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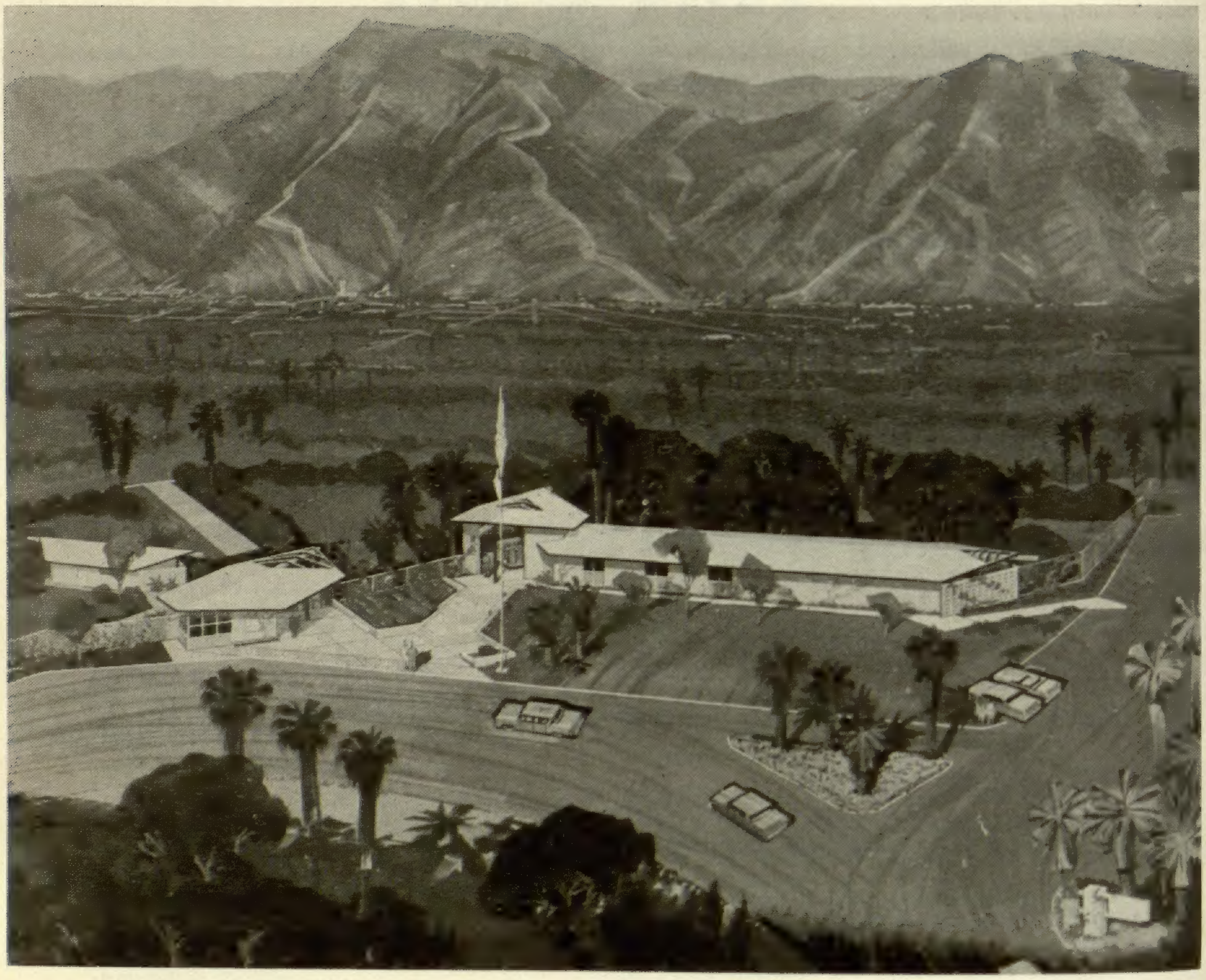

ARBORETUM ADMINISTRATION BUILDING

WILLIAM S. STEWART

ANOTHER MILESTONE in the development of the Los Angeles State and County Arboretum was passed last month when the contract for the Arboretum Administration and Gatehouse Building was awarded by the Los Angeles County Supervisors to Daniel Brothers Construction Co. of Pasadena. Their bid was $198,496 and construction began December first. An artist's conception of the completed buildings is shown above. (Visualized on a smog-green day!). Plans were prepared by architects Allison and Rible of Los Angeles. Construction is to be of painted concrete block walls, concrete floor, and composition and gravel roof.

From Baldwin Avenue the Administration building will be approached by three tiers of broad concrete steps leading up to an entrance pavilion and waiting room. Here will be illuminated wall display cases and a center plant display case. From this entrance a corridor runs the length of the building with the various offices opening onto the hallway. Just inside the main door and to the left is the reception office and telephone exchange. This adjoins the business office which temporarily will be used to house the library. Continuing down the corridor along the north side of the building, offices are located for the business manager, superintendent, secretary, and director. On the south side of the building the first office will be for the executive secretary of the Arboretum Foundation. Then in succes-

sion and opening off the central corridor is the research office with a photographic dark room and small laboratory, and the taxonomy office. There is also a basement to house heating, mechanical equipment and to provide some limited storage area.

An important feature of the building will be the conference room and meeting garden at the east end. This room, about 20 x 40 feet in size opens by sliding doors onto a walled patio garden with colored cement tile floor. The conference room and meeting garden will provide space for gardening and botany classes of limited size and for lectures and staff meetings. It also will be available to garden clubs and plant societies for meetings and plant forums. The meeting garden opens to the outside by a grille gate leading to a concrete ramp sloping gently down to the street level where there is ample parking.

The second unit now under construction is the gatehouse which has a tour assembly area, and walk leading to the jeep train station. Features of the gatehouse include a public information office, a naturalist-guide office and electrically controlled entrance turnstiles. The information office will have two information wickets, a counter, and is so arranged that post cards, bulletins and books concerning the Arboretum, gardening and horticulture can be sold. Inside the gate will be a covered tour assembly area with wooden benches and an attractively filled planter. The final touch in the present construction project is an attractive illuminated entrance sign on Baldwin Avenue and the flagpole forty feet high.

It is expected the building will be completed in June, 1956, and the dedication ceremony should occur soon thereafter. That's a great day coming!

AIR POLLUTION RESEARCH

W. M. Noble

In 1943, Hazon Gill of El Monte first noticed that certain crops could no longer be profitably grown. Since that time many people from nurserymen and farmers to the man with only a small plot of lawn to mow have become increasingly aware of the effect on vegetation of what, for want of better terminology, we call smog. During the latter part of this period a number of organizations have done a considerable amount of work in this field and many observations, both scientific and casual have been made. Some of these have been erroneous, but many have been valid. It seems, therefore, worthwhile to summarize briefly some of this information in a semi-technical manner for those who are concerned with raising anything from a radish to an orchid.

The Los Angeles County Air Pollution Control District attacked this problem in the spring of 1949 with two thoughts in mind. First, no damage of this sort had been observed elsewhere in the world up to that time and this peculiar injury always appeared following a period of eye irritation and low visibility. Thus plants themselves could be used to detect the pollutants which caused these symptoms and also to trace the areas to which this pollution spread. Second, the District was concerned with the loss to growers, one farmer having estimated his loss in spinach to have been $30,000 from a single smog period.

Immediate action was begun by the District, in cooperation with the California Institute of Technology and the University of California at Riverside which culminated in the discovery by Dr. Haagen-Smit of compounds present in gasoline which on combination with ozone would

cause this injury (1). Continued work by the Plant Section of the Air Pollution Control District later established the fact that car exhaust fumes combined with ozone would also readily produce this type of injury (2). After extensive studies, no

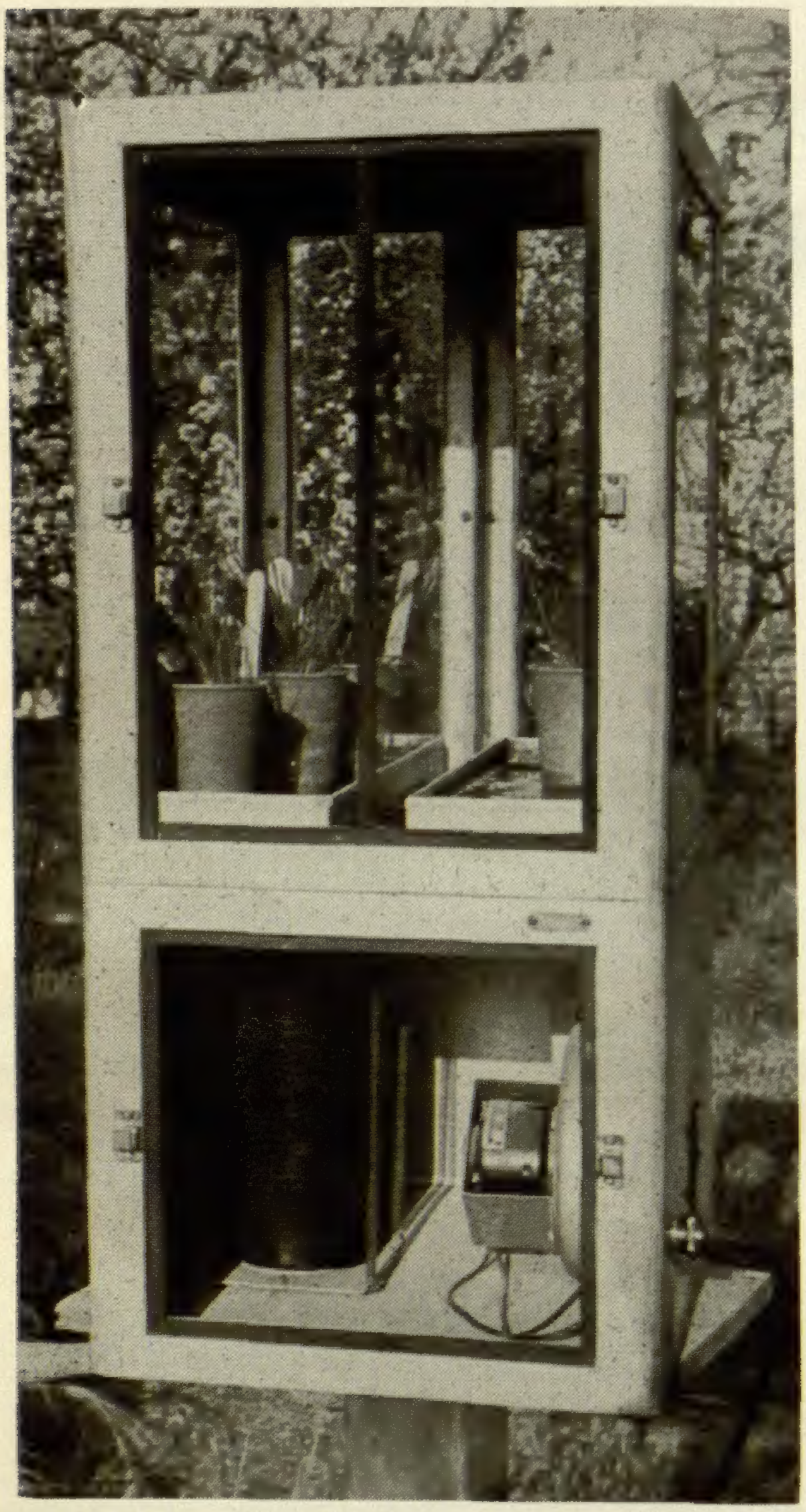

Fig. 1. A test cabinet with covers removed to show: Top, left, filtered air compartment and top, right, unfiltered air. Bottom, right, carbon canister and left, electric blower

other sources have been found which will cause the same symptoms. What the precise substance is which produces this injury has not been definitely established but the source materials are now known, thanks to the lowly plant, and controls are being applied where such are known and being developed for sources where none are yet available, as in the case of automobile exhaust fumes.

Besides the problem of source evaluation, some fifteen test stations have been established covering roughly the area included by San Fernando, Pomona, Anaheim, Long Beach and Westwood Village. A week's supply of plants is taken to each of these stations and placed in a growing chamber receiving a constant flow of filtered smog free air (Fig. 1). The filtering medium is activated coconut shell carbon. Each day a local operator, housewife, nurseryman, farmer or research technician exposes a set of these plants for a single 24-hour period in a duplicate chamber receiving unfiltered air. In this manner an estimate of the intensity of the pollution for that day may be made and the area which it covered determined (Fig. 2).

The appearance of the injury on the plants varies considerably depending upon the anatomy and physiology of the leaves and upon the intensity of the pollution. Some of the more typical symptoms are a silvery or glazed appearance on the lower surface of leaves such as is observed on spinach, petunia and snapdragon. Monocotyledonous plants show a streaking which follows stomatal rows. Other symptoms are speckling, bronzing, tanning and bleaching. Plants high in anthocyanin such as red beets, dock and darker colored snapdragons also show a reddening.

The sensitivity of a plant is affected greatly by its environment. A petunia grown in partial shade may be heavily damaged where a similar plant in the sun may show no injury. An abundance of water also increases sensitivity. The knowledge of this factor has enabled many farmers to successfully grow spinach by not overwatering during smog periods. In most instances, young succulent plants are much more sensitive than older plants. The reverse, however, is true with chrysanthemums which are most damaged at the time color appears on the bud.

The variation in expression of symptoms and the confusion in sensitivity lists which is caused by environmental condi-

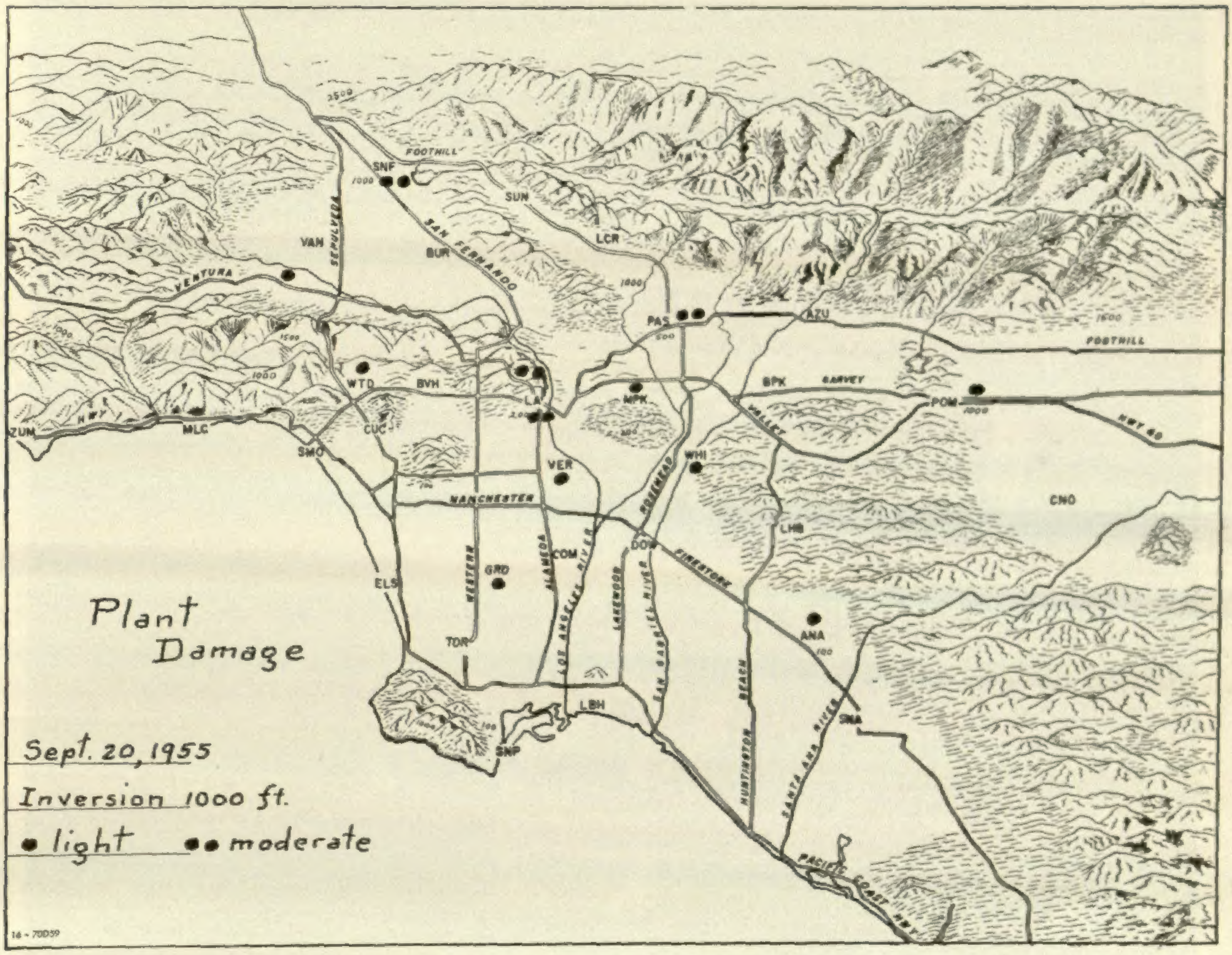

Fig. 2

tions makes it difficult for the uninitiated to separate smog damage from other types of injury such as are caused by heat, nutrition, irrigation, insects or disease; while environmental factors make relative sensitivity lists of dubious value for the purpose of identifying the cause of injury. Three things, however, are helpful. First, large silvery or glazed areas on the lower leaf surface are typical and, when not confused with insect or frost injury, are reasonably definite. Second, microscopic examination of the leaf shows that the cells immediately below the stoma are collapsed without their cell walls being disrupted (3). The third symptom, and one of the simplest to observe, is that cells are normally damaged at only one stage of growth (4).

This particular state of sensitivity may be confined to a very narrow region on a single leaf or blade of grass. Following a series of smoggy days it is not uncommon to find four to six bands of injury on a single leaf or blade of grass, each band caused by a different day's exposure (Fig. 3). The injury occurs where the most recently matured cells are found. Younger immature cells are rarely injured while older cells are apparently protected by cutin or suberin. On very sensitive plants during very heavy smog periods, these bands will sometimes merge, usually however, they are distinguishable.

A partial list of sensitive and resistant plants has recently appeared in a previous issue (5). Some additional resistant plants are coleus, stock, pansy, zinnia, marigold, nasturtium, verbena, sweet peas, calendula, begonia, iris, gladiolus and most bulbs. However, as has been stated, even these under certain growth conditions such as are found in greenhouses, may be injured. Usually plants such as philodendron, dief-

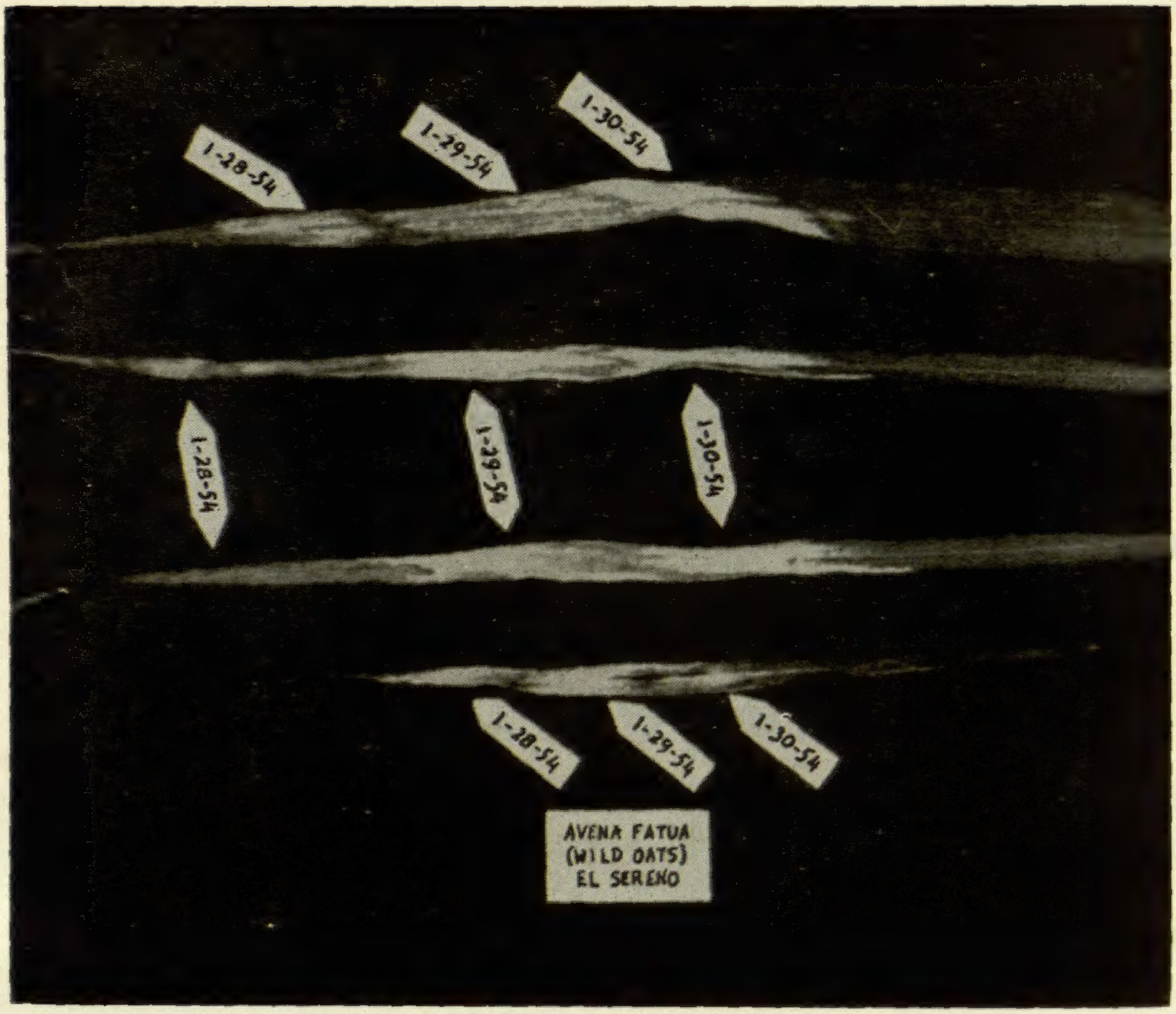

Fig. 3. Wild oats showing three bands of injury on each blade caused by three successive days of smog

fenbachcia, aralia and others used in planters appear to be very resistant.

Trees and shrubs have not been extensively studied but work is being begun on these both by the University of California and by the Air Pollution Control District in cooperation with the Arboretum. Many observations have been made in the greenhouse where numerous varieties are available for study. These plants will be followed as they mature since resistance varies with age. For example the early leaves of ceanothus and sedling bananas have been found to be quite sensitive while older plants are rarely injured.

An extensive list of smog resistant plants will be presented in a future issue.

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DR. F. W. WENT

New President of the California Arboretum Foundation

THE BOARD OF TRUSTEES of the California Arboretum Foundation and the Board of Governors of the Los Angeles State and County Arboretum have announced the election of Dr. F. W. Went as their President. He succeeds Dr. Samuel Ayres, Jr. who has been President for the past three years.

Dr. Went, Professor of Plant Physiology at the California Institute of Technology is internationally known among plant scientists for his outstanding work on plant hormones and on the relationships between climate and plant growth. The famous Earhart controlled environment greenhouse at the California Institute of Technology was the first laboratory of its type to provide control for so many of the environmental factors affecting plant growth. Dr. Went directed the planning and construction of this laboratory. It is operated and maintained under his supervision. Scientists from all over the world have come to avail themselves of the opportunities it presents for advanced study in plant growth. It is significant that both the French government and the Australian government are planning to build similar controlled environment greenhouses.

Dr. Went was born in Holland, the son of Dr. A. F. Went, at Utrecht. He received the Master Degree and Doctorate Degree from the University of Utrecht and for several years thereafter conducted research at the Botanical Gardens at Buitenzorg, Java. He joined the staff of the California Institute of Technology in 1933. In 1937 a book *Phytohormones* was published with Dr. K. V. Thimann as co-author. This summarized the knowledge concerning plant hormones up to that time and was one of the first books on this subject to be published. The classical experiments performed by Dr. F. W. Went during his days at Utrecht University in Holland are reported here.

Dr. Went has been President of the American Society of Plant Physiologists, of the Western Society of Naturalists and was the first President of the Board of Trustees of the California Arboretum Foundation.

He has just returned from a four and a half month tour of Australia which he made at the invitation of the Australian government. During this tour Dr. Went collected seeds for the Los Angeles State and County Arboretum from nearly every section of Australia. The seeds are now being grown in the propagation houses at the Arboretum for subsequent planting on the grounds and testing for their value as ornamental plants for Southern California. He is an authority on desert plant growth.

