

# ARNOLDIA



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## THE CHARLES STRATTON DANA GREENHOUSES OF THE ARNOLD ARBORETUM

**I**N March of 1962 the staff of the Arnold Arboretum accepted and occupied a new set of greenhouses. Modern in design, construction, and function these greenhouses provide excellent new facilities for the Arboretum staff for work in plant propagation and for the study of living plants.

In the very early years of the Arnold Arboretum, the growth of seeds and the vegetative propagation of plants for the developing collection was implemented in the Harvard Botanic Gardens in Cambridge. The time required to commute and the difficulty of transportation led Mr. Jackson Dawson, the first superintendent and propagator, to build what he described as a "tiny unpretentious greenhouse" at the rear of his house at 1090 Centre Street, in Jamaica Plain. This modest unit, supplemented by a pit house and cold frames, contained for nearly a decade the plants propagated for the Arboretum collections and for distribution to other gardens. It was inevitable that this limited facility would be outgrown, and, in 1917, a modern greenhouse was built on a small corner lot between Prince Street and Orchard Street and separated from the Arboretum by the Arborway. It was again a limited area and proved to be even more restricted and isolated as the traffic increased on the Arborway and that street was widened. Dawson's successor, William Judd, for 33 years the propagator on the Arboretum staff, reported in his diary for June 13, 1927, that this property had been sold and that he must move his plants by May 1, 1928. Under the guidance of Oakes Ames, then supervisor of the Arnold Arboretum, a new location was chosen adjacent to the greenhouses of the Bussey Institution, on Bussey Institution land which did not belong to the Arboretum, overlooking the shrub collection of the Arboretum. The greenhouse area was occupied in the summer of 1928, and, in 1929, an additional greenhouse was added. This familiar pair of greenhouses with a small, white, frame headhouse served the Arboretum from 1928 through the

past winter. Finally another move seemed inevitable when successive bills were filed in the State Legislature during the past decade to acquire the Bussey land by eminent domain proceedings. The continuous threats to our greenhouse operations required the selection of an area offering greater stability, larger nursery areas, and a new and modern building. Fortunately, a timely bequest and some available land suitably located led to the present new development.

While the majority of the land occupied by the Arnold Arboretum is owned by the City of Boston and rented in perpetuity, the four and one-half acre site chosen for the Dana greenhouses is owned by Harvard College for the Arnold Arboretum. This property, at 1050 Centre Street, adjoins the main collections near the plantings of lilacs. Its accessibility for visitors, staff, and equipment, both from the Arboretum and from a major highway, makes it a most convenient location.

The construction of the new greenhouses at this time was made possible through the income of the Mercer Trust, established from the residuary estate of Mrs. William R. Mercer. Mrs. Mercer, née Martha Dana, was a native of Boston and the daughter of Charles Stratton Dana and Marie Grogan Dana. She died at Doylestown, Pennsylvania, February 21, 1960, and her will provided that the income of her estate be divided equally between the Arnold Arboretum, the Boston Symphony Orchestra, and the Boston Museum of Fine Arts.

It was Mrs. Mercer's wish that the use of her bequest honor her father and his lasting interest in the Arnold Arboretum. This has been done in naming the new greenhouses the Charles Stratton Dana Greenhouses of the Arnold Arboretum. A plaque inside the front hall indicates that construction was made possible through the generosity of his daughter, Martha Dana Mercer. The income from the Mercer Trust is also used to award Mercer Fellowships in horticulture and botany, thus honoring Mrs. Mercer, too. Research space in the Dana Greenhouses is available for holders of these fellowships.

With the approval of the President and Fellows of Harvard College, who are the trustees of the Arnold Arboretum, the firm of Griswold, Boyden, Wylde and Ames was engaged as architects. When final drawings were approved, the specifications were placed for competitive bids and the construction contract was awarded to Bond Brothers, Inc., of Everett, Massachusetts. Ground was broken on May 12, 1961, by President Nathan M. Pusey, of Harvard, in the presence of members of the Committee to Visit the Arnold Arboretum, the architects, the contractor, and members of the Arboretum staff. Work on the greenhouses continued through the fall, and the cold storage house was occupied in November 1961, and the greenhouses in March 1962.

