



## Annual Report 1963-1964

TO THE PROVOST OF THE UNIVERSITY:

SIR,

The year just completed was an active and productive one for the staff of the Arnold Arboretum. Significant contributions were made in the many areas of botany and horticulture represented by the interests of the staff. Certain problems associated with the maintenance of a living collection of woody plants open to the public increased. The need for an irrigation system, increased police protection, control of automobile traffic, and additional trained staff required initiation of studies seeking some solutions. A detailed report of the activities of the staff and of appropriate statistics for the various collections is published in the October number of the Journal of the Arnold Arboretum. Copies are available upon request. The following paragraphs represent a brief summary of the academic year.

### STAFF

During the year Dr. Lily M. Perry retired as an active staff member and [Mrs. Susan D. McKelvey](#) as a research associate.\* The devoted services of both, which together totaled nearly seven decades, are marked by their many publications and known also by their varied contributions. Dr. Lorin I. Nevling, Jr. was appointed Associate Curator and Supervisor of the Herbaria jointly with the Gray Herbarium. Dr. Mary Sanders was reappointed a research associate, and Dr. Lalit Srivastava's Mercer Research Fellowship was renewed.

### HORTICULTURE

The care and use of the living collections of woody plants are basic to all our activities. Increasing amounts of time, labor, and (\*Mrs. McKelvey died on July 11, 1964, shortly after her retirement) money are being spent on the collections to counter the effects of successive unusually dry summers.

At the Case Estates in Weston municipal water supplies are available and sprinkling systems can be operated in most of the nursery beds. In Jamaica Plain all water must be obtained through meters and carried first by tank or truck, and eventually by sprayers or back packs, to the plants. In recent years the average rainfall has remained normal but the distribution is abnormal with dry spring, summer, and fall seasons, and heavy rain and snow falls in the winter. This shift has directly affected the planting program which must be

conducted in the spring or fall, and the maintenance program of mid-summer. There is some evidence that the Arboretum had an irrigation system before 1918. None of the present staff recalls it nor are old plans available. There is again need for such a system, and a study of location, installation, and operation costs has been started. Although the City of Boston and the Metropolitan Police cooperate fully on all emergency calls, the need for more effective surveillance of the grounds is evident. Damage by vandalism has increased to plants, benches, roads, buildings, and signs, and subsequent repairs are correspondingly more costly. A re-examination is underway of driving regulations, open hours beyond staff work schedules and types of patrol systems available. The dry weather held the fall planting program to a minimum, but during the early spring 558 plants representing 250 taxa were added to the Arboretum collection. Included were many replacements among which were 34 taxa of *Salix*, the willow, to substitute for old trees showing symptoms of decline.

A major improvement on the grounds was the completion of the turn around on Peters' Hill. The easy accessibility of the area has provided a new vista and made available additional plants for use in conducting tour groups and classes.

The Charles Stratton Dana greenhouses draw an increasing number of visitors including representatives of other arboreta and universities. Although the greenhouses were constructed without flaw, the professional advice received regarding the soils and drainage proved deficient. An underlying layer of compacted soil hampered drainage and damaged nursery stock so that special work was needed in the areas adjacent to the greenhouses. The top soil was completely removed, the hardpan layer broken, drainage tile installed and covered with sand and gravel before the top soil was replaced. This action, although costly, has provided us with two acres of fine nursery soil. Two recent flower show exhibits and a publication on methods of handling seeds have encouraged requests for propagating materials. At the same time the research programs and the travels of the staff have added to the number of plant introductions. The shipment of plants or plant parts and the handling of imported materials are some of the activities of the greenhouse staff.

The Arboretum received 153 shipments of whole plants of 731 different kinds from 12 countries, as well as 159 lots of seeds from 43 countries. This increase in material received is due in part to the travels of the staff; and the materials received, although not all hardy, are important to programs of research. In response to specific requests or for its own research programs of hardiness testing, the Arboretum staff sent 149 shipments of 969 kinds of plants to 7 countries, and 56 shipments of 172 kinds as seeds to 13 countries.

