Annual Report 1930-1931

TO THE PRESIDENT OF THE UNIVERSITY:

SIR,

I have the honor to submit the following report on the progress and condition of the Arnold Arboretum.

The summer of 1930 was characterized by a serious drought. Artificial means of watering were attempted where the plantations were in obvious need of moisture, but it was impossible to meet the requirements of every plant or to do more than supply the minimum of relief to rare or unfavorably situated specimens of trees and shrubs.

The winter was mild and proved favorable, in that the ground was covered with snow for much of the time. The mildness of the winter was evident in the profusion of flowers produced by the Cherries and allied groups in the spring and in the slight or negligible injury to the flower buds of the less hardy exotic species.

In the late spring the effects of the drought of the preceding summer became manifest in the abundance of dead wood that had to be removed from the trees and in the necessity for severe pruning among the shrubs.

In April there were several fires in the Arboretum, but the damage to the trees was slight and the areas burned over were small. Copious rains in June, records for rainfall for the month being broken, were extraordinarily beneficial.

The "*Bulletin of Popular Information*" goes to 1,932 subscribers. It has proved to be a valuable publication for spreading information with regard to the behavior of woody plants that have proved hardy in the climate of Boston. It is gratifying to report that the articles in the *Bulletin* are frequently referred to in foreign journals and are sometimes reprinted almost verbatim. Eighteen numbers were issued in 1930.

The *Journal of the Arnold Arboretum* is widely circulated, being issued to 300 subscribers and scientific institutions at home and abroad. It has served as a valuable medium for exchange with other libraries and to it we are indebted for many serial publications that are received by the Library of the Arnold Arboretum. Beginning with the twelfth volume (1931) the format and

paper of the Journal were changed and the editorial work given to Alfred Rehder as editor and to Professors Faull and Sax as associate editors.

Between July 1, 1930, and June 30, 1931, to countries in all parts of the world, 1,812 packets of seeds were distributed and in the same period there were sent to institutions and individuals in the United States, Canada, Great Britain, Holland, Germany, Poland and Austria 1,097 cuttings. In the United States, Great Britain and Holland there were distributed 1,780 plants.

In exchange there were received from New Zealand, the United States and countries in Europe, Asia, and South America 321 packets of seeds and 10,492 plants and cuttings.

Visitors to the Administration Building numbered 1,178, representing Scotland, England, Ireland, New Zealand, Sweden, Germany, France, Russia, South Africa, India, Poland, Bulgaria and many parts of the United States.

Numerous requests for information regarding plant diseases were received at the Pathological Laboratory during the year. These have pertained to a wide range of host species and diseases, and have referred to individual trees or shrubs, entire plantations and to forest areas covering tens of thousands of acres. To the exceptional inquirer interest centers in the disease itself, but generally the main concern is to learn how the disease may be eliminated, controlled or prevented. The Arboretum welcomes both types of inquiries, though sight is never lost of the fact that the ultimate ideal of its pathological division is the accumulation of data on the ways in which the conflicting environmental factors that beset ornamental plants or forests may be adjusted to permit normal development.

Another department of our work has to do with aid given to students of pathological problems. During the year we have had seven students who came to us from the United States, Canada and Europe to carry on investigations under the supervision of Professor Faull. Several weeks were spent in the forest by Professor Faull on a study of trunk diseases of Spruce, their causes, their relative frequency of occurrence, the relation of these diseases to the age of the trees, the conditions that underlie their spread and control. Investigations based on these and certain other coniferous diseases have been continued in the Laboratory.

Dr. Christine Buisman of Holland, who, as reported last year, first positively identified the occurrence of the Dutch Elm disease in America, studied various native diseases of Elms while at the Arboretum. Some of the results of her investigations will be published in a forthcoming number of the "*Journal of the Arnold Arboretum*."

An important part of Dr. K.S. Chester's work on the graft blight of Lilacs was completed during the year. He was able to demonstrate that the common practice of propagating Lilacs on privet stocks, a practice that has arisen, not through necessity but through its somewhat lower cost, is the cause of this disease.

The greatest confusion has prevailed with reference to the taxonomy of a group of wood-attacking fungi of the genus Ganoderma which occur on both hard woods and soft woods.

An excellent piece of work by W.R. Haddow, based on a comparative study of distinctive characters, has revealed what appears to be an easy approach to a correct understanding of the species concerned.

The devastating epidemic disease of the Beech in Nova Scotia has spread across the border into New Brunswick. Mr. John Ehrlich has begun his second year of study of this disease and finds that it results from a joint attack of a Coccus insect and a Nectria fungus. The Coccus has been found by Ehrlich in metropolitan Boston. His studies, not yet completed, afford interesting information regarding the cause and spread of this disease.

