

A STUDY GARDEN FOR STUDENTS
IN
ORNAMENTAL HORTICULTURE

by

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Bachelor of Science
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Ithaca, New York
1949

Submitted to the faculty of the Graduate School of
the Oklahoma Agricultural and Mechanical College
in partial fulfillment of the requirements
for the degree of
MASTER OF SCIENCE
May, 1953

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A STUDY GARDEN FOR STUDENTS
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PREFACE

This paper describes the design of a small garden area for the display of plants for study and observation. To plan a small study garden with a sufficient number to be of practical value to the horticulturist and the botanist has required careful study of the plant materials. The arrangement presented on the master plan is but one of countless possible solutions. Some spaces have been left vacant to permit movement of plants within the garden or the addition of plants not suggested on the lists.

The small demonstration gardens are but four feasible designs. The students of future classes would redesign and rebuild one garden each year on a rotation order, thus no garden would be extant more than three seasons. This space has been planned to be a useful, living area to serve the needs of the college as an outdoor classroom and laboratory.

My thanks are due to my major professors, Fred LaCrone and Roger B. Thompson, for their sound council, for their interest and criticism in this study and the preparation of this thesis.

I am also indebted to Robert P. Ealy, now on sabbatical leave, with whom this study was begun.

TABLE OF CONTENTS

Chapter	Page
I. Introduction	1
II. Review of Literature	3
III. Definitions and Functions	5
IV. General Study Garden Planning Suggestions	9
V. Plan for Description for the Case Study Garden	15
Service Building & Entrance	16
Demonstration Gardens	19
A Modern Home Yard	20
A Narrow City Lot	21
A Colonial Type Garden	23
A Southwestern Oklahoma Garden	24
Tables of Plant Lists	26
Illustrations	33
SUMMARY	43
BIBLIOGRAPHY	45

LIST OF TABLES

Table		Page
1.	Plant Materials Designated On Master Plan	26
2.	List of Plants for a Modern Home Yard Garden	33
3.	List of Plants for a Narrow City Lot Garden	34
4.	List of Plants for a Small Colonial Type Garden	35
5.	List of Plants for a Garden for Southwestern Oklahoma	36

LIST OF ILLUSTRATIONS

Figure		Page
1.	A Study Garden for Students in Ornamental Horticulture	37
2.	Service Building and Entrance	38
3.	A Modern Home Yard	39
4.	A Narrow City Lot Garden	40
5.	A Colonial Type Garden	41
6.	A Southwestern Oklahoma Garden	42

CHAPTER I

INTRODUCTION

The horticulture department at Oklahoma A. & M. once had a specimen plant materials garden which was destroyed to make way for the new Home Economics building. This garden had filled a very real need for students of both the horticulture and botany departments. A large nursery is maintained by the horticulture department where specimen are grown, but they are not well labeled and easily accessible for student study. The students are now forced to waste valuable time walking about the campus under the guidance of an instructor, for none of the campus plants are labeled for ease of identification. It is difficult and often impossible for students to find known plants out of class study. Free-time work with plant materials is the best method for learning to identify, use and enjoy plants. Students here must often use small dried twigs for comparative identifications. A properly labeled plant study garden is needed to increase available study facilities and to enable students to become familiar with plant materials readily.

The National Landscape Nurserymen's Association has published a recommended curriculum for students in landscape design. A part of this recommended curriculum included the suggestion that actual practice in garden construction be made part of the instructional program. There is no place in the Oklahoma

A. & M. course of study at the present time where students can be given this type of supervised constructional work. Instruction of this nature must be done by lecture, on paper and by observation. A plant study garden would provide a demonstration area where students could actually work out ideas and procedures adaptable to Oklahoma conditions.

CHAPTER II

REVIEW OF THE LITERATURE

Historically, gardens planted for educational purposes were first planted in the early part of the 16th century in France. (Bailey, 1937)¹ The first collection of woody plants in America was made by John Bartram, of Pennsylvania, in 1728. Institutions of higher learning did not see the need for laboratory gardens until 1868, when through the gift of James Arnold, Harvard University founded the now famous Arnold Arboretum.

Bailey (1937)¹ mentions a three acre garden of study material founded early at the Michigan State Normal School in Ypsilanti, Michigan, which was used for classes in botany, nature study and agriculture, though he does not state specifically that ornamental classes used the garden.

McQuestem (1942)¹¹ states that arboretums in park developments can add to the recreational interest by teaching visitors to know and appreciate plant materials. The arboretum will also be a laboratory for classes organized by park recreational directors.

According to Pyle (1945)¹² the war retarded garden construction. He states that the educational garden picture should be surveyed once each decade to determine its educational and monetary status. Most of the recent institutional public gardens have been built in the last 50 years. He feels

that the gardens are all weak in personnel and finances. Twenty-seven states do not have state operated public gardens. Oklahoma is one of these. Pyle (1945)¹² believes the federal department of agriculture, by example or otherwise, should guide land grant colleges in the planting of a suitable garden area for each, and thus laboratories for demonstration and testing purposes, and wherever it is lacking, supply with adequate supplies.

Wyman (1947)¹⁶ of the Arnold Arboretum has compiled a list of public garden institutions in North America. As part of this treatise he discusses the procedure to follow in establishing a botanic garden. The article is very general in character, but is one of the few publications that have offered this type of information. Most of the literature refers to botanic garden operations. Previous published materials relative to a study garden of the plan discussed in this paper have not been discovered. It is hoped that this paper will be an inspiration to future planners.

CHAPTER III

DEFINITIONS AND FUNCTIONS

Definition: A study garden, as considered in this thesis is a cultivated area planned for the growing and effective display of many genera and species of ornamental tree, shrubs, vines and other ground covers, to provide for use, study and enjoyment of students in ornamental horticulture a compact outdoor work area that could be maintained with a minimum of expense, labor and time.

Wyman (1947)¹⁶ defines an arboretum as a place where the growing of woody plants is stressed, whereas a botanic garden is a place where all kinds and types of plants both woody and herbaceous may be grown. The value of the arboretum or botanic garden is dependent on accurate labeling. A park is usually planted for display, aesthetic appreciation and protection. Park plants are seldom labeled, and are usually a collection of native or locally adaptable plant materials. Specialty gardens as rockeries, rose gardens, iris collections and perennial borders may be a part of the arboretum, botanic garden or park.

The study garden differs from the arboretum, botanic garden and park in that it is actually a laboratory area functioning as a living outdoor class room, for the use of students studying ornamental horticulture. It is an area where students can go when they have free time to study and familiarize themselves with plants. The small compactly arranged collection of plants in gardens of this nature allows students to compare

shapes, forms, flowers, colors and textures of foliage, and season of bloom. Climatic influences on the growth of ornamental plants can also be observed and studied.

Not much material has been published on the procedure to follow in building a study garden of the type needed for students in ornamental horticulture, because until recently there has been little demand for it and no one has taken the time to do research on the problem.

The first part of this thesis gives general information and ideas usable in study garden design and construction. Such a garden would seem to be a requisite to the improvement of the training now given in ornamental horticulture at Oklahoma A. & M. College.

The last part of this thesis presents plans and describes a possible solution to the problem heretofore mentioned. The specific area used for the plan is at the college nursery about two miles west of the campus. The area used for the study is small and nearly level, therefore, the garden could be adapted to an area nearer the campus, once the building program now underway is completed and in the event that the development program is planned to include such an area.

This study is undertaken to discover what work had been done along this line and to make available information on ornamental plant study gardens for colleges planning to build such gardens. The drawings are simple enough to be workable for many college programs. Special lists are presented for Oklahoma conditions, but, the plant lists could easily be varied to fit any section of the country.

The more important functions of the ornamental plant study garden are:

(1) to grow plants indigenous to the state of Oklahoma, in order that students might become better acquainted with the local plants, their names, growth characteristics and proper culture.

(2) to display a large collection of correctly labeled, ornamental woody plant materials usable in landscape planting.

(3) to introduce new plants that might be adaptable to the region, testing them for hardiness to extremes of temperature, and resistance to injury by drought.

(4) to display turf and other cover plants suitable for surfacing in Oklahoma.

(5) to provide a specimen plant laboratory for students in horticulture, botany and other related fields.

(6) to provide demonstration gardens as described in Chapter V for the students in landscape design, stressing economic importance and beauty, through practical, functional and interesting plant arrangements.

(7) to provide an area for public observation, education and appreciation of the variety of usable and attractive plant materials available for Oklahoma gardens.

(8) to provide a small tool shed and sheltered place suitable for class recitation or demonstrations.

These definitions and functions provide a basis for the descriptions and ideas to be presented in the following pages and illustrations for a case study garden suitable for Oklahoma A. & M. College.

CHAPTER IV

GENERAL STUDY GARDEN PLANNING SUGGESTIONS

A study garden designed and developed from the ideas expressed in this thesis should be sufficient, practical and require a minimum of upkeep. Since such a project would have the intelligent advice and direction of the members of the college staff, it would have the usefulness of a classroom laboratory without the expense of permanent building construction.