The Charles Stratton Dana Greenhouses comprise a main building with three attached glasshouses, a cold storage house, a bonsai house, a permanent shade house, nursery and plant beds. The four and one-half acre plot of land has been fenced so that the gates can be locked and the buildings and nursery areas guarded in a manner not possible previously. Special plantings have been made



**PLATE X**

(Top): Plaque located in entrance to the main building. (Bottom): Mr. Nathan M. Pusey, President, Harvard University, breaks ground for the Dana Greenhouses on May 12, 1961 with members of the Overseers Committee to visit the Arnold Arboretum, architects, contractors, and members of the Arboretum staff present.

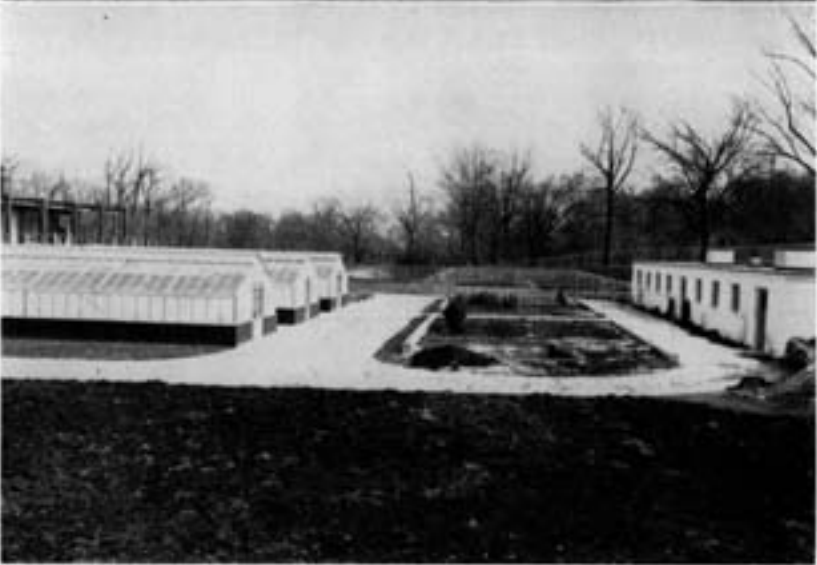
around the buildings in such a manner as to accentuate the nursery areas with displays showing how plant materials can be used.

### **The Main Building**

By tradition the main building to which the glasshouses are attached bears the name of the "headhouse." This common name hardly does justice to the modern work area and research facilities now available to the Arboretum staff. The first floor and full basement are 36x111 feet and are topped by a centered second floor apartment 22x68 feet. Working space for the propagating staff occupies the central area of the first floor and the full length of the rear of the building. At the two ends are smaller rooms, one a modern laboratory for cytological or morphological research, the other a conference room with blackboard and screen which can be used as a small lecture room. Skylights in the roof supplement the fluorescent lighting in the research laboratory and the work areas. Storage space, such as walk-in rooms, cupboards, and open shelving, is abundant in all areas. An acid-resistant black "vulcathane" covers the 400 square feet of work surface and potting benches. The walls of the work area are of glazed tile for easy cleaning. Stainless steel sinks and drainboards are used in the laboratory. A small lunch-room area adjoins complete locker facilities for the staff. Soil for use in the work area is placed in hoppers located outside the building and so designed that the soil is available inside the building through openings under the work benches.

There are two walk-in cold-storage rooms on the first floor. One room 11x7 feet can be maintained at temperatures between 28° and 40° F. This will be used for temporary storage of cuttings, for seed storage, and for seed-dormancy research. The second room is 8x7 feet, with temperatures controlled between 35° and -20° F. This room will be used for experiments determining plant hardiness, inception of flowering, and foliage variation experiments. Either room can be readily converted to constant environment chambers if such physiological work is required. As with the first floor, the full basement is dominated by work or storage areas for plant propagation. A passageway the full length of the building is designed for plant beds which can be illuminated by fluorescent lighting, or portions of it can be used for storage. Two small rooms are designed for enclosed storage and open areas at either end of the basement for storage on exposed shelving. The basement can be reached by two stairwells inside the building as well as by a delivery well on the west end. An electric lift, a type of dumb waiter, allows the easy transport of a small wheelbarrow, bales of peat moss and similar supplies between the basement and the first floor work area.

The building is heated by two oil fueled furnaces and forced hot water. The furnaces can be run either interchangeably or together. Thirty-five thermostats control the supply of heat to the greenhouses and various parts of the building. An auxiliary electric generator capable of producing 15 kilowatts is operated on fuel oil from the main storage tanks and a storage battery. If the main line vol-



**PLATE XI**

(Top): North side of the main building and the greenhouses. (Bottom): View looking south of the main building, the glasshouses, the shade house and the cold storage house.

tage drops below 70% of its normal load the auxiliary generator operates automatically. This emergency electric supply will operate both the cold rooms and the furnaces in case of power failure, ensuring protection for the plants in the greenhouses as well as any low-temperature experiments in progress.

