



Annual Report 1934-1935

TO THE PRESIDENT OF THE UNIVERSITY:

SIR,

I have the honor to present my ninth and final report on the condition and progress of the Arnold Arboretum. This report covers the year ending June 30, 1935.

The winter of 1934-35 almost equalled in severity the extraordinary winter of the preceding year. Low temperatures prevailed and many trees and shrubs that were weakened by previous cold weather suffered additional damage or died. Since 1933 the losses have been greater than ever before in the history of the Arboretum and many plants once regarded as perfectly hardy in the climate of Boston are now known to be unable to withstand an exceptionally cold winter. A careful survey of winter damage was undertaken and a list of the species and varieties found to be killed or injured was published in the *Bulletin of Popular Information* (Ser. 4, Vol. II, nos. 7 and 8). This list should prove of value to landscape architects and to nurserymen and be a permanent record for the guidance of gardeners.

Beginning in the autumn of 1934, the differences in temperature between selected stations in the Arboretum were measured regularly until spring with amazing results, it being found that variations of as much as twelve degrees Fahrenheit occurred in adjacent localities. Indeed, the records explained why it is that plants growing under apparently similar conditions and close together respond differently to the effects of a severely cold winter.

Dr. Edgar Anderson spent the summer of 1934 in the Balkans for the purpose of collecting plants and seeds in Bulgaria, Rumania and Yugo-Slavia. The climate of the Balkan region resembles closely the climate of Boston and it seemed probable that the Balkan strains of such plants as Ivy, Yew and Box coming from a climate similar to ours would prove more adaptable here than the more or less tender strains that have already been imported from northern Europe. Among the more promising collections obtained by Dr. Anderson mention should be made of a Bosnian holly, the hybrid *Fraxinus* from the Danube delta, alpine forms of the common lilac and numerous forms of *Malus sylvestris*, the small, yellow fruited wild apple of southwestern Europe.

During the year there were distributed 1,258 packages of seeds, 2,187 plants and 545 varieties of scions and cuttings. There were received from different parts of this country and

from abroad 454 packages of seed, 1,894 plants and 592 scions and cuttings. To the permanent collections in the Arboretum there were added 595 plants.

THE HERBARIUM

In the year covered by this report the organized herbarium was increased by the addition of 16,896 specimens, bringing the total number to 408,699, an increase of over 120,000 sheets since 1926. In my first report, that for 1926-27, I referred to the rapidity with which the herbarium has increased in recent years, stating that a set of new metal cases had just been installed and that sufficient space had been provided to accommodate accessions for from eight to ten years. By 1930, however, it became evident that we had again outgrown available case-room, and in 1931 we installed 45 new metal cases. If accessions increase at the present rate, it will be necessary to add materially to the herbarium equipment and to take over the fourth floor of the herbarium building now devoted to the overflow of books from the library.

THE LIBRARY

At the end of June 1935 the Library comprised 42,025 bound volumes, 10,917 pamphlets and 17,573 photographs. Approximately 225 visitors registered in the Library during the year.

THE PHYTOPATHOLOGICAL LABORATORY

[Professor Sargent](#) in his plans for the development of the Arboretum, in 1919, had proposed to establish a laboratory for research work in plant pathology if the needed funds could be obtained. So, in 1927, when it was evident that the Charles Sprague Sargent Memorial Fund was about to be successfully raised, plans for a phytopathological laboratory were made, and Professor J. H. Faull of the University of Toronto was invited to serve as professor of forest pathology. The laboratory was erected in 1928 and has now completed its seventh year of service. The publications based on the research work done in the laboratory have been numerous and of exceptional importance, having a distinct bearing on problems arising in connection with the diseases of ornamental trees and shrubs.

In efforts to establish a closer relationship between the Arboretum and the other botanical departments of the University, the Laboratory of Phytopathology, through the services of Professor Faull, arranged for courses in forest pathology to be given in Cambridge to properly qualified students, and he accepted from two to six graduate students each year. Fortunately the coming of graduate students to the Arboretum coincided with the need for critical and intensive studies of recently discovered diseases that were threatening the welfare of ornamental trees and shrubs. It is gratifying to be able to report that the researches undertaken in connection with these diseases have already been of great arboricultural value. Five of the graduate students who took the degree of doctor of philosophy under Professor Faull's direction received travelling fellowships, including three Sheldon awards, and seven of these students are now filling responsible positions in connection with pathological

investigations here or abroad. While it may seem that participation in courses of instruction taxes too heavily the time and resources of the Arboretum staff, it should be borne in mind that properly qualified graduate students increase research activities while stimulating a closer relationship between the College and one of its outlying departments.

In 1934-35 the problems receiving attention had to do with coniferous rusts, the wilt-diseases of the elm, mycotrophy and Gymnosporangium diseases of junipers and pomaceous trees. With regard to the Gymnosporangium diseases a new means of practical control has been developed following four years of intensive research. It is no longer necessary to resort to the elimination of either the apple or cedar host in the control of the Gymnosporangium rust, as it is now possible to prevent its spread. It would be difficult to estimate the economic and esthetic significance of this discovery or to measure its value to the growers of pomaceous and juniperous species.