The site is of great importance and utmost consideration should be given to location, adaptability and accessibility in relation to the classes expected to use the garden. The area should be as near as conveniently possible to classroom buildings and other college facilities, to save the time of students and interested persons, in getting to the garden. Services of water and electricity should be available. Water is necessary to prepare sprays, water plants and to use in pools. Electricity is needed to operate pump systems, light sections of the garden and to operate electric power equipment for demonstrations. The site should provide suitable environmental conditions for a large variety of plants. A plant list in Chapter V, specifies approximately 200 species and varieties requiring varying environmental conditions.

Level ground permits the use of straight rows and level plant beds. A sloping site would add interest by changes in

level and angles but necessitates more waste space. The sloping site would cause an erosion problem in the cultivated beds and increase the amount of runoff water. The idea of this study garden is to keep the space as small as compatible with adequate presentation of material, because larger sites involve more care and a larger operating budget. A suitable garden can be built on a single acre, but some study gardens are as large as several thousand acres. A college department can develop an area of from one to five acres which will provide an adequate study area and also grow sufficient plant material for students to work with in laboratory classes.

The planning of a study garden should be undertaken with the co-operation of all departments to be affected. A horticulturist with landscape design training should head the planning. His classes will make the greatest use of and have the greatest interest in such a project. He will direct students in plant materials courses and in landscape design and construction work. Upperclass students majoring in the horticulture field should be consulted since students can often offer practical ideas. Interested nurserymen and former students because of their continuous contact with field problems can also frequently offer practical suggestions that may be incorporated into the plans of such a garden.

Colleges which have already developed such study gardens may well be asked for their planning programs. However the author wrote letters to nine colleges for such information and has received no answers.

After the site is chosen, draw a master plan to scale. Because we are planning a small practical and functional garden keep the plan sufficiently flexible to accommodate further acquisitions. Plan for a maximum number of plants regardless of size at maturity. Plan so that when material outgrows a practical size for the compact garden, it will be removed and replaced with new specimens. The variety of plant material indigenous to the locale will determine the space allotted to large plants. With a small garden of one to five acres, trees that are fifty to one hundred feet tall at maturity must be planted as small specimens and replaced as they shade or crowd out other plants.

The master plan should show existing plant material and contours if there is any slope to the site. It should indicate where the water system is to be laid, show where new plants are to be placed and mark paths and roads for servicing.

Water pipes should be planned to extend where they will be most useful when watering or spraying. The main service line should be placed where it is easily accessible so that repairs may be made without damage to any of the permanent features of the garden. Do not locate plants over pipes. Plan the outlets so that not more than fifty feet of hose need be used water from any part of the garden. A tee should be provided near each of the demonstration gardens so that future outlets can bring water to a pool if wanted. Pipes can be shifted easier on a paper plan than later when the garden is planted.

The soil should be tested by a college agronomy department for pH and available nutrients. If soil will not support a maximum number of the plant varieties, the soil should be improved before planting by using cover crops, manures and fertilizers as recommended by the agronomists.

Placing of plants in the garden should be made with thought to the convenience in cultivation, culture and ease of access by students to minimize the damage as much as possible. Be sure there is enough room to use a small tractor, and to get a pickup truck on the grounds and turn either vehicle without damaging plants. Provide sufficient space for all students in a class to gather about whatever specimen the instructor might want to discuss. For ease of care place the shrubs in continuous beds with the smallest shrubs at the front and grade back to the largest shrubs and small trees at the rear of the beds. In large arboretums and botanic gardens, plants are often arranged according to botanical sequence of order, family and genus, but this arrangement would be too difficult to follow in a small study garden area. Efficiency in care and aesthetic beauty would be lost because of spacing necessary to retain botanical sequence.

In making a choice of plants, it is best to consult previously established lists of plants suitable to specific regional growing conditions. The botany department and the horticulture department should both be in a position to furnish such lists of plants. These lists will of course vary in length from a few hundred to several thousand species. First

select plants that are growing and growing well in local nurseries and home grounds. Such a list will be sizable. Add also the native plants that grow nearby and other plants worthy of testing under local soil and climate conditions. The small study garden of this type should include a selection of forty to fifty plant families.

As to sources of plants, check local or area nurseries, other colleges and universities, arboretums, botanic gardens and city park systems. Gifts and exchanges of plants can very often be arranged. Much material can be propagated from seed, grafts and cuttings obtainable from some of the above mentioned sources. Propagation of new plants can be carried on by the college nursery facilities to begin the project, thus space in the developed unit can be saved.

In making the master plan of a study garden area of one to five acres, a scale of one inch equal to four feet is none too large for mapping the grounds. If the garden is more than five acres the scale for the master plan might be reduced to facilitate easy handling of the map and to give an over all picture. However a scale plan of one inch equal to four feet should be made and the map cut in sections $8\frac{1}{2}$ by 11 inches to fit a looseleaf notebook. This is a handy way to carry a map of the grounds to locate plants in a large garden.

In addition to showing the location of specific plants by a numbering system or a cataloging system on the map, each plant should bear a permanent and indestructible label. Lead, zinc and copper bear a permanent adaptability for the purpose.

Each label should bear the accession number, a map number, scientific name of the plant, common name and origin by geographic location as minimum information. Unless the student has the advantage of correctly labeled plants the function of the study garden is lost. By mapping as well as labeling and cataloging, quick location of any plant is a simple process.

CHAPTER V

PLAN AND DESCRIPTION FOR THE CASE STUDY GARDEN

The plot assigned for the projected study garden for students in Ornamental Horticulture at Oklahoma A. & M. College is the southwest corner of the department's nursery grounds. The section is 426.5 feet long and 150 feet wide or about 1.45 acres of nearly level ground, although there is a slight slope from west to east. The area is now covered with overgrown nursery stock, most of which must be removed by bulldozer and tractor to make way for the new garden plants.

The row of *Juniperus virginiana* growing from the southeast corner and 187 feet along the south side should be saved. The *Juniperus virginiana* trees growing from the northwest corner for a distance of 60 feet along the west side should also be saved. These trees need some pruning and heading back, to thicken growth, but they will provide good background for other garden plantings and provide needed wind protection.

After the rest of the plant material has been cleared from the plot and the root holes filled, the soil should be leveled and the slight slope from west to east maintained for drainage of surface water. Water pipe lines should then be laid as indicated on the master plan. The pipe line is indicated as entering the garden along the driveway entrance and

extending 100 feet south. At a point about 50 feet along the main pipe line and at the south end four branch lines are installed, two of which are laid to within 50 feet of the east boundary and two within 50 feet of the west boundary of the garden. Draining shutoffs are installed at the union of the branch pipes to the main line for drainage of lines in winter, and service faucets are spaced at 50 foot intervals along these branch lines as marked on the master plan. A tee outlet should be left below the ground in the branch pipe lines adjacent to each of the demonstration gardens for possible future pool construction when design classes rebuild the gardens. With the water line laid as shown on the master plan, Figure I, a fifty foot hose will reach any part of the garden for watering.

To locate the west edge of the driveway, measure from the fence at the northwest corner 180 feet east along the north boundary. A driveway 10 feet wide and 100 feet long is to be built from the north entrance toward the south side of the garden. As shown on the master plan, an eight-foot drive is planned to form a long narrow curved service road from the main drive to give a continuous circulation through the east section of the study garden. The drives and walks should have a six inch base of crushed stone. Two inches of asphalt rolled on the crushed stone will give a road surface that will bear garden traffic.

As indicated on the master plan (Fig. I), the sketch and ground plan in Figure 2, a Service Building and Garden Entrance which is 25 feet wide and 30 feet long, (A on the master plan)

will be built. This building which covers part of the driveway, has a concrete base. It provides a tool shed and a sheltered outdoor classroom. The tool shed is constructed of random width vertically laid redwood siding. The indicated corner supports are two inch steel pipes set in the concrete base and tied to the roof with bolted flanges. The recitation and tool shed part of the service building has a builtup asphalt roof covered with fine crushed stone. This is an economical and practical type of roof. The area over the driveway is covered with rafters spaced three feet on centers. These can be covered with vines, left open or covered with canvas. The effect of a butterfly roof gives the lean-to shed roof a light appearance and a feeling that the building is larger than it actually is. An automobile, small truck or spray equipment can be driven under the raftered section of the shelter. One narrow window at the top of the tool shed will admit the light necessary in the small room. Since the window is near the top of a nine foot wall, vandals will be discouraged from entering and taking tools. For further discouragement a metal grid or screen should be put over the window. The building is necessary as a convenience to aid in teaching, for tool storage and to draw attention to the garden entrance.

