The ARNOLD ARBORETUM of HARVARD UNIVERSITY

Annual Report 1931-1932

TO THE PRESIDENT OF THE UNIVERSITY:

SIR,

I have the honor as Supervisor to submit my sixth annual report on the progress and condition of the Arnold Arboretum. This report covers the year ending June 30, 1932.

Climatically the year proved generally favorable to the growth and well-being of the collections. Our trees and shrubs have prospered and are, with a few exceptions, in a normal and healthy condition. Now and again, usually through the unintentional carelessness of visitors, fires break out in the Arboretum and threaten injury or destruction to valuable specimens.

In the spring of 1932, several fires, a few doubtless of vandal origin, caused distressing damage. One of these menaced Hemlock Hill on April 30th, and before it was checked had destroyed a plantation of Japanese yews. It is evident that in future, extraordinary precautions must be taken if the work of years is not to be undone in a few minutes and losses incurred that can never be made good.

In continuation of our exchanges with other institutions in the United States, Canada, Great Britain, Holland, Germany, Hungary, Finland, Sweden, Palestine, Japan and New Zealand, there were distributed 1,997 plants, 833 cuttings and grafts and 941 packets of seeds. We received in exchange, 1,666 cuttings and grafts and 294 packets of seeds. This record indicates a diminution both in material sent out and in material received, and is an indication of economies in postage and express forced on institutions by unsettled financial conditions.

The Jackson Dawson House, near the Centre Street gate, was in a dilapidated condition when it came into our possession. It remained vacant for many months, and was subjected to rough treatment by the boys of the neighborhood, who broke in from time to time, destroying fixtures and finally setting on fire one of the rooms. In the spring of 1931, this house was repaired and made habitable. It is now occupied by Ernest J. Palmer of the Arboretum staff.

The heating system of the Administration Building began to give trouble in the spring of 1931. After careful consideration of the most economical way to overcome this trouble, a new automatic-feed boiler was installed. It has been estimated that the reduction in the fuel bill made possible through the ability to use a cheaper fuel than we have been accustomed to use in the past will bring about a saving that in two years will pay for the new boiler.

The Journal of the Arnold Arboretum has been issued quarterly and contained during the year more pages than ever before. From a publication devoted wholly to taxonomy it has become more comprehensive, giving space to articles on cytology, genetics, phytopathology and cryptogamic botany, all of these departments being represented by papers contributed by the staff.

The Bulletin of Popular Information has been issued with customary regularity. A new series of publications was initiated in June, to be known as *Contributions from the Arnold Arboretum*. It is planned to use this publication for monographs, and for longer articles than we have space for in the *Journal*. The first number of this series contains an important contribution, entitled *The* Hypodermataceae *of Conifers*, by Dr. Grant Dooks Darker, a member of the staff.

The second number is in press and the third and fourth numbers are ready for printing. Articles by the staff and by our research students published between July 1, 1931 and June 30, 1932, either in our own publications or in the journals of other institutions, comprised about 615 pages.

On August 1, 1931, Dr. Ivan Murray Johnston joined the staff with the title of Research Associate. He will devote his attention to taxonomic work in the Herbarium and for the present continue his investigations among the *Boraginaceae* of the western United States. Next year he will carry on research work in Europe, Brazil, Argentina and Chile, assembling data and material that may prove significant in explaining the occurrence, in widely separated areas, of identical or closely related species. His plans for fieldwork in Chile and in the central Andean region are of more than usual interest, because he will endeavor to obtain from the drier northern limits of Nothofagus and Araucaria new plants for cultivation in the Arboretum, among others species of the Mutisioid Compositae and interesting representatives of the Rhamnaceae. For the support of this work, Dr. Johnston has been granted a fellowship by the Guggenheim Foundation.

Dr. Edgar Anderson joined the staff on August 1, 1931, with the title of Arborist. Since his arrival at Jamaica Plain, he has devoted his time to the living collections and to the relations that exist between the Arboretum and horticultural clubs and societies. He has also carried on successful breeding experiments, producing from crosses between varieties of English Ivy a hybrid that gives promise of being more hardy and more vigorous than the ordinary strains now offered by nurserymen.

The Herbarium contains 358,503 sheets of specimens. Additions between July 1, 1931 and June 30, 1932, consisted of 10,022 specimens received from many parts of the world. The growth of this department has been consistently rapid in recent years, and to accommodate *inserendae* it proved necessary in 1931 to install 45 new cases. There is now sufficient space to receive a large number of accessions without undue crowding.