A new project expanded during the year in the selection and evaluation of seed progeny from plants of pine and hemlock having witches-broom types of abnormal growth. Although such forms have been known in horticulture for many years, the present seed crops represent new selections and offer the unique opportunity of following the plants through all stages of their development. It is clear that new cultivars can be obtained from these seedlings. The

Arnold Arboretum was reappointed National Registration Authority for woody plants not otherwise represented by societies.

The registration list for cultivars of *Fagus* was published and distributed by both the American Nurseryman's Association and the American Association of Botanical Gardens and Arboreta. Work on lists of *Ulmus* and *Weigela* is nearing completion.

#### CASE ESTATES

The use of the grounds in Weston increases with more classes and individual visitors who come over a greater number of hours. Permanent parking areas have been designated and a "self-guiding" nature trail is being developed. To the existing demonstration collections, we added special collections of *Lilium*, *Hemerocallis*, and prepared beds for taxa of *Iris* and *Allium*. Cultivar collections associated with plant registration activities have been supplemented for many genera. The most extensive development occurred for *Chaenomeles* where 86 cultivars were planted out for permanent record or for hardiness testing and evaluation.

#### HERBARIUM

The most conspicuous changes in the Herbarium were made in the facilities for housing and studying cultivated plants in the Administration Building in Jamaica Plain. Forty-three new herbarium cases were purchased and installed on the second floor gallery, doubling the case capacity of the Herbarium in the past three years. This entire section of the Herbarium has also been painted and new fluorescent lighting has been installed. The full Herbarium of cultivated plants was redistributed in the cases now available and the initial steps were taken toward a new system of geographical arrangement of the specimens.

During the year 20,104 specimens were mounted and added to the Herbarium collections in Jamaica Plain and Cambridge. The total number of sheets in the Herbarium is now 783,748. Nearly 14,000 specimens were received, the greater portion by exchange with other herbaria. Noteworthy was the receipt from the Royal Botanic Garden, Edinburgh, of the G.H. Cave collection from the mountainous regions of India.

Staff members and students requested or received for identification 6,219 herbarium sheets, but filled requests for 130 loans of 13,298 specimens to 66 institutions. The taxonomists on the staff of the Arnold Arboretum have continued and intensified their research studies, partly as a result of recent field work on special groups. The twenty-three published papers which would be considered taxonomic or systematic research studies represented work in 15 families of flowering plants from geographic areas such as northeastern China, southeastern United States, Iran and Turkey, New Zealand, the Bahamas and the Lesser Antilles, Borneo, and Mexico.

## LIBRARY

The task of maintaining a highly specialized library so that current needs are met and gaps in older literature are filled is a demanding one. Thanks to the acuity and energy of Mrs. Lazella Schwarten, the Librarian, our collection continues in its superior position. Two of the interesting volumes added during the year are the *Curioser Botanicus* of Samuel Mueller, published in Dresden and Leipzig in 1730 -- a notable addition to the pre-Linnaean collection and not known to be in any other library in the United States -- and a first edition of John Lindley's *The Vegetable Kingdom* which completes our series of this work. Three hundred forty-five bound volumes, obtained by purchase, exchange, or as gifts were added to the Library during the year. Of these, one hundred concerning horticultural subjects are housed in Jamaica Plain.

Additions to the collection of reprints and pamphlets brought that collection to a total of 19,824. New series of cards were incorporated in the *Index to American Botanical Literature*.

## LABORATORIES

The work in laboratories associated with special collections at times supplements the taxonomic studies in the Herbarium, the cultural practices on the living collections, or may represent independent directions of scientific investigation. Working in the wood collection Professor I. W. Bailey has continued his studies of the primitive Cacti, seeking evidence for both taxonomic relationships and for metabolic specialization that enabled these plants to survive in desert areas. Dr. Lalit Srivastava, a Mercer Research Fellow, has sought information on the distribution of lignin in the bark of various plants and has used the electron microscope to determine the changes in cells during the period of frost hardiness.