Dr. Went is recognized among his colleagues for his originality of thought, his boundless enthusiasm and his complete appreciation of plants.

W. S. S.

OUR COVER PICTURE

Phoenix reclinata, a native of tropical and South Africa, will lend its graceful form and beauty to the semi-tropical aspect found elsewhere on the Arboretum grounds. In addition the placement of these two groups of palms highlights two new features of the Arboretum now under construction. First, the Gatehouse whose entrance will be just north of the palms in the left foreground of the picture, and second, the Administration Building, whose west entrance will be accented by the thirteen trunk cluster of palms, right background.

We are very proud of such a gift and though the donor wishes to remain anonymous, the California Arboretum Foundation acknowledges his generosity with a heartfelt thanks.

TREE FERNS IN SOUTHERN CALIFORNIA

Concluded from last issue

ALFRED W. ROBERTS

Cibotium schiedei is considered by some to be the most beautiful fern in existence. It is now planted quite extensively out-of-doors in lathhouses or protected and sheltered coastal areas. The golden-green fronds are produced in great profusion, and they droop gracefully. Excellent if planted high on top of a wall so that the fronds are permitted to cascade down. It is also suited for hanging baskets and is well known for its decorative qualities indoors. Will withstand temperatures of 20° if established outside for several years.

Cibotium chamissoi, a Hawaiian species of tree fern, has a heavy trunk with arched fronds of a glossy texture and golden green hue. Average height in Southern California is 4 to 6 feet. Since the fronds are produced less numerously on imported trunks, this fern is often used in front of ornate stone or wood structures. Sporelings will produce more fronds.

Cibotium menziesii is not too common in Southern California and distinguishes itself from other species by having darker green, shiny and leathery leaves produced on dark, hairy stems. It is not so tolerant of sunlight as the above-mentioned species *C. chamissoi.*

Blechnum braziliense, a dwarf tree fern, has become quite popular. Its beautiful mahogany-tinged foliage makes it a charming subject for well protected situations. In appearance it closely resembles a cycad and is therefore quite exotic looking. It requires a very sheltered location. In Brazil and Peru it produces a 4 to 5-foot trunk and 3 to 5-foot fronds.

Closely allied to *B. braziliense* is *Lomaria gibba,* a very symmetrical dwarf tree fern requiring a warm location with no overhead watering during the winter months. Truly a beautiful fern, it should be planted in pots or open ground in a semi-outdoor environment. In New Caledonia this fern produces a trunk 5 feet tall, and its gracefully, arching fronds are said to grow from 3 to 4 feet long.

To obtain best results with tree ferns one should select a sheltered, frost-protected area free from dry winds, and provide a well-drained moisture-retaining soil which is rich in humus. To avoid disturbing surfact roots, do not cultivate but mulch frequently with rough leafmold and cedar or redwood bark. Fresh stable manure should not be used. A well balanced organic acid plant food or an acid liquid fertilizer, diluted to one-half of recommended strength, and applied three times from May to September will provide nutrients for good frond development. Too much nitrogen tends to give fronds a weaker structure. During warm summer weather, a late afternoon or evening overhead watering creates a moist, cool condition so beneficial to most tree ferns.

When removing old fronds do not pull or tear them from the trunks, but remove them with a sharp knife or pruning shears, leaving a portion of the leaf base attached to the trunk for insulation and frost protection. Eventually these leaf remains will detach themselves or can be easily removed.

Should insects such as scale, mealybug, red spider and thrips appear, spray with the latest approved and safe spray materials.

* * *

"If you have once planted a tree for other than commercial purposes,—and in that case it is usually done by your orders and by the hands of hirelings,—you have always in it a peculiar interest. You care more for it than you care for all the forests of Norway or America. *You* have planted it, and that is sufficient to make it peculiar amongst the trees of the world."

ALEXANDER SMITH

MORTON ARBORETUM
MORE THAN A COLLECTION OF WOODY PLANTS

Transcript of address delivered at National Shade Tree Conference, Santa Barbara by C. E. Godshalk, Director of Morton Arboretum.

I AM SORRY John Wister could not be here tonight to address you as originally planned. However, I am glad of this opportunity to tell you about the Morton Arboretum.

The Morton Arboretum was founded by Mr. Joy Morton, son of J. Sterling Morton, the founder of Arbor Day. Surveying was started in the summer of 1921 and the first construction work was done that fall. The Arboretum lies partly in the DuPage River Valley, in DuPage County, about 23 miles west of Chicago. The original 419 acres deeded to a board of nine trustees, by Mr. Morton, have been added to from time to time by the trustees from the Morton estate farm land. Now the Arboretum comprises about 1200 acres and may include more farm land later making it 1500 acres. Mr. Morton set up an endowment sufficient to care for it for all time.

The Arboretum has about 14 miles of roads and at least 25 miles of paths with large meadows and several artificial lakes which form a skeleton work around which approximately 5000 varieties of woody plants are arranged for the convenience of study. The land so set aside for this purpose, properly endowed and planted with labelled plants arranged for study, was sufficient to classify it as an arboretum.

Webster gives a definition of an arboretum as, "A place where trees are cultivated for scientific or educational purposes". Mr. Joy Morton, the founder, preferred to define it as "An outdoor museum of labelled living woody plants arranged for the convenience of study". I like Mr. Morton's definition better because it includes all woody plants, not only trees. His definition also distinguishes it from a park, in that the plants are labelled and arranged for the convenience of study.

After observing the public making use of our arboretum for 34 years I would enlarge on Mr. Morton's definition. A piece of land can be laid out like a park and have labelled living woody plants arranged in rows or in taxonomic sequence so they are easy to get to and according to either of the previous definitions would classify as an arboretum. From what I have observed it takes more than that to make people plant conscious.

We realized this fact early and tried to do something about it. My feeling, and that of our trustees, has been that we want the Morton Arboretum to be a live, active part of our community as well as having it influence the midwestern area to do a better job in beautification of its surroundings. In other words, our first appeal has been to the layman who plants and in doing a good job there we also have something worth while for students of plants too.

The key to making an arboretum an attractive and inviting place is in the arrangement of the plantings. Coupled with it should be some sort of educational program, even in the simplest form, so as to enable persons visiting the arboretum to know how best to use it. In view of these observed facts I would define an arboretum as follows: *"An arboretum is an outdoor museum of labelled woody living plants, true to name, arranged aesthetically for the convenience of study, and supplemented with an educational program enabling users of it to derive the maximum benefit".*

You will notice I have included in my definition that plants should be true to name. That, as you all know, has been one of the great failings in most institutions. In our eagerness to build up collections many times plants are included which have not had their original sources properly checked. We, like the rest, are trying to correct this situation.

In my definition I also say plants should

The Thornhill Building, south facade. This building is used for administration work in part, but was primarily designed for classrooms, workshops and auditorium lectures.

be *aesthetically* arranged for convenience of study. In the Morton Arboretum we have four classifications of plantings: Botanical groups, where plants are arranged according to plant families, genera, species and varieties; Geographical Groups where plants are arranged according to their native habitat; Test Forest Plots, where trees in pure stand and mixed plots are studied from the economic standpoint; Landscape Groups where plants, though perhaps entirely unrelated, are grouped together to show good landscape effects. In the Landscape Groups our formal test hedge garden is included.

We find more people are interested in the landscape arrangements than all other groups put together. In early years people would come to the Arboretum and ride around but seldom get out of their cars. When we began to develop landscape plantings along roads and around meadows their curiosity was aroused as to what plants made up the combinations. After their interest was aroused they then began to want to know more about the species and varieties of certain genera and the natural thing was to study the botanical groups.

As I stated in my talk last year at the Shade Tree Conference, an arboretum or botanical garden has a job to do or a product to sell, and that is to sell the idea of learning more about good plants and how to use them. If we put a few in good landscape arrangements in the show case, so to speak, we get people conscious of what can be done with good plants and then they are eager to learn more.

By 1939 laymen visitors were making good use of the Arboretum but we could not understand why teachers of the Chicago and local schools were not bringing their students. We felt it was because the teachers had a good book knowledge but did not know plants and didn't want to be embarrassed in front of the children. To check our theory we offered four Saturday afternoon lectures and field trips to Chicago and suburban teachers. At that time we had no lecture room so the lectures were given out of doors. We expected about 50 but over 300 came. From that time on we offered classes for teach-

ers and it took three classes a week to accommodate the enrollers. Every year since we have never had any trouble with lack of students using the Arboretum.

That was the beginning of our educational program. In 1934, at the death of Mr. Joy Morton, Mrs. Joseph Cudahy, his daughter, built the Administration Building as a memorial to her father. She at that time, became chairman of the board of trustees. She was greatly interested in the educational work and the making of many refinements we have at the Arboretum today. Mrs. Joy Morton died in 1941 and left funds for the Thornhill Building which is now our educational center with classrooms, lecture room etc.

We now have classes four seasons of the year which include plant identification, scout leader groups, gardening classes, a landscape class, garden literature classes etc. Recently we opened our own nature school where people come and live for a week or two and attend concentrated nature study classes. All classes are so large the enrollment has to be limited and most classes are 10 week courses, free of charge. The winter evening classes are in the form of a Nature School where one can have a choice of three classes, one in plant identification, one in tree and shrub maintenance and one in landscape gardening.

Besides we have three nature trails where a leader can guide his own group through a trail by use of a nature trail guide we prepared. The students get work sheets to do at the end of the trail so the leader can see how well they learned what the nature trail teaches. We are planting many native trees in a certain area and numbering them where children, sent by their teachers to collect leaves for school, can collect them. They will have to identify them by our simple key so they will learn something as they collect the leaves. We have over 1500 students taking our classes each year.

I think from what I have told you so far, you can see why I used the title for my talk, "The Morton Arboretum, More than a Collection of Woody Plants". In looking back, I associate the years Mr. Joy Morton was living as the foundation years of the Arboretum history. I like to think of the period 1934 to 1953 when Mrs. Cudahy was chairman of the board of trustees as the years when many of our refinements were made and the educational program was put into effect.

Mrs. Cudahy died April 7, 1953 and left a sizeable fund to the Arboretum. At this time Mr. Sterling Morton, son of the founder, who introduced me tonight, was made chairman of the board of trustees. Under his direction we are entering a new phase of the Arboretum development, a research phase. A major development at the Arboretum this year is the building of a laboratory wing to the Administration Building as a memorial to Mrs. Cudahy. It will have a large glass pavilion on the hedge garden axis, a lecture room seating about 100 with a class work room beneath it. There will be a large laboratory room equipped with unistrut partitions so it can be flexible in its arrangement. There will be a reception room and several offices. On the second floor there will be three sleeping rooms and a living room with a kitchenette thus enabling students or others working on assignments to stay for periods of time.

In addition two new propagating houses and an experimental greenhouse are being built close by. Attached to them will be work rooms with cold rooms etc. One cold room can be brought as low as —30° for hardiness studies. Considerable land has been added so we have available planting space for research plantings.

The question has come up by many interested persons as to the type of research we intend doing. That is also flexible in our program but generally it will be research in maintenance problems and the physiological study of plants, with some plant breeding in ornamentals at a future time.

We have invited the Illinois State Natural History Survey, whose offices and laboratory are at Urbana, to use a part of our laboratory in helping to control the spread of Dutch Elm Disease and Oak Wilt in the Chicago area. Dr. Carter and

his assistants, I'm sure, will welcome that help as they are now swamped since Dutch Elm Disease is getting in the Chicago area. They in turn will be able to give us more pathological help in some of the problems we are working with such as spruce canker, wilt in Redbuds etc.

Though we do not have our laboratory as yet, we have been starting some studies in the field in pruning and effects of defoliation, as well as a number of other studies. We are starting some field tests on fertilizers, mulches etc. We are at the moment in the process of using the dirt excavated from our new building to fill around various groups of forest trees at varied depths, some with and some without tree wells, to study the effects of fill around trees when people grade for new housing. We will later try different methods to save trees which have shown ill effects from the fill. We are also running all sorts of root pruning tests on large trees to see how much they can stand in building excavations and ditching. We are girdling trees at various depths and cutting off circulation in various ways trying to study the effects on trees which will help us determine what may be wrong when we see the same symptoms created by a disease.

We are performing another service for which we have been commended. It is to prove or disprove some of the cure-all remedies that are being advocated to control everything from Dutch Elm Disease to Oak Wilt and Phloem Necrosis. The use of salt for curing Phloem Necrosis is being tested on 25 trees in the area of Urbana through the U. S. Natural History Survey Division. In cooperation with Dr. Spencer and the American Salt Producers Assn. twenty-five trees are being used as check trees. So far no results have been given out. We at the Arboretum are running tests on a product called Normal Soil and have had two sample tests of another product which have not been fair tests due to uncontrollable circumstances. There will be many cure-all products coming up and the Arboretum, we think, can be of great service to our community in these hysterical times of Dutch Elm Disease by proving or disproving their value.

We also hope in some small way to aid in the Dutch Elm Disease fight by running as many physiological tests as we can to aid in stopping the effects of the disease while pathologists are doing their best to stop the spread of it by controlling the beetles.

One of the things we have been doing in the last few days is to experiment with composting of chopped hay, legumes, weeds etc. freshly cut from meadows. The International Harvester Company experimental farm near us has been furnishing the equipment for the experiment. I thought this would be a good time to tell about it for our chairman will then be better prepared if at the fall trustees meeting he is approached for more equipment. All kidding aside, the project looks at this time to be most worth while for if it works it will eliminate buying quantities of mushroom manure and at the same time accomplish the heavy first cut mowing problem, as well as giving us more humus for fertilizing and mulching than we have felt justified in spending budget money for in the past.

Results of our research tests when proven will be published and visitors will be welcome to visit our testing areas.

In September a National Architects competition will be carried on through Howard A. Fischer and Associates for the purpose of getting the best possible designs for a new staff and labor housing project for the Arboretum. Seven new houses will be built at first and several of our old houses will be moved in to the housing project. The streets in the new housing project will be lined with the best recommended street trees and each place will be used as a demonstration area in housing and landscaping. Actual construction of the new housing project will start in the spring of 1956.

If any of you find it convenient to visit the Morton Arboretum next summer I feel sure we can prove to you the Morton Arboretum is more than a collection of woody plants.

LASCA LIBRARY

THREE YEARS ago Mrs. Janet Wright explained the problems involved in arranging a collection of books to advantage for the use of both amateur and professional horticulturists (*Lasca Leaves,* Vol. III, No. 1, 1952-53). At the same time Mrs. Wright outlined the classification scheme devised by Miss Dorothy Manks, Librarian of the Massachusetts Horticultural Society Library. This scheme appeared to answer our needs and was adopted for use in our Lasca Library although with certain adaptations.

During these early years of our institution appropriate material—books, reprints and files of serial publications have been donated by individuals and societies and purchased by funds granted by the California Arboretum Foundation and by Los Angeles County. This growing body of material is constantly in the process of classification and cataloguing.

The limits of our quarters have long since been outgrown. Last year the floor of the temporary library quarters was reinforced so that the physical weight would not cause disaster in that direction. This year we can look forward to the next step in our growth. The permanent administration building will soon offer the library safer quarters, though still temporary, while we await the day when the library will have its own permanent home.

Requests to use the library have increased greatly and are widely varied. In addition to use by the staff of the Arboretum it functions also for the inquiring public. Those doing research in botany, landscape architecture, horticulture, California history and many other fields come seeking information which may be obtained from our shelves. The administrators of County funds recognize this service and have increased the hours of the librarian from part to full time.

In acquiring items for our shelves we have endeavored to consider the varied horticultural interests as well as adding to our collection of descriptive material of botanical genera and of various floras, especially those of areas of the earth similar to Southern California.

We have approximately 1400 volumes, 2000 reprints and are receiving 184 periodicals currently by subscription, gift, exchange or publication. The binding of over 300 volumes of periodicals has been made possible by an appropriation of Los Angeles County. Outstanding among the acquisitions of recent months have been a bound set of United States Department of Agriculture Plant Inventories complete through Number 126, and a bound set of Curtis's Botanical Magazine from 1793 to 1831. A set of the photostated references on Begonias of Mrs. Helen Krauss which has been added to our shelves is being indexed by a most competent volunteer. Because of the very fine Herb Garden being developed in the Arboretum by the local chapter of the Herb Society of America, the owner of an extensive collection of books on Herb gardening has decided that this collection will be most constructively used as part of Lasca Library. We have acquired a card key to the Eucalyptus. This key makes possible the identification of more than 600 species of *Eucalytus.* It is of the punched card variety which permits mechanical sorting and selection.

With satisfaction we observe that the classification scheme adopted is serving as the tool which unlocks the information contained in our library for those who are searching for it. It is especially proving itself as demands upon it become more varied. We are encouraged that the body of material is steadily growing though limited funds spread this growth very thinly. Increasingly do those who own related material realize that when it has served their needs it can serve many others from our shelves.

R. K. MCGAH, *Librarian*

Pereskia gigantea showing habit of the plant

GENUS PERESKIA (Tribe 1. *Pereskieae*) OF THE FAMILY CACTACEAE

Wm. Hertrich

Primarily found in the more tropical sections of the American Continent, this group of plants is roughly described as including leafy shrubs or trees, though a few are clambering vines. The more or less woody type of plants among them have straight spines in clusters in the axils of the leaves, occurring occasionally in pairs; rarely are they entirely devoid of spines. The leaves are either flat or channeled, ranging in shape from orbicular to a more elongate form, from about three inches long by one to one and a half or more inches wide. The woody type of Pereskia is deciduous.

In the Huntington Gardens *Pereskia gigantea* and *P. pereskia,* which is a climbing form, are practically evergreen during milder winters, while other species are barren of leaves. Flowers are produced which are either single or in umbels; fruiting of certain of the species is very prolific. In locations free of heavy frost, *P. gigantea* forms a large ornamental shrub, sometimes of small tree proportion under favorable conditions. The accompanying photograph shows a specimen which has been in the gardens for about fourteen years. It froze nearly to the ground in 1937 and 1949 when heavy frosts occurred; but it has now recovered and is approximately 8 feet tall with 10 canes of 2-inch diameter.

Found wild only in the tropics, this tribe enjoys wide geographic distribution, various species being native to Mexico, the West Indies, Central America, and South America. The type species was first introduced into Europe from the West Indies, during the latter part of the 16th century. Adoption of the nomenclature honored Nicholas Claude Fabry de Peiresc (1580-1637), " a member of Parliament from Aix, in Provence, a very learned man and devoted to Botany." The spelling of the generic name has suffered a number of deviations, appearing in literature variously as *Peirescia, Peireskia, Perescia* and

Flower and fruit of *Pereskia gigantea*

Pereskia. Several species of *Pereskia* are used as understock for grafting forms of *Zygocactus, Epiphyllum* and other cacti adaptable for this purpose. The familiar Opuntia is closely related: in fact, some species of *Opuntia* were first referred botanically to the *Pereskieae.*

Flower and fruit detail may be studied in the photograph in these columns; it shows clearly proliferous tendencies in the nature of the fruiting, and also the curious habit of branching which elementally follows the pattern of reef-coral growth. Of the types grown in the Huntington Gardens, *P. pereskia* was another to suffer severely in January 1937; it is a form which at first appears erect but ultimately develops long clambering canes. This type grows natively on the north and east coasts of South America, in the West Indies, Florida, and in Mexico; it is grown largely for its fruits in the West Indies, and for its leaves in Brazil where it is used as a potherb. In La Plata, it is used as hedge material, though never near habitations because of its objectionable and strong odor. Several folk names are commonly used for this plant, Blade Apple, Barbados Gooseberry, West Indian Gooseberry, Lemon Vine.

REFERENCE: *The Cactaceae,* Britton & Rose, Carnegie Institution of Washington. 1919.

IN ANSWER TO YOUR QUESTION

DONALD P. WOOLLEY

Hello! . . . yes, this is the Arboretum. . . . Yes, we'll be glad to answer your question if we can.

"What's new in Southern Californian horticulture?"

Well, knowing how keenly alert Southern Californian home gardeners are to new plants which have particular ornamental or utilitarian value in the landscape, we must, these days, be more aware of a third factor—size. We must encourage the use of more plants—trees and shrubs, which do not constanly need pruning or create so much brush haulage. . . . We thought you'd agree. Bearing this in mind, there are several plants which go right along with this trend and are being offered to the public from several nurseries.

First, *Abelia grandiflora prostrata,* a very fine, low, rolling form of the old, reliable Abelia, spreads about three feet along the ground; and as much as ocean waves come running to our feet at ebb tide, it gently overlaps to form a beautiful, sloping mat, 12 to 16 inches high. It is a plant easily regulated by pinching a stray upright and is very acceptable. Although only recently patented it is coming along in good quantity.

Second, another ground cover, even lower than the first, is the strikingly beautiful *Juniperus horizontalis glauca.* Running over the ground in all directions from its eight-inch crown, it stays less than a foot high and roots as it runs. The slate blue, glaucous, tamarisk-like foilage is more beautiful than that of other junipers now grown in the Southland. Spilling over a wall or down a bank, it adds charm and draws attention wherever used. How far each plant will spread is not known at present, possibly 12 to 15 feet.

Third, is the old favorite, *Viburnum robustum,* in a dwarf form. Now, sir, this shrub is a pleasant surprise; it looks permanently juvenile! It is 24-30 inches tall; spreads in proportion to its height; has white flowers almost constantly, followed by bright, blue berries. Its reddish new growth gives it a youthful beauty far surpassing the old, well known, but larger form. . . . Thanks, I thought you'd like those.

"A perfect shrub?"

Is there such a thing? Well, let's see, we've all looked for a shrub that would be neat and full-foliaged; interesting at all times; changing with the seasons; useful as a hedge, a windbreak, a specimen or an accent plant; taking practically any Southern Californian condition and even having winter color. *Dodonaea viscosa* var. *atropurpurea* seems to be the answer. It's hardy to cold and likes hot sun. Wind doesn't bother it. It likes good drainage but can live with less watering when drainage is poor. It's fast growing to 8 or 12 feet; has interesting, pink, papery, heart-shaped seed vessels in late summer and always has the club-shaped, green and reddish bronze, beautiful foliage which becomes deep purple bronze in cold weather. Although it starts as an open pyramidal form it thickens with age and growth until it is a fuller, broader cone; some branches becoming pendulous. For an evergreen it is not heavy in littering. Several nurseries are offering it or you may see it growing here at the Arboretum.

Did you say you wish you could be sure of getting a certain shade of red flower when you buy a young *Eucalyptus ficifolia?* You're in luck! Soon you will be able to do so and even in dwarf variety that can be grown in tub or pot. Two of

Dodonaea viscosa var. *atropurpurea*

our friends are working on these propagation problems. The unpredictable flower color, varying from a washed-out pink to an almost black red, has always been annoying, as you know only too well.

George Ryan of the research staff in subtropical horticulture, University of California at Los Angeles, has successfully side-grafted several branches from a mature dwarf tree, having good color, to seedlings. Walter J. Husband, owner of Rockcliffe Nurseries, Inglewood, California, has successfully rooted cuttings of two species of Eucalyptus. They are the vividly beautiful, *E. erythrocorys,* which produces brilliant yellow flowers in the winter and has a white trunk with red stemmed new growth, glossy green leaves, and red headed, green flower buds. The second is *E. ficifolia,* which has a bright orange flower. Several hundred of the rooted *E. erythrocorys* are growing vigorously in one gallon cans and more than a dozen of the cuttings of *E. ficifolia* are now well rooted and vigorous.

The results of experiments with other Eucalyptus of garden size show gratifying progress. These include the beautiful pink *E. caesia, E. pyriformis* and the winter flowering, yellow, bush form *E. preissiana.* Of course some of these come true colored from seed so your question as to the value of the experiment is proper. We would point out that propagation by grafting or cuttings stabilizes the type and assures more uniform size and color of bloom.

In the future we hope to be able to tell you of other new plants and show the progress of experimentation. . . . Thank you very much, sir, we are glad to have been able to tell you what's new in Southern Californian horticulture. . . . You're most welcome, good-by.

* * *

Camellia Festival in Descanso Gardens. The Second Annual Camellia Festival in Descanso Gardens is being presented from February 25-March 11, 1956. Co-sponsor of this event is the Los Angeles Camellia Council, Ltd. This will be the first time that such an event has been staged under outdoor, natural conditions. The show is scheduled to open at 2:00 p.m. following the Temple City Parade which starts at 10:00 a.m. on February 25th.