The second floor of the main building contains a modern two bedroom apartment. The back wall of the living room area consists of floor to ceiling glass panels which open onto a large deck area surrounding the apartment on three sides. The apartment will be occupied by a staff member generally responsible for the greenhouse area during non-working hours. The entire area is easily observed from this apartment, and a battery of eight searchlights can be used at night to illuminate the area. An electric system of alarms is located in the apartment, and will serve notice of heat, power, or refrigeration failure in any part of the building.

Stained redwood siding is used on the front of the main building. Aluminum casements are on all doors and windows and bronze screens add protection. Exterior maintenance costs should be moderate.

### **The Glasshouses**

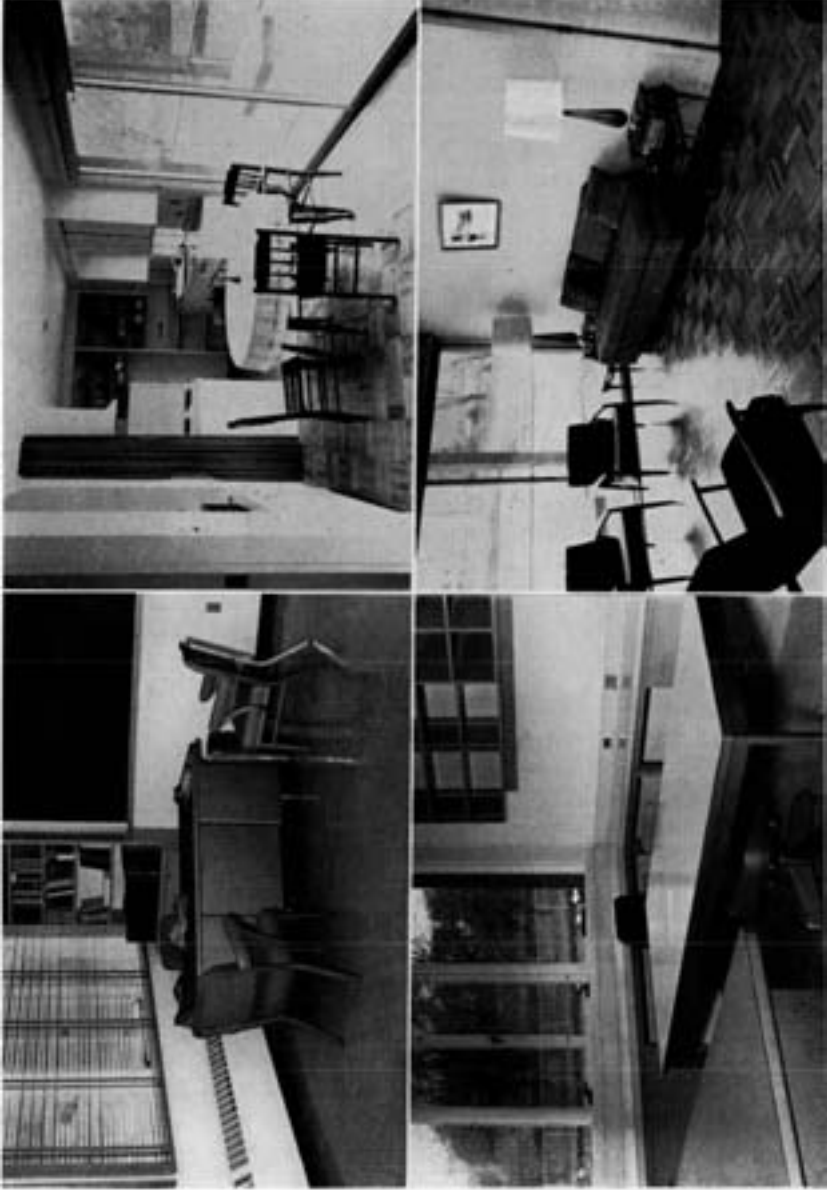
Three all-aluminum glasshouses, supplied by the Lord and Burnham Company, are attached to the main building. These are of the "Century" class and each is 17x51 feet, with eaves 6 feet high. House "A" is designed for research projects which may require different environmental conditions. Each section of this house may be maintained at different conditions of temperature, light, and humidity. Two of the sections have 155 square feet of bench space each, with a walk on either side of a central bench. The third section has a central area without benching to allow the growth of plants to a height of ten feet. House "B" is a single unit without divisions and with a central walk. An experimental bench plan utilizing peninsulas offers 582 square feet of bench space. The peninsulas and side walks off the central aisle are arranged so all areas can be reached by an average-sized person. House "B" has 15% more bench space than House "C" because of this bench arrangement. House "C" has one partition dividing it into two areas, each with 248 square feet of bench space. An area has been reserved for a fourth greenhouse designed to be comparable to house "A" when this additional space is required.