The part of the garden immediately west of the service building will be laid out as a section of a very small city park. This layout is based on an integration of regular and irregular planting arrangements in a belief that blending

these forms will give strength and beauty to the plan.
(Eckbo, 1949) ⁷

Because of the size of the plants at maturity relative to the small size of the garden would be out of scale the park area has been given indefinite boundaries so that a feeling of confinement and limited size will not become oppressive. The plants in this small area make use of trees in other parts of the garden for background. Also important to this area in particular, and to the whole garden in general, is the size of specimens, their colors, textures and forms, for where only one or a few individuals are used the diversity of plant characteristics from many plant varieties would create an unpleasant reaction in the observer.

The surface of the park area will be *Cynodon dactylon*, Bermuda grass. The plants used throughout the garden are as indicated by numbers on the master plan, Figure I and on the plant materials list Table 1.

On the south and east section of the garden, a collection of deciduous trees and shrubs is planted with the smallest specimens next to the walk, and the plants are spaced with the tallest shrubs and small trees next to the *Juniperus virginiana* on the south and east. The smallest plants are spaced five feet apart in the row, while ten feet are left between all other plants in the specimen collection. This allows ample space for cultivation and class observation.

The broadleaved and narrow leaved evergreens are planted on the north and east sections of the garden and spaced the same as the deciduous trees. Some small ornamental trees are

planted in the center panel of the garden to provide shade patterns. A portion of the center panel in the east end of the study garden will be used for specimen plantings of ground covers and grasses suitable for Oklahoma gardens. Other parts of the center panel might be used for lining out rooted cuttings and to build demonstrations of hot beds and coldframes suitable for home garden use. Each of these should be made from a single three by six foot sash.

Demonstration Gardens

Four gardens have been planned for construction within the study garden. These four gardens are planned for students to build for actual practice in garden construction, so they can learn building adaptable to Oklahoma conditions. These gardens are planned to be simple and practical to construct. They are functional because they meet the needs of many people by providing terrace space for relaxation, and plant beds for leisure time exercise. The plant arrangements are planned for easy care and to present interesting forms and arrangements. Texture contrasts are stressed in both ground covers and space forms. These gardens are planned not only for student but also for public observation, and to educate the people to appreciate the variety of attractive plant materials available for Oklahoma gardens. These gardens also will suggest plant combinations and arrangements that individuals can adapt for their own home yard beautification.

A Modern Home Yard

A 50 by 60 foot section in the northeast corner of the study garden (B on the master plan) has been laid out as a suitable design for a backyard garden for a contemporary home. It provides a rest terrace, some garden area, with shade, trees and an arbor. The view from the terrace is toward the south, where it is assumed the house stands. The *Juniperus virginiana* form a windbreak on the west. To screen the north side beginning at the northwest corner, a vertical wooden panel is constructed seven feet high by sixteen feet long, raised one foot above the ground on four by four inch posts set in eighteen inches of concrete. These posts extend one foot above the panel for a height of nine feet. An abstract painting based on leaf shapes and geometric forms to carry out the contemporary scheme should be painted on the garden side of the panel. Because this is for Oklahoma where summer climate is hot and arid, strong use of blue, yellow and green colors should be made in the painting as these are cool colors. Two shorter panels are built as indicated on the plan, in front of the one just described. The panel on the west side of the terrace is six feet high and the panel on the east is four feet high. These are built of planed redwood boards. An arbor structure overhead slants from a height of 12 feet, where it is supported by posts at the south side, to nine feet at back panel. The two by six inch rafters are spaced three feet apart on centers at the high end and two feet apart at the panel, thus a false per-

spective is constructed which gives the garden interest center an appearance of greater depth. A brick surface on the terrace in this corner fronting the ornamental panel provides an interesting textural contrast between the brick and the redwood boards in the arbor. A group of regularly spaced *Pinus sylvestris* is planted at the east of the yard where the hedge cuts through to the brick terrace. The hedge is to screen the opening on the north side easement. The pines balance a group of regularly spaced *Platanus occidentalis*. The mottled texture of the *Platanus* bark contrasts with the deep green foliage of a free-form planting of *Juniperus sabina*. These *Platanus*, planted above the *Juniperus sabina*, would have to be removed in a few years and new trees planted, as they would eventually outgrow the area. Also on this south end, as indicated on the plot plan in Figure 3, is a small overlook pergola, built here to suggest that this is where the house is located. The garden could be built from this plan, or an adaptation of it, by students in construction methods classes. A plant list will be found in Table 2.

A Narrow City Lot

Narrow city lots are challenging problems to landscape designers. They must provide a feeling of space, give privacy and require little upkeep. The plan on Figure 4, marked C on the master plan, and its accompanying plant list on Table 3, are for a backyard lot, 30 feet wide and 50 feet long. At the east end is a six foot hedge of *Buonymus japonicus* pruned by severe shearing to make a compact growth

and a fine textured green wall. Overhead is an arbor of two by six inch pine planks stained brown and raised to an eight foot height on four by four inch posts. Under the arbor is an angular shaped concrete terrace surfaced in red tiles. On the south side is a six foot vertical louvred fence. The fence louvers are mounted on pins to permit turning to close off the winds or view as desired. A specimen plant of *Pinus ponderosa* at the south side of the yard next to the terrace arbor provides a fine textured contrast to the *Euonymus* hedge at the rear, and its bright green color and seasonal cones provide additional interest. A grass panel *Cynodon dactylon* HV, the U-3 Bermuda grass, extends from the terrace at the east and is terminated with a curved wooden bench under a large *Quercus alba* at the west. A line of red colored concrete stepping stones in the form of two-foot discs is laid from the terrace across the lawn and through the flower bed to provide entrance to the garden from the east side of the house. A group of *Photinia serrulata* on the northwest corner of the yard provides year around green color. The area around the terrace, along the south side and west end, is designed for a planting of spring bulbs and annual and perennial flowers. White-leaved *Caladiums* would be attractive on the east against the sheared hedge and around the red tiled terrace. A shallow pool could be added in the severe angle of the terrace to provide sound and suggest the coolness associated with water.

Colonial Type Garden

Garden area D on the master plan Figure I, and plot plan Figure 5, has a plant list Table 4, that mentions plants that were common to 18th century gardens, and that will grow in Oklahoma. Many homes are of colonial design. A period garden at least for part of the grounds provides some of the charm of colonial days. This garden is an adaptation, suitable for Oklahoma of an 18th century garden. It is 25 by 46 feet and faces west. The formal or symmetrical plan is based on gardens of colonies in the south. The entrance through the north hedge of *Ilex vomitoria* has a view to a small gate to terminate the brick paved axial path. The four beds of flowers and herbs contain plants used in authentic 18 century gardens. They are bordered with *Santolina chamaecyparissus* or *Lavandula officinalis*, clipped as a hedge not more than eighteen inches high. The circular terrace is centered with a sundial on a thirty inch pedestal. The sundial is surrounded with a planting of *Hedera helix*. The short east-west axis is terminated with a colonial style wooden bench, four feet wide, at each end. The hedge on the west is the same sheared *Euonymus japonicus* planting that is used in the small city backyard garden. The south wall is a wooden fence, six feet high, painted the characteristic clean white of colonial garden fences and walls. The east wall is made of the cove siding of colonial garden fences and walls, of which the pattern is laid horizontally. Against this wall are planted several specimens of espalier fruit trees and a *Campsis radicans* to

attract humming birds. An arbor of simple design across the north wall completes the colonial type garden with a specimen of *Wisteria chinensis* to cover the white rafters.

A Southwestern Oklahoma Garden

Area E on the master plan, the plot plan, Figure 6, and the accompanying plant list, Table 5 are designed for the arid area of southwestern Oklahoma. The garden entrance is at the northeast corner of a plot 50 by 46 feet. The garden faces east. Breaking through a rugged hedge of *Poncirus trifoliata*, the short ramp rises 18 inches, through a mass planting of *Cercis canadensis*. A turn to the right leads to the wood terrace, or terrace platform. The wall on the west side, backing the terrace, has five panels with abstract designs depicting the five tribes of Oklahoma: Creek, Choctaw, Cherokee, Chickasaw, and Seminole. A louvred fence of stained redwood, is on the south side. A mass planting of *Yucca filamentosa* grows in the area where the ramp and terrace meet. Joining this planting are steps with three, six-inch risers and twelve-inch treads leading to the ground level. A curved fence five feet high, made of chestnut saplings, backs the planting of *Prunus angustifolia watsoni*, and a piece of garden sculpture with its design based on Indian hunting weapons. A grass planting of *Cynodon dactylon* HV, U-3 Bermuda grass, would stand up in the summer heat. The remainder of this section is surfaced with crushed and tamped red sand-

stone. The planting area in the southwest corner is filled with sand and has a planting that will tolerate such soil. In the center of the north end of the terrace is a sheared *Cupressus arizonica*, planted to provide visual strength for the overhead raftered frame of the raised terrace. The frame is covered with canvas lashed to the wood frame with sash cord.