This event is being staged in honor of the West Coast Convention of the American Camellia Society which meets in Los Angeles February 24, 25 and 26. A distinguished panel of judges from across the nation and some foreign countries will officiate.

* * *

"Why doesn't some learned gentleman write a backyard nature book to tell little children and simple adults what they can find by sitting outside their own houses with a magnifying glass? The world of insects, with its thousands of kinds of creatures, is a fascinating one. And such a book could do a wonderful service to humanity by teaching children that they don't have to stamp on or swat every little moving thing they see. Some of these are harmless pals who devour all sorts of pests. So many children have been so frightened of insects by their mothers that they believe all sorts of mishmash about harmless creatures. The study of nature could preserve a lot of people from crack-ups. And I'd rather teach my child to look at a bug than to criticize somebody."—San Marino Tribune, Germaine Haney.

SELECT SMALL PALMS FOR PATIO AND CONTAINER

NOLAN W. KINER

Instructor in Horticulture, Pierce Agricultural College

Canoga Park, California

FORTUNATELY, for the sake of our patio and home interiors, numerous palm species are exceedingly well adapted for such use, even in relatively restricted containers. We say fortunately because the palms not only have much to offer in grace and beauty, but they survive and look well with a minimum of attention.

It is true that considerable variation occurs among the palms regarding hardiness to temperature and light extremes, but actually this only tends to substantiate their versatility, when proper selection and usage are observed. One need not look long or far to notice that much emphasis is currently being placed on the use of handsome, bold, foliage plants for accent and atmosphere, both indoors and in patio design. Further, it is noteworthy that the palms are playing no small part in helping to fulfill this interesting trend.

The following are a few of the smaller members of this majestic family with brief descriptive and cultural remarks.

Far from being a newcomer in horticultural and landscaping ranks, but always appreciated for its fresh tropical appearance is the Kentia palm. Botanically designated as *Howea forsteriana*, it is commonly referred to as Paradise palm, or sometimes as Thatch palm. A graceful sister species is the slightly slower establishing Curly palm *H. belmoreana;* it is also used for tub and patio planting.

Both of the above palms are typically planted in multiple arrangement of four or five to a tub for fuller effect and are widely seen in hotels, restaurants, and larger dwellings throughout the country. They tolerate considerable root restriction, moderate watering, and seem to thrive best in a slighly heavy soil. Excessive sunlight is objectionable to Kentias; thus, they serve admirably in reduced-light situations of interiors, or shaded patios. Little or no frost is tolerated, which points up one of the advantages of a container plant, it can be readily moved to protection when necessary.

This normally deep green feather (or pinnate) leaved palm will remain at from about four to six feet in height for a number of years, maintained in a ten- to fourteen-inch tub. The most striking placements are: corners of large interior rooms, along blank walls, and protceted patio decks.

Chamaedorea elegans, frequently handled by greenhouses and nurseries as *Neanthe bella,* is also a readily adaptable small palm for everything from dish gardens to dense tropical clumps in the garden. One of the common names for this dainty-growing member is Parlor palm, and it has adorned numerous parlors for many years.

Several other species are quite common in cultivation, *C. graminifolia* being one representative, with sparse and finer textured leaflets than *C. elegans.* As small seedlings they lend a tropical air to planters and dish gardens, growing slowly, and adapting easily to these moist, crowded conditions. Upon outgrowing a planter, they can readily be placed several in a tub as patio or indoor specimens. Attractive specimens are to be seen thriving outdoors at Santa Barbara, San Marino, and Belair (Westwood), ranging from about four to eight feet in height.

Probably the most delicate and graceful of the feather palms is the Pygmy Date or

Howea forsteriana

Roebelen palm, *Phoenix roebeleni.* A very symmetrical but airy crown and basal leaf spines, typify this miniature Phoenix member. The fronds have a soft arching habit, lending themselves best as single specimens, rather than mixed with other foliage.

Several degrees of frost are tolerated, but full sun slightly burns and yellows the larger leaves; thus shelter from wind, sun, and cold, with moderate watering suit this handsome little palm best. The eventual height range for older specimens is about five to eight feet (in the ground) depending largely on the soil, and water practices.

The only fan palm native to Europe, *Chamaerops humilis*, has proven itself reliably worthy of use for large container or garden. Often referred to as Dwarf Fan palm, Hair palm or Cluster palm, this stiff, rugged member grows to a maximum of 12 to 18 feet, making a striking specimen wherever used. The fan-shaped or palmately arranged leaves measure about 15 to 20 inches across, have sharply armed petioles and form a compact, globular head effect. Normally a rather dull green, much variability of foliage size and color shows up in seedlings, many are a glaucous green.

The typical growth habit, if left alone, is to form dense clusters or masses, but most garden and park specimens are kept to from one to four or five trunks. This member seems to set seed while very young, and with seedlings arising from the base of the mother plant the clustering growth results, making for the picturesque outward and upward trunk forms. Dwarf varieties or seedlings are quite well suited

for small containers (one to three feet diameter), while older or larger plants may need containers of larger proportions. Moderate water and fertilization are sufficient culturally, with a sunny or partially shaded placement.

Actually, many palms other than those mentioned above may be used satisfactorily in containers while young, the selections depending largely upon the individual's taste for texture and foliage type. The following are suggestions of examples frequently used for this purpose: *Arecastrum; Archontophoenix; Butia* (several species); *Erythea armata, E. edulis, E. brandegeei; Phoenix reclinata, P. rupicola; Rhapis excelsa, R. humilis; Trachycarpus fortunei;* and in ample quarters, *Washingtonia robusta.*

When these are found to be outgrowing their particular container or situation, they may be quite readily planted permenantly in the garden or sold in favor of smaller replacements.

THE CALIFORNIA INTERNATIONAL FLOWER SHOW

The Educational Division

FEW OF US will journey to the 1956 Olympics to be held in Melbourne, Australia; therefore, the Educational Division of the International Flower Show will attempt to bring a portion of the Olympics to us!

Mr. Philip A. Chandler, University of California at Los Angeles, chairman of the Educational Committee states that this year's theme will be patterned, in part, after the familiar Olympic emblem of internationalism, the five interlocking circles. A replica of this emblem against a background of a stadium will be at the center of this exhibit. The rings, each representing one of the five participating continents, will be constructed of plant material. The plants for each ring will be a common species of appropriate flower color found within the confines of that continent.

This unity of purpose and action found in the philosophy of the Olympic games is in itself the keynote of this particular exhibit. Many agencies of the Los Angeles area, such as the: Parks Dept., schools, Farm Advisor, nursery trade and Arboretum will work together to make this plan a reality.

In addition to this central display, two gardens will be featured. One, a typical garden will be designed and planted to Australian plants now found in the Southern California area; the other, a tropical garden, suggesting a more exotic landscape, will feature a second group of Australian material.

A third feature will be the floral display along the walls surrounding this section of the show. Here, whenever possible, living plant material native to each country participating in the Olympics will be seen. These plants will be labelled with both the scientific and common names.

A unique opportunity is offered this year by the committee to the plantsmen of Southern California. All those who have specimen plants indigenous to Australia or its neighboring islands and wish to display them at the show, are urged to contact the members of the committee.

The California International Flower Show will be open to the public beginning Saturday, March 17th and will close the night of March 25th.

Members of the Educational Committee in addition to Mr. Chandler are: Mr. H. Deane, Mr. M. H. Kimball, Dr. Mildred Mathias, Mr. L. Matthews, Mr. Fred W. Roewekamp, Mr. John Stark, Dr. William S. Stewart, Dr. V. T. Stoutemyer, and Mr. C. Wenger.

GROWING NOTES

GEORGE H. SPALDING

ONE OF THE most interesting new plants we have grown at the Arboretum during the past year is *Hypericum yakusimense*. A native of the Orient, it resembles the well-known Baby's Tears (*Helxine soleirolii*) so much that visitors often pass it by without special notice. The resemblance is superficial, however, as closer examination will reveal. The stems are red and the sessile leaves a dark green. Seeds of *H. yakusimense* germinate in about two weeks. Its fine seed and resulting small seedlings require careful handling. During the first year, our plants appeared to be creepers, attaining a height of not over three-quarter inches and a diameter of about eight inches. One year from seed they bloomed, the flowers being small, of yellow color but not very showy. However, it would be well worth growing as a ground cover if it never bloomed for it presents a neat, tidy appearance the year round when grown in the proper location.

The past six months have provided additional opportunity of observing this *Hypericum* and we can include the following data: The plants flourished on a south bank in sun and increased one-third in diameter during the spring. With the onset of hot weather they stood still and finally began to brown rather badly apparently from the heat as there is no evidence of disease. This is rather surprising as the Hypericums as a group are sun-lovers, but it serves to point out the fact that there are often exceptions in plant groups. We have moved one-half the plants to a position where they will receive high light shade to see if they will recover. The balance were left in the original position for a check.

The plants flowered well last spring but the flowers are rather inconspicuous. It will be grown as a ground cover for the foliage not for the bloom, that much is evident.

Hypericum elegans is a low ground cover native to Central Europe through Western Siberia. It has been in the trade in Southern California in years past but does not appear to be at the present time. Why this is so it is hard to say as it has proven to be a very fine ground cover at the Arboretum. It is not difficult to grow and two-year-old plants will average approximately eighteen inches to two feet in diameter. The Arboretum planting consisting of approximately a dozen plants now covers an area about two feet wide by four feet long. They are planted in full sun in heavy soil on a sloping bank with a western exposure. Propagation of this Hypericum is not difficult as seed germinates in approximately eleven days. The seedlings are small of course as the fine seed would indicate them to be. Young plants will bloom in approximately one year from seed. So far the plants have not been subject to any insects or diseases and have grown with an abandon which would seem to indicate that this little creeper might become rather rampant. The accompanying artist's illustration will give some idea of the landscape effect of this plant. It is to be hoped that as fine a plant as this will again become available in the trade and enjoy a wide use throughout Southern California.

Kunzea sericea is a member of the *Myrtaceae* which is deserving of much more attention than it is now receiving in Southern California. In Australia it is commonly called the Silky Kunzea. This is a most apt common name as the leaves are silvery silky, giving a greyish appearance. When the brilliant red flowers appear in May and June the effect is more than striking. The blooms are borne singly or in pairs and look like the in-

dividual blossoms of *Eucalyptus ficifolia.* Seed requires no special treatment and will germinate in about two weeks. Growth is slower than with many of the *Myrtaceae* and it takes about 3 to 4 years for the first blooming. The largest plant at the Arboretum is now four years old, about 3½′ high, with a graceful, open, vase-shaped form. It has proved completely hardy for the past three years. Again a caution: we have not had a severe winter since 1950.

Foreground, *Hypericum elegans.* An original pen and ink sketch by Ted Pugh, a member of the Arboretum Staff. The background tree is *Pinus thunbergii.*

NAMES, NOTES AND NEWS

November brought a number of interesting visitors to the Arboretum.

Mr. Ghulam Hanif, Forester from Lahore, W. Pakistan is on a trip through the United States in quest of information on plants used for fuel. His chief purpose is to find tree species combining features of rapid growth with high commercial burning qualities.

Dr. Albert H. Willis, Professor of Mechanical Engineering, New South Wales University of Technology, Sydney, is interested in the many facets of conservation of natural resources. His present visit will be useful in his work which is associated with the Australian Department of Agriculture.

From the Kenya Forest Service, Nairobi, Kenya, East Africa we met Mr. Michael F. A. Abraham, Forester. The reforestation program concerning the pine forests of the southern United States was the major reason for his coming to this country. The Arboretum gained a new friend and also a source of seed exchange with East Africa.

Miss Florence Cornes has been in charge of a government sponsored correspondence school in New Zealand for the past ten years. Her pupils are children who are unable to attend regular schools because of distance or physical conditions. Instruction is carried on by radio. With such a background, Miss Cornes is experienced in giving illustrated lectures covering the scenery and wildlife of New Zealand, we are informed. Her tour of the Arboretum was indeed thorough, being under the personal direction of Mrs. Samuel Ayres, Jr.

The November Arboretum Staff Meeting was highlighted with a lecture by Dr. Peter Peterson of the Riverside Citrus Experimental Station. His topic, illustrated with kodachrome slides & times lapse movies, touched on that phase of his avocado breeding work concerning flower structure and the accompanying flower part movements during pollination.

Mrs. Janet Wright, our editor, is taking a well earned leave of absence for this issue. In the years since Mrs. Wright became editor of *Lasca Leaves* it has become a quarterly of which we may be very proud.

Denis E. Kucera, naturalist by preliminary training and experience, and Information Aid to visitors who tour the Arboretum grounds each weekend, expects to devote a major share of his time during the coming year to completing his work toward a degree in the Departmnt of Botany at the University of California, Los Angeles.

In the New York Times for Sunday, October 9, 1955, mention is made of experiments at LASCA with fire resistant plants (*Lasca Leaves.* IV, 64-67, 1954). A photograph of some of the cistus plants is included. Miss Dorothy Jenkins, garden editor for the Times, visited us while on the west coast in August.

* * *

Errata: On the reverse front cover of *Lasca Leaves.* V, No. 4, 1955, the Acting-President and the Vice-President should have been listed as Mr. Ralph D. Cornell. On page 75 of the same issue the picture credit should have read Mr. Ralph D. Cornell. Mr. Cornell's middle initial was omitted entirely on page 7 of the index. On the reverse back cover we again find Mr. Ralph C. Cornell where it should be Mr. Ralph D. Cornell. All these many activities belong to him in spite of our efforts to divide them among several Messrs. Cornell.

* * *

The many friends of Alfred Hottes may be glad to learn that they can soon again share in the beauty and knowledge of plants which it was his pleasure to record during his life time. A portion of his will reads, "On account of my friendship and admiration for Vernon Stoutemyer of the University of California at Los Angeles, I hereby give and bequeath to said university my paintings of flowers and my files, clippings, sketches and notes pertaining to horticulture". As soon as his collected works are catalogued by the Agriculture Department library, they will be available for further study and enjoyment.

* * *

The annual midwinter show of the Santa Barbara Horticultural Society was held January 7th and 8th, 1956 in the Hale Flower Hall of the Santa Barbara Museum of Natural History. David Case was general chairman. This noncompetive show displayed plant material which was attractive in the winter season and which is recommended for planting in this area.

* * *

The Arboretum has been invited to be an exhibitor in the Cavalcade of Health and Medical Progress, to be held at the Shrine Exposition Hall, January 6 through 15, 1956. This event is sponsored by the Los Angeles County Medical Association. The Arboretum's booth will feature a small greenhouse, a root growing box, sensitive plants, a display of medicinal plants and certain experimental work of the Air Pollution District.

A CARD SORTING KEY FOR THE IDENTIFICATION OF EUCALYPTS

N. Hall and R. D. Johnston. Forestry and Timber Bureau, Canberra, Australia.

While one might feel that botany and particularly plant identification might remain aloof from automation nevertheless man's tendencies in this direction are even leaving their mark in this field. Fortunately the card sorting key for identification of Eucalypts does not require a special room to house a "brain-battery" of electronic tubes but has distilled and condensed automation to a single, simple, infallible, component—a steel knitting needle! in action this

"piercing" component of the key deftly brings forth the identification card for the species under analysis.

The card sorting key consists of 551 cards and covers the 638 species and varieties in Blakeley's *A Key to the Eucalypts* and the 35 Eucalypts described since 1934. In most cases each card (size 4.5 x 6.5 inches) represents a single species of Eucalypt. However, when more than one species is given on a card, characters for differentiation between those species also are given on that card. Spaced equally along all four edges of the cards are eighty-four punched holes bearing numbers to relate them to diagnostic characters. These characters cover geographic distribution (numbers 1-12), growth habit (13-15), mature leaves (22-40), general (28-30), color (31-33), venation (34-40), inflorescence (41-46), operculum (47-49), features common to the bud and fruit (50-51), and fruit characters (52-75). The remaining holes have not been allocated so that users in any particular geographic area can code for any local features which may aid in sorting for that area. In species where the characteristics are present the card has been clipped so that there is a notch on the margin of the card instead of a hole. On each card are notes giving identifying features and illustrations concerning the species represented by the card. In use, all of the cards are aligned and the knitting needle is inserted into the hole for the feature under consideration. The cards then are lifted slightly and shaken gently. The notched cards which fail to be lifted are the ones required for further sorting. They are then sorted for the next feature and so on until theoretically the number of cards is reduced to a single one which identifies the specimen.

In practice the authors advise not to attempt to sort a single card but to sort down to a few cards and then check on each card the individual features and illustrations before making a final decision. By this means specimens may be identified without using any one single characteristic which might be variable and lead to an incorrect identification.

Heretofore, for many species of Eucalypts, the only key required microscopic examination of the anthers. The need for a simple means of identifying members of this large genus (over 600 species) has long been recognized. The card key fills this need since complete botanical material is not required. In addition identifying features can be sorted in any order, furthermore species can be added without any basic change in the key and it can be used by the non-botanist. Its disadvantages are that it is bulky, occupying a box 4½" x 7" x 9", and is relatively expensive to produce. It may be purchased for approximately $17.00 U. S. currency.

W. S. STEWART

BOOK REVIEWS AND COMMENTS

Geraniums for Home and Garden. Helen K. Krauss. Macmillan, New York, 1955. Just when geraniums are reaching a new high in popularity comes this book, which is both authoritative and readable. It is what we would expect from the noted author of *Begonias for American Homes and Gardens,* and does for the bright sun lovers what her earlier treatise did for the favored flowers of shady situations.

The book begins with a color plate that identifies a dozen different plants in bloom and ends (not counting the ample index) with a list of sources of plants, which happily includes a number in California. This is notable for so many general books of this character are written for the East and make pleasant leisure time reading for us but for practical information on local problems we must look elsewhere. Mrs. Krauss has taken care of us. She travelled around our geranium growing districts talking to our successful growers and passes on to us the ideas she gleaned. However no one seems to have told her that we do not add limestone to our soils!

The author also travelled to South Africa, home of the several original species from which our present day geraniums have evolved and found some growing wild on the sunny slopes near Capetown. And she has done much researching in libraries. This all makes for a complete story of the subject, from its history down to the newest beauties on the market, and it is all told with the charm of one who loves geraniums and knows how to grow them to perfection. The page after page of named cultivars, hundreds of them, are interesting if only for their witness to the ease of hybridizing, not to mention the ease of naming them. Which reminds us that geraniums botanically are pelargoniums. Both are members of the great Geranium Family, but it is the genus *Pelargonium* that has provided the plants we know and love as geraniums.

Cultural directions take account of the various places where geraniums are grown, outdoors in beds and boxes, and indoors in home windows and greenhouses, and beginners have a chapter devoted to their problems. There are descriptions of some rare and unusual species added to the four general classes we recognize: the garden geranium with its gaily colored flowers or leaves; the trailing one with its ivy-like leaves, which we call ivy geranium and employ so often as a ground cover; the Martha Washington, aristocrat of the clan, whose ruffled flowers rival the orchid in charm; and the scented-leaved sort which has such a variety of leaves and growth as well as distinctive fragrance. Many of these are pictured in the 16 pages of cuts which help so much in identification. All in all this book is a choice addition to our horticultural literature. Price $5.00.

ALVA GRAHAM

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CONTENTS

THE USE OF CISTUS IN EROSION CONTROL

GUSTAF JUHREN

THE RECENT FOREST FIRES in Southern California, followed by flood damage to the densely populated valley lands, have again emphasized the importance of a good plant cover on the mountain sides.

Besides the burned areas there are other sources of erosion which are more chronic. Such spots are road slopes and similar places caused by construction activities, where large quantities of earth have been displaced and loose masses of it dumped over the slopes. More difficult from the standpoint of getting cover established are those mountain areas which so far as we know have never supported more than a sparse vegetative cover, with plants too dwarfed and far apart to hold the soil.

The first steps in controlling this erosion consisted of attempts to extend the native chaparral. Some of the barren areas were too steep, with the result that seed slid off and young plants were washed out. Certain of these areas were then selected for experimental treatment. One method attempted was that of terracing with wire or brush wattles, after which plantings were made behind the supporting structure. Even so, the native species such as Rhus and Ceanothus did not become well established. *Colutea arborescens* from the Mediterranean did better, while *Spartium junceum* (Spanish broom) grew best.

It was suggested that a broader introduction of plants from other lands would be worth trying.

The philosophy back of this may be of interest. It was suggested independently by several ecologist and plant physiologist, Jens Clausen and William Heisey of the Carnegie Institution and Dr. M. Zohary of the Hebrew University, that from an evolutionary standpoint, our chaparral has been the climax vegetation for a long time, and has about reached its limit of producing vegetative cover. If it were able to extend over these barren areas or cover them more thickly, it would have done so; likewise, if any of the desert or semi-coastal species could succeed, they would be encroaching here. Efforts to increase chaparral or to introduce species from nearby areas are therefore likely to be somewhat unrewarding. But some plant from another continent might succeed more spectacularly. There are regions, these men pointed out, similar to ours but geologically older, in which plants have had more time to evolve into species which might possess more desirable characteristics of reproduction and survival. Drs. Zohary and Evinari acted upon this theory by collecting seed from plants growing in regions of the driest soils and most extreme temperatures of Palestine, and sending them to us for trial planting.

The seed of *Cistus villosus* from this initial collection appeared to be most promising. First planted in 1949 in the Earhart Laboratory, seed germinated well under a variety of conditions. It also germinated in the field and the first bushes set out, where native species had heretofore failed, grew vigorously.

Seed of this species was difficult to obtain in sufficient quantity to extend the experimental work. Dr. Seibert, then director of the Los Angeles State & County Arboretum, was contacted when it was learned that there were extensive plantings of other species of Cistus there. In addition, through correspondence with Dr. A. Y. Goor, Forest Conservator of Israel, it was learned that other Cistus species as well as *C. villosus* withstand drouth, grazing and fires, resprouting

The rows of darker plants are the various Cistus species planted as seedlings on the south facing slope of Lannan Canyon earth dam. The Cistus seedlings were furnished by the Los Angeles State and County Arboretum.

rapidly from root crowns and coming up from seed in quantity.

Martin and Juhren, *Lasca Leaves,* Summer, 1954, reported the next step in the Cistus experimental program. In this article, mention was made of the planting on the sloping face of Lannan Canyon earth-filled dam in Sierra Madre. The results of that planting are given below:

Name	No. of plants set out	Percent Survival
C. purpureus	900	100
C. monspeliensis	200	88
C. albidus	300	62
C. ladaniferus	200	52
C. laurifolius	110	45
C. villosus	20	100

A high survival was not expected of *C. ladaniferus* or *C. laurifolius* on this site, elevation 1000 ft., since they are native to somewhat higher elevations. They may be expected to do well at higher elevations in the San Gabriels, and are now being tried there. *Cistus purpureus,* a hybrid *(C. ladaniferus* x *villosus),* succeeded as well as *C. villosus.*

The unusually poor conditions for plant growth on this site was illustrated by the use of Coulter pine. This is a hardy native which usually does well as an erosion control planting; however, planted at the same time as the Cistus, there was only eight percent survival.

All the Cistus flowered in the succeeding year, 1955, except *C. ladaniferus* and *C. laurifolius.* Flowering was followed by a good crop of viable seed.

In November, 1954, a trial planting of 8 month old Cistus was made on McClure dam, Los Angeles County Flood Control, in the Verdugo Mts. The species *C. albidus* and *C. purpureus* showed 100 percent survival a year later. At the same time, seed of a number of Cistus species was sown in sample plots. This seeding resulted in the establishment of:

Name	No. of plants per square meter
C. ladaniferus	27
C. purpureus	7
C. crispus	7
C. albidus	4
C. canescens	30
C. hirsutus	3

A second germination occurred on these plots, following a rain of 1.5 inches in November, 1955. The germination ranged from 50 to 500 seedlings per square meter. If such a germination pattern proves to be a characteristic of Cistus, it will be a valuable one; since it might mean that if a first or second germination were followed by periods of unfavorable conditions, there would still be seed left which might germinate at later dates. A somewhat similar germination pattern had been observed after the seeding of the firebreak reported in *Lasca Leaves.*

It was now felt that the timing of the germination might be profitably studied in the laboratory.

Seeds of *C. villosus* and *C. hirsutus*

were brought into the Earhart Laboratory. The seed, in lots of 100, were placed between pads of filter paper moistened with deionized water in plastic germination dishes. These dishes were then divided between six different conditions of temperature (see Table 1). In each temperature combination there was a transparent dish which received light, and a black painted one in which the seeds were in darkness. There were two replications of each treatment. Germination counts are given in Table 1. Germination was best in the low and moderate temperatures. At the high night temperatures of 20 and 26 deg. C. however, seed was germinating better toward the end of the experiment. The tests had to be discontinued after 10 weeks because of an infection by mold. With high temperatures, germination was better in the light; with low temperatures, better in the dark.