All sections of the greenhouse area have automatic heat controls and automatic ventilation. All benches are built of "Transite," a mixture of asbestos and cement. Suitable wiring and 88 electric outlets will allow the use of electric heating cables on the benches and accessory lights or additional types of electric research instruments. The walks in the greenhouses are at the same level as the floor of the main building and exterior sidewalks. Wheelbarrows, carts and similar vehicles can be moved easily in or out. Redwood slat shades will be used on the greenhouses.



### PLATE XII

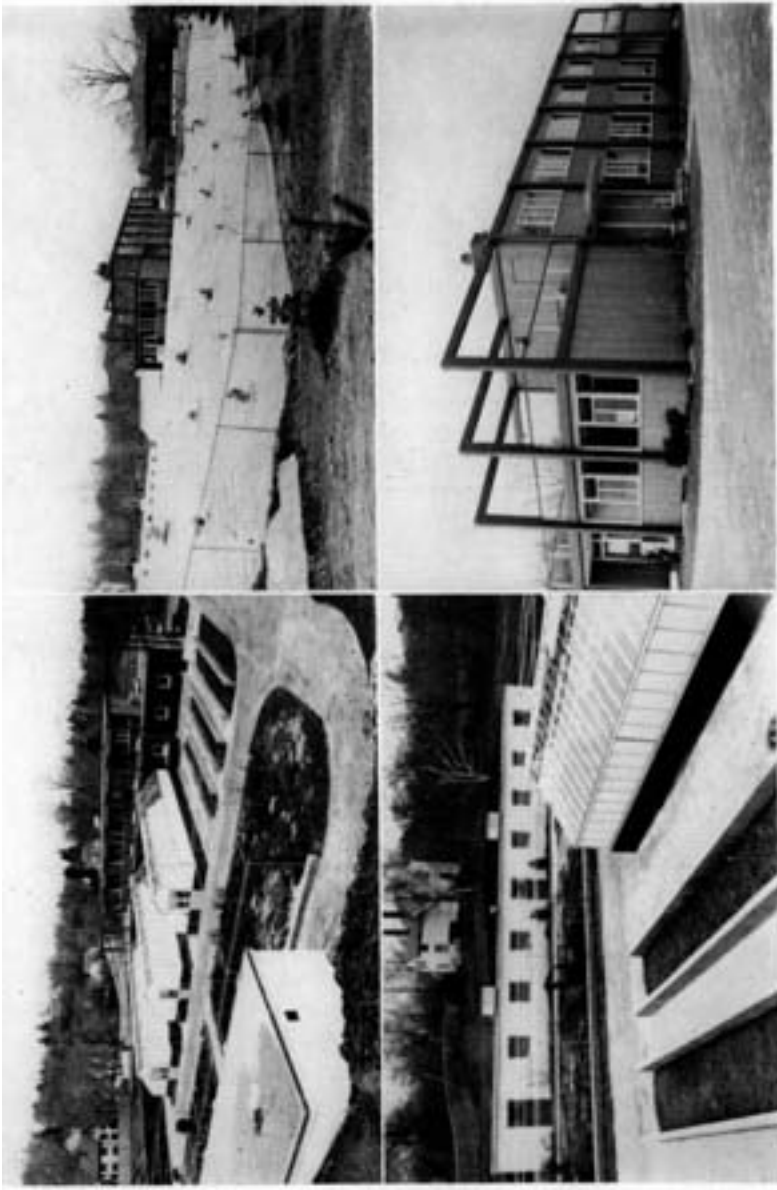
(Top): Propagation work area. (Bottom): Propagation work area at rear of main building. Shown on left wall is the electric lift to the basement, storage room, propagation work area, and two refrigeration rooms. Greenhouses are on the right.



**PLATE XIII**

(Left, top) : Office and conference room. (Left, bottom) : Research laboratory. (Right, top and bottom) : Two views of apartment for greenhouse guard.





**PLATE XIV**

Four views of the Dana Greenhouses of the Arnold Arboretum.