TABLE I : PLANT MATERIALS DESIGNATED ON MASTER PLAN

Classification of plants are indicated by initials as follows:

EC	----Evergreen Conifers
EB	----Evergreen Broadleaf
ES	----Evergreen Shrub
EV	----Evergreen Vine
EGC	----Evergreen Ground Cover
DT	----Deciduous Tree
SOT	----Small Ornamental Tree
DS	----Deciduous Shrub
V	----Vine
RS	----Rose Species
LG	----Lawn Grass

Each species or variety is assigned a key number which, accompanied by proper classification initials, appears on:

- (1) the label attached to the plant,
- (2) the accession card that is filed in a permanent card file,
- (3) the master plan, in designated location.

The following list indicates key letters and numbers, together with their corresponding botanical and common names, as designated on the master plan:

EVERGREENS

Conifers

<u>Key Number</u>	<u>Botanical Name</u>	<u>Common Name</u>
EC 1	Cupressus arizonica	Arizona Cypress
EC 2	Juniperus chinensis	Pyramid Chinese Juniper
EC 3	Juniperus chinensis sargentii	Sargent Chinese Juniper
EC 4	Juniperus chinensis HV	Pfitzer Juniper
EC 5	Juniperus communis depressa	Oldfield Common Juniper

Conifers (cont.)

EC 6	<i>Juniperus excelsa</i> HV	Spiny Greek Juniper
EC 7	<i>Juniperus horizontalis</i>	
	<i>douglasi</i>	Waukegan Creeping Juniper
EC 8	<i>Juniperus horizontalis</i>	
	<i>plumosa</i>	Andorra Creeping Juniper
EC 9	<i>Juniperus procumbens</i>	Jap garden Juniper
EC 10	<i>Juniperus sabina</i>	Savin Juniper
EC 11	<i>Juniperus sabina</i> HV	Vonehron Juniper
EC 12	<i>Juniperus scopulorum</i>	Rocky Mountain Juniper
EC 13	<i>Juniperus squamata</i>	
	<i>meyeri</i>	Meyer Singleseed Juniper
EC 14	<i>Juniperus virginiana</i>	Eastern Red Cedar
EC 15	<i>Pinus mugo mughus</i>	Mugo Swiss Pine
EC 16	<i>Pinus ponderosa</i>	Ponderosa Pine
EC 17	<i>Pinus strobus</i>	Eastern White Pine
EC 18	<i>Pinus sylvestris</i>	Scotch Pine
EC 19	<i>Pinus taeda</i>	Loblolly Pine
EC 20	<i>Thuja orientalis</i>	Oriental Arborvitae

Broadleaf

EB 1	<i>Ilex opaca</i>	American Holly
EB 2	<i>Magnolia grandiflora</i>	Southern Magnolia

Evergreen Shrubs (Broadleaf)

ES 1	<i>Abelia grandiflora</i>	Glossy Abelia
ES 2	<i>Buxus sempervirens</i>	Common Box
ES 3	<i>Cotoneaster horizon-</i>	
	<i>talis</i>	Rock Cotoneaster
ES 4	<i>Cotoneaster apiculata</i>	Cranberry Cotoneaster
ES 5	<i>Euonymus kiautschovicus</i>	Spreading Euonymus
ES 6	<i>Euonymus japonicus</i>	Evergreen Euonymus
ES 7	<i>Ilex cornuta</i>	Chinese Holly
ES 8	<i>Ilex cornuta</i> HV	Burford Holly
ES 9	<i>Ilex vomitoria</i>	Yaupon
ES 10	<i>Jasminum humile</i>	Italian Jasmine
ES 11	<i>Ligustrum lucidum</i>	Glossy Privet
ES 12	<i>Mahonia aquifolium</i>	Oregongrape
ES 13	<i>Nandina domestica</i>	Nandina
ES 14	<i>Photinia serrulata</i>	Chinese Photinia
ES 15	<i>Prunus laurocerasus</i>	Common Laurelcherry

Evergreen Shrubs (Broadleaf)

(cont.)

ES 16	<i>Pyracantha coccinea</i>	Scarlet Firethorn
ES 17	<i>Pyracantha coccinea</i> <i>lalandi</i>	Laland Firethorn
ES 18	<i>Yucca filamentosa</i>	Adamsneedle Yucca
ES 19	<i>Yucca glauca</i>	Small Soapweed

Evergreen Vines

EV 1	<i>Euonymus fortunei</i> <i>radicans</i>	Common Wintercreeper Euonymus
EV 2	<i>Euonymus fortunei</i> <i>vegetus</i>	Bigleaf Wintercreeper
EV 3	<i>Hedera helix</i>	English Ivy
EV 4	<i>Lonicera japonica</i>	Japanese Honeysuckle
EV 5	<i>Lonicera japonica</i>	Halls Japanese Honeysuckle

Evergreen Ground Cover

EGC 1	<i>Arctostaphylos uva-ursi</i>	Bearberry
EGC 2	<i>Mahonia repens</i>	Creeping Mahonia
EGC 3	<i>Vinca major</i>	Bigleaf Periwinkle
EGC 4	<i>Vinca minor</i>	Common Periwinkle

Deciduous Trees

DT 1	<i>Albizia julibrissin</i>	Silktree (Mimosa)
DT 2	<i>Amelanchier canadensis</i>	Shadblow Serviceberry
DT 3	<i>Celtis laevigata</i>	Sugar Hackberry
DT 4	<i>Celtis occidentalis</i>	Common Hackberry
DT 5	<i>Ginkgo biloba</i>	Ginkgo
DT 6	<i>Gleditsia triacanthos</i>	Common Honeylocust
DT 7	<i>Gleditsia triacanthos</i> HV	Thornless Honeylocust
DT 8	<i>Liquidambar styraciflua</i>	American Sweetgum
DT 9	<i>Liriodendron tulipifera</i>	Tuliptree
DT 10	<i>Maclura pomifera</i>	Osageorange
DT 11	<i>Platanus occidentalis</i>	American Planetree
DT 12	<i>Populus alba</i> HV	Bolleana Poplar
DT 13	<i>Quercus alba</i>	White Oak
DT 14	<i>Quercus coccinea</i>	Scarlet Oak
DT 15	<i>Quercus macrocarpa</i>	Bur Oak

Deciduous Trees (cont.)

DT 16	<i>Quercus muhlenbergi</i>	Chinkapin Oak
DT 17	<i>Quercus phellos</i>	Willow Oak
DT 18	<i>Tilia americana</i>	American Linden
DT 19	<i>Ulmus alata</i>	Winged Elm
DT 20	<i>Ulmus americana</i>	American Elm
DT 21	<i>Ulmus parvifolia</i>	Chinese Elm
DT 22	<i>Ulmus pumila</i>	Siberian Elm

Small Ornamental Trees

SOT 1	<i>Acer ginnala</i>	Amur Maple
SOT 2	<i>Acer palmatum</i>	Japanese Maple
SOT 3	<i>Cercis canadensis</i>	Eastern Redbud
SOT 4	<i>Cornus florida</i>	Flowering Dogwood
SOT 5	<i>Crataegus crusgalli</i>	Cockspur Hawthorn
SOT 6	<i>Ilex decidua</i>	Possumhaw
SOT 7	<i>Koelreuteria</i> paniculata	Panicled Goldraintree
SOT 8	<i>Laburnum anagyroides</i>	Goldenchain Laburnum
SOT 9	<i>Elaeagnus</i> angustifolia	Russianolive
SOT 10	<i>Malus</i> SP	Crabapples
SOT 11	<i>Rhamnus cathartica</i>	Common Buckthorn
SOT 12	<i>Salix discolor</i>	Pussy Willow
SOT 13	<i>Sorbus aucuparia</i>	European Mountainash
SOT 14	<i>Zizyphus jujuba</i>	Common Jujube

Deciduous Shrubs

DS 1	<i>Amorpha canescens</i>	Leadplant
DS 2	<i>Artemisia tridentata</i>	Big Sagebrush
DS 3	<i>Berberis mentorensis</i>	Mentor Barberry
DS 4	<i>Berberis thunbergi</i>	Japanese Barberry
DS 5	<i>Berberis vulgaris</i>	European Barberry
DS 6	<i>Callicarpa americana</i>	American Beautyberry
DS 7	<i>Callicarpa dichotoma</i>	Purple Beautyberry
DS 8	<i>Caragana arborescens</i>	Siberian Peashrub
DS 9	<i>Chaenomeles lagenaria</i>	Common Floweringquince
DS 10	<i>Chaenomeles japonica</i>	Japanese Floweringquince

Deciduous Shrubs (cont.)