TABLE I

Germination of Cistus seeds between April 9 and June 20, 1955 under controlled conditions in the Earhart Laboratory.

Temperature in Centigrade		Plastic dish	Number of seeds germinating (100 per dish)	
Day	Night	Placed in	*C. villosus*	*C. hirsutus*
20°	4°	Light	3	43
		Dark	-	51
6°	6°	Light	16	56
		Dark	5	57
20°	14°	Light	9	68
		Dark	5	53
26°	20°	Light	28	60
		Dark	2	41
26°	26°	Light	7	20
		Dark	4	17
30°	17°	Light	4	17
		Dark	4	9

On the whole, the number of germinations of *C. villosus* are probably too small to be signficant. This was the same seed lot as used in 1949 and may have deteriorated as the germination at that time in the Earhart Laboratory was much better. Also, the sand and gravel mixture used in 1949 for seed bed material may have been more favorable for the germination of *C. villosus* than the moistened filter paper in closed dishes.

There was germination of *C. hirsutus* at all temperatures, with only the 30 deg. C. day and 17 deg. C. night, a summer condition, markedly less favorable than the other.

The thing which seemed most interesting was the sporadic character of the germination, so different from the usual germination curve, which rises smoothly to a maximum then declines.

Following the tests in the laboratory, a second set of tests were made in soil in a greenhouse. Six species of Cistus were used. Flats were filled with a regular nursery mixture of ⅓ sand and ⅔ garden loam. One hundred seeds were planted per flat. Maximum and minimum temperatures were recorded daily. Germination counts were made daily, seedlings being marked with toothpicks. After a two month period, the total germination for the various species was:

Name	Percent Total Germination
C. hirsutus	44
C. salvifolius	43
C. laurifolius	23
C. villosus (Coon Canyon seed)	13
C. villosus (Lannan Canyon seed)	15
C. albidus	63

As in the field plots and in the laboratory, germination occurred from time to time in each species; days of germination alternating with days of no germination. Peaks in germination occurred on different days for different species. No correlation could be detected between these peaks and the fluctuations of temperature. Figure 1 shows a typical germination curve for *C. albidus*.

A final germination test was carried out in which seeds were planted in flats of soil taken from a burned-over area. Comparison flats of seeds were planted in soil taken from an adjacent unburned area. Four hundred seeds per flat of *C.*

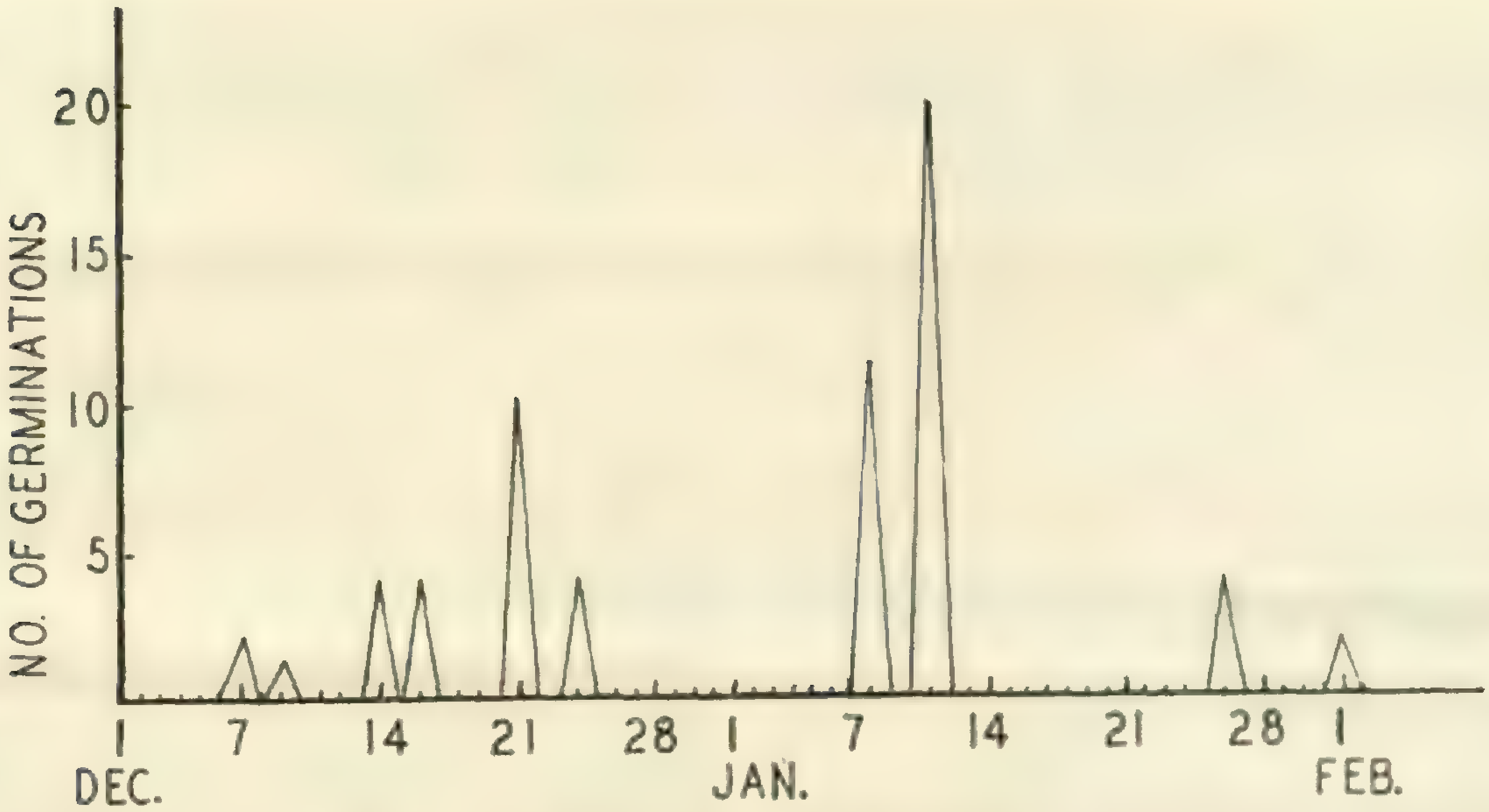


Fig. 1. An example of the germination of *C. albidus*. Seeds were planted in a flat of soil and placed in a greenhouse. Total germination was 63 percent.

salvifolius were used in this test. At the end of a month, 55 percent of the seed in the soil from the burned area had germinated; while, 30 percent of the seed had germinated in the comparison flats. At the present time, germination is continuing in both types of soil. This seems of interest in the light of the experiments at the Arboretum, in which more seedlings appeared beneath the burned bushes than appeared below the unburned bushes. Additional experiments concerning the germination characteristics of Cistus are in prospect.

Returning to the field trials, it may be mentioned that Cistus, through the long unbroken period of heat during August and September, 1955, remained green and ing good condition longer than did native plants in the same areas. Plantings on a larger scale seemed to be warranted on a wide variety of sites. Such plantings are now being made. More trial-plantings should be made to determine the fitness of the various species for different altitudes, since there is need of erosion control measures at high elevations as well as in the foothills. Considering the present evidence, there seems good reason to hope that Cistus will constitute a valuable addition to our plant resources for erosion control.

The author wishes to express his gratitude to the California Institute of Technology and to Dr. Frits Went for the use of the Earhart Laboratory. He also thanks his wife, Marcella, for her part in carrying out the germination tests in the laboratory. And finally, an expression of appreciation is extended to Mr. Paul Bauman and Mr. E. C. Kenyon, Los Angeles Flood Control District, for their cooperation in the work at McClure dam. Construction and planting of Lannon dam was carried out by the U. S. Forest Service, under the direction of Gustaf Juhren, U. S. F. S. Silviculturist.

MRS. WRIGHT BEGINS NEW WORK

Mrs. Janet Wright, who has been editor of *Lasca Leaves* and assistant to Mr. William Hertrich at Huntington Botanic Gardens, has retired from these positions to enter a Carmelite Order. Mrs. Wright assisted Mr. Hertrich in his work as Curator and Curator Emeritus for almost ten years.

Long before her association with Mr. Hertrich, Mrs. Wright began an interest in herbs; growing them at her home; studying them in the literature of Huntington Library; writing on herbs; lecturing for, and participating in the activities of the Herb Society of America. Being well versed in other phases of Southern California plant life she became of valued assistance to Mr. Hertrich in his writing of *Palms and Cycads* and *Huntington Botanic Gardens,* 1905-1945.

When Mr. Hertrich retired from the active management of the Gardens, Mrs. Wright began to share her time with the Arboretum. She began to edit *Lasca Leaves* and classified and catalogued the rapidly growing library according to a scheme which she adapted from that used at the Massachusetts Horticultural Society Library. During her editorship *Lasca Leaves* grew from its beginning of but a few pages to a 24 page publication, the editorial choice of material constantly improving its quality as well as its size. Later when Mr. Hertrich began work on the *Camellias in the Huntington Gardens*, she worked long hours assisting him and also carrying on her editorship and library work.

Her conscientious, quiet, efficient work and personal charm made her assistance of great value in all her endeavors. We who have worked with her will miss her talents and her ready smile. All of her associates wish her great happiness, satisfaction and joy in her work in another field.

R. K. M.

JOHANN FRIEDERICH ESCHSCHOLTZ

WILLIS LINN JEPSON

(Reprinted by permission from *Madrono* Vol. I, No. 17, Dec. 1929)

On Oct. 2, 1815, the exploring ship Rurik entered San Francisco Bay. It had been fitted out by the Russian chancellor, Count Rumiantzof, to undertake a round the world voyage of discovery under the command of Lieutenant Otto von Kotzebue of the Russian Imperial Navy. Two naturalists accompanied the voyage, Adelbert von Chamisso and Dr. J. F. Eschscholtz, the latter being the surgeon of the expedition. These two botanized on the San Francisco peninsula during the month of October, after which the Rurik sailed for the Sandwich Islands on November 1.

Among the new plants collected at San Francisco was a poppy-like species which Chamisso, after his return home, dedicated to his companion as a new genus, Eschscholtzia, and thus made well known to all future Californians the name of the surgeon of the Rurik. Probably the first paper devoted exclusively, save for a few post-scriptal notes, to Californian plants and carrying California in its title, was written by Eschscholtz. This paper, "Descriptiones Plantarum Novae Californiae", was published in the Memoires de l'Academie Imperiale des Sciences de St. Petersbourg in 1823. For the first time we have here named and described various very common Californian plants: Abronia latifolia, Navarretia (Hoitzia) squarrosa, Polemonium capitatum, Solanum umbelliferum, Ceanothus thrysiflorus, Rhamnus californica and Lupinus chamissonis.

When Kotzebue undertook his second voyage of exploration Dr. Eschscholtz again went out with him. After this Eschscholtz became professor of anatomy in the University of Dorpat. His writings are of importance but they lie mainly in the field of zoology. Born at Dorpat in November, 1753, he died there in May, 1831.

COVER PICTURE

As a flower of that group of Cypripediums whose dorsal bears spotted markings, no more striking representative can be found than C. Milmoore (C. Mildred Hunter x C. Farnmoore). This seedling was registered by Mr. L. Sherman Adams in 1953. The Arboretum's recent good fortune in receiving as a gift the Cypripedium collection of Mr. Arthur Freed is described in detail by Mr. W. Quinn Buck within the pages of this issue.

THE INTRODUCTION OF NEW PLANTS

JOHN C. WISTER

Prepared for the regional meeting of the American Association of Botanical Gardens and Arboretums at the National Shade Tree Conference, Santa Barbara, California, August 3, 1955. Reprinted by permission of author.

Whether we live in Maine or California, in cities, suburbs or farms, we are growing plants brought to us from many other parts of the world. Some of these plants came quite by chance, others were the result of systematic search. From the earliest prehistoric times the human race has been moving plants around the globe. Well known examples are wheat, rye and other grains. Centuries later the so-called medicinal plants were grown and taken from place to place, and then in the days of Greece and of the early Christian era an interest was taken in plants as ornaments. Box, Yew, Myrtle and many other plants were grown and were taken from their Mediterranean homes to Great Britain. Botanists, indeed, have asserted that it is difficult to determine which species are natural to Great Britain, as so many plants were brought in by the Romans.

We have more knowledge, of course, of the introductions of more recent centuries—of the British and Continental explorers who came to this country to find new plants to send back to Europe. And we know a good deal about early explorations in China from the time the Portuguese found the orange and the French Jesuit Father d'Incarville brought us the Ailanthus.

We know the plants brought by later Jesuit Fathers—David, Delavay, Fatiges and others. We know of the explorations encouraged by Kew. We are familiar with the famous explorers of the Royal Horticultural Society, Douglas, Fortune, and others, and of the twenty-two explorers sent out by the great British nursery firm of Veitch, including James Veitch, John Gould Veitch, Maries, and E. H. Wilson.

We come to the explorations undertaken from this country and the work of David Fairchild, Frank Meyer, N. E. Hansen and E. H. Wilson, and the more recent men who have followed or are following in their footsteps.

It is present day exploration and its possibilities that I particularly wish to emphasize. A respected botanical professor in one of our great universities has publicly stated that the day of exploration is over and that little more is to be found. He was referring, of course, to natural species. To those of us who grow plants, in distinction to those who merely look at them dried in papers in an herbarium, it would seem that the day of exploration was only just beginning, because there is so much more ahead that needs to be done and that never has been done, except in a very small way.

A few examples will illustrate what I mean by this. Most of you are familiar with the fact that Father David discovered and sent back to France *Buddleia Davidi* and that this turned out to be a very uninteresting plant. It was little grown and in a few years was dropped from cultivation. Fifteen or more years later, Wilson found the same species in China, but being a horticulturist as well as a botinist, he recognized that the plants he saw were slightly different from the plants that Father David had introduced, even though they undoubtedly belonged to the same species. Wilson sent back plants which were at the time given the status of wild

botanical varieties. The three best were named *magnifica, superba,* and *wilsoni.* Those three were so superior in garden effect that the plants immediately attracted great attention. They became popular very quickly. Some bright publicity man, realizing that the name *Buddleia* would not strike a popular chord, called it "Butterfly Bush". It was widely advertised. Plants were propagated by cuttings as easily as geraniums. Nurseries offered them at reasonable prices. In a few years they were sold in immense quantities all over this country.

Another example is found in our yellow tree peonies. Father Delavay found them first, and from them hybrids have been raised both in France and in this country. Many of the hybrids have the misfortune of hanging their heads, just as the parent plants sent from China had done. The flowers were hidden under the foliage. Then came Ludlow and Sheriff who, in their explorations on the border of Tibet, found a plant that they sent back under the name *lutea,* Tibetan variety or Ludlow variety. Botanists are still arguing whether this is a new species, a new botanical variety or just a new form. In any case, the reports coming from England say that it has larger flowers, stronger stems and its flowers do not hang under the foliage. As far as I know, this plant has not yet bloomed in this country. Its value, of course, is something that will not be known for many years, but at least there is the possibility that a superior wild form has been given to us that may prove of great value to our gardens, not only for its good garden characteristics but as a parent of new hybrids to be made by plant breeders of the future.

There are to be found in our own great country, without going to China or elsewhere, innumerable forms of familiar species that are superior to the ones that we grow in our gardens. All it takes is someone with a keen eye to travel and search. This has been done by a number of people as you well know, and our gardens have been enriched by them. It has, however, not been done by enough people. One of the most important things that arboretums and botanical gardens can do is to organize expeditions to make systematic search for such superior forms.

To send expeditions to China is a very expensive matter. To explore near home does not cost nearly so much. It could, of course, be expensive if it was done on a wholesale scale as some day I hope it may be. It may, however, be done very cheaply by utilizing the services of professional botanists and of professional horticulturists plus the many hundreds or thousands of skilled amateur gardeners who are fond of nature and who like to go off on summer trips. Many of them could be urged to keep their eyes open for some particularly fine plant.

This is now being done in the case of the western Azalea through the efforts of the officials of the Tacoma Rhododendron Society. They have not only personally gone on hikes in the mountains, but have secured the cooperation of botanists in institutions in the states of Oregon and California. Some of these botanists have led trips of students to mountains near them, just for the purpose of picking up forms of this flower which seemed to them different from the ones ordinarily grown.

No one can say, of course, how successful they will be, but I have seen photographs of some of the plants brought in, which seemed to me to give great promise. What I, as an Easterner, have hoped the most of course, has been that in the course of their travels, they would find certain plants which although they might not be more spectacular in bloom might prove to be more adaptable to the conditions of the East, where summers are hot and the rainfall sometimes scanty.

For gardens in our colder climates we need explorations as far north and at as high an altitude as the particular species in question will grow. Winter hardiness is not so important for California and the

Pacific Northwest, but there similar explorations for wild plants can be undertaken looking for forms of species that would adapt themselves better to their garden conditions than the forms of the same species they are now growing.

It is not even necessary to go out in the wild to search for new plants. Many fine plants practically unknown except to botanists can be found by visiting arboretums, botanical gardens, nurseries and private gardens. Some arboretums have recognized fine new plants appearing spontaneously. Witness *Malus arnoldiana,* springing up in the Arnold Arboretum near the Crab Apple collection. It looked so good that it was named and made available to our gardeners. Mr. A. F. den Boer, perhaps our greatest authority on crabapples, went from his own park in Des Moines to the neighboring town of Boone, and because he kept his eyes open, found a particularly fine form of the wild Iowa crab, which no one in the town of Boone had even noticed. He brought back scions and propagated it. It will soon be in commerce under the name of Boone Park.

Many nurserymen recognize superior plants among the varieties they grow from seedlings but do nothing about them, because of the trouble, or the expense, that it would involve to propagate them and then publicize them. We ought to be on the lookout for these and if the nurserymen are not prepared to exploit them perhaps we could take over the best of them, test them thoroughly, and if they prove worthy make them available.

There are plenty of interesting but nearly unknown plants in private gardens. A member of one of the Philadelphia garden clubs went one day to Wilmington and noticed a plant of *Calycanthus floridus* which had a fragrance quite different from the one in her own garden. She begged a piece and now has it growing in her garden alongside of the common form. It has never been propagated commercially. It should be. I don't mean that it is a world-startling plant, but it is a charming plant and gives a fragrance different from the one usually found in old gardens. Our arboretums, by the way, could do a service to horticulture by making available to nurseries plants of their truly fragrant forms of this species. The plants ordinarily sold under the name *Calycanthus floridus* from nurseries are without fragrance.

Arboretum executives, as well as nurserymen and amateurs, should be always looking for the plant which is not only different but better. Too often in the past, the plants which nurserymen of the last century picked out to propagate were different, but were not, in my opinion, better. The nurserymen were so used to the common run that any change seemed to them worthwhile. So they propagated many monstrosities which are with us today. I hope that we may have more discriminating tastes in the future in that particular field.

There are many things that arboretums and botanical gardens can do to help plant introduction, and do them without any real expense to themselves. I know of a number of examples personally. Here are two of them that concerned Professor Sargent and E. H. Wilson. A Pennsylvania farmer who had just returned from the Army in 1920 was strolling in his woods and noticed that the native azaleas there were not all alike. He picked and pressed a couple which were different and more beautiful than the others and sent them to the Arnold Arboretum. How he, in a small community, had ever heard of the Arnold Arboretum I do not know! But he had heard of it and he sent the flowers there with his questions.

Professor Sargent saw the letter, became interested in the man, explained to him to what species these azaleas belonged, and urged him to be on the lookout for particularly good forms and also to grow in his garden other azaleas and rhododendrons. After the man had bought a few well known kinds and got started, Mr. Wilson arranged to send him seeds

of species not ordinarily in commerce. Later on Wilson made it possible for him to get pollen from rhododendron growers in England. The result has been that this man, with no botanical training, no horticultural experience beyond his general farm and orchard knowledge, a year or two ago received in recognition of his fine breeding work the gold medal of the American Rhododendron Society. You all know whom I am talking about—Joseph Gable of Stewartstown, Pennsylvania.

This story was almost repeated a little later in the case of C. O. Dexter of Sandwich, Massachusetts. A landscape architect had planted a good selection of rhododendrons and azaleas for him. He became interested in them and wanted additional species. Professor Sargent and Mr. Wilson enabled him to get them. He took up breeding on a large scale, grew about ten thousand seedlings a year during the last twenty years of his life. He kept no records and his plants usually were not marked. After his death, there remained scattered collections of them in the gardens of people to whom he had given or sold unbloomed seedlings. A group of men from the American Rhododendron Society has been trying to find which are the best of the many thousands of seedlings they have examined in a score of gardens in the East. If they can do that, they will perform a great service for eastern rhododendron growers. Among the institutions represented in this small group of men are the Arnold Arboretum, the National Arboretum, Cornell University, and, I am proud to state, the Scott Foundation at Swarthmore.

Could not literally dozens of amateurs be found who might do similar work in the next quarter century, if they had the encouragement of a few people in our Association, who would encourage them and guide their early footsteps?

Our great nurseries no longer grow the great collections of plants that they did a quarter of a century ago. Economic conditions, the high cost of labor particularly and the almost impossibility of getting good labor that is interested in plants, has forced them to cut down on the items they grow and to grow instead larger quantities of fewer kinds. This is a severe blow to American horticulture, which might have developed many more wonderful nurserymen like Thomas Meehan or Henry Hicks, or like the German Ludwig Spaeth, or the French Vilmorin, or the British Veitch. No one can blame these nurseries. Conditions have forced them into this decision. Fortunately to fill the gap left, there have arisen many amateurs who have gone into business on a small scale on some particular plant. This is particularly to be noted in such plants as iris, daffodils, peonies, hemerocallis, gladiolus, dahlias, chrysanthemums, African violets, and other relatively small plants that fit in the back yard. Our greatest advances are now coming from such men. Can not these back yard specialists in some way be kept informed of the work of arboretums and to learn what plants or what pollens are to be had of the rarer kinds not ordinarily seen in nurseries, which they might advantageously use in their breeding?

No one arboretum or botanical garden can do this alone. Such institutions might outline objectives or work needed in certain groups of plants which might interest garden clubs enough to take some of their attention away from artistic arrangements and put it on what seems, to us, the more important phase of producing new plants superior to those which have gone before.

After the new and superior forms of plants have been discovered, tested and evaluated there remains the job of properly publicizing them and making them known to the gardening world. Most institutions have publications which can give at least brief accounts of the new plant. I commend to your attention the recent release by Professor Lantz of Iowa of the story of the Jonadel Apple—brief and to

the point and in its last paragraph enumerating the reasons why this apple is to be introduced.

This is the best type of publicity, brief, to the point and free of exaggerated claims. Once a statement like this has been officially sent out nurserymen will be anxious to get the plant and the gardening press will be anxious to give it to their present day enormous public. We have to, as yet, rely on the nurserymen for packing and shipping quantities of plants.

I have given you just a few suggestions, many more examples will come to your minds. I hope you will think about them and see what your institution and you individually can do to encourage the search for better plants and to make them available to the gardening public.

NOTE: Although this article, at least in part, has been reprinted elsewhere, its horticultural message seems worthy of as wide an audience as possible. The ideas and examples expressed should be taken as a challenge to the botanical endeavors of our readers who hold membership in a new and growing arboretum in Southern California.

A portion of the educational booth entered by the Arboretum at the Calvacade of Health and Medical Progress, held in the Shrine Exposition Hall, Jan. 5-16, 1956.

These colorful posters heralded the establishment of the California Botanic Garden in the late 1920's

THE CALIFORNIA BOTANIC GARDEN

(An Historical Vignetté)

ELMER LORENZ

"ONE OF THE IMPORTANT standards by which the cultural progress of every civilized community can be measured, is the development of its gardens. The botanical achievements of London, Paris, Rio de Janeiro and other important world cities, have contributed very greatly to the charm which these centers hold for discerning persons. In our own country, Boston, New York, St. Louis and other prominent cities long ago recognized the civic value of botanical institutions.

"The Pacific Coast, unfortunately, has not until recently awakened to the far-reaching importance of such institutions, although in Los Angeles, for fully forty years, there has been a feeble movement in the direction of making this city a center of authority in the botanical world."

The foregoing remarks are quoted from the introduction of a booklet entitled "The California Botanic Garden".