The Herbarium, in its highly specialized field, is one of the great botanical treasures of the world. It is not a collection of dead things brought together simply through a love of acquisition; it is an indispensable biological tool. In the final analysis no identification is reliable that does not rest on a type or on critically named material, and in close and careful work the Herbarium is the most helpful guide we have in arriving at the identity of plants used in research either for the interpretation of structure or for the investigation of function. The number of specimens distributed exceeded the number received.

In 1931-32 we sent to forty institutions in the United States, Canada, Europe, Asia, Africa and Australia 22,037 specimens, for which we should in time receive much valuable material in exchange.

Exploration has been supported liberally during the year, and either through cooperation with other institutions or at an expense borne wholly by the Arboretum many parts of the world have been visited by our collectors.

The policy of contributing toward the cost of expeditions originated by Chinese institutions has been continued, because it would be a sad blunder to allow the commanding position we have gained in relation to the flora of China to slip away.

Members of the staff devoted part of their time to collecting in the United States and Cuba. Mrs. Susan Delano McKelvey travelled from the middle of March to the end of May, in Texas, New Mexico, Arizona, California and Oklahoma for the purpose of studying and collecting species of the genus Yucca. In this undertaking she covered approximately 11,000 miles, obtaining herbarium specimens, collections of flowers and fruits in alcohol, numerous photographs, material for cytological study and over2,000 Yucca moths.

Professor Jack spent several months in Cuba at the Atkins Institution of the Arnold Arboretum, where he collected 4,500 sheets of herbarium material. Mr. Palmer and Dr. Anderson spent the month of April in exploring the Atlantic coast region from New Jersey to Georgia, paying special attention to the genus *Crataegus*.

In June Dr. Hugh M. Raup set forth on what promises to be a distinctly interesting undertaking in the department of geographic botany, his purpose being to correlate floristic and ecological points of view through studies of the little known flora of the Peace River region in the provinces of Alberta and British Columbia. This undertaking will supplement the results obtained on five other expeditions to northwestern Canada, and should help materially in the solution of the broader problems of subarctic plant geography, with emphasis on the arboreal flora.

The Library is extraordinarily exhaustive in its dendrological departments. It is becoming increasingly useful. Additions during the year included 878 volumes, 205 pamphlets and 321 photographs, making a total of 40,648 bound volumes, 9,885 pamphlets and 16,786 photographs now on the shelves or in metal filing cases. Unfortunately this priceless collection

is insecure against the risk of fire. Therefore, one of the most pressing needs of the Arboretum is a fire-proof addition to the Administration Building for the proper protection of our books.

The staff of the Laboratory of Plant Pathology has been engaged in much useful and influential work. The problems solved or taken in hand during the year have a strong bearing on arboriculture and on the welfare of New England trees. Several diseases of the utmost importance have been under observation. Indeed, after their existence was made known they attracted the attention of national, state and city organizations, and stimulated between the Arboretum and other institutions the fullest cooperation for a common purpose.

Six research students have been working under Professor Faull's supervision and guidance. It is a pleasure to report that these students are being furnished with space and apparatus in the new Biological Building in Cambridge. While drawing their inspiration from the Arboretum they enjoy the advantages of being in the centre of University life.

Dr. Grant Dooks Darker, supported by a Sheldon Travelling Fellowship, spent the year in Europe, where he carried on research work in connection with his investigations of the "needle cast" fungi of conifers. He was able to obtain gifts of much critical material for our herbarium of phytopathological specimens.

Dr. Kenneth S. Chester completed his studies of the phytophthora blight of lilacs and carried further his investigations in the realm of plant immunology, arriving at conclusions of significant importance. He will continue his studies in Europe during 1932-1933 with the aid of a Sheldon Travelling Fellowship.

Problems now receiving attention in the Laboratory of Plant Pathology have to do with rusts of conifers; trunk diseases of conifers; wilt diseases of elms; spermagonia of rusts; "cedar apple" diseases of red cedar, apples, hawthorns, etc.; a devastating disease of the American beech; and the mycorrhiza of forest trees. To determine the relation between the number of chromosomes and the accepted taxonomic grouping of different genera and species of woody plants, much additional work has been done by Professor Sax at the Cytological Laboratory. The plants investigated include species of the *Ulmaceae, Tiliaceae and Cornaceae* and a group of rare or monotypic genera.

Several members of the staff are working in cooperation with Professor Sax on problems presented by the pairing and division of chromosomes, this work involving an extensive study of the mechanism of heredity.