DS 11	<i>Cornus alba</i>	Tatarian Dogwood
DS 12	<i>Cornus amomum</i>	Silky Dogwood
DS 13	<i>Cotoneaster divaricata</i>	Spreading Cotoneaster
DS 14	<i>Cytisus scoparius</i>	Scotch Broom
DS 15	<i>Deutzia gracilis</i>	Slender Deutzia
DS 16	<i>Deutzia scabra</i>	Fuzzy Deutzia
DS 17	<i>Euonymus alatus</i>	Winged Euonymus
DS 18	<i>Euonymus atropurpureus</i>	Eastern Wahoo
DS 19	<i>Exochorda racemosa</i>	Common Pearlbush
DS 20	<i>Forsythia intermedia</i>	Border Forsythia
DS 21	<i>Forsythia suspensa</i>	Weeping Forsythia
DS 22	<i>Hamamelis vernalis</i>	Vernal Witchhazel
DS 23	<i>Ilex verticillata</i>	Common Winterberry
DS 24	<i>Jasminum nudiflorum</i>	Winter Jasmine
DS 25	<i>Kerria japonica</i>	Japanese Kerria
DS 26	<i>Kolkwitzia amabilis</i>	Beautybush
DS 27	<i>Lagerstroemia indica</i>	Common Crape Myrtle
DS 28	<i>Ligustrum amurense</i>	Amur Privet
DS 29	<i>Ligustrum obtusifolium</i>	
	<i>regelianum</i>	Regels Border Privet
DS 30	<i>Ligustrum ovalifolium</i>	California Privet
DS 31	<i>Lindera benzoin</i>	Common Spicebush
DS 32	<i>Lonicera morrowi</i>	Morrow Honeysuckle
DS 33	<i>Lonicera fragrantissima</i>	Winter Honeysuckle
DS 34	<i>Lonicera tatarica</i>	Tatarian Honeysuckle
DS 35	<i>Philadelphus coronarius</i>	Sweet Mockorange
DS 36	<i>Philadelphus virginialis</i>	Virginalis Mockorange
DS 37	<i>Prunus angustifolia</i>	
	<i>watsoni</i>	Sand Chickasaw Plum
DS 38	<i>Prunus glandulosa</i>	Almond Cherry
DS 39	<i>Prunus tomentosa</i>	Manchu Cherry
DS 40	<i>Poncirus trifoliata</i>	Trifoliolate-orange
DS 41	<i>Rhodotypos scandens</i>	Black Jetbead
DS 42	<i>Rhus aromatica</i>	Fragrant Sumac
DS 43	<i>Rhus copallina</i>	Flameleaf Sumac
DS 44	<i>Rhus glabra</i>	Smooth Sumac
DS 45	<i>Rhus trilobata</i>	Skunkbush Sumac
DS 46	<i>Rhus typhina</i>	Staghorn Sumac
DS 47	<i>Salix purpurea</i> HV	Dwarf Willow
DS 48	<i>Sambucus canadensis</i>	American Elder
DS 49	<i>Spiraea arguta</i>	Garland Spirea
DS 50	<i>Spiraea billiardi</i>	Billiard Spirea

Deciduous Shrubs (cont.)

DS 51	Spiraea bumalda HV	Anthony Waterer Spirea
DS 52	Spiraea bumalda HV	Froebeli Spirea
DS 53	Spiraea prunifolia	Bridalwreath Spirea
DS 54	Spiraea trichocarpa	Korean Spirea
DS 55	Spiraea thunbergi	Thunberg Spirea
DS 56	Spiraea vanhouttei	Vanhoutte Spirea
DS 57	Symphoricarpos albus	Common Snowberry
DS 58	Symphoricarpos orbiculatus	Indiancurrant C. (Buckbrush)
DS 59	Syringa persica	Persian Lilac
DS 60	Syringa vulgaris	Common Lilac
DS 61	Syringa chinensis	Chinese Lilac
DS 62	Tamarix africana	African Tamarisk
DS 63	Tamarix hispida	Kashgar Tamarisk
DS 64	Viburnum dentatum	Arrowood Viburnum
DS 65	Viburnum opulus roseum	Common Snowball
DS 66	Viburnum prunifolium	Blackhaw Viburnum
DS 67	Viburnum trilobum	American Cranberrybush V.
DS 68	Vitex agnuscastus	Lilac Chaste tree
DS 69	Vitex negundo	Negundo Chaste tree
DS 70	Weigela florida	Old Fashioned Weigela

Vines

V 1	Campsis radicans	Common Trumpet creeper
V 2	Celastrus scandens	American Bittersweet
V 3	Clematis paniculata	Sweet autumn Clematis
V 4	Clematis jackmani	Jackman Clematis
V 5	Parthenocissus quinquifolia	Virginia Creeper
V 6	Parthenocissus tricuspidata	Japanese Creeper (Boston Ivy)
V 7	Polygonum auberti	Silver Vine Fleece Flower
V 8	Wisteria sinensis	Chinese Wisteria

Rose Species

RS 1	Rosa hugonis	Father Hugo Rose
RS 2	Rosa multiflora	Japanese Rose
RS 3	Rosa rugosa	Rugosa Rose
RS 4	Rosa setigera	Prairie Rose
RS 5	Rosa wichuriana	Wichura Rose

LAWN GRASSESSummer

SLG 1	<i>Cynodon dactylon</i>	Common Bermuda Grass
SLG 2	<i>Cynodon dactylon</i> HV	U-3 Bermuda Grass
SLG 3	<i>Euchloe dactyloides</i>	Buffalo
SLG 4	<i>Echte loua gracilis</i>	Blue Gramma
SLG 5	<i>Zoysia matrella</i>	Zoysia

Winter

WLG 1	<i>Poa pratensis</i>	Kentucky Blue Grass
WLG 2	<i>Lolium multiflorum</i>	Italian Rye

TABLE II: LIST OF PLANTS FOR A MODERN HOME YARD GARDEN

<u>Key Number</u>	<u>Botanical Name</u>	<u>Common Name</u>
V 1	<i>Celastrus scandens</i>	American Bittersweet
EC 10	<i>Juniperus sabina</i>	Savin Juniper
EC 14	<i>Juniperus virginiana</i>	Eastern Red Cedar
EC 18	<i>Pinus sylvestris</i>	Scotch Pine
T 11	<i>Platanus occidentalis</i>	American Planetree

Also these perennials are suggested:

<i>Alyssum saxatile</i>	Goldentuft Alyssum
<i>Aquilegia canadensis</i>	American Columbine
<i>Chrysanthemum morifolium</i>	Florists Chrysanthemum
<i>Convallaria majalis</i>	Lily-of-the-valley
<i>Delphinium Sp.</i>	Delphinium
<i>Hemerocallis flava</i>	Lemon Daylily
<i>Iris Germanica</i>	German Iris
<i>Paeonia officinalis</i>	Common Peony
<i>Primula polyantha</i>	Polyantha Primrose
<i>Viola odorata</i>	Sweet violet

and annuals and spring flowering bulbs in variety.

TABLE III: LIST OF PLANTS FOR A HARROW CITY LOE GARDEN

<u>Key Number</u>	<u>Botanical Name</u>	<u>Common Name</u>
ES 6	Euonymus japonicus	Evergreen Euonymus
EC 16	Pinus ponderosa	Ponderosa Pine
ES 14	Photinia serrulata	Chinese Photinia
DT 13	Quercus alba	White Oak

These are suggested perennials suitable for this garden:

Alyssum saxatile	Goldentuft Alyssum
Pellis perennis	English Daisy
Chrysanthemum	
morifolium	Florists Chrysanthemum
Dictamnus albus	Casplant dittany
Galax aphylla	Galax
Iris Germanica	German Iris
Lavandula officinalis	True Lavender
Paeonia officinalis	Common Peony
Phlox divaricata	Sweetwilliam Phlox
Polianthes tuberosa	Tuberose

and annuals and spring flowering bulbs in variety.

TABLE IV: LIST OF PLANTS FOR A SMALL COLONIAL TYPE GARDEN

<u>Key Number</u>	<u>Botanical Name</u>	<u>Common Name</u>
V 1	Campsis radicans	Trumpet Creeper
ES 6	Euonymus japonicus	Evergreen Euonymus
ES 9	Ilex vomitoria	Yaupon
SOT 10	Malus sp.	Apples (expaliers)

These perennials are suggested:

Achillea ptarmica	Sneezewort	Yarrow
Aquilegia canadensis	American Columbine	
Dianthus barbatus	Sweetwilliam	
Eupatorium rugosum	White Snakeroot	
Hemerocallis flava	Lemon Daylily	
Heliotropium arborescens	Common Heliotrope	
Hibiscus palustris	Common Rosemallow	
Lavandula officinalis	True Lavender	
Myosotis alpestris	Alpine Forgetmenot	
Papaver orientale	Oriental Poppy	

and selected annuals and spring flowering bulbs.

ATLANTIC PARCHMENT

100% RAG U.S.A.

TABLE V: LIST OF PLANTS FOR A GARDEN FOR SOUTHWESTERN OKLAHOMA

Key Number	Botanical Name	Common Name
SOT 3	<i>Cercis canadensis</i>	Redbud
EC 1	<i>Cupressus arizonica</i>	Arizona Cypress
DS 37	<i>Prunus angustifolia</i>	
	<i>watsoni</i>	Sand Chickasaw Plum
ES 16	<i>Yucca filamentosa</i>	Adamsneedle Yucca
ES 19	<i>Yucca glauca</i>	Small Soapweed

These are suggested perennials suitable for the garden:

<i>Asclepias tuberosa</i>	Butterfly Milkweed
<i>Chrysanthemum morifolium</i>	Florists Chrysanthemum
<i>Dianthus chinensis</i>	Chinese Pink
<i>Iris germanica</i>	German Iris
<i>Lavandula officinalis</i>	True Lavender
<i>Opuntia</i> sp.	Opuntia

other members of the Cactaceae family for the sand garden.

and annuals and spring flowering bulbs in variety.