On January 7, 1927 the Garden Foundation, Inc., was formed with the main object of securing land for an outstanding botanic garden. Originated during a fabu-

A waterfall and jungle planting constructed in the tropical section of the California Botanic Garden

lous era of wealth and free spending, the pretentious program of the California Botanic Garden was an ambitious project. Businessmen saw the advantage of the idea and scientists asserted that the climate and site were ideal for the formation of such a garden. Some of the Southland's most influential personalities assisted and encouraged the undertaking of this enterprise.

The whole area of Mandeville Canyon from Beverly Boulevard to Mulholland Highway, comprising 3200 acres, was purchased from the Los Angeles Mountain Park Company and H. C. Oakley. This property was placed in trust with the Metropolitan Trust Company of California for the sole benefit of the Garden. A minimum of 800 acres was set aside for the establishment of the Garden. The remaining 2400 acres was to be administered by the Trust Company as an endowment for the Garden. The endowment money would flow from the well of sales of the surrounding property for fashionable homesites. The source of the well's supply indeed must have seemed limitless when an association could legally incur an indebtedness of ten million dollars!

The post of directorship was filled by Dr. E. D. Merrill, then Dean of the College of Agriculture of the University of California. His Associate Director was Dr. E. B. Copeland, former Dean of the College of Agriculture of the University of the Philippines.

Financial and social affairs were under the guiding hand of a Board of Governors. The available records show that the following personalities were numbered among the Board members: Harry Chandler, Hugh Evans, Douglas Fairbanks, Mary Pickford, G. Allan Hancock, William Randolph Hearst, William Hertrich and Rufus B. von Kleinsmid.

The goals of horticultural and botanical endeavors to be reached within the Garden's scope reflected the grand scale of its financial creation. Every field of plant science would be under consideration eventually. Formal and casual gardens were to be constructed. Aquatic, xerophytic, systematic and regional gardens would display their floral gems. Plantings ranging from the tropical to the semi-arid regions were visualized.

California's agricultural industry came in for its share of improvement within the Garden's service to mankind. The waste lands of Southern California might some day be brought under cultivation using crop plants inroduced by the Garden. This increased source of new raw material, it was argued, would attract manufacturers and this in turn would expand the industrial might of the Southland.

For the scientist, the Garden would furnish an outdoor laboratory of unmatched opportunity. A reference library, an herbarium, laboratories and a trained technical staff would be available tools for his research.

Actually, there was an Administration Building, greenhouses, the beginnings of a library, approximately 1200 species of plants growing in the various sections and an herbarium containing some 180,000 sheets of dried specimens. In addition, seed and plant exchanges, both foreign and domestic, had been arranged.

One project which was underway, but with appeal strictly for the tourist, centered around a section known as the "Forest of Fame". Here, visiting notables might plant a tree as a lasting memorial of their visit. Here, also, could be found native trees of the various states. According to the "Index to Trees Planted in the Forest of Fame", in the author's possession, a portion of this planting contained: a pine planted by Mary Pickford; a silk oak planted by John Philip Sousa; an olive by Lord Allenby; a box elder planted by the G.A.R.; while Alabama donated a bald cypress; Alaska an Alaskan cedar; Colorado a blue spruce; Mississippi a magnolia; Utah a juniper; and Wisconsin a white birch.

That the Garden did not fulfill its

planned destiny but closed its gates only a few short years after its birth, was not the fault of its founders or its Director, Dr. Merrill. The "Crash" and the "Depression" years which followed must bear the shame.

It has been reported, that with the growing knowledge that the Garden's days were numbered, Dr. Merrill was concerned as to the fate of the library and herbarium collections. A chance meeting, on a bus, with Dr. Carl Epling of the University of California at Los Angeles settled the matter. While the two men discussed the problem, Dr. Epling suggested that the collections be given to the University. As far as can be learned, that is their present home.

Little is known, and possibly that is best, of the details of the closing of the Garden. Time and another age were left to the future development of the site that had been The California Botanic Garden.

The author, wishing to avoid any shadow of misunderstanding, cautions the reader that the Los Angeles State and County Arboretum is not a revival of the California Botanic Garden and is in no way connected with it.

As *Lasca Leaves* went to press, we learned of the death of Dr. Merrill. Well known for his contributions to both botany and horticulture, his passing will be regretted by his many friends. Rewarding the pursuit of his life's interest, he held many medals of honor and high offices in scientific organizations the world over. He served as director of both the New York Botanic Garden as well as the Arnold Arboretum. He was Professor of Botany, Emeritus of the Arnold Arboretum when he died.

CYPRIPEDIUMS FOR THE ARBORETUM

W. Quinn Buck

One of the final plant accessions of the year 1955 was also one of the most important yet received by the Los Angeles State and County Arboretum. This extraordinary and valuable gift was of some eleven hundred cypripedium plants from the Arthur Freed orchid collection. The group includes both species and hybrids, many of the plants being quite rare.

These newly acquired lady-slippers are very similar to the native *Cypripediums* of the Northeast except that most of them are derived from species indigenous to mild or else to completely tropical areas of Asia. These orchids are fascinating for the great range of patterns, colors and forms that they exhibit. The hybrids are vastly superior to the species which were their ancestors, and these hybrids especially demonstrate the accomplishments in plant breeding possible from the efforts of a somewhat limited group of enthusiasts.

Among the species in this gift are representatives of both the cooler growing green leaved type and the more tropical tessellated leaved type, some of the latter being *C. callosum* and its albino variety *Sanderae; C. concolor; C. Godefroyae* and its variety *leucochilum; C. bellatulum; C. Curtisii; C. Lawrenceanum* in two forms; *C. niveum;* and *C. dayanum.* The green leaved species include the rare *C. Charlesworthii* and such more frequently seen species as *C. Spicerianum; C. insigne* and its variety *Sanderae; C. philippinense,* and *C. exul.*

In the collection are many plants of the hybrid, C. Maudiae, including the varieties 'magnificum', 'The Dell', 'Bankhouse', 'coloratum', 'Baldwin', 'Frank J. Lind' and 'Oakland'. Other albino hybrids of this lovely white-and-green type are C. Rossetti, 'Goliath' and 'Fowler's'; C. Clair de Lune, 'A.M., R.H.S.' and 'Edgar van Bells', A.M., R.H.S.; and C. Holdenii, 'Westonbirt'.

The collection also is surprisingly rich in the lovely white hybrids derived from

Left to right: Representatives blooms of: C. Milmoore; Rosy Dawn; Milmoore; Lawrenceanum coloratum; Maudiae, var. Frank Lind; Hellaswest.

C. niveum such as C. Albion, 'St. Albans', 'Bodnant', 'F.C.C., R.H.S.', 'Wyld Court' and 'Westonbirt'; C. Astarte; C. Chastity; C.F.C. Puddle, 'superbum' and 'F.C.C.'; and the later C. Rosy Dawn, 'Westonbirt', 'superbum'; 'A.M., R.H.S.'; and 'Pinkie'.

Many beautiful greens and yellows are included, such as C. Bettina, 'Lawnacres'; C. Diana Broughton, 'Golden Light'; C. Dervish, C. Grace Darling, 'Forfarshire'; C. Jasmin, 'Charm' and older ones such as C. Actaeus, Bianca, 'Westonbirt' and C. Ansun, both of which have been much used in breeding. The prizes of this group are C. Minster Lovell, 'Golden Queen' and C. Denehurst, 'Surprise' both very large and quite outstanding. Another fine yellow, but with some color in dorsal and petals, is C. Selena, 'The Grange', which was given a Bronze Certificate by the Cymbidium Society recently.

C. Hellas, 'Westonbirt', is another choice variety of an altogether different type, being one of the finest amber-colored hybrids. The beautiful white edge of the dorsal is its greatest charm.

Among the colored and spotted types

there are several hundred plants, including some dozens of fine and named varieties. The famous C. Cameo, 'Wyld Court' and the boldly spotted C. Black Thorp in several varieties are examples of one type. The American grown seedlings of the cross C. Milmoore that are flowering in this collection seem to be quite outstanding, several so far showing great superiority in shape, color and spotting.

The "reds" are well represented by C. Cardinal Mercier and many of its derivatives, such as C. Cardinal Wings, of which the Arboretum now possesses a good number of clones. The exquisite C. Lemani Ducis, though old, is still a thing to be prized.

These cypripediums, together with other genera already being grown, will form the foundation stock for what we hope some day may be one of the best displays of orchids anywhere. A continuous educational exhibit of blooming plants of both species and hybrids is projected for the public display greenhouse, and the plants will be useful also in breeding and in experimental work.

For the gift of this group of plants, the Arboretum is especially grateful to Mr. Freed.

The reader will note that the genus name *Cypripedium* is used in this article. It is known that there exists a disagreement between the use of this name and that of *Paphiopedilum*. However, in view of the continuing use of the name *Cypripedium* both in the nursery trade as well as in many technical circles, propriety has been given to the more familiar.

One can almost see our visitors passing through the turnstiles of the Arboretum's Gatehouse, at 301 N. Baldwin Ave., as the construction of this building and the Administration Building progress toward completion.

GROWING NOTES

GEORGE H. SPALDING

GROWING NEW or unknown plants from seed is a fascinating experience. Those of us who have grown this type of plant material for any length of time have experienced both the elation of seeing a new and beautiful plant opening its first bloom and the dull disappointment of seeing a much touted flower turn out dull and uninteresting.

At the present time we are looking forward to the first blooming of some seedling Jacarandas at the Arboretum. Interest is particularly high as these seedlings are from a pink form of the common Jacaranda *(J. acutifolia)*. Undoubtedly many will be no different from those we now have but if only one has a good pink color our labors will be well rewarded. We are also looking forward this year to the first blooming of a white form of the same Jacaranda. Budwood received from Peru was used on seedlings and several strong young trees resulted. Flower buds formed last year but did not open. This year we should have blooms.

One of the more elegant small palms being grown here is *Collinia elegans* or as it is sometimes called *Chamaedorea elegans*. This palm is one of the finest for container culture. It has multiple stems and a maximum height of about six feet. It apparently stands full sun in this area (Arcadia, Calif.) but will probably look better in light shade. Mr. Hertrich in his fine book *Palms and Cycads*, relates his experience with this palm at the Huntington Gardens and the reader is referred to this book for additional information.

South Africa, the home of so many plants which brighten the Southern California landscape, has sent us another worthwhile flowering shrub or subshrub. *Gamolepis chrysanthemoides* is an evergreen which grows to about three feet. It resembles a yellow Marquerite but the flowers are held well above the foliage and are deeper yellow. It is easily grown and blooms intermittently during the year. It must be pruned regularly or it will become leggy. If pruned right after blooming, a new crop of flowers will follow.

Acanthostachys strobilacea is a rather uncommon Bromeliad which is deserving of more attention from the home gardener. It is particularly effective grown in a hanging basket or on a tree. The leaves are long and stringy, somewhat like a *Rhipsalis*. When alight with the orange-red pseudocones or miniature pineapples it is a sight to behold. Racine Foster in the *Bromeliad Society Bulletin* Vol. V. No. 4, 1955 says to give it "plenty of acid leaf mold or fern fiber and ample water". This plant has proved hardy in a lath house during the past three years in the Eagle Rock area. Our plants are still seedlings in the greenhouse.

The last item to be discussed is an Australian, *Clianthus speciosus*. This creeping legume has greyish foliage and spectacular red pealike flowers accented with a jet black spot. It comes from the low-rainfall deserts of Western Australia and has proved very tricky here at the Arboretum. We have flowered it in a pot once but have failed several times since, due almost entirely to over watering. In its young stages it is subject to smog damage. If the seed is scarified it germinates readily and will come along nicely if watering is closely watched. As it grows, apparently the water factor is more critical. We are told that in its native habitat there may be several very dry years and no plants appear, then comes a year of greater rains, maybe 6 inches, and the desert blazes with the Sturt Pea as it is called in Australia. A recent visitor reported he had the same feeling upon seeing one of these fields in bloom as he had experienced the first time he saw the Grand Canyon. For the experienced amateur and new gardener alike, this plant presents a challenge hard to refuse as success brings a never to be forgotten reward.

Mr. Ralph D. Cornell and members of Girl Scout Troop 62, Arcadia, admiring a specimen tree of *Eucalyptus Gunnii.*

NAMES, NOTES AND NEWS

Arbor Day: In California, March 7, Luther Burbank's birthday, is celebrated as Arbor Day. This year the Arboretum, the Girl Scouts of Troop 62 and two garden clubs cooperated in sponsoring an Arbor Day program. In the morning, trees of *Eucalyptus Gunnii*, donated by the Arboretum, were presented by Troop 62 to each of six elementary schools of Arcadia. In the afternoon, a program prepared by the Girl Scouts was held in the Herb Garden at the Arboretum. Mrs. Edwin Best, President of the Los Angeles Garden Club presented to the Arboretum, 18 purple leaf plums. Mrs. William D. Shearer, as a representative of the Las Jardineras Garden Club, presented to the Arboretum a specimen Magnolia. Accepting these gifts for the Arboretum was Mr. Ralph D. Cornell, First Vice-President of the California Arboretum Foundation, Inc. Supervisor John Anson Ford, one of the Arboretum's most ardent supporters, spoke on the "Signficance of Arbor Day in Los Angeles County". Attendance, including the garden club members, Arboretum staff and the Girl Scouts, numbered well over a hundred.

The Mid-Summer Shade Plant Show sponsored by the California National Fuchsia Society, will be held this year at the Long Beach Municipal Auditorium, Long Beach, California, on Friday, June 29, Saturday, June 30, and Sunday, July 1. It will be open to the public from 6 p.m. until 11 p.m. on Friday, from noon until 11 p.m. on Saturday and from noon until 6 p.m. on Sunday. Admission will be 65¢, tax included.

There are thirty branches in the Society now participating in bringing you a larger and more beautiful display of fuchsias and other related shade plants in natural settings, landscaped gardens, novel and outdoor living areas for the enjoyment of the viewing public. Other garden societies will participate also.

Individual entries are open to the public as well as members of the society and anyone wishing to enter Fuchsias, Begonias, Ferns, African Violets, Gloxinias, Bromeliads or other shade plants are urged to do so. Many ribbons and trophies will be awarded.

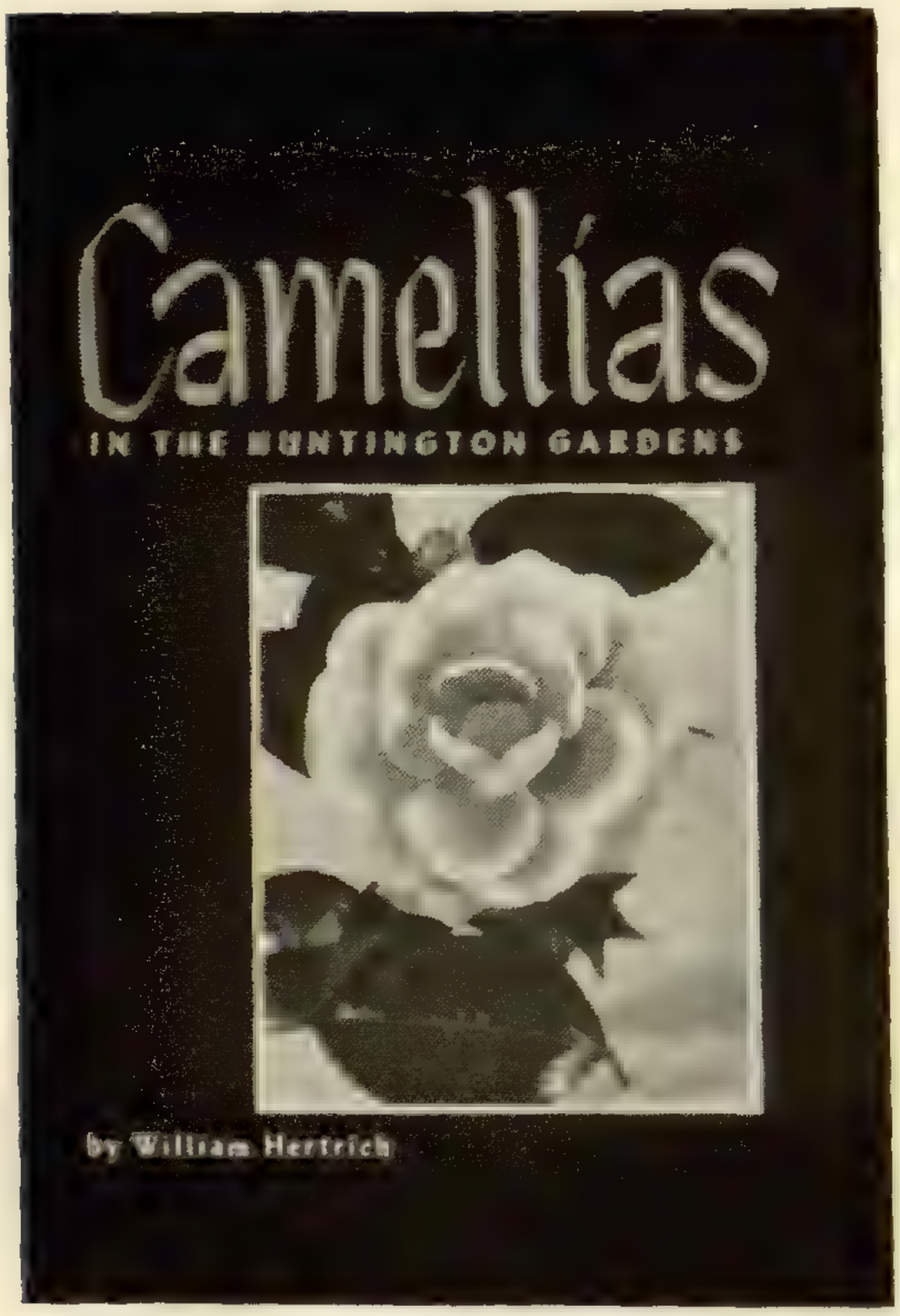
Commercial displays will also be present offering the latest in gardening equipment, materials and information.

ALBERTA LOGUE

The Girl Scouts of Troop 62, Arcadia, having passed the requirements for their Tree Merit Badge, pose for an official picture. The adult leaders (rear, left to right) are: Mrs. Phyllis Hauk, Mrs. Maria Stewart and Mrs. Louise Hewitt.

Education: Girl Scouts of Troop 62, Arcadia, under the leadership of Dr. Louis Martin, have just completed the requirements for their Tree Merit Badge. This troop of girls served as an experimental group for the developing educational program at the Arboretum. It is anticipated that this and similar activities will become a regular part of the Arboretum's program of service in Southern California.

BOOK REVIEWS AND COMMENTS



Camellias in the Huntington Gardens, Volume II—William Hertrich. Huntington Library, San Marino 9, California. 1955. 378 pp. including 275 black and white photographs, 1 line drawing, 3 colored plates. $10.00.

The second volume in this excellently planned series by William Hertrich on Camellias in the Huntington Gardens continues the detailed studies of camellia cultivars which were begun in volume one.* Of the two hundred and sixty nine varieties and cultivars included, nineteen represent *Camellia reticulata* and the rest *C. japonica.* As in the first volume, each cultivar is described in carefully catalogued detail and illustrated with a full page black and white photograph.

A useful introductory chapter includes a concise and well illustrated outline of the grafting methods used at Huntington Gardens. Cleft grafting is the most common practice, and choice of understock, methods of procedure and subsequent care of the graft are discussed.

In view of the rapidly growing interest in the varieties of *Camellia reticulata,* their inclusion in this second volume should make it of extreme usefulness. An introductory chapter gives a brief account of the botanical characteristics and horticultural history of this species from the time of its introduction into England in 1820 by Captain Hawes to the present day. Special mention is made of the recent introductions of Kunming reticulatas. The nineteen cultivars of *Camellia reticulata* include all in cultivation at the time of preparation of the manuscript. Two plates of leaves of all cultivars show the decided variation in the species.

This volume is characterized by the same handsome format and careful preparation that were evident in the first volume. A slight editorial oversight has resulted in a minor discrepancy between chapter headings as listed in the table of contents and the actual headings in the text. This is fortunately of little consequence and the volume shows careful editing otherwise. The photographs are again outstanding for their rendering of texture, and they have been beautifully reproduced. The text descriptions could result only from long observation and detailed notes by the author. The color names given each plant are based on the Royal Horticultural Society Colour Chart. Their use in these descriptions require the reader to refer to the first volume for their classification into general color groups such as pale pink, rose, red etc. Repetition of this brief color classification at the beginning of each volume would be helpful.

KATHERINE K. MULLER
Santa Barbara Botanic Garden

* * *

Plant Regulators in Agriculture. H. B. Tukey, Editor. John Wiley and Sons, Inc., New York. 1954. The study of plant growth regulators during the past twenty five years has led to the publication of a large volume of information concerning their wide variety of uses. In this book these uses are presented in individual chapters each written by a specialist in that field. There are chapters on the following subjects: principles of plant growth and how plant regulators act; chemical nature of plant regulators; rooting; flowering and fruit setting; fruit development and parthenocarpy; abscis- fruit development and parthenocarpy; abscission; fruit drop and fruit thinning; maturity and ripening; inhibition of sprouting; plant breeding; weed control; and application methods for plant growth regulators. These topics are the ones for which information is generally requested. The chapters are well illustrated with numerous drawings and photographs and are clearly written so that technical terms can be understood by a non-specialist in this field. The book is of particular value to those desiring to have a general understanding of this field of agriculture but who may not want to read numerous widely scattered reports to obtain this background. In addition to presenting general

*Reviewed in LASCA LEAVES, Vol. V, No. 4, Winter 1955, p. 24.

principles governing applications of growth regulators there is sufficient detailed information given to allow readers to put these uses into practice. The cost of this 269 page book is $5.50.

W. S. STEWART

* * *

Ornamental Trees. An illustrated guide to their selection and care. Evelyn Maino and Frances Howard. University of California Press, Berkeley. 1955. $3.75. This book is a welcome addition to our all too small number of publications on trees for ornamental use. There are 182 desirable ornamental trees described in some detail, each discussed under the following headings: features, use, conformation, flowers, fruit, root system, rate of growth, natural requirements (climate, soil, exposure), care (pruning, feeding, watering, pests and diseases) and faults. Excellent line drawings are included for each of these trees showing details of foliage, fruit or flower and the over-all conformation of the tree. In addition charts are given for many more trees listing them under ornamental use and indicating rate of growth, habit, foliage, flowers, fruit and climatic tolerance.

The categories for climatic tolerance are poorly defined as temperate coastal, desert, cool coastal, temperate inland and cold winters. Even after some study of the lists the author's distinction between temperate coastal and cool coastal is not too clear. The use of such comparative terms as moderate, rapid and slow for rate of growth likewise is vague. A number of statements may be questioned. We note that *Paulownia tomentosa* "will not stand any frost". This tree is grown in many parts of the eastern United States where frost is common. *Aesculus californica* is described with "pinkish-white flowers" and it is said that it "grows best in cool, coastal areas". Both statements are surprising to one who has admired the much more common creamy-white flowers borne in such profusion in the southern Sierra foothills. A number of the statements on climatic requirements may be questioned. However the book meets a long-felt need and will be a well-thumbed copy on every garden book-shelf.

MILDRED E. MATHIAS

* * *

Flowers in Colour. An amateur gardening encyclopaedia. A. G. L. Hellyer. W. H. & L. Collingridge Ltd., London. 21s net.

The Encyclopaedia of Plant Portraits. A. G. L. Hellyer. W. H. & L. Collingridge Ltd., London. 21s net.

Illustrations of plants are always useful to both amateur and professional gardener but unfortunately in these days of high repreduction costs their number has been greatly reduced. Consequently the publication of these two volumes of illustrations at a moderate price is most welcome. The first volume describes over a thousand species and varieties of plants and for every genus there is at least one illustration in color reproduced from original water-color drawings, made from living material, by Miss Cynthia Newsome-Taylor. The color reproduction is good and although cost dictated combining a number of illustrations on a single plate the plates are not too crowded. On the text pages are nearly five hundred line illustrations taken from the wood engravings made by Sowerby in the last century for Loudon's, *Encyclopaedia of Plants*. The text gives brief descriptions of the plants and their culture.

The second volume reproduces photographs of more than 1100 garden plants arranged in alphabetical sequence. The quality of the photographs and their reproduction is in general excellent. However, an arrangement of the photographs by plant families rather than alphabetically would have made the book more useful for checking identifications.

MILDRED E. MATHIAS

* * *

South African Flowers for the Garden—Sima Eliovson (Howard Timmins, Cape Town) How to Grow Them, Identify Them and Use Them for Effect.