In my report for 1929-30, I mentioned the occurrence of an elm disease in Ohio. Dr. Christine J. Buisman, who was at that time working with Professor Faull in the Arboretum, identified the causative fungus as being conspecific with the fungus causing the Dutch elm disease and placed the country on guard against a threat to the existence of the elm, a threat comparable to that contained in the blight which destroyed the American chestnut. Since 1930 this disease has become a severe threat to the existence of the elms of New York, New Jersey and Connecticut. In 1934 the Arboretum took an active part in the campaign for control and elimination of the Dutch elm disease, emphasizing the view that complete eradication of affected trees is the surest means of saving America's elms.

Dr. J. D. MacLachlan, who received the degree of doctor of philosophy under the direction of Professor Faull in the spring of 1935, will spend 1935-36 in Jamaica with the aid of a Sheldon Travelling Fellowship. Dr. MacLachlan will work on a cooperative undertaking between the Arboretum and the Jamaican government planned to overcome a devastating new rust of Pimenta, a genus of economically important trees of the Myrtaceae.

THE CYTOGENETIC LABORATORY

At the Cytogenetic Laboratory fundamental research relating to the mechanism of heredity has been pushed forward during the year under the direction of [Professor Karl Sax](#). The work on cytotaxonomic problems was continued with studies of the genera Robinia, Verbena and Tradescantia.

An intensive breeding campaign was begun in the spring, numerous crosses being made in the genera Magnolia, Rosa, Rhododendron and Syringa. At the present time approximately one hundred first-generation hybrids have been planted out in a special nursery and the prospects are excellent for the development of interesting horticultural novelties when these hybrids are carried through to the second and third generation.

Investigations having to do with chromosome structure and the spiral structure of the chromonemata in meiotic chromosomes of *Tradescantia* and *Vicia* have been continued.

THE ATKINS INSTITUTION OF THE ARNOLD ARBORETUM

Last year the original agreement made between Mr. E. F. Atkins and Harvard University terminated. Mr. W. B. Claflin, now head of the Soledad Sugar Company, generously agreed to a new convention allowing for a large addition to the lands included in the Garden area. This addition takes in the land on which Harvard House stands and extends southward to the Garden without a break, taking in the neighboring area of uncultivated forest.

The legal instruments covering rights of way, rights to draw water and to cross and recross roads, have all been drawn and recorded in the Cuban courts.

When I was appointed Supervisor of the Arboretum in 1927, a campaign to raise the Charles Sprague Sargent Memorial Fund was being organized. At that time the invested funds amounted to \$1,253,444.40, yielding an income insufficient to maintain, as Professor Sargent had developed them, the activities of the Arboretum. The campaign to increase the endowment by one million dollars was successful owing to the extraordinary loyalty of Professor Sargent's friends and to the nation-wide appeal of the great dendrological institution he had established. In addition to this endowment, over five hundred thousand dollars have been added to the resources of the Arboretum since 1930, bringing the total endowment to \$2,941,186.54 for the fiscal year 1933-34.

Up to 1926 the Arboretum had followed a policy of isolation. With my appointment as Supervisor of the Arnold Arboretum and Botanical Museum and as Chairman of the Council of Botanical Collections, a new policy of unity with the other botanical institutions was initiated with close coordination and cooperative undertakings. Members of the Arboretum staff began to take part in the courses of instruction offered under the Faculty of Arts and Sciences and to take an active interest in the work of the Division of Biology. A harmonious relationship between the Arboretum, the [Bussey Institution](#) for Applied Biology, the Gray Herbarium, the Botanical Museum, the Harvard Forest and the Farlow Herbarium was established. A committee was appointed to look into methods of eliminating duplication in herbaria and libraries seeking possible economies in maintenance and administration. When the Biological Laboratories in Cambridge were contemplated I was appointed chairman of the "Committee looking toward the future development of biology in the University, " through which Committee the planning and erecting of the new building were accomplished. Graduate students working under Faculty members of the Arboretum staff have been furnished with space and apparatus in this building and while drawing their inspiration from the Arboretum have enjoyed the advantages of being in the centre of University life. Students from the Harvard Forest whose work could be more advantageously done at Jamaica Plain than at Petersham have come to the Laboratory of Forest Pathology of the Arboretum and have been directed by Arboretum men. When the Cuban Garden founded by Mr. E. F. Atkins was affiliated with the Arnold Arboretum as a tropical division, the broad significance of its interests was recognized by having the present Director of the Museum of Comparative Zoology appointed

Custodian and by throwing open to students of the Department of Zoology the laboratory and dormitory in Cuba.

Funds being available at the Arboretum, it was possible to bring to Harvard, with the approval of the members of the Department of Botany, eminent men, whose interests, though primarily dendrological, also strengthened the Department through special fields of scientific research.

In spite of the physical separation of the eight independent botanical units, prevented from consolidation by legal obstacles and fiduciary responsibilities, and in spite of restrictions regarding the pooling of their unequal incomes, the foundation is laid for the ideal of biological unity through harmony of interests and cooperation.

I desire to express again my deep feeling of obligation to the members of the Overseers Committee on the Arboretum for the advice and assistance they have rendered and to express my gratitude to the many friends of the Arboretum who have contributed so liberally to its support.

OAKES AMES, Supervisor.

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