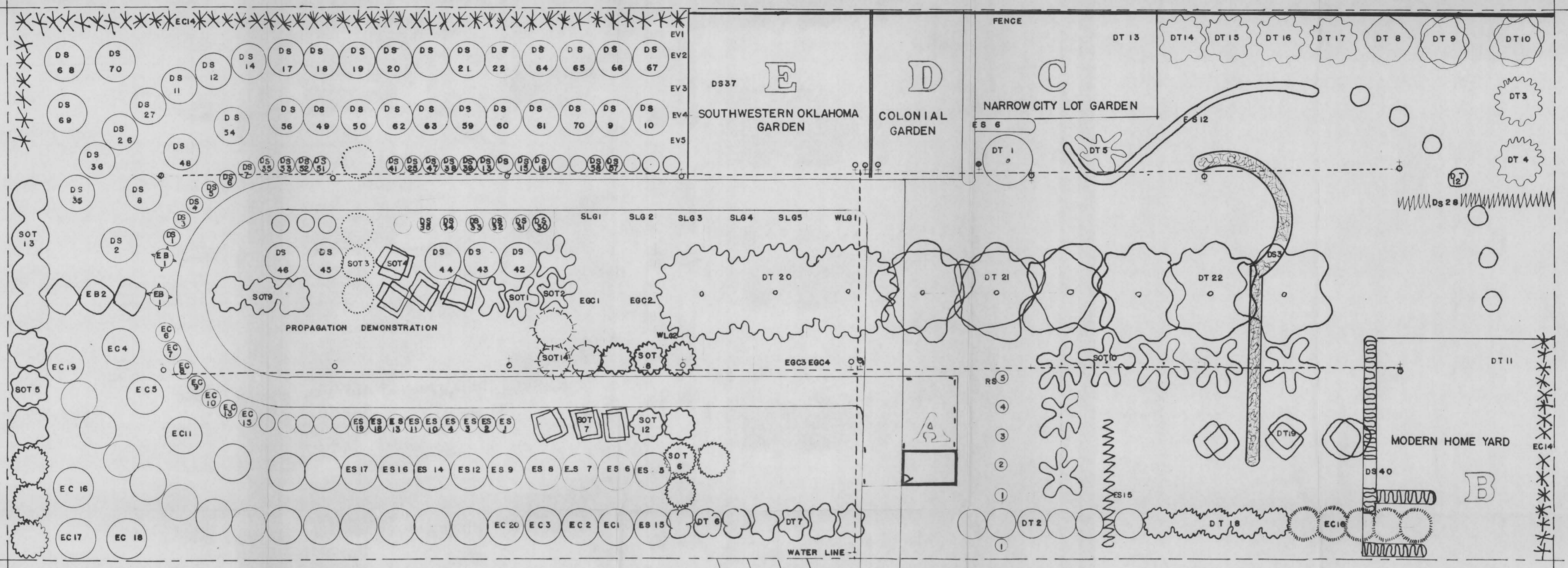
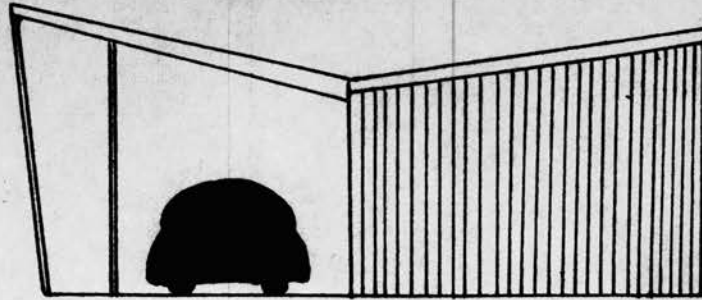
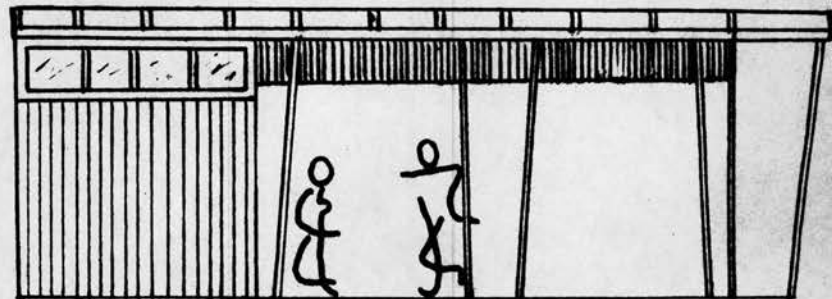


FIGURE 1.
 A MASTER PLAN FOR
 A STUDY GARDEN FOR STUDENTS IN ORNAMENTAL HORTICULTURE
 John Alden Haight LANDSCAPE DESIGNER
 MAY 1953
 SCALE 1" EQUALS 16'



North Elevation



West Elevation

Ground Plan

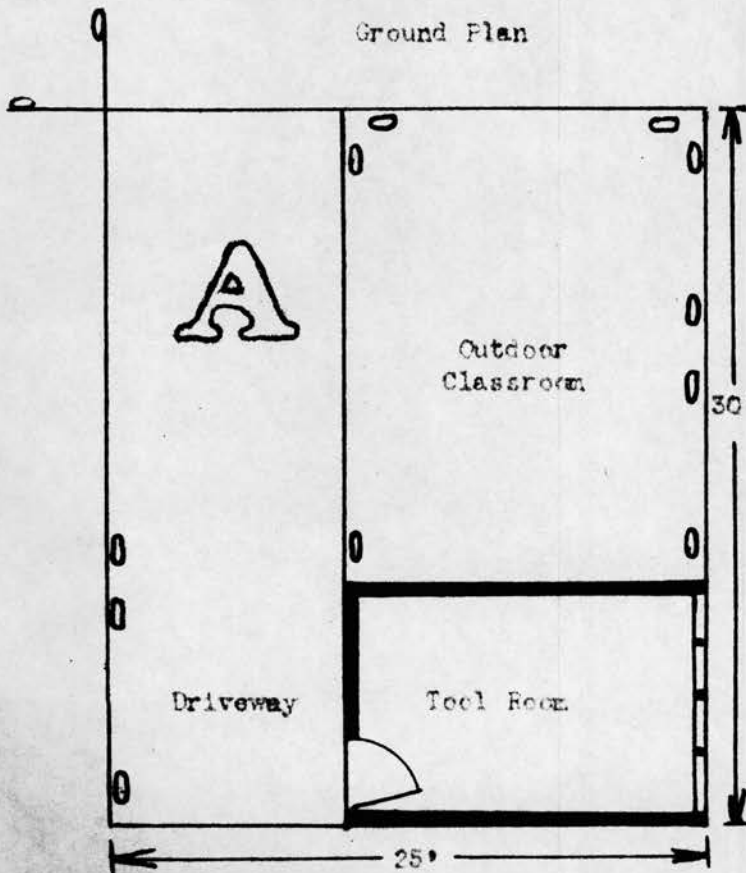


FIGURE 2.

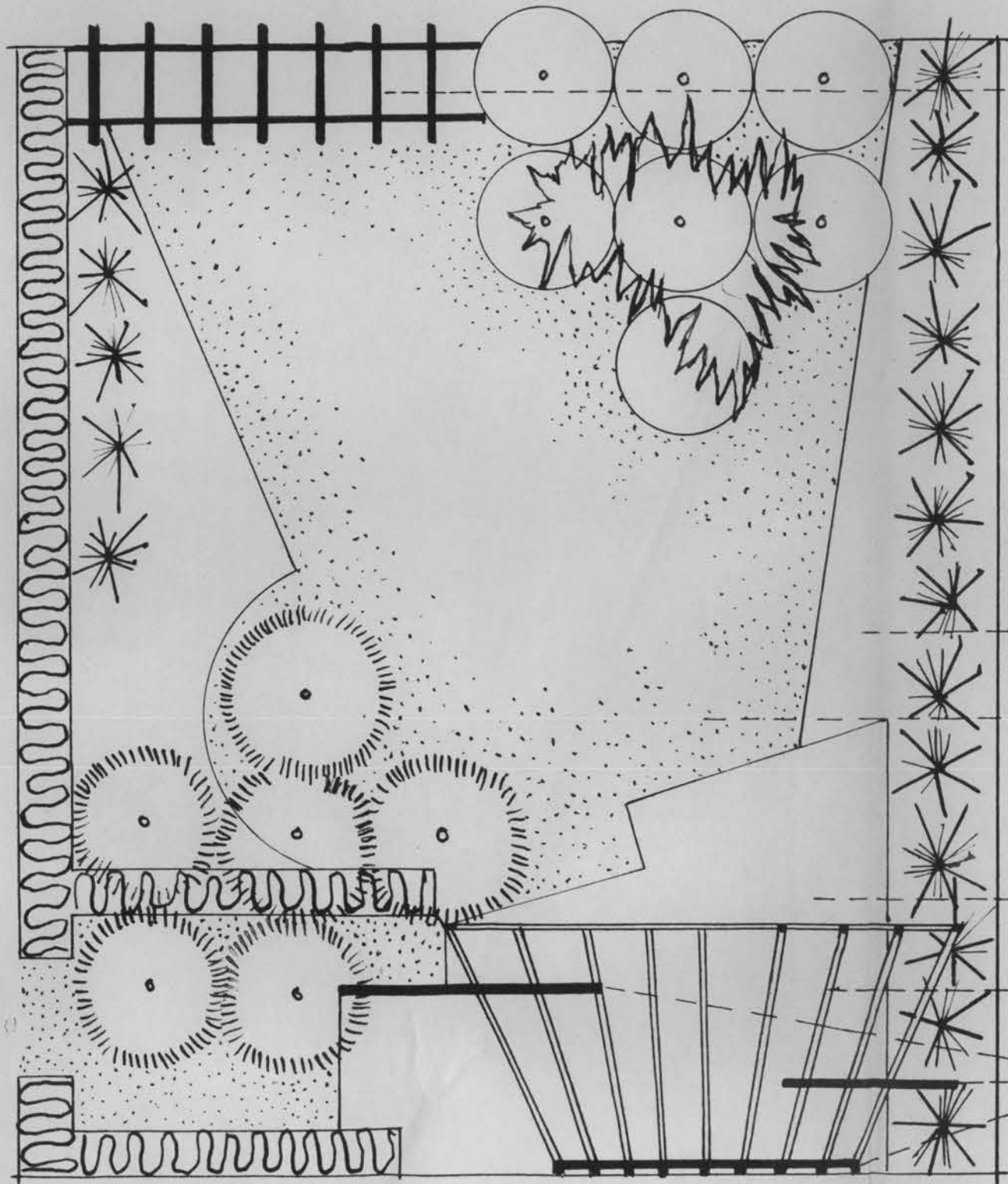
SERVICE BUILDING
&
ENTRANCE

by John Alden Haight

Scale 1" = 8'

North





● PERGOLA

FIGURE 3.

A MODERN HOMEYARD

SCALE 1" EQUALS 8'



B

● FLOWER BED

● LAWN

● BRICK TERRACE

● ARBOR

● PANELS

FIGURE 4.

A NARROW CITY LOT

SCALE 1" EQUALS 8'

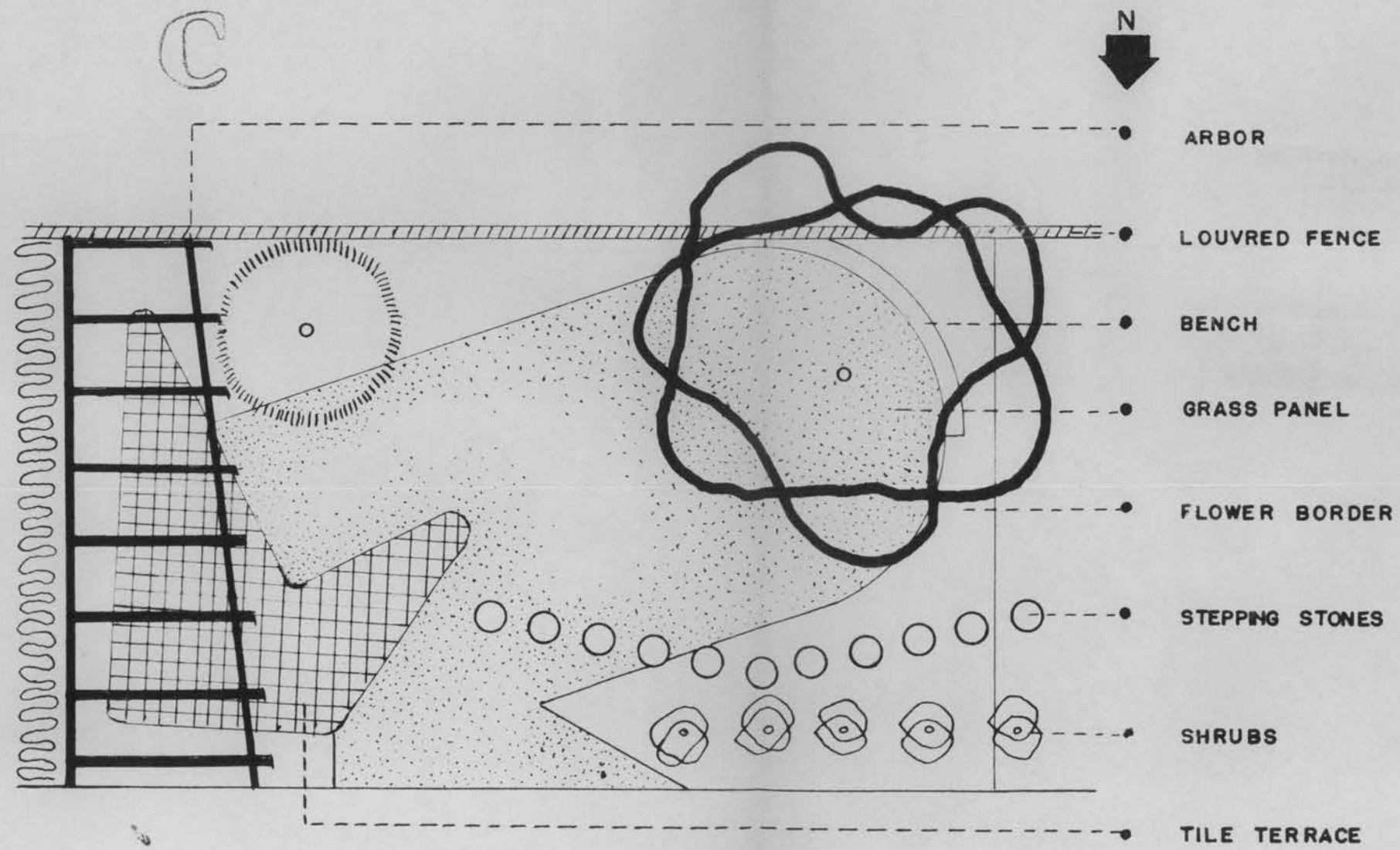


FIGURE 5.

A COLONIAL TYPE GARDEN

SCALE 1" EQUALS 8'