This magnificent volume with 254 color and 242 black and white photos, covering the bulbs, bulbous plants, annuals and perennials, succulents and ornamental shrubs and trees of South Africa, is a fitting continuation of the author's previous work, *Flowering Trees and Shrubs for South African Gardens.*

Part I includes a brief history of the early distribution of South African plants and bulbs to other parts of the world, gives the reader an insight into their horticultural value and a definite realization that they must be protected in their habitat to avoid extinction. A chapter devoted to gathering seed, the proper times of ripening, methods of dispersal, length of fertility and storage is most enlightening. The author has done a thorough and instructive account of the cultivation of these plants, devoting a chapter to each type, giving detailed descriptive information on habitat environment, moisture, light and soil requirements and proper planting to give a continuous year round display. Detailed landscaping plans with South African flowering plants is included and the wealth of material available is incredible.

Part II of the volume is an alphabetical, descriptive list of bulbs, bulbous plants, annuals, perennials, showy succulents, ornamental shrubs and trees with details of their growth habits, main characteristics and horticultural value, and

is concluded with a list of registered Wild Flower Nurseries who carry stocks and seeds of South African plants,—all of which adds up to an excellent reference work of real worth to the botanist, horticulturist, nurseryman and any gardener interested in the colorful and unusual. Though written primarily for gardeners in her own country, this work is of especial interest to Californians since most of the plants included may be grown here in a climate similar to many parts of South Africa.

The beautiful detailed illustrations in natural color and in monochrome were done by the author's husband Ezra Eliovson, an amateur photographer and president of the Camera Club of Johannesburg, and add very materially to making this volume a "must" for any botanical library.

GLADYS C. NOLAN

* * *

What's New in Gardening Dr. P. P. Pirone, Plant Pathologist, New York Botanical Garden (Hanover House, N. Y.)

Gardeners familiar with the earlier volume *Modern Gardening* (1952) by this able author will fully appreciate this new work which covers not only the latest developments in flowers, vegetables, fruits and ornamentals but the most recent methods of plant propagation, information on landscaping, including garden lighting, and aerial or vertical gardening—(and not epiphites, believe it or not).

An interesting chapter on house plants lists and describes many of "today's popular house plants," including philodendrons, ivies, foliage plants and gesneriads and gives the latest news on equipment for growth and display under flourescent lights—desirable plant foods and insect controls.

There is a fascinating chapter on hybridization and also methods to protect the desirable new varieties with plant patents,—interesting information on soil conditioners, plant foods, growth regulators and the latest in weed killers, —insect controls, and last, but not least, new gadgets and equipment to ease the gardener's chores.

Here is a volume that is never dull and brings the gardener right up to date!

GLADYS C. NOLAN

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RANCHO SANTA ANITA

"Place of Many Waters"

SUSANNA BRYANT DAKIN

Thousands of people have come from all over the world to live and work within the original boundaries of Rancho Santa Anita (called "Place of Many Waters" by the aborigines). They include scientists at the Los Angeles State and County Arboretum, scholars at the Huntington Library and Art Gallery, promising pupils at the Hugo Reid public school in Arcadia.

Such people may reside on tiny fragments of the Spanish land grant, but no boundaries of the mind are imposed upon them. To the history makers and recorders of this region, I dedicate my study of their land.

S. B. D.
Arcadia, California
July 15, 1956.

COVER

"The Queen Anne Cottage" showing stone work along the lagoon shore line and the boat house—
(Courtesy of Title Insurance and Trust Company, Los Angeles.)

RANCHO SANTA ANITA

"PLACE OF MANY WATERS"

SUSANNA BRYANT DAKIN

PART ONE—THE PLACE

SINCE REMOTE TIME, visitors have marvelled at a homesite blooming perennially in arid, Southern California country. First to come upon the wonder were Indians, of Shoshonean stock and tradition, who roamed the region for centuries before Spanish occupation. They gaily decked their nakedness with flowers and fished the spring-fed lake. A settlement grew alongside, which they named *Aleup-kig-na,* "Place of Many Waters."

The Indian homes were low round huts *(jacales)* built of bent oak branches and woven *tule* reds from the water's edge. Through the years, discoveries of arrowheads, pestles, pots and baskets, cold-weather and ceremonial clothing, shell ornaments and shell money, human and animal bones—all these have aided in authentic re-creation of a vanished, carefree way of life.

The limited population had a plentiful supply of food. Fish abounded in the lake, and birds in the reeds and bushes. The Indians also ate a variety of snakes and animals —excluding only the rattler and the bear (whose black body was feared to contain a wizard's soul). Grasshopper roasted on a stick was considered a delicacy.

Everything grew wild and needed no tending. Besides the reeds and grasses used for weaving, local trees and plants provided edible acorns, mountain cherries, chía (a blue-flowered sage from which nutritious mush was made), roots, berries and fruit. Soap came from a star-flowered marsh plant *(Chlorogalum pomeridianum).* Hugo Reid, first lay owner of the land, was a Scot married to an Indian chieftain's daughter who knew many of the ancient recipes and indigenous remedies.

To certain plants were ascribed healing properties. A local medicine man would have prescribed wild tobacco pills to cure fever, whipping with branches of nettle and drinking the juice of *Datura meteloides* (Jimson weed) for paralysis. Rheumatism received a heat cure through the application of pressed dry nettle fuzz, set on fire—like spunk. Lime pounded up with wild tobacco was eaten to clean out the stomach and bladder. "Purification" after child-birth included lying on hot rocks in a sweat house.

Hugo Reid, a pioneer anthropologist, concluded that "in regard to the diseases then prevalent, inasmuch as syphilis was unknown, brandy and its associates unused, and high living at low ebb, their nosology was very limited." Due to diet (everything was unrefined and eaten cold) "they carried their teeth perfect to the grave."

The Scot, informed by his wife, was first to reveal facets of Indian life completely unknown to the conqueror race. Far from being stupid, dirty "diggers" fitted only for servitude, these Shoshones once had an advanced system of government, an imaginative mythology and belief in a Diety so sacred that His name never was mentioned aloud, a spoken language with *nuances*—though no literature. The so-called "court" language and traditions came down through the generations by word of mouth. Elders were venerated for their memories and store of knowledge. Hugo Reid mastered the language and talked to many of the "old ones", recording conversations over a twenty-year period (from his first visit to California in 1832 to the year of his death, 1852).

In the old days, trade was carried on with neighboring tribes, and warfare seemed unknown. But they all possessed weapons, for hunting, and it is difficult to see why

these aborigines—living the unpressured life of natural man in a productive land—should have yielded without a struggle to Spanish conquest. They far-out-numbered the first white men to reach California. Perhaps the appealing piety and intrepid character of the "founding fathers" convinced them of the need to change their ways. Hugo Reid, a sceptic, wrote an account of the Indian "conversion" that the Church banned for many years (16).[1]

More than two hundred years after discovery by Spanish explorers, Alta California was colonized for the King of Spain by members of the Franciscan order travelling afoot and unarmed through hundreds of wilderness miles along the coast. The intent of these gray-robed, sandalled priests—carrying no more than meager provisions, some seeds and tools—was two-fold: to save the Indians' souls and with their labor to start the string of twenty-one coastal missions that would stretch, eventually, from San Diego in the south to San Rafael, above San Francisco Bay.

Spanish soldiery and other colonists arrived by land and sea to aid the *padres*, whose planning contained elements that were military, political and economic, as well as religious. Presidios and pueblos sprang up in mission neighborhoods, like *"el Pueblo de la Reina de Los Angeles"* not far from *la Mision de San Gabriel.*

Following the establishment of San Gabriel (to become "Queen of the Missions") in 1771, a vast acreage was claimed by the Mother Church to sustain her many children. The fertile "Place of Many Waters" came under ecclesiastical jurisdiction as the mission *rancho* called Santa Anita. Indians burned their own homes at *Aleup-kig-na* and elsewhere in the region. Persuaded by priests, prodded by soldiers, they exchanged their freedom for the complete care of body and soul offered under the Franciscan system. Great numbers came to live in dormitories (called *monjorios*) within the mission walls. With unending labor, they carried out the great design.

SPLENDID WAYFARER

Father Juan Crespi belonged to that small company of "splendid wayfarers"—of missionary explorers who penetrated the world's wilderness in attempts to spread the Christian faith beyond safe, established boundaries. Through the centuries they recorded what they saw and did; and of all the diaries in church archives, none are better written nor more informative than Crespi's (4).

The missionary fervor of this gentle kindly *padre* spirited him from a comfortable home in Mallorca across the ocean to Mexico, in company with Junipero Serra; across the North American continent and up the entire length of the Californias—often afoot and alone, always unarmed.

"As the only one who had gone all the way by land from the royal *presidio* of Loreto to the very end, at the port of our Father San Francisco", Crespi was asked by Serra, *el padre presidente,* to record the historic Portolá expedition, seeking mission sites for the Franciscan order in Alta California—1769-70.

Crespi wrote of a free and happy people living on a generous land, and knowing how to use its gifts for food and medicine, clothing and shelter. Only their spiritual state perturbed him and this—he was convinced—would be elevated by embrace of the Christian, Catholic religion. Crespi himself had been a pupil of Father Junipero Serra, and for many years his close companion. From this most splendid wayfarer he inherited a burning, blazing faith to light the way. He longed to share it with even the humblest heathen, in the furthermost wilderness.

The San Gabriel valley he saw with dawn-struck eyes on Sunday, July 30, 1769. From a camp site in the [Puente] hills his party entered "A valley of very large live oaks and sycamores." He recorded, "We then descended to a broad and spacious plain of fine black earth, with much grass, although we found it burned. After travelling for an

[1]Numbers in parenthesis refer to the Bibliography. Available in California libraries are books, published articles or manuscripts written either by or about individual owners of Rancho Santa Anita. Each happened to be an extraordinary man, symbolizing the successive eras in California history.

hour through the valley we came to an arroyo of water which flows among many green marshes, their banks covered with willow and grapes, blackberries and innumerable Castilian rosebushes loaded with roses.[2] In the midst of the verdure runs a good channel of water which when measured was found to have a volume of three quarters of a square yard. It runs along the foot of the mountains, and can easily be used to irrigate the large area of good land that the valley has. The valley has a length from north to south of about three leagues, and is surrounded by ranges of hills. The one to the north

Yang-na, an Indian village of the Los Angeles region, but the exact site is unknown. Mention of visiting this village is found in the diary of Father Crespi—(Yang-na, as reconstructed by this drawing from The Yang-na Indians, School Publication No. 420 shown through courtesy of Los Angeles City School District and Mr. W. W. Robbinson.)

is very high and dark and has many corrugations, and seems to run farther to the west. The others are not so high and they run from east to west. The plain must be about six leagues long. We camped near the arroyo of running water, whose banks were covered with watercress of which we ate."

When Father Crespi came, a few miles further on, to the Indians' "Place of Many Waters", he showed a concept of geology in explaining the phenomenon that he found there—at the base of the Sierra Madre mountain range, twenty miles away from the Pacific Ocean. Through friction, eons ago, earth stirrings commenced to form an underground basin in crystalline rock, of great depth and extent. Water from rain and melting snow is retained indefinitely and comes to the surface at certain spots, like *Aleup-kig-na,* the ancient homesite of Rancho Santa Anita.

The local Indians believed that subterranean activities, whose significance they dimly comprehended, were caused by the stirrings—in sleep or anger—of seven giants who held the world upon their shoulders. The even more thrilling geological story of the region only recently has been revealed by scientists at California Institute of Technology.[3]

Because of terrifying, frequent earthquakes the name *Temblores* was given to the

[2]The wild roses of California reminded Father Crespi of Spanish natives. He was the first of many to call them "castilian". Hugo Reid frequently referred to his Indian wife as his "Rose of Castile".

[3]The study was initiated by the late Dr. John Buwalda.

arroyo of running water mentioned in Crespi's diary, and to the mission first established on its bank. Later both river and mission were dedicated to San Gabriel. But the so-called "Old Mission" actually fell down in an earthquake, and had to be rebuilt at a distance—in the present townsite of San Gabriel.

Of the aborigines, who met the first Spaniards with gifts—baskets of food and strings of shells—Crespi wrote: "All this land is populated with a large number of Indians who are very gentle, generous and well-formed." He described their appearance as he first saw them—before they had been reduced, as mission neophytes, to servile anonymity in straight coarse *xergas:*

"The women were modestly covered, wearing in front an apron of threads woven together which came to the knees, and a deerskin behind. To cover the breasts they wear little capes made of hare and rabbit skins of which they make strips and twist them like rope. They sew these strips together, to protect them from the cold as well as for covering for modesty's sake. Most of the women go clothed in the same manner, but all of the men go as naked as Adam in Paradise before he sinned, and they did not feel the least shame in presenting themselves before us, nor did they make any movement to cover themselves, just as though the clothing given them by nature were some fine garment."

QUEEN OF THE MISSIONS

Tremendous tasks lay before the Franciscans who would build a mission community in an earthquake-ridden wilderness, the natural haunt of a pagan people. But by 1829, when Alfred Robinson spent a few days in the San Gabriel, the place buzzed like a giant hive with a myriad of activities conceived by the priests and carried out by their converts.

Robinson was a Bostonian, rather stiff in bearing and formal in attire, who travelled for several years up and down Alta California as resident agent for the Boston trading firm, Bryant and Sturgis. His recollections of those years became the celebrated "Life in California", reprinted many times in several languages (17). He recalls the visit to San Gabriel and to Santa Anita, the mission *rancho:*

"It was Saturday evening and as we approached the buildings of the Mission, the chapel bells tolled the hour for prayer. Hundreds of Indians were kneeling upon the ground, and as the tolling ceased, they slowly rose to retire, and a merry peal announced the coming of the Sabbath.

"The director of San Gabriel was Father José Sanchez, who for many years had controlled the establishment which, through his management, had advanced to its present flourishing condition. Possessing a kind, generous and lively disposition, he had acquired, in consequence, a multitude of friends, who constantly flocked around him; whilst through his liberality the needy wanderer, of whatever nation or creed, found a home and protection in the Mission.

"In the morning, at six o'clock, we went to the church where the priest had already commenced the service of the mass. The imposing ceremony, glittering ornaments and illuminated walls, were well adapted to captivate the simple mind of the Indian, and I could not but admire the apparent devotion of the multitude, who seemed absorbed, heart and soul, in the scene before them. The solemn music of the mass was well selected, and the Indian voices accorded harmoniously with the flutes and violins that accompanied them. . . .

"There are several extensive gardens attached to this Mission, where may be found oranges, citrons, limes, apples, pears, peaches, pomegranates, figs and grapes in abundance. From the latter they make yearly from four to six hundred barrels of wine, and two hundred of brandy; the sale of which produces an income of more than twelve thousand dollars. The storehouse and granaries are kept well supplied, and the corridor in the square is usually heaped up with piles of hides and tallow. Besides the resources of the vineyard, the Mission derives considerable revenue from the sale of grain; and

the weekly slaughter of cattle produces a sufficient sum for clothing and supporting the Indians.

"The two 'ranchos' of St. Bernardino and Sta. Anita are included in the possessions of the Mission; the former of these has been assigned by the padres for the sole purpose of domesticating cattle, and is located some leagues distant, in a secluded valley among the mountains; the latter is for cultivation, and is one of the fairy spots to be met with so often in California. On the declivity of a hill is erected a molino, or grist-mill, surrounded with fruit trees and flowers. A beautiful lake lies calm and unruffled in front, and all around fresh streams are gushing from the earth, and scattering their waters in every direction. It would be a magnificent spot for a summer retreat, and much reminded me of many of the beautiful locations to be met with in the vicinity of Boston.

"The Mission of St. Gabriel was founded in the year 1771, and its population, including the two ranchos before mentioned, now numbered from twelve to fifteen hundred. It was thought at one time to possess from eighty to over a hundred thousand head of cattle, besides horses, mules, and sheep, and countless numbers which run at large. No advantage is derived from them beyond the value of their hides and tallow, and thus thousands of dollars are yearly left to perish on the field. . . .

"Speaking of the rich character of the valley of San Gabriel, the author would say that years subsequently [after the Secularization Act was passed, in 1833, taking all temporal control from the mission padres] the good old Father urged him to petition the government for the possession of the Santa Anita Rancho, located in the very heart of this valley, which he could easily have obtained gratis, had he deemed it expedient to do so, as it only required the consent of the presiding missionary, with that of the territorial governor, to have obtained it. The author, having no idea of remaining in the country, had no desire for it. The same property now would be worth millions of dollars to him."

DONA VICTORIA REID

It was a triumph for the Franciscans when the Comicrabits, family of chieftains, came to live within the mission walls at San Gabriel. According to custom each Indian convert received a Christian name, and the small girl among them became Bartoloméa to the padres. Twenty years later, upon marrying a British subject, she took the name of the young girl then being crowned Queen of the British Empire. Ever after, Hugo Reid's wife was known as "Doña Victoria" to the *vecinos* who revered her for aristocratic grace, medical skill and unbounded hospitality.

A beautiful Indian's enduring romance with a handsome, educated Scot provided Helen Hunt Jackson with source material for "Ramona" —the best-selling novel which in the 1880s aroused almost as much sympathy for the abused red race as had "Uncle Tom's Cabin" for negro slaves before the Civil War.

Doña Victoria's knowledge of her people, elicited and recorded through the years by an understanding husband, was used with telling effect and full acknowledgement by a friend and neighbor named Benjamin Davis Wilson, a native of Tennessee.

"Don Benito", who entered California in 1841 as a trapper with the Workman party from New Mexico, acted as first United States Indian Agent in the territory. He wrote a humane report in '52, attempting to interest President Fillmore in long-needed regulation of Indian affairs, and outlining a long-range program.

After the Secularization Act ended paternalism in the missions, providing for lay administration, the Indian neophytes fared very badly—ridden and decimated by the white men's diseases, no longer protected by the *padres*, exploited as personal servants, deprived of ancestral lands—even though the Act allowed for distribution of land and livestock to each converted Indian.

Doña Victoria was one of the few Indians ever to own land as an individual. To her Scottish husband she brought a dowery of San Gabriel mission land acquired in appre-

ciation of early, housekeeping services to the *padres*. This was known as "Huerta de Cuati" ["Orchard of the Twins"] and later acquired by B. D. Wilson (21), who changed the name to "Lake Vineyard".

In successive decades, "Don Benito" went on from his poorly-paid government job as Indian Agent to become a leading orchardist, vineyardist and vintner in Southern California. Also he made a great deal of money in real estate and received many honors —being elected State Senator, a founding member of the San Gabriel school board, director in pioneering oil, telegraph and railroad companies.

Don Benito built a home in the San Gabriel Valley on a site which is now a part of the city of San Marino—(Reproduced by permission of The Huntington Library, San Marino, California.)

He participated in successful water development in the area, and had a mountain named after him—with a famous observatory built upon it. But in 1877, when interviewed by historian Bancroft as a pioneer prominent in all these fields, Wilson's one request was that he be recorded as "a friend of the Indians and credited with urging their settlement on reservations."

After marriage to Hugo Reid, Doña Victoria did not occupy her orchard property (a westerly portion of the original Rancho Santa Anita). Nor did she ever live there with her first, Indian husband—christened Pablo María—who died of smallpox in 1836 or early '37. Twenty years her senior, he was a superior individual of aristocratic lineage who managed the large San Pasqual ranch for an old lady named Doña Eulalia Perez. After his death, the young widow lived on, with her children, as a ward of Doña Eulalia. Indeed the week-long celebration of her second wedding took place at San Pasqual (the present site of Pasadena).

To many people's astonishment, the young Scot adopted his wife's Indian children

as his own. According to extant mission records, they were four in number, named Felipe, José Dolores, María Ygnacio (to become known as the "Flower of San Gabriel") (12) and the baby, Carlitos. The little Indians received an education rare in early California, first from their step-father and then the older boys went on to William Hartnell's pioneer *colegio* (5b) in Monterey.

The Reids' first home was a two-story *adobe* in San Gabriel near the mission, built Monterey-style. The mud-brick construction was strengthened by heavy timbers cut and hauled from the forests of San Bernardino; the roof shingled, as was rare in Southern California. The Scot used the upper floor (where his wife never would go, for fear of earthquakes) for a schoolroom and library. Here he kept books, including a set of Shakespeare and Byron's poems; newspapers and magazines sent by far-away friends, ranging from "London Punch" to the "Polynesian" published in Sandwich.[4] Red *chile* peppers drying on the rafters, and clusters of Indian corn added color to the large room.

There were daily lessons in French, English, Spanish, arithmetic and geography. Don Hugo, a born and experienced teacher, took keen pleasure in them. He was a linguist, a skilled accountant, and the geography lessons were thrilling reviews of his own adventures. They served as an outlet for the old wanderlust that had been stemmed by marriage. The children listened, wide-eyed, and went at their studies with fervor.

In the dusty twilight of the attic, their step-father revealed to them the sesamic quality of education. As a result, they did not rebel at the drudgery of learning grammar rules and how to spell hard words.

Doña Victoria, for whom reading and writing were against nature, used all her ingenuity to find distractions for the young ones. She feared that too close indoor application would ruin their health. Gardening, fancy work and teaching household skills to Indian servants occupied her time—when there was no entertaining to be done.

Within a year after Hugo's marriage, William Heath Davis came from San Francisco to San Gabriel on a business trip, and stayed with the Reid family. Of course he had been offered hospitality of the home for as long as he liked, by an old friend. This was the custom in a country without hotels. But Davis accepted Reid's invitation doubtfully —fearing, like many others, that the Scot had become a typical "squaw man", that he would find himself in a brush *jacal* or at best a two-room *adobe* swarming with *pulgas* (fleas) and dark, dirty little "diggers". Instead, following directions with a companion, he drew rein at a two-story home rivalling that of the United States Consul, Thomas Larkin's in Monterey, and found "old Reid" living happily and luxuriously with a companionable wife who was no more than tanned in appearance and dressed Castilian-style, like the "Scotch Paisano" himself.

Standing in the doorway, they made a striking pair—both above middle height and each the flowering of a race. The Anglo-Saxon was ruddy blonde with the deep blue eyes of a sea-captain; the Indian more mysterious in appearance, with crow-black hair and large dark eyes somber in repose but lighted now with welcome for her husband's friends.

The visitors were "surprised and delighted with the excellence and neatness of the housekeeping of the Indian wife, which could not have been excelled. The beds which were furnished us to sleep upon were exquisitely neat, with coverlids of satin, the sheets and pillowcases trimmed with lace and highly ornamented." (From the ancient Doña Eulalia Perez she had learned the European arts of lacemaking and embroidery.) Treasures from Don Hugo's travels mingled harmoniously with Doña Victoria's furnishings: her conventional Spanish furniture, religious pictures and images, lace curtains—still favored by the *gente de razón* (privileged class) in the late 1830s, long after the military conquest by Spain. The Indian children they found strikingly handsome, well-dressed and well-mannered.

[4] As the Hawaiian Islands then were called.

William Davis, in a widely read book (6b), did much to dispel illusion about the Reids' married life. He not only described Doña Victoria's ménage as he found it on visits both to San Gabriel and, later, to Rancho Santa Anita, but went on to say in general that, "the Indian women of California are far better stock than those of Mexico, which accounts in a measure for their finer children." To Reid's wife he attributed unusual (but not unheard-of) beauty and grace, besides housewifely skills, saying, "there are similar instances of this kind, with other Indian wives I could mention, who have been tutored and raised by Castilian [foster] mothers," like Doña Eulalia.

By the time Hugo Reid, advised by the *padres*, commenced petitioning for Rancho Santa Anita, there were several other claimants. Assured of eventual ownership, the Scot took a chance and made improvements calculated to strengthen his own claim. On January 27, 1840, he wrote to his good friend William Hartnell, *Visitador de Misiones* by appointment of Governor Alvarado:

"Bandini (2b) (through your kindness) having given me the necessary possession of Santa Anita, I immediately made corrals and a *jacal* for the present, until the rains are over. I have sown 10 *fanegas* of wheat—cleared ground to put in a vineyard of 10,000 vines and 1000 fruit trees. I have put on the farm . . . 62 mares and in April intend putting on my stock of cattle.

"This I consider doing more than the Lopez family would do in fifty years, notwithstanding that your uncle D. José Antonio Carrillo has made out new representations for them and intends pleading for them with the governor. . . . Now, since you were down, I have built a new house in the mission [*rancho*], flat roof'd and corridor'd. Certainly government will never be so blind to take away land from one anxious for the progress of the country, to give to another who has neither a just claim, means, or yet will do anything."