Dr. Howard accumulated additional material for a survey of petiolar vascular anatomy during his trip to Africa and Australia, and from this has found new nodal-vascular patterns. The wood collection was increased by prepared microscope slides, preserved material, and dried wood specimens.

In the cytological laboratory of the Dana greenhouses, Dr. Mary Sanders has continued her work on the cytology and genetics of sorghum, searching for evidence that colchicine induced mutants may result from chromosome changes. Working with associates and students, Dr. Sanders has aided the staff in such diverse problems as a cytological survey of *Lonicera* species under cultivation in our collections, the cytological basis for homostylous pollen-trimorphic plants of *Psychotria guadalupensis*, and a careful search for a missing triploid *Forsythia*.

## EDUCATION

No formal courses were offered by Arboretum staff members during the year, but Messrs. Green, Howard, and Wood took part in presenting Biology 247, a course in plant geography, and in directing both undergraduate and graduate research students in special problems. Staff members conducted informal class programs at Jamaica Plain and Weston in both the fall and

the spring. Special "open house" days were held at the Arboretum in Jamaica Plain and on the Case Estates. Two large educational exhibits were prepared during the year for the International Flower Show in New York and for the Spring Flower Show of the Massachusetts Horticultural Society in Boston. The exhibit in New York concerned the treatment of seeds from time of collection until after germination; it was awarded the Director's Trophy.

Members of the staff attended scientific meetings associated with their special research interests, presented papers, or presided over meetings. In addition the staff filled requests for speakers for groups visiting the Arboretum and at other locations.

#### TRAVEL AND EXPLORATION

The opportunity to observe, collect, and study plants in the field and under cultivation is both a privilege and a requirement for the botanist. During the past year staff members have worked close to the Arboretum and in distant countries. From their efforts have come specimens as dried material, preserved for anatomical or cytological studies, photographed for teaching and lecturing, as well as living material for growing in the green house or out-of-doors for scientific study and for horticultural application.

Dr. Dudley undertook the task of adding to the representation of cultivated plants in the Herbarium, and acquired specimens in areas between Mt. Desert, Maine, and the Callaway Gardens in Georgia. Mr. Green, with partial support of a grant from the National Science Foundation, made an extended trip to the Pacific Ocean region to study plants of the Oleaceae and to make general collections in a few island areas poorly represented in our Herbarium. His itinerary included the Hawaiian and Fiji Islands, New Caledonia, New Zealand, Norfolk Island, Lord Howe Island, and parts of Australia.

Dr. Howard spent two and a half months in the fall on a trip that began with a meeting of AETFAT, a society devoted to the study of African botany, in Italy; he continued back to Boston via Egypt, Ethiopia, Kenya, Mauritius, Australia, New Guinea, and Fiji. The initiative for the trip was an invitation to take part in a botanical tour commemorating the 50th anniversary of the founding of the Kirstenbosch Botanical Garden and the Natural History Society of South Africa.

Dr. Hu studied collections of Ilex, the holly, in New York and Maryland. Dr. Schubert attended the Mexican Botanical Congress, and in additional days collected herbarium material in the states of San Luis Potosi, Jalisco, Nayarit, and Mexico.

#### GIFTS AND GRANTS

The Arboretum received gifts of many kinds in support of its work. The monetary gifts of the Friends of the Arnold Arboretum, which have been most generous, are gratefully acknowledged. In addition there have been gifts of botanical specimens and books for the Herbaria and Library, of living plants for the collections in Jamaica Plain and Weston, and special travel grants for research from government and private foundations.

## PUBLICATIONS

Regular issues of the [\*Journal of the Arnold Arboretum\*](#) and of *Arnoldia* were distributed during the year. Special publications included the photocopy reproduction of a booklet entitled "How to Form an Arboretum" first issued as a number of *Arnoldia* in 1960 and still in continuous demand; a photocopy reproduction of Rev. Lansdown Guilding's catalogue of the botanic garden in St. Vincent, published in 1825, was made to be distributed honoring the 200th anniversary of the founding of that garden.

The bibliography of the Arboretum staff during the past year includes 67 articles and books published in our own journals and elsewhere.

RICHARD A. HOWARD, Director