D

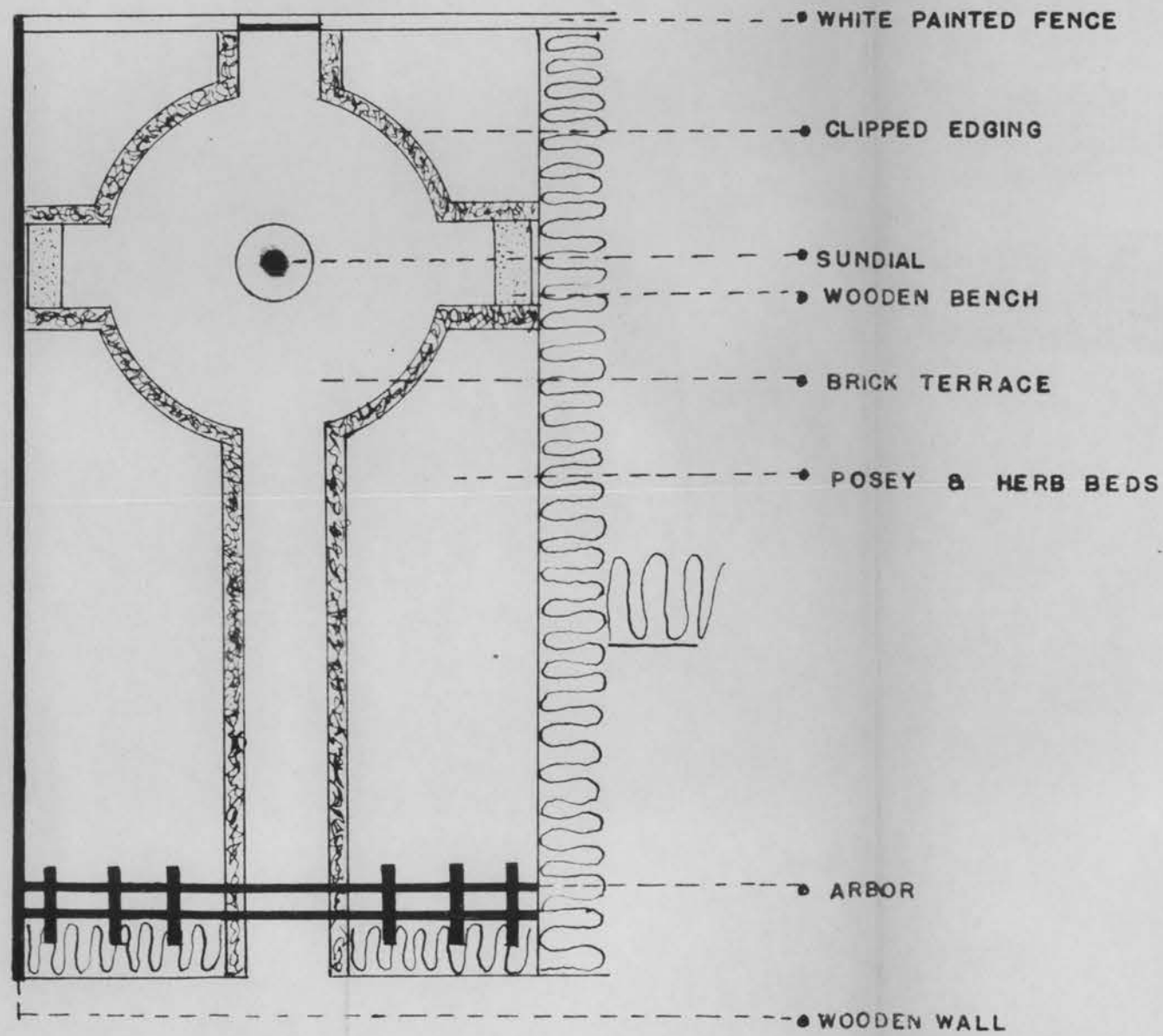
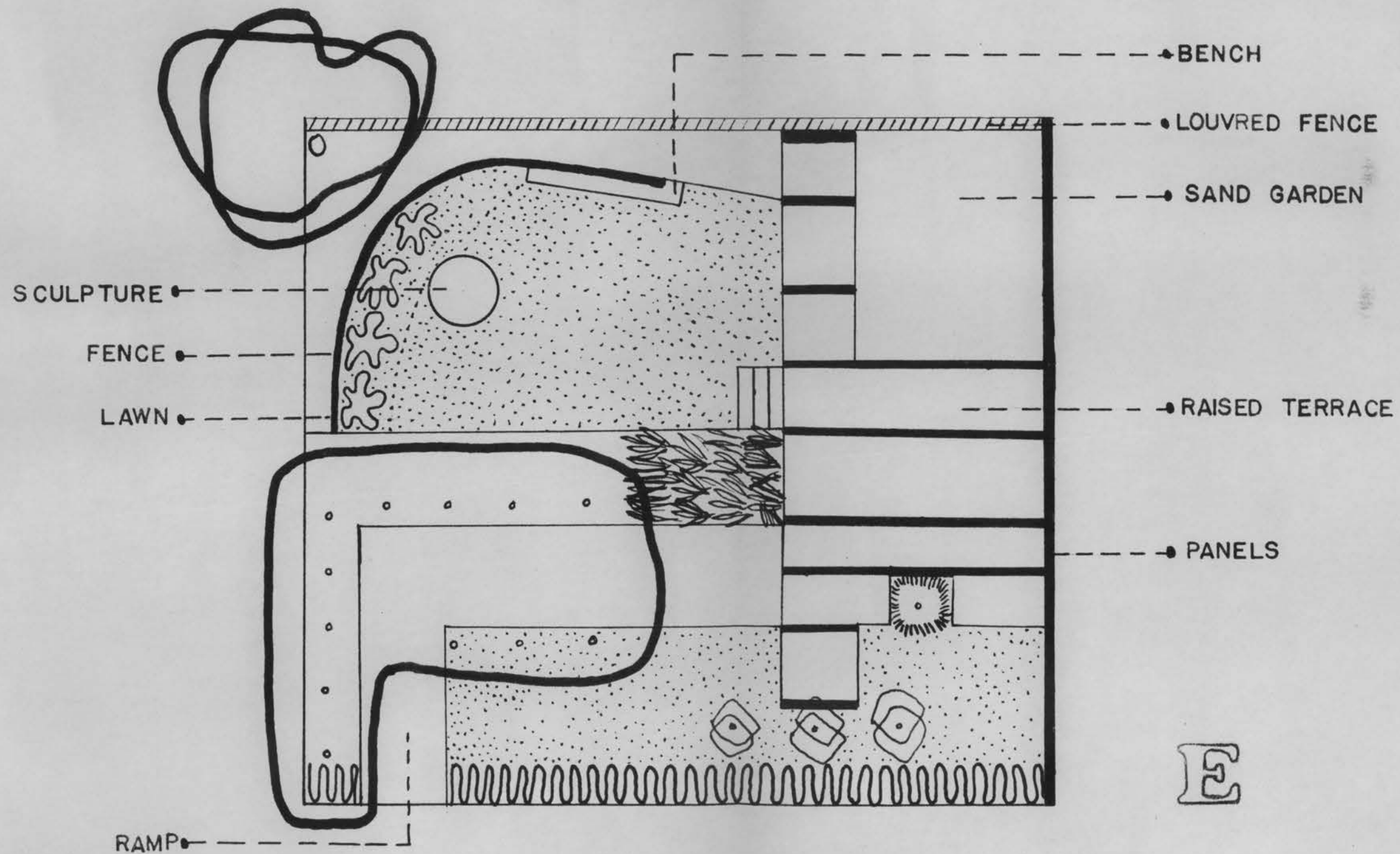


FIGURE 6.

A SOUTHWESTERN OKLAHOMA GARDEN

SCALE 1" EQUALS 8'



SUMMARY

The problem of this thesis has been the planning of a study garden for students majoring in ornamental horticulture, so that plant materials will be available for their use, and so that the students majoring in landscape design will have an area where they may, under the guidance of an instructor, design and construct gardens that will permit them to learn the basic principles involved in simple wood construction, the handling of concrete, brick, stone and other media which they, as landscape designers will be forced to use.

This study garden has been laid out to provide approximately 200 plant varieties in an aesthetic and functional planting. The plants are arranged so that they are easily cared for; access for students is planned for convenience, with paved driveway and walk, and with space about the plants for class observation in study groups.

The demonstration gardens are planned so that each one faces a different direction, thus students will have an opportunity to observe the effects of light on garden plants and people as they live, work and play in the area.

Such an organization of plant material is planned to be adaptable to any small level plot of ground. Hence, the plan while primarily for Oklahoma, has many ideas that are usable in any section of the country. This paper helps fill a need in horticultural literature. There are no published plans

available for a study garden layout, and park or arboretum plans are not readily adaptable to use by landscape design students. This solution is one that will be satisfactory to any horticulture or botany department.

A SELECTED BIBLIOGRAPHY

- (1) Bailey, Liberty H. Standard Cyclopedia of Horticulture. New York: Macmillan Company, 1938, p 347-352, 526-532.
- (2) ----- . Hortus. New York: Macmillan Company, 1941.
- (3) Chessmore, Roy A. Lawns for Town and Country. Forage Crops Leaflet No. 10. Oklahoma Agr. Exp. Sta. May, 1952.
- (4) Kelsey, Harlan P. and William A. Dayton. Standardized Plant Names. Harrisburg, Pa.: J. Horace McFarland Company, 1942.
- (5) Ealy, Robert P. Plant Materials List. Department of Horticulture Leaflet. O.A.M.C., Stillwater, Oklahoma, 1950
- (6) ----- . A Preliminary Report On An Arboretum For Lake Carl Blackwell. Unpublished manuscript, courtesy of the author May, 1941.
- (7) Eckbo, Garrett. Landscape for Living. Duell, Sloan, & Pearce, 1950. p 61-78, 165.
- (8) Gilmore, M. R. The Indian Garden. Indian Notes 3:209-213, 1926.
- (9) Gothein, Marie Louise. A History of Garden Art. New York: E. P. Dutton & Company., 1928.
- (10) Lockwood, A. G. B. Gardens of Colony and State. New York: Charles Scribner's Sons, 1931-1934. (2 vols.)
- (11) McQuestern, T. B. Arboretums, Their Place in Park Development. Parks and Recreation. Sept.-Oct. , 1942. pp 32-34.
- (12) Pyle, Robert. Botanical Gardens. American Nurseryman. 82 (2) : 18, 1945.
- (13) Teucher, H. Display Gardens for Public Instruction. Parks and Recreation, 24, No. 4:173-178, Dec. 1940.

- (14) Thompson, Roger. The Contribution of A Landscape Architect to the Design of a Residential Community. (unpublished thesis for M. S. Degree, Department of Horticulture, Louisiana State University.) (1952.)
- (15) Tunnard, Christopher. Gardens in the Modern Landscape. New York: Charles Scribner's Sons, 1948.
- (16) Wyman, Donald. Arboretums and Botanic Gardens of the World. Waltham, Massachusetts: Chronica Botanica Company, 1947.
- (17) ----- . The Park Arboretum. Parks and Recreations. Nov., 1939. p 96-99.

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