The case dragged along for more than a year before Reid went to Monterey, then capital of Alta California, in April '41, and secured a decisive grant from the Governor. Wryly the Scot wrote to "Don Abel" Stearns (2b) who, somehow, had accumulated more land than any other man in California:

"His Excellency has attended to the papers of my ranch in the same manner in which I would dispose of a dish of lima beans for breakfast —fattening myself in so-doing."

As Reid had written to Hartnell, the ranchhouse that he designed and built on the homesite at Santa Anita was "flat roof'd and corridor'd"—Los Angeles style. Black pitch for the roof, called *brea*, came from treacherous oil pits west of the Pueblo (since ancient times a trap for man, bird and beast). *Adobe* bricks were made and sundried on the ranch by Indians experienced in mission building. Some of the same ones had helped, a few years earlier, to build the more pretentious San Gabriel house called *Uva Espina*, in which the family continued to live. Often the Reids rode or drove in a *carreta*[5] to Santa Anita—sometimes bringing *padres* or other friends to advise on construction problems.

The new, low house (one-story out of deference to Doña Victoria's fear of earthquakes) was L-shaped, placed on an eminence overlooking the San Gabriel valley on the south and in view of the Sierra Madre mountains. The garden planting, of seeds and slips from *Uva Espina* or the mission, grew luxuriantly near all-year water.

The children, most of all, loved the Santa Anita—for the fish, easy to catch in the lake; birds nesting in the *tules* and water grasses; wild grapevines festooning the trees and forming hiding-places; horses to pet and ride.

Running the ranch entailed seasonal activities such as *siembra*, or the sowing of wheat and corn in December; harvest from July to September; irrigating and picking

[5] According to custom among the *gente de razón*, the Reid *carreta* probably was upholstered in calico and quite comfortable. But, fundamentally, it was a large creaking cart with solid wood wheels, drawn by a pair of oxen, similar to those used in transporting mission produce to the nearest seaport.

at various times; grape gathering and wine-making—Don Hugo's main interest as a *ranchero;* then the great *rodeo*. or roundup of cattle in April, and smaller ones throughout the year for *la matanza* (slaughtering), doctoring, dehorning or branding. Of course there were intermittent activities like hide curing, garden fencing, gopher killing, adobe repair and whitewashing after heavy rain. Indian labourers lived as they used to, with their families in *jacales* near the lake, and an old mill built by the *padres* was repaired and used.

With so much to do at Santa Anita and a nice new house to stay in—the Reids spent increasing time at the ranch. When William Heath Davis came again (in November 1843) with a business associate and fellow countryman of Don Hugo's named Jim McKinley, he found the whole family living there in lavish *hacendado* style. His description of meals served at Santa Anita is mouthwatering (6b).

"During our stay as guests at Santa Anita, we feasted daily on good food. For breakfast we had honey (the production of the land, and in fact everything we ate was), fresh eggs from the poultry yard, which was well stocked with chickens, ducks, geese and turkeys; coffee, with rich cream; chocolate and tea; 'chino beans' (curley beans), which looked like scrambled eggs, especially for breakfast; *tortillas* made of flour or corn; but no butter, strange to say, with hundreds of cows on the place, but however this was characteristic of the *ranchos* at that season of the year. This composed the first meal of the day. The cloth was neat, and the furniture of the table exquisitely clean.

"As the house clock sounded the noon hour, the visitors were summoned by a maid servant to the dining room for a midday meal, which was a solid meal of beef steak with and without onions, broiled beef, stewed chickens, or hash made of *carne seca* (dried beef) with scrambled eggs mixed, seasoned with onions, tomatoes, and a sprinkling of red pepper (this dish was very palatable), beans prepared with plenty of gravy, the water from which it was boiled preparatory for the frying pan, and seasoning; homemade bread, California wine, and finished with black coffee. This noon repast could not be excelled in respect to neatness and in preparation of the food.

"The dinner consisted of chicken soup, roast ducks, *guisado de carne* richly flavored, sweet potatoes grown on the land, *frijóles,* chicken salad, and lettuce. This fine dinner was served with old wine of the make of the Mission of San Gabriel, and custard and pies and coffee.

"During our stay of nearly two months, we were well fed, the meals varying but little from day to day in the makeup of the viands. On Sundays for dinner a turkey this week, roast geese for the next, and for the third Sunday roast ducks, and so on to the end of our sojourn, and we regretted when the day of our departure had arrived, which was the day succeeding the festivals of Christmas, the birth of our Saviour.

"These festivals were prepared in grand style, with all the nice things for the celebration of such happy occasion. . . . The turkeys had been fattened for more than a month previously, with walnuts whole with the shells on pushed down the throats of the mutinous birds as part of their food, the flavor of which is still on my palate, or the remembrance of it. There were many invited guests who contributed largely to the enjoyment of the occasion, and dancing prevailed after the sun had appeared above the peaks of the lofty mountains; and from the gay hall McKinley and myself departed for Los Angeles, amid the greetings of the assemblage.

"Both Reid and his wife were epicures, and they had everything (their own market place on the *hacienda*) to entertain visitors sumptuously. Doña Victoria had a fine Indian cook who had been educated in the art at the Mission of San Gabriel, though the lady herself superintended more or less in the preparation of our good living.

"James McKinley and Reid our host were both from Scotland and from the same town, and knew each other in the Old Country; hence the great kindness bestowed on the former, and to me as his friend, by Don Hugo and Doña Victoria. Hugo Reid was the grantee . . . of the Santa Anita *rancho* . . . It was then the most picturesque spot of Southern California, with mountains, valleys, springs and running silvery streams. You

would observe in riding over the *rancho* its having more than its *pro rata* of towering and overspreading liveoak trees, manzanita, laurel and other forest in comparison with other *ranchos*.

"Reid was a cultivated and educated man, a big-hearted man, a thorough accountant and bred as a merchant in his own country . . . The hospitality shown to McKinley and myself, not only by Reid himself but by his Indian wife, was sumptuous. A Castilian lady of standing could not have bestowed on us any greater attention or graciousness than was extended to us as I have described at the 'Santa Anita'."

THE DIBBLEE LETTERS

More than a decade elapsed between the end of the peak years at Rancho Santa Anita, under Reid ownership, and its acquisition as an investment by Corbitt and Dibblee in 1858.[6] During the absentee ownership of Henry Dalton; then the inept management of a circus man named Rowe, many fine plantings of mission stock suffered from neglect and even disappeared—especially the garden plants and trees that had no practical value. *Tules* encroached on the once clear water of the lake, and its level went down during drought years until it seemed scarcely more than a marsh.

The countryside also changed, and the easy-going, hospitable atmosphere—during the war years and subsequent transition from Mexican to American ways. Life in the San Gabriel Valley no longer centered around the mission. It took little time, during the secularization process, to destroy what had been years in the building. Hugo Reid wrote sadly: "Destruction came as a thief in the night. The whites rejoiced at it. They required no encouragement, and seemed to think it would last forever. Even the mere spectators were gladdened at the sight, and many of them helped themselves to a sufficiency of calves to stock farms."

As the *pueblo* of Los Angeles displaced San Gabriel in importance, hotels were built and the stranger no longer participated in home life as a matter of course. He could easily remain unaware of its delights. For instance, when young Thomas Dibblee came to look over the Santa Anita and report on conditions there to his brother Albert, it was natural that he should stay at a hotel—not in a run-down ranch-house nor a strange home. He was accompanied by his sister Helen, an elegant young lady from New York who found Southern California quite disappointing.

"Dear Brother," they wrote together from Los Angeles on March 25, 1859, to Albert in San Francisco:

"Your letter to Ellie per Overland Mail was received yesterday afternoon, the mail having been delayed by upsetting of stage. We had a pleasant passage in the 'Senator', and a good day for the ride from San Pedro here, on Sunday, the sky being overcast. . . .

"Ellie was not affected by the journey. We were told on arriving at the hotel there was no room, but after Mr. Banning (14) spoke to the proprietor, we were led through a dirty alley between wooden shanties, to an old wooden house on the rear of the lot, up an outside wooden stair and in the second story of the house shown a room which Ellie was to have, and another room which Mr. Burnett and I were to occupy in common with two other persons.

"After trying in vain at the 'Lafayette' Hotel opposite the first to get quarters, and also without success inquiring for a private family where both of us or Ellie alone could go, I was compelled to take the above rooms, but in the afternoon changed them for others a little better at the 'Lafayette'. For myself it would have made of course no difference about accommodations, but it has not been very comfortable for Ellie although she does not complain. This town is a queer place, very unprepossessing, and we have laughed a good deal at the idea of our bringing so many things in clothing which will never be required, particularly dresses for Ellie. There do not seem to be any ladies here (as we have seen none) or any houses in town where any are likely to reside. The whole place appears, so far as buildings go, to have felt very little the effect of chang-

[6]The tenures of Corbitt and Dibblee, Dalton and Rowe all are sketched on pages 33, 34 and 35.

ing from Mexican to American hands and is entirely behind the age. The new hotel 'Bella Union', not yet finished, is a good brick two story building; there are two or three other two story buildings, the rest are old and dilapidated, low, flat-roofed, one story adobes, except here and there a one story brick store. But of course ten years hence there will be great improvements. There are many vineyards near town, generally on sandy soil . . ., and at this time the vines being mere scraggly trunks without leaves, the places are uninviting. The Sanseverain vineyard however looks fine having shade trees about it which others generally have not.

"We intended to go to the Ranch (St. Anita) on Monday but it rained a drizzle all day and we deferred it until Tuesday when we went, Mr. Corbitt on his horse, and Ellie, Mr. Burnett, myself, and Mr. Leighton, surveyor, in a two horse buggy. After all the bare coast country and many hills bare of trees on our way out towards San Gabriel we were delighted to come to a tract with trees and fine pasture and soon after to enter upon the west end of Santa Anita.

"That part of the ranch is covered with trees (small leaved oaks) standing apart sufficiently to drive through; the ground there is undulating and altogether it forms a very pleasant place; the grass and clover too are green now; this description applies to nearly all the part we passed through lying west of the house and also from a short distance north of the house, northerly to the mountains, but in parts above there are open places or fields clear of timber. The trees are oak I should think, and their trunks are rough and crooked and the branches also crooked and wide spread. Among these trees and knolls there are several spots quite picturesque; back of the whole ranch at the north, rise up abruptly the Sierra Madre Mountains, steep and rugged and bare except the gullies which appear to be filled with brush and scrub timber; the top of the range is broken into sharp peaks. Around the house the ground is probably moist as it is covered with a thick growth of clover grass and mallows and near by is the springy place which is now being converted into a "mill pond" and from which is a fine flow of water. East of the house is the vineyard and beyond for miles lies the plain, extending far beyond the end of the ranch; on this plain are the sheep and not far off from them a herd of cattle, the latter belonging to some Drover, I believe; and beyond the ranch, south of the house about ¼ mile distant commences a tract of poor land, being a plain covered with clumps of scraggly bushes, the soil being very poor; this continues to the southerly boundary. There are some other poor fields but I think that generally the soil is good and in many parts very rich. One trouble is the ground is full of gophers (don't know whether I spelled it correctly). The house is situated on a bare knoll commanding an extensive view to the eastward, but behind the house (westwardly) is a high knoll with a very gradual rise having some good oaks upon it and being altogether a better place for the house except that it is further from water; but it was a mistake . . . not to have built either there or on the edge of the oaks on the rising ground a little further towards the mountains, where are some green and beautiful spots probably capable of being watered from springs which ought to exist near the foot of the mountains toward which the ground gradually rises.

"The house is a one story adobe in form of an L about 58 on one side by 80 on the other and one part 20 feet deep, the other 18 feet deep, divided into three rooms in one branch and (as they told me) five rooms in the other, the latter being for the hired persons.[7] It is one uniform height outside; ceiling of one room I measured being 9 feet 4 inches. The wall of one of the ends (the west) was cracked and settled and will require to be rebuilt if it is intended to keep up the house eventually. The roof is good apparently; I should think first rate, and is of shingle—I should have said the rest of the walls seem good and that I did not discover any cracks except as above, but they ought to be protected from the wet by either very wide eaves to the roof or some other

[7]It must be remembered that Thomas Dibblee is describing the *adobe* ranchhouse as it appeared after Dalton neglect and Rowe alterations amounting to the then large sum of $6000.

means,—a piazza could have been built but it would have cost a great deal as the length would be very great. There ought at any rate to have been around about half this distance and projecting eaves for the remainder; the eaves now project about 15 or 18 inches and it would have cost very little more to have made them project double that; the outer plastering has mostly crumbled. Four of the rooms are floored, none are ceiled and there are no window sashes—Mr. Corbitt showed me one room which he said if I came to stay there I had better take, and which could be made comfortable enough at small expense.

"I am much pleased with the ranch and agreeably disappointed as from what little I had seen of a few of them and of the country previously I was prepared to see a very dry, mountainous, uninteresting place. I doubt whether others look as well—I do not know what effect of the summer may be on it as I have no experience of this, there is some land which would probably be green but I do not believe there is much of it.

"Mr. Corbitt is very enthusiastic, I fear rather too much so, but at the same time he is very energetic about it and enters into the matter with zest. There are a number of men now at work driving on the ditches, etc., for the vineyard. The latter is not yet completed although in good progress—he is driving it on as fast as possible and has now gone out to stay some days there. He has some difficulty about men—some leaving unexpectedly sometimes and making it necessary to get others.——

March 26th

"Ellie seems to like the place—I am finishing this letter at 'Thompsons', a little tavern about five or six miles from the house [at El Monte] where I have come with Ellie for a few days, this being the nearest to the ranch where I can find a place to stay. The fruit trees and cuttings arrived yesterday at Los Angeles and have been sent to the Ranch. I am just going over to see the setting out. I have not examined them but Mr. Corbitt looked at them; he says the trees are budded some and vines look very dry; also that the cuttings are so small he will have to plant them at present in a nursery, as, if put out in the usual way in the vineyard, they will be ploughed up and otherwise stand a poor chance."

Corbitt and Dibblee's plans for developing the Santa Anita were intelligent and extensive. But an increasing loss of confidence in Corbitt, by the Dibblee brothers, added to problems induced by the drought years, caused their decision to sell the property.

Albert Dibblee was especially disappointed, because he envisioned a paradise in the Santa Anita. This appears in a letter to his older brother William who, of all the brothers, knew most about agriculture. He managed the family farm at Kingston, New York state. Writing from San Francisco to New York, April 1, 1858, Albert admits:

"I have never seen the property, but have as good a knowledge of it as one can derive from witnesses and all agree in describing it as one of the best Ranchos in the Southern country.

"In 1854, Jos. A. Rowe, then a successful circus proprietor (having returned from Australia with a reported $100,000 to $150m) after examining that part of the State, selected this Rancho and paid for it $33,000,—he also spent $6,000 in re-building a house now upon it and other expenses for an orchard and etc., say in all $40,000 and over.

"We paid for the property, 13,316 acres @ 1.25,—$16,645.

"The great drawback of most Ranchos in Cala, is want of wood and water. This one is abundantly supplied with both,—in fact the wood could be sold for a large sum. Corbitt is in active business and cannot reside on the Rancho, nor can I.

"The Southern country is our vine growing district, the production of the grape there is almost fabulous, far surpassing the yield in Europe. The culture is attracting great attention, already many are going down to Los Angeles to engage in it. Already several persons have made fortunes by their vineyards.

"Santa Anita is admirably suited for grape growing. Every fruit of the temperate

zone flourishes there and most of those of the tropics—oranges, almonds, etc., etc. My idea of the property is that it should be turned to account for *stock raising*. Cattle winter themselves, as you know, in this State. A few Vaqueros only are needed to keep on the look out—their wages are about $15. or $18. p. mo. and board, say beef and beans. 2 or 3 only are needed for a large number of cattle.

"The increase of cattle here would be about 80% an.—that is 80 calves to 100 cows. 3 year old cows will always have calves and often sooner. So you can readily see how rapidly the cattle accumulate if not sold off.

"This is to be by far the greatest stock raising State in the Union.

"I think it a safe calculation, 300 cows put on the Rancho and looked after, none sold till end of seven years, would then allow 1000 head p. an. to be sold and still keep the number whole.

"Cattle are usually worth $15 to $18 each in Los Angeles Co. Also sheep can be profitably raised by present appearances, so as to pay, for wool growing. At the present they are valued most for mutton but for that purpose they will not always pay. I know less of sheep but think they must be very profitable where no expense for wintering is incurred.

"While the stock were increasing, by degrees a splendid vineyard might be got ready at a moderate expense,—plowing per acre $2.50 to $3.50, by contract, cutting costs $2.50 p. thousand (1000 to an acre), irrigation at Santa Anita would cost very little,—in 3 years the vines are in large bearing and would thereafter produce regular crops; 20 acres or so per year might be got into vineyard. The vines yield by *lowest estimate* hlf. gal. each, say 500 gals. p. acre, now worth as it runs from the press 50 ct., p. gal.—but allowing that it fell in value some years hence by largely increased production, so that after it had been refined and acquired age it would be worth only 50 cts., it would still pay handsomely. 100 acres of vineyard at 500 gals. p. acre would produce 50,000 gals. wine per year. Most of the estimates of production are 800 to 1000 gals. p. acre. In Europe I hear it is only 300 gals.

"Peaches grow in Los Angeles in profusion, but won't pay as they won't bear transportation. Pears also thrive splendidly and pay to send here. (There is a pear orchard on Santa Anita and was a peach orchard but that has not been looked after and is probably run out.)

"Almonds thrive well, if they can be raised of right quality, say Languedoc, or Tarragona, they will pay splendidly,—they yield as quickly as peaches I am told. Also I think all the nuts which are now imported from abroad and sold largely here, say English walnuts, pecans, peanuts, etc., etc., must do well in that climate and soil.

"If labor becomes cheap, tobacco and cotton can no doubt be raised abundantly in Southern California, also sugar cane.

"I have no doubt part of the Santa Anita would be splendid corn land, as it is described as being similar to the "Monte Ranch", some 10 miles off, which is the best corn land in Cala. There is but little land in the State fit for corn, owing to the long dry summer and hard clay soil. Santa Anita is a light loamy soil and never bakes and has moisture in it from springs.

"The Rancho is all bottom land, lying along the base of a high range of mountains, which are and always will be public lands, as they are not worth taking up,—but at certain times of the year they are said to afford a very good range for cattle.

"My opinion is that the Southern country (Los Angeles Co. is the best part) must fill up quite rapidly and that it is destined to be the richest agricultural portion of the State. Taken care of properly I think Santa Anita, ten years hence, will be a fine estate. If I can get time I will send you a sketch map of the property.

"Neighbors, of course, are scarce in that country and the Spanish element largely predominates as yet, but Americans are fast coming in and will by degrees drive out the Spanish. Many of the old and wealthy Californians still retain their property and are said to be very pleasant and polite people to associate with. Of the Americans, there

are many highly respectable people now residing there. Old Dr. White who was well known in St. Louis in his cholera practice has a vineyard and house adjoining Santa Anita (but remember, S. A. is 7 or 8 miles long and some 3 broad); also Mr. Wilson, State Senator, adjoins it with his vineyard. I find many here are thinking of investing in the vinegrowing country and I believe a good population, Germans and French, will by degrees get in there. . . .

"I think this Rancho if used carefully would within ten years pay more profits than 80 or 90 such farms as you have at Kingston. . . .

"The climate of Los Angeles is one of the healthiest in the world. Summers I think by all accounts, milder than New York, *nights always cool* (this is a guarantee against the lassitude of your hot summer days and sleepless nights). Winter a little chilly, but only agreeably so. You may judge how mild the winters are from the oranges ripening in Jany. and Feby. (this is a very profitable fruit also,) in fact Los Angeles County is the garden of California.

"A friend of mine, a great agriculturist and horticulturist, Wm. Neely Thompson, has just returned from his first visit to Los Angeles, perfectly charmed with the country, —he heard much talk of our purchase down there, and all expressed a high opinion of the property and *the bargain*. . . . Another idea has occurred about the stock. The regular stock men seldom pretend to milk any cows. Now, at least a portion of the cows might be milked while the feed was good and all the milk made into cheese, (butter is too much labor); Cala. cheese, ordinary, is worth 22 to 25 cts, if made of unskimmed milk it would bring 3 to 5 cts. more, and large quantities can be sold. Would not this pay? I don't know the process of making cheese, but it cannot require any great labor. In August I shall probably go down to see the Rancho. . . .

"Winter is the time for nearly all kinds of farming operations in this country. I have written 5 times as much as I meant, but couldn't say all in less. Wish I had a chance to talk this over with you and mother and Thomas. It would be farming on a scale one might be proud of after a few years."

THE HOME PLACE

Albert Dibblee never saw the Santa Anita, while he owned it. The *rancho* remained a beautiful dream—to tantalize him in the midst of all the corruption, violence, arson, greed from which San Francisco suffered during the Gold Rush, and for a few years afterwards. During the 1850s, Vigilantes formed of the better element acted outside the Law, because no enforcement was possible under corrupt city and state officials.

Unpublished, family papers reveal Albert Dibblee as a member of the inner, inner Vigilante Committee of Three.(7)[8] At that time, and for a few years longer, he lived alone in a ramshackle apartment above a store (his money was mostly made in trade). Four times the city burned, in as many years. The scream of sirens, the shouts of drunken miners often disturbed the young man who lay dreaming of Rancho Santa Anita in the peaceful, sunny south.

Not for twenty years was the Dibblee dream materialized, and then by a man of equal, and oddly similar vision. "Lucky" Baldwin fell in love with the Santa Anita and bought it straightway (14)—with a fortune wrested from a violent, northern scene. The Comstock Lode, flourishing a quarter century after the Mother Lode, offered silver instead of gold to greedy miners from all over the world.

Tangible evidence of vision combined with industry, was described by H. H. Bancroft during a visit to "Lucky" Baldwin's "Home Place" in 1891, when Rancho Santa Anita appeared at the very peak of production. Like many visitors before him, and many more afterwards, the historian was moved to rhapsody:

"The scene is one of fairy-like loveliness; not only the little *bijou* residence and its

[8]Generously loaned by Harrison Dibblee, Jr. of Ross, California.

surroundings,[9] but the entire estate, with its groves and vineyards, its golden fruit and waving harvests, its shaded drives and vistas of mountain peak and valley, carrying the beholder into an ideal region, calm and peaceful as the fabled realm of Rasselas, where soft vernal airs induce forgetfulness of the din and turmoil, the crowded sreets and selfish intensity of city life."

PART TWO—THE PEOPLE

RANCHO SANTA ANITA

CHAIN OF TITLE

King of Spain—1771
The Mexican Nation—1822
Hugo Reid—1839-45
Henry Dalton—1847
Joseph A. Rowe—1854
William Corbitt and Albert Dibblee—1858
William Wolfskill—1865
Harris Newmark—1872
Elias Jackson ("Lucky") Baldwin—1875
Harry Chandler—1936
State of California—1947

King of Spain—1771

Title to the Californias, first Baja (Lower) then Alta, was vested in the King of Spain under the monopolistic Laws of the Indies. Following the establishment of Mission San Gabriel in Alta California in 1771, more than 13,000 acres, extending north of San Gabriel to the Sierra Madre mountain range, became the mission farming land known as Rancho Santa Anita. Franciscan monks administered it for many years.

Cattle, horses, hogs, sheep, grain and fruit were raised on the fertile land, the virgin soil. Water abounded, in springs, streams, and a natural lake where the enterprising *padres* built a grist mill. Besides supplying mission needs, they engaged in a flourishing "hide and tallow" trade with sea captains and "supercargoes" who sailed to the West Coast in increasing numbers from the outside world.[10]

The Mexican Nation—1822

Spanish rule in Alta California yielded to Mexican in 1822, after Mexico's successful revolt against Spain. Temporal power of the Church was broken, through passage of the Secularization Act of 1833. But the able administration of Rancho Santa Anita by *padres* from the San Gabriel Mission continued until secularization of all the missions was completed, in the late 1830s.

Hugo Reid—1839-45

Reid, a Cambridge classmate of Charles Darwin, was a Scot who became a Mexican citizen in 1836—after several years of trade in South America and teaching in Mexico. In '37 he married an Indian neophyte from San Gabriel Mission, and is best remembered for informed and interesting "Letters" on his wife's people. (16) He petitioned

[9]Bancroft refers to "Lucky's" elegant house built for entertaining not far from the simple old *adobe* his real residence while on the ranch. Sharing the lake and the mountains, they still are strangely separate. Each typifies an era, as did their builders, Reid and Baldwin.