## **Plant Beds and Nurseries**

The plant beds and nursery areas are on the same level as the greenhouses and are easily accessible from bordering roads. They should be the most practical units of this kind that the Arboretum has ever had. A shade house 30x105 feet is located between the greenhouses and the cold storage house. Concrete frames mark the edges of this area. A permanent pipe frame supports not only the saran cloth but an overhead irrigation system as well. Saran cloth, woven of a plastic fiber, can be rolled over the pipe frame when required and removed for storage during the remainder of the year. Parallel to the greenhouses, occupying the place of the fourth greenhouse, are three concrete-framed nursery beds. Adjacent to the main building to the east and west are additional blocks of land totaling approximately an acre to be used as space for additional nursery plantings.

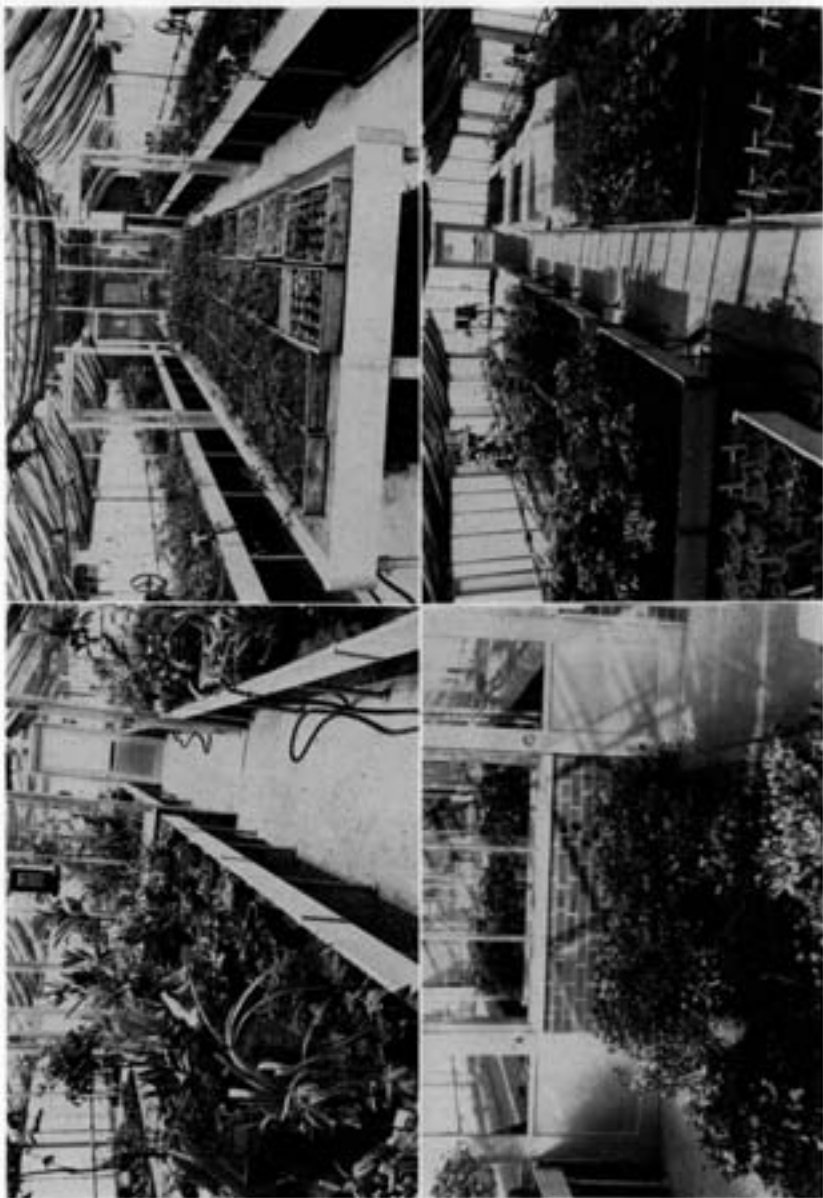
## **The Cold Storage House**

A building of concrete blocks and reinforced concrete insulated with two-inch slabs of "Styrofoam" has been built into the north side of a hill and will serve as a cold pit storage area. The building, 15x100 feet, is divided into two compartments. The east end is for winter storage of the bonsai plants. The west end occupying three-fourths of the building is for the storage of dormant plants, cuttings, scions and stock plants in flats or pots. Twelve hundred and twenty-five square feet of shelving is provided for such storage. One side of this area is clear for heeling plants into the soil.

