILL, Director