During the spring and summer months more than 350 crosses were made between different species and varieties of trees and shrubs in the effort to obtain interesting or improved horticultural novelties. The genera used in this work include *Syringa, Lilium, Malus, Philadelphus, Ulmus, Lonicera, Ribes and Rosa*. Many successful crosses between *Rosa rugosa* and other species have been made. From these crosses, it is probable that interesting hybrids will be obtained.

THE ATKINS INSTITUTION OF THE ARNOLD ARBORETUM

In 1926, Professor Sargent regarded favorably the plan to consolidate the Arnold Arboretum with the tropical station in Cuba, the control and management to be vested in the Arboretum. At this time he authorized a botanical survey to be made, sending Professor Jack to Cuba for this purpose. Nothing definite was done until 1932, when by vote of the Corporation the Cuban station was merged with the Arboretum under the official title of the Atkins Institution of the Arnold Arboretum. By the merging of these two kindred enterprises the rounding out of both is assured, and while the scope of the older institution is broadened, there is created under one general management a botanical undertaking of exceptional interest and importance.

As the Atkins Institution of the Arnold Arboretum is in no small measure devoted to biology in its broadest sense, and is quite properly concerned with biological research in the tropics, definite expression was given to this fact sometime ago by appointing as Custodian Dr. Thomas Barbour, Director of the Museum of Comparative Zoology. To Dr. Barbour's energy and enthusiasm is due the rapid growth of the collections in recent years, and for the introduction of many noteworthy ornamentals and economic plants we are indebted to his personal efforts. Robert M. Grey, who has been superintendent of the gardens since 1903, is still in charge of the collections and devotes his entire time to resident manager ship. A large amount of work on repairs, improvements and planting has been done during the year. In April the grounds around Harvard House (the laboratory and dormitory) were carefully replanned and a beginning made of a collection of trees and shrubs of botanical interest or horticultural charm. The dams in the series of ponds were repaired to conserve water and to seal leaks that hasten the draining away of water in the dry season. As an aid in conserving the micro-fauna that is often depleted by the floods that sweep through the ponds in the wet season, and to furnish controlled conditions for the cultivation of aquatic plants, a large tank, 30 feet wide and 35 feet long, was constructed on high land north of the greenhouse. This tank will provide ample accommodations for the rarer and more delicate water plants and be a constant source of vegetable and animal micro-organisms.

In 1931-1932 there were distributed to botanical gardens in many parts of the world and to experiment stations of the United States Department of Agriculture 300 species of plants, approximately 400 packets of seeds, many grafts and material for cytological research.

Since 1924, when records were begun, over 100 visitors have made Harvard House their headquarters for research at the Cuban Garden. Among these visitors there have been members of the Division of Biology, the Bussey Institution of Applied Biology, The Arnold Arboretum and the Harvard Medical School.

From thirty-eight contributors to the Charles Sprague Sargent Memorial Fund we received during the year additional payments of $30,175.00, and from the Estate of Charles Lawrence Hutchinson, "for the promotion of the work of the Arnold Arboretum," $29,518.60.

Another large contribution that falls to the year 1932-1933, as it was received shortly after June 30th, may well be mentioned now, that is the Mr. and Mrs. Henry Cowell Fund of $50,000.00, established by Miss Isabella M. Cowell of San Francisco.

The Supervisor desires to place on record his deep feeling of obligation to the members of the Overseers' Committee on the Arnold Arboretum for their advice and assistance, and to express his gratitude for the great service rendered by the Committee in raising and establishing the Charles Sprague Sargent Memorial Fund of one million dollars.

On June 30, 1932, contributions toward this Fund amounted to $992,717.92, and when several deferred gifts are received, one of these consisting of payments that will not be completed until 1936, the entire amount will have been paid in. That a campaign to raise one million dollars, extending over a five-year period, with three of the years falling in a time of great financial depression, should be successful, and should terminate with only $195.00 of cancelled pledges, and with pledges that are of doubtful fulfillment amounting to only $1,700.00, is indeed remarkable. It is a striking manifestation of the loyalty of the friends of the Arnold Arboretum, some of them having contributed at a time when to do so must have been desperately inconvenient.

Perhaps the deep sense of loyalty to Professor Sargent embodied in the Memorial Fund finds its reward in the assurance that the new undertakings which have broadened the scope of our work, and have placed the Arboretum in a more commanding and influential position, were clearly premeditated by Professor Sargent in 1919, when he made known his hopes and desires in "Harvard and the Future."

OAKES AMES, Supervisor.

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