The cold storage house is built with electric heaters, as well as refrigeration units. The temperature in the area reserved for the bonsai collections will be maintained just above freezing. The temperature in the larger area can be fluctuated or maintained steady. The main objective of this experimental storage unit is to hold dormant woody plants from mid-October to mid-May and to prevent vegetative growth. When used in conjunction with the walk-in cold chambers of the main building, these refrigeration units will allow experimental work on hardiness and vegetative dormancy of the plants grown at the Arboretum.

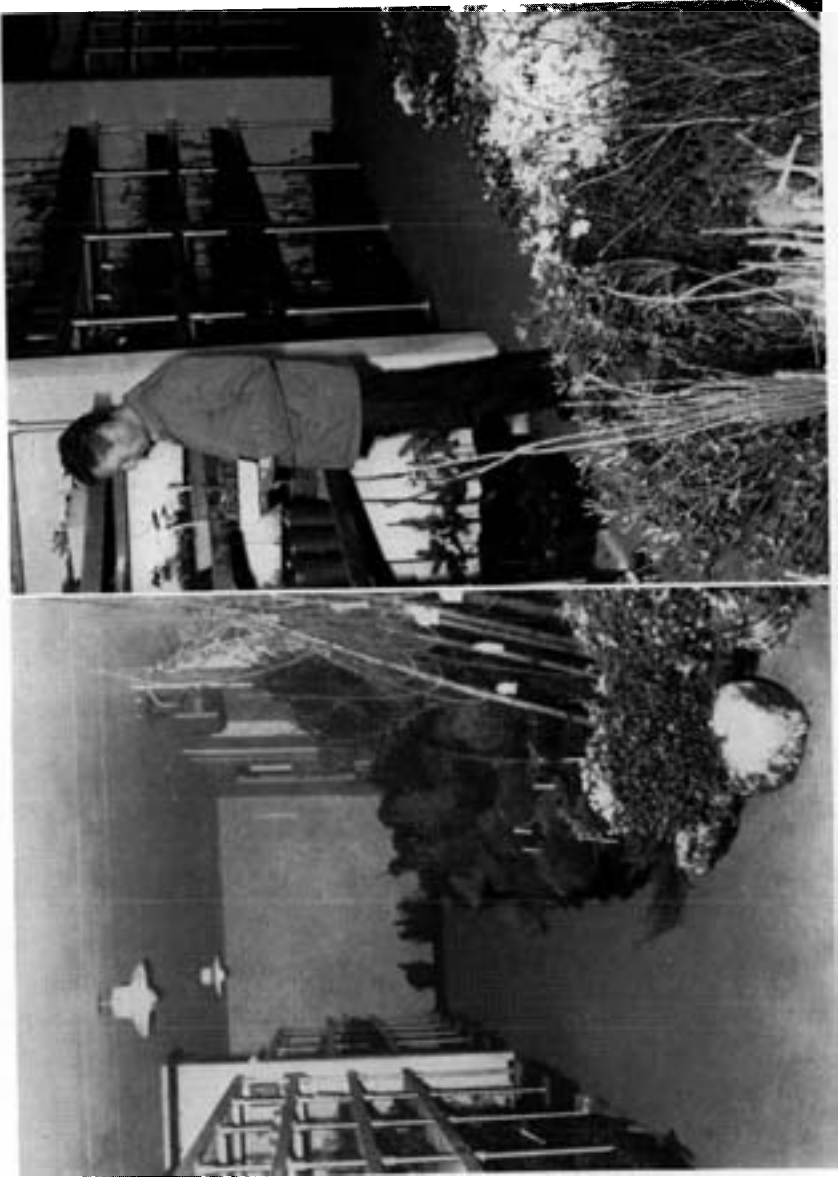
## **The Bonsai House**

In front of the main building, a hexagonal display house has been constructed for the collection of Japanese dwarfed trees given to the Arboretum by Mrs. Larz Anderson of Brookline, in memory of her husband. The attractive house is made of redwood slats, 2.25 inches wide and set 3.75 inches apart. The building is 9 feet long on each side and approximately 18 feet in diameter. The plants will be displayed on raised concrete benches and will be readily visible from inside or out. A walk with a railing completely surrounding the bonsai house serves for viewing the plants when the doors are locked and also gives a vista over the adjacent plantings. Overhead sprinklers facilitate the care of these interesting

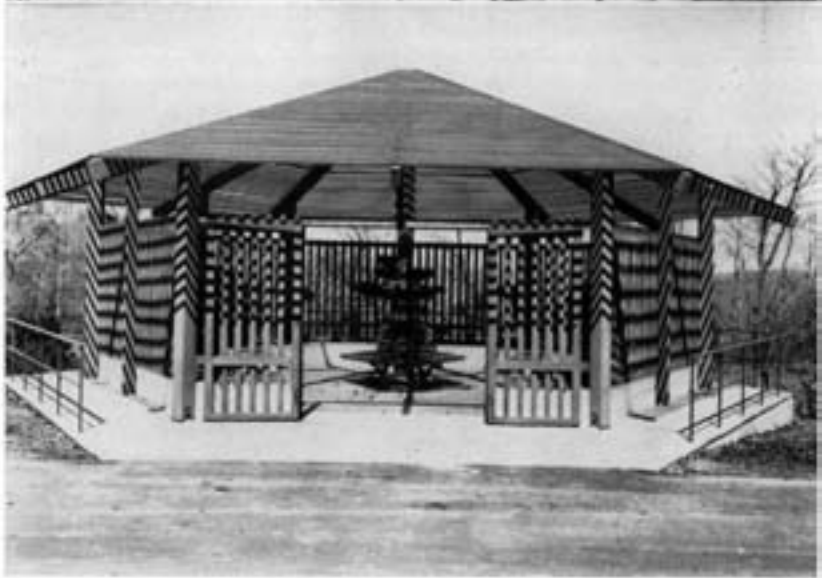


**PLATE XV**

(Left, top and bottom) : Two views of greenhouse A. (Right, top) : Greenhouse C. (Right, bottom) : Greenhouse B, showing peninsula arrangement of benches.



**PLATE XVI**  
Two views inside the cold storage house.



**PLATE XVII**

(Top): View inside the Bonsai house. (Bottom): The Bonsai house.

plants. Since the bonsai must be moved to the cold storage house for the winter, care was taken to assure that these heavy plants could be handled easily. The area between the two locations is level.

### The Grounds

The construction of a new greenhouse on ample land of clear title not only will further the practical and scientific work in plant propagation and horticultural research but will also afford an opportunity for attractive landscaping of a building and the development of new collections of horticultural interest. Mr. Seth Kelsey of East Boxford, a member of the Committee to Visit the Arnold Arboretum has worked with the staff in designing these new plantings. Furthermore, he has on his own initiative invited various nurseries to contribute many of the plants needed for these plantings. As a result of his interest and effort, we gratefully acknowledge the contributions of over 1300 plants by eight Massachusetts nurseries: Adams Nursery, Westfield; Cherry Hill Nurseries, West Newbury; Corliss Brothers Nursery, Ipswich; Jackson Brothers Nursery, Norton; Kelsey-Highlands Nursery, Boxford; Littlefield-Wyman Nurseries, Abington; Weston Nurseries, Hopkinton, and Wyman's Garden Center, Inc., Framingham. The large plants these nurseries have donated will make many of the demonstration areas of practical value in the very near future. Many additional plants propagated by the Arboretum staff will be placed in their proper locations but will require a longer period to reach maturity and to be of demonstrative value.

One of the potentially attractive plantings is a collection of 28 cultivars of American holly. This selection was offered to the Arnold Arboretum by Wilfrid Wheeler in the fall of 1961. He personally selected the plants, which represent the last of a long series of generous gifts he has made to our plantings. Regrettably, Wilfrid Wheeler died on Christmas Day 1961, but his wishes were carried out by his sons, Wilfrid, Jr., Richard, and Charles. The Wheeler hollies are interplanted with flowering dogwood and white pine and are located on a slope immediately inside the Arboretum gate in the greenhouse area.

On the slopes flanking the cold storage house will be bank plantings of low or prostrate junipers. A demonstration area of various types of plants suitable for bank planting will be located along the Centre Street bank below the greenhouses. Plants suitable for espaliered growth are planted on the front wall of the cold storage house. Suitable ground-cover plants will be used in many flat areas. Genetically dwarf evergreens, mainly conifers, will form a bank planting below the bonsai house, accentuating the artificially dwarfed plants in the house. Finally, in the flat area north of the greenhouses the Arboretum collection of hedges will be planted. The present collection, of limited value for demonstration purposes because of its location on Bussey Institution property, will be moved when possible and new hedges added or used as replacements. The planting plan allows space for approximately 100 types of hedge planting.

The entire area is surrounded by a chain-link fence. It will be open to the public at regular hours, but the buildings, plantings, and nursery areas will be protected adequately for the first time in recent years.

The development of this new area of the Arboretum offering new plantings to the visitors and new facilities for horticultural research to the staff has been the work of many people. The generosity of Mrs. William Dana Mercer as one of the Friends of the Arnold Arboretum made the construction possible. The development of the area was aided by the use of the annual gifts and of the plants contributed by other Friends. These gifts from loyal supporters of the work of the staff of the Arnold Arboretum are acknowledged with gratitude.

RICHARD A. HOWARD

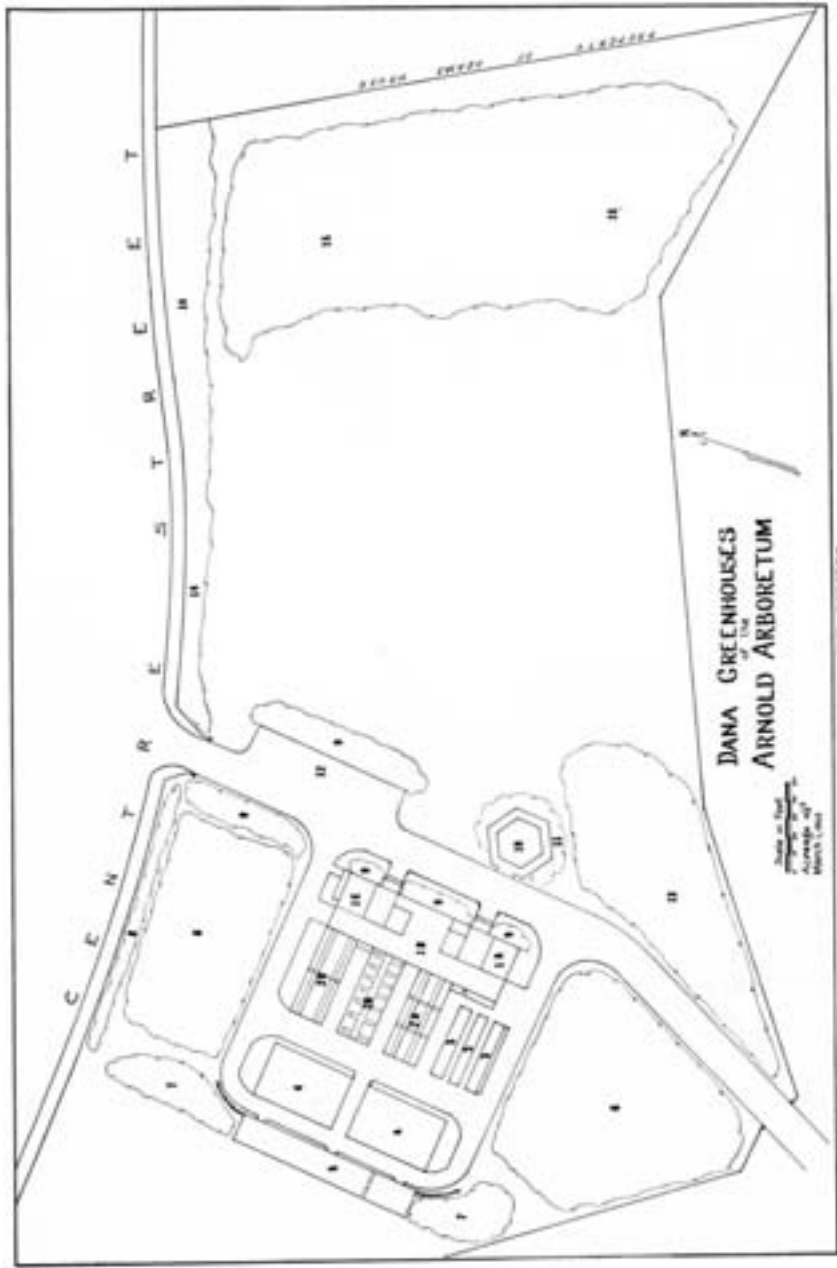


PLATE XVIII

1. Main Building. 1A. Research Laboratory. 1B. Propagation Work Area. 1C. Office and Conference Room. 2. Greenhouses. 3. Plant Beds. 4. Shade House. 5. Cold Storage House. 6. Nursery Areas. 7. Ground Covers. 8. Junipers. 9. Shrub Planting. 10. Bonsai House. 11. Dwarf Evergreens. 12. Parking Area. 13. Wheeler Holly Collection. 14. Bank Plants. 15. Hedera Plant Collection.