Dr. G. D. Darker has now assembled the results of his work on the morphology and the biology of the needle cast fungi of conifers. The number of known species (about 50) has been doubled by his investigations and a good beginning has been made toward a study of their life histories.

Cytological investigations of chromosome numbers in various families of plants have been continued during the year. In certain groups, such as the *Pomoideae*, the chromosome numbers are closely correlated with the taxonomic grouping. In the *Pomoideae*, cytological studies have given us considerable information concerning the origin and relationships of different genera and species. Chromosome numbers have also been obtained from representative genera and species of the *Oleaceae, Berberidaceae, Cornaceae, Saxifragaceae*, and from a number of isolated genera.

Much work has also been done on chromosome structure and behavior in relation to the mechanism of heredity. One paper has been completed on chromosome behavior in *Rhoeo*, a species of the Commelinaceae, based on material collected at the Harvard Botanic Garden in Cuba. This paper has been sent to a Japanese journal for publication. Another long paper on chromosome structure is practically completed, this paper also being based on preparations made in Cuba in 1930.

Mr. Dermen has published a paper on chromosome pairing in polyploids, and a paper by Mr. O'Mara on the mechanism of chromosome pairing has been sent to "Cytologia" for publication.

Breeding work was conducted on a large scale last spring and about 200 crosses were made between different species and varieties of ornamental shrubs and trees. Many of these crosses were successful. Earlier breeding work has produced a hybrid of unusual interest - a cross between *Syringa pinnatifolia* and *S. oblata*, species of Lilac. Similar hybrids of spontaneous origin have also been found in the nursery by Mr. Judd.

The Herbarium contains 348,603 specimens, 15,234 having been added between July 1, 1930, and June 30, 1931. There have been distributed 25,424 specimens to 46 institutions in the United States, Canada, Europe, Asia, Africa and Australia. Besides the constant use of the Herbarium by the staff in the determination of plants sent in for identification, the collections have been used by members of other departments of the University and by representatives of other institutions.

Dr. F.P. Metcalf of Lingnan University, Canton, who is preparing a flora of Fukien, and E.H. Walker of the National Herbarium in Washington, who is working on a revision of the Chinese Myrsinaceae, have depended largely on our collections in the prosecution of their work.

Botanical explorations by members of the staff or by expeditions partly financed by the Arnold Arboretum have been carried on indifferent parts of the world.

Since March, 1930, Mr. S.F. Kajewski has been collecting in the Solomon Islands. He has been most successful in his expeditions and we have already received from him a large amount of material.

Professor C.Y. Chiao returned in September, 1930, from the expedition to Shantung mentioned in the report for 1929-30, and this year he expects to start, toward the end of June, with Professor A. N. Steward for the province of Kweichou. Mr. R. Goerz, from the beginning of April to the beginning of August, collected in northern Asia Minor, giving concentrated attention to the study of the Willows of that region.

From the beginning of April to the beginning of June, Mrs. Susan Delano McKelvey collected chiefly in the southwestern United States, obtaining approximately 900 numbers with duplicates. She gave special attention to the species of Yucca, Nolina and Agave and visited most of the type localities of these genera.

Professor J.G. Jack spent the month of July, 1930, and the month of March, 1931, in Cuba continuing his botanical explorations in the vicinity of the Harvard Botanic Garden near Cienfuegos.

Mr. E.J. Palmer collected from the middle of June to the beginning of September, 1930, in the northwestern United States and from the end of March to the middle of June in the southeastern United States as far west as Oklahoma, paying particular attention to the species of Crataegus.

Alfred Rehder spent the summer from the end of June to the middle of September in Europe where he attended the International Congress of Horticulture in London as a member of the International Committee on Horticultural Nomenclature. He also attended the International Botanical Congress in Cambridge. At the meeting in Cambridge he participated chiefly in the sessions of the Subsection on Botanical Nomenclature. Many of the proposals he had submitted for changes in the present rules were accepted and he was appointed a member of the

Executive Committee of the Subsection on Botanical Nomenclature and of the Special Committee on Phanerogams and Pteridophytes. He also visited the herbaria of Kew, the British Museum, Paris, Berlin, Breslau and Vienna, where he examined and took photographs of over 500 types of Chinese plants.

During the past year there have been added to the Library 688 volumes, 215 pamphlets, and 965 photographs, the total number at the end of June being 39,770 bound volumes, 9,680 pamphlets and 16,465 photographs. The following abridged bibliography cogently shows the extent and nature of the investigations that have been undertaken by members of the staff and their students. This bibliography covers the year ending June 30, 1931.

BIBLIOGRAPHY OF THE PUBLICATIONS OF THE STAFF AND STUDENTS

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OAKES AMES, Supervisor.