[10]Company agents on shipboard, like "Don Alfredo" Robinson, acting on various coastal vessels for the Boston firm of Bryant and Sturgis.

for Rancho Santa Anita in 1839, when church property was fast passing into private ownership.

Assured of eventual title, Reid built an *adobe* ranch-house, using Indian labor, and started new orchard and vineyard plantings. In '41 he received provisional title from Governor Alvarado. But not until 1845, on the very eve of Mexico's war against the United States, did the first lay owner of Rancho Santa Anita receive full title from the last Mexican governor of California, Don Pio Pico.

Henry Dalton—1847

Dalton was an English merchant who settled in Southern California in 1843, after a successful business career in Lima, Peru. A decade earlier, Hugo Reid had been his partner in a trading venture to Hermosillo, Mexico, and they renewed the old acquaintance. Like the "Scotch Paisano", the Englishman became a Mexican citizen and a Catholic in order to own land in California and marry a native daughter. Dalton's father-in-law was Don Augustin Zamorano, remembered as the first printer in the territory (11).

The newly-weds came to live near the Reid family at Rancho Azusa, adjoining Santa Anita on the east. During the Mexican War, when Reid became hard-pressed to the point of offering Rancho Santa Anita for sale, Dalton bought it for 20¢ an acre ($2,700)—although he kept the Azusa as his permanent home.

After the War, Alta California was ceded to the United States and, in 1850, admitted to statehood. Henry Dalton's title to Rancho Santa Anita was upheld by the American Board of Land Commissioners, in spite of being a last-minute grant by the fleeing Mexican governor. Several such grants the Commissioners ruled invalid.

Joseph A. Rowe—1854

Rowe, owner and star performer of California's pioneer circus (19), bought the Santa Anita for $33,000—retiring from the sawdust ring to raise cattle. He also pastured a few wild animals and performing horses.

But Rowe and his pretty wife, both trick riders, were inexperienced and unsuccessful ranchers. After giving a mortgage on the place to William Wolfskill, they took the money and went back in the show business—off to Australia—leaving a foreman to run the ranch as best he could, until a buyer appeared.

William Corbitt and Albert Dibblee—1858

Albert Dibblee, a New Yorker who attained prominence in San Francisco's business and political life, bought the Santa Anita as an investment, sight unseen, in partnership with a Los Angeles promoter and trader named William Corbitt. They took over the Wolfskill mortgage and acquired a fine ranch of 13,316 acres for $16,645. Joseph Rowe, the only owner who did not make a profit out of Ranch Santa Anita, wanted to be rid of a burdensome property—even at a 50% loss.

Neither of the new owners ever lived on the ranch. It was managed by a younger brother of Albert Dibblee's named Thomas, who left a promising law practice in New York City to come to Southern California. Albert remained in San Francisco, earning the money for capital expenditures. Their hopes rode high until the catastrophic years of drought commenced in the early '60's, ending the great days of cattle ranching in California.

The beautiful lake at Santa Anita, fed by springs, dried and shriveled into an ugly marsh. Livestock died like flies on bare, paper-dry pastureland. When the partners decided to sell, Thomas Dibblee moved to Santa Barbara. He married into the royal family of the region, that of Don José de la Guerra; and managed another ranch, the Lompoc, for his older brother.

Leonard Rose—1865

Rancho Santa Anita was sold in two sections. The first and most important subdivision of Reid's original grant, 2,000 unimproved acres in the west, went to an indus-

trious German named Leonard Rose, for $2 an acre. In time, after extensive irrigation, he created a splendid estate—a showplace known as "Sunnyslope". Grapes grown from Rhineland slips and trotting horses became Rose specialties. He also produced high-grade citrus fruits, wine and the brandy called *aguardiente* (firewater) by the *paisanos*.

William Wolfskill—1865

Wolfskill bought the remainder of Rancho Santa Anita including the homesite—11,316 acres for $20,000—with the idea of irrigating and raising more diversified crops than anyone in the country. Widely known as a horticulturist, he appears in Bancroft's "Pioneer Register" as "the pioneer [with his French *vecino*, Louis Vignes] of California's greatest industry, the production of wine and fruit." He had known and coveted the Santa Anita ever since mission ownership.

The old Arcade Depot of the Southern Pacific Railroad, about 1861. The orange grove beyond the station was a portion of 100 acres of trees belonging to William Wolfskill—
(Courtesy of Title Insurance and Trust Company, Los Angeles.)

Wolfskill first came to California from Taos in 1831, heading an overland beaver-trapping expedition (13). He was a Kentuckian of German ancestry, belonging to that "reckless breed of men" who met and overcame incredible hardships crossing the continet afoot or horseback—fighting hostile Indians, sinking in deep snow, suffering from thirst on interminable desert stretches.

The Wolfskill party made a winter crossing of the Wasatch Mountains, the Great Mojave Desert, and then—only five years after Jedediah Smith showed the way—climbed over the Sierra Madre and down into San Gabriel, where exhausted men found beds and food at the mission. It was while resting there that the party leader first saw Rancho Santa Anita, and fell in love with the land.

Wolfskill settled down in Los Angeles. His home in the center of town became a mecca for former trappers, and a showplace surrounded by fruit trees. He married a daughter of Don José Lugo, Magdelena, with whom he raised a large and congenial

family. Often the Wolfskills would pile into a *carreta.* or ride horseback out to the Santa Anita—to visit with Reids, Daltons, Rowes, or Thomas Dibblee. But possession came too late, for William died in 1866. He had only time to plant some eucalypti from Australia, and a few date palms which he introduced to California from Africa.

His youngest son Louis—named for Louis Vignes and married to a daughter of Henry Dalton—inherited the ranch, developed and further subdivided it. This period was one of rapid change in the use and value of California land. Among Louis' sales was the section now known as "Chapman's Woods", 1,740 acres adjoining the Rose estate, sold for $19,500 to Alfred Chapman, a West Pointer with legal training.

Although inexperienced in ranching, Chapman was intelligent and industrious. He set out and irrigated a record number of orange trees. Citrus orchards of other owners sprang up where livestock had roamed in undisputed possession of the countryside, only a few years previously. The entire San Gabriel Valley was pastureland until that time—save for an infrequent garden near an *adobe* building (with never a lawn), a few vineyards and other plantings of slips and seeds carried afoot from Lower California by the Franciscans, or brought in by sea-captains.

E. J. (Lucky) Baldwin (Courtesy of Title Insurance and Trust Company, Los Angeles.)

Harris Newmark—1872

Newmark, the merchant author of "Sixty Years in Southern California" (15), paid $85,000 for Rancho Santa Anita, reduced by sales to 8,000 acres. Besides putting more land under irrigation for orchards and vineyards, he pastured sheep in the rocky foot-

hills, as an adjunct to a flourishing wool business in Los Angeles. He did not live continuously on the ranch, but made good use of the *adobe* during frequent visits.

Newmark deeded a northern section of his property to the Southern Pacific, realizing that land values would skyrocket with the coming of the "Iron Horse". But before this could happen, he sold the Santa Anita for a fabulous price to a fabulous person.

Elias Jackson ("Lucky") Baldwin—1875

"Lucky" Baldwin—rich from the sale of Ophir mine stock, in the Comstock Lode—paid $200,000 for Rancho Santa Anita. Born of poor, pioneer parents in the Ohio wilderness, he set out to rival all the "Bonanza Kings" in Northern California—with his racing stables and private track, his deer park and stately peacocks, his pleasure pavilion and exotic plantings around the lake that he restored beyond its original size and beauty. Like his German neighbor, Rose of Sunnyslope, "Lucky" had a practical side—shown in the fine livestock and poultry, fruit and nut trees, grain fields, vineyards, winery and the buttery that supplied his ranch houses and three hotels that he built (in Arcadia, San Francisco, and Lake Tahoe) with plenty left to sell in the open market. Among his frequent guests at Santa Anita were stars from the Baldwin Theatre in San Francisco, always entertained in his "Oakwood Hotel" or the elegant "Queen Anne Cottage" right on the ranch,[11] while he himself lived in the simple *adobe* at the southern end of "Baldwin Lake". There, eventually, he died—remaining a controversial, contradictory character to the end of his days (10).

* * *

Since the first discovery of gold in California, residents have been tantalized by "get rich quick" schemes of all kinds. In the late 1840s the tempo of living commenced to accelerate, even in the south where easy-going *rancheros* made sudden fortunes selling beef to rich but hungry miners. Besides pasturing and mining,[12] other uses of the land were explored by new owners, of all nationalities. Of the new uses, even including oil discoveries, the sale of real estate has made easy money for the greatest number of people, through the years.

As early as 1855, Henry Dalton became the pioneer realtor—using modern promotional methods. During the first decade of his residence in Southern California, he acquired approximately 45,000 acres of ranch land. With the sale of Santa Anita to Rowe in '54, he commenced to break up this huge acreage—acquired mostly without cost, by grant from the Mexican government. To dispose of the dry and rocky foothill section of Rancho Azusa, he tried the lottery method—offering prizes, in real and personal property, including 240 "elegant lots in the town of Benton". This might be called a "ghost town", since it existed only in his imagination.

Not enough gullible people had yet found their way to Southern California, so Dalton failed in this promotion scheme. Not until the boom of the '80s did a town actually rise at Azusa. As a real estate operator Dalton was forced into second place when Nathaniel Carter came out from Lowell, Massachusetts, to recover from "consumption". Arriving in '71, he bought 17 acres of Santa Anita foothill property from Dalton's son-in-law, Louis Wolfskill who by then was doing some sub-dividing on his own.

[11]The Victorian era favored fanciful terminology and, for reasons of his own, "Lucky" Baldwin dubbed his guest house "Queen Anne Cottage". From the standpoint of architectural design, the term has no validity whatever; but, is has become so fixed in the minds of the public that there seems little likelihood of its ever being dislodged. The cottage was completed in 1881. It is a typical expression of the late Victorian period in which it was built.

[12]Refer to page 313, in Newmark's, *Sixty Years in Southern California.* "Although cattle raising was the mainstay of Southern California for many years, and gold mining never played a very important part here, Wells Fargo and Co., during the spring, frequently shipped thousands of dollars worth of gold at a time, gathered from Santa Anita, San Gabriel and San Fernando placers, while probably an equally large amount was forwarded out through other channels."

Carter's recovery was quick, and he became "the most picturesque boomer" California has ever known (8). He circulated a picture of himself called "Before and After Taking", and would explain that this referred to the climate as a sure cure for *t.b.* Even before the Southern Pacific reached the area, in 1872 he tried to interest Collis Huntington, as one of the railroad "Big Four" (14), in adding cheap excursion cars to westbound trains. Two years later, and for twenty-five years thereafter, Carter made annual trips back home for the express purpose of advertising his adopted state. He achieved official status as Excursion Agent for the Santa Fé.

Nathaniel Carter prospered by becoming the "first California booster to boost on a large scale." In 1881, he bought 845 acres from "Lucky" Baldwin for $33,880. He piped water down from the Santa Anita and Little Santa Anita Canyons, divided the entire property into town lots, advertised widely, sponsored a stylish hotel called "Sierra Madre Villa", also a church and a school—and soon attracted a colony which he called "Sierra Madre". "Lucky" admired his way of doing things and asked him to act as agent for the Baldwin properties. Together they planned the "Santa Anita Tract" —a model to this day of high-class residential subdivision.

Mr. Baldwin had added to his original holding at Santa Anita, by canny foreclosure and timely attendance at county tax sales as well as, by outright purchase. By 1885 he owned over 80,000 acres of increasingly valuable Southern California property. Unlike Henry Dalton, thirty years earlier, he found the time ripe for a successful sale of his surplus land. His first prospect appeared as an overnight guest at the Santa Anita, a railroad engineer from Texas named William Monroe who had settled in Los Angeles and became a member of the City Council.

After seeing the Carter advertisements of Sierra Madre, Monroe decided to build a modest country home in the San Gabriel valley, somewhere. His host enlarged his ideas. Before departure next day he had bought eight thirty-acre "choice, frost-free" lots in the wild undeveloped area that became the boom town of Monrovia.

A Los Angeles businessman named Jonathan Slauson revived interest in Azusa as a townsite and helped to organize the Azusa Land and Water Company, with a capitalization of $500,000. Although this company acquired 4000 acres of predominately fertile land from the Dalton family, Slauson located the town in a desolate, rocky, sandy wash. When asked why, he answered: "If it's not good for a town, it isn't good for anything."

With examples of such enterprise all around him, Mr. Baldwin commenced to plan his own community. From the Santa Anita Tract sprang Arcadia, east of the historic homesite where "Lucky" continued to live. Water rights were shared with the Sierra Madre Water Company, founded by Nathaniel Carter; and shade trees, Santa Anita seedlings, planted along all the new streets. Arcadia was solidly established when the boom "shriveled" at the end of a rate war between the rival Southern Pacific and Santa Fé railroads.

At one time, in 1887, the cost of a ticket from Kansas City to the coast descended to $1. Mr. Carter's excursion trains overflowed with gullible prospects, well supplied with real estate liturature. Mr. Baldwin learned the jargon, and even improved upon it. When one prospect protested the price as too high for unimproved property the answer was, "Hell, we're giving the land away. We're only selling the climate." So successful were "Lucky's" methods that the Louisville Courier-Journal used him as a symbol of California aggressiveness.

The boom was all but forgotten when that indefatigable historian, H. H. Bancroft, paid Mr. Baldwin a visit in 1891, to interview him for *Chronicles of the Builders* (2a). His affairs were in good order, aside from periodic lawsuits involving women and water rights. Cash realized from Carter sales of Baldwin property had brought the "Home Place", the historic homesite, to a peak of production and beauty. So it remained until "Lucky's" death in 1909.

Distributees of the estate of Elias Jackson Baldwin, under the decree of distribution rendered April 24, 1913, were Baldwin (McClaughry) Baldwin ¼; Dextra (Mc-

Claughry) Baldwin ¼; Albert Snyder ¼; Rosebudd D. Mullender ¼ (subject to the Life Estates of Anita Baldwin McClaughry and Clara Baldwin Stocker).

The buildings at Rancho Santa Anita depreciated sadly after Mr. Baldwin's death, although his peacocks increased and some care was taken of exotic trees and shrubs planted by him and earlier owners around the lake. No member of the family continued to live on the Home Place. It was managed by his younger daughter, Anita, who took back her maiden name after divorce from a lawyer named Hull McClaughry. Earlier, at sixteen, she had briefly married her cousin, George Baldwin. Her own mother Jennie Dexter (Lucky's third wife) was not much older at the time of Anita's birth. Five marriages apiece seem to be the score of "Lucky", his elder daughter Clara, and Anita's son Baldwin. This has led to continuing inheritance confusion.

A widow who never remarried, after resuming the Baldwin name, Anita operated the Santa Anita successfully as a stock ranch, but lived at her own home (now Anoakia School). She improved and even increased her father's fine cattle, sheep and hogs, and kept some of his champion race horses, out of sentiment. Only a month after his death, a state law was passed banning horseracing in California. A spectacular era ended suddenly at Santa Anita. The private track echoed to its last starting bugle on April 20, 1909.

Arcadia voted dry, April 15, 1912, and not long afterwards "Lucky's" resort hotel, "The Oakwood", burned to the ground. No more gay passengers climbed down from the Baldwin tally-ho, to open wicker baskets of viands and vintage champagne on the grassy mall of the "Home Place". Sporting life in Arcadia remained in suspension—save at Clara Baldwin Stocker's "Clara Villa"—until long after World War I. "Lucky's" racetrack was on property appropriated by the United States government for a "Balloon School" in 1917. Not for seventeen years did construction start on the Santa Anita racetrack site sold by Mr. Baldwin's heirs to San Francisco's Dr. Strub and his associates. Mrs. Anita Baldwin was their honor guest at the Grand Opening on Christmas Day, 1934.

Harry Chandler—1936
(Rancho Santa Anita, Inc.)

Baldwin heirs agreed to sell the historic homesite of Rancho Santa Anita to Harry Chandler, owner and editor of the Los Angeles Times and already a great landholder in California, Arizona and Mexico. The price was undisclosed, also the acreage. Mr. Chandler anticipated that complete subdivision of the Santa Anita would be more profitable than any sort of ranching, considering the phenomenal growth of population in Southern California. Therefore he set up a corporation to conduct a high-class residential subdivision, calling it "Rancho Santa Anita, Inc."

The City of Arcadia, whose first mayor had been "Lucky" Baldwin, expanded enormously as a result. So did the new racing establishment. Modern homes, shops, churches, schools all were encroaching on Mr. Baldwin's "Home Place" by 1947 when the State paid $320,000 to Chandler heirs for property amounting to 111 acres. This was the last vestige of the once vast Baldwin estate. Contrast Henry Dalton's payment, considered adequate 100 years ago, of $2,700 for 13,300 acres!

State of California—1947

We, the people, form the final link in Rancho Santa Anita's Chain of Title.

The Santa Anita homesite became the nucleus of the Los Angeles State and County Arboretum, for public use and enjoyment. As a part of a long-term master plan, a citizens' Historical Committee works on restorations, both architectural and horticultural, in a nine-acre "Historical Preserve". This borders Baldwin Lake, includes the Baldwin "cottage", and carriage house, besides the *adobe* built by Hugo Reid in 1839 and used by each successive owner. Director of Restorations is Maurice Block, formerly Curator of the Henry E. Huntington Art Gallery and originator of the period rooms there. Because of depreciation—caused by dry rot, termites and vandals—the latest to

be built was first to be restored. The frame "Queen Anne Cottage", finished in 1881, was dedicated as Historical Landmark No. 367 of the State of California, in 1954. Money from the accumulated Tidelands fund has been allocated by the State for architectural restorations of the frame carriage house and the *adobe* ranch house. Private funds have paid for the elegant Victorian restoration, and will be needed to furnish and landscape the other two buildings in the Historical Preserve.

A formal garden enhancing the Queen Anne Cottage was planned and planted by the late Charles Gibbs Adams. From boyhood visits, he remembered and restored pampas grass reflected in the lake, Russian violets edging the paths, banksia roses rampant. His successor, whom the Historical Committee shares with the entire Arboretum as Landscape Consultant, is Edward Huntsman-Trout. To aid him in planning an authentic setting for the *adobe*, there is Hugo Reid's own planting list for 1844 enclosed in a letter to his friend, "Don Abel" Stearns.[13]

Early plantings are treasured wherever they survive. Several of the ancient trees have grown from tiny seeds or slips to extraordinary size. There is a pomegranate, more than 100 years old, probably from the San Gabriel Mission garden, a eucalyptus given to Albert Dibblee in the 1850s by a sea-captain coming in from Australia, a date palm introduced from Africa by William Wolfskill, seven ginkgoes carried home by "Lucky" Baldwin after a big game hunt in India, and so on.

With the exception of Rowe the circus rider and Chandler the newspaper tycoon, each owner of the Santa Anita has pioneered in some way during tenure—in improvement of livestock, plant introduction, new uses of the land, modern farming methods. Henry Dalton originated a method still in use, of packing grapes in sawdust. Among these were the first French winegrapes grown in California, started by Hugo Reid from slips of his *vecino* Louis Vignes.

Reid's planting inventory is an amazing document of the time and place. He diversified Santa Anita products as seldom was done. On vast ranges of the early *ranchos* in California, there was no attempt to produce more than hides and tallow for the coastal trade. Variety in foodstuffs, clothing, et cetera, came mostly through trade. On arrival of a sailing vessel at the nearest port, rancheros and their families from miles around climbed aboard—to see and feel and taste wonders from the outside world.

Back in home pastures choice meat may have been left for the buzzards, after a slaughter for hides that sold at $2 a piece. Few *rancheros* bothered to make butter or cheese, or even to keep cows that must be milked. Irrigation did not become general practice until after the disastrous drought of the 1860s. In that empty, bountiful land—California before the Gold Rush—there was scarcely any need for the residents to exert themselves. The aborigines lived without farming at all.

As the population increased and there was less land for higher price, its use became intensified. As acreage shrank, on the original *ranchos*, production went up. Moving with the times, using the most advanced farming methods, each owner of the Santa Anita developed the fertile land for his private need and gain. With the establishment of a public arboretum a new era has commenced.

People of world-wide reputations already have contributed thought, time and money towards an ideal which cannot be realized by one man's effort or in one man's lifetime. As in earlier days, seeds and slips arrive from similar geographical zones of the world, for experimental planting. William Wolfskill, more than 100 years ago, was first to explore Africa as a source of trees for semi-arid, semi-tropical Southern California. But, like all the private owners of Rancho Santa Anita, he was limited in concept—if not in space. Confined to a tiny fraction of the original land grant, dedicated men and women at the Los Angeles State and County Arboretum continually are expanding their contributions, in the allied fields of horticultural, medical and historical research.

[13]Dated June 1, 1844. Preserved among the Stearns papers in the Huntington Library. Published in *Lasca Leaves*, Summer, 1951.

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Three forms of rosemary cover this mound. Lower edge, *Rosemarinus officinalis* var. *prostratus;* center, *R. o.* var. *lockwoodi;* and *R. officinalis* on the rim

SOUTHERN CALIFORNIA HERB GARDEN

MARY B. DARROW

HERBS, MYSTERY PLANTS to the moderns of our atomic age, will soon be finding their way back into our everyday life. As the beautiful herb garden at the Los Angeles State and County Arboretum becomes a fully accomplished fact, the time for their re-entrance becomes ever nearer. The energetic work of the Southern California Unit of the Herb Society of America through continual planning and planting has already made the garden an attraction for visitors to the Arboretum.

It was a telephone call in November of 1951 which resulted in a meeting at the Arboretum with the late Charles Gibbs Adams, Dr. Seibert and a committee from the Unit, to discuss the idea of an herb garden. The Unit agreed to furnish the plants and aid in designing the garden. Mr. Edward Huntsman-Trout, a noted landscape architect, was engaged to aid in the project planning. George Spalding, Arboretum Superintendent, was appointed to work with the Unit Committee. Planting began in November of 1952 following final plan approval and the garden's location finally established.

Today, a beautiful rosemary mound draws the attention of the visitor to the north side of Tallac Knoll, just west of the Coach Barn, where herb dreams are becoming a reality.

At the garden's entrance, brilliantly colored annuals, well known to medieval herb gardeners, greet one. In olden days many flowers which are just that to us today, were used for home remedies, and nearly every flower has been listed as an herb at some time in history.

After one passes the flower beds, one sees a "pattern" garden. Here, specially shaped beds containing stone chips of turquoise and brick red catch the eye. This differs from the medieval knot garden

where color is supplied by the foliage of the herbs. Boxwoods border the stone chip beds. Planted near the patterns are santolina and germander, forming small hedgerows.

The center of this plot is a square of brick paving. This is to be the base for an astrolobe. Set in the four corners of the paving will be ornamental hollies shaped as they were in medieval days, when holly was a well used herb.

From the paving, one walks into an allee, where a vista has been fashioned by planting eighteen flowering plum trees this spring. These trees were a gift to the Unit from the Los Angeles Garden Club. On either side of the allee, are beds of culinary, fragrant and medicinal herbs, the latter used by the American Indians and the Aztecs. There is also a bed of simples. A collection of thymes will be seen in a bed ninety feet long and seven feet wide. Included in this collection will be many species unknown at present to the modern home gardener.

The sweet little old fashioned dianthus or pink finds a place in the fragrant garden. Mints, both beds and borders, will also be found here. At present, a clipped border of apple mint forms a well kept hedge. There will be calendulas, pennyroyal, native herbs, scented and other geraniums, salvias, flax, fever-few and many other well known herbs.

Midway down the allee leading to a walled medieval garden (future) is a dipping well. Designed by Mr. Huntsman-Trout, the well suggests a replica of one of ancient days. The well curb is of used brick. An ornamental iron arch with wheel, rope and bucket add authenticity and charm to this setting.

An old fashion rose collection is being planted in a separate garden. This garden is located across the road to the east, directly south of the Coach Barn. A display of some 200 rose bushes is planned to stimulate herb growers to raise roses, using their petals for potpourri.

The special labels, placed as each planting is completed, will make an educational feature of the two gardens for the botanist, horticulturalist and gardener. Further plans include an opportunity for many visitors to obtain herb products. Funds raised in this manner will be used for the garden's maintenance.

A member of the Herb Class inspects the dipping well. The well's design was created by Mr. Huntsman-Trout

Although incomplete, the herb garden has enjoyed visits of internationally recognized herbarists whose comments rank this garden as one of the finest collections in the country.

NOTE: Between July 11 and August 15, the following members of the Unit conducted a highly successful series of six lectures on herbs and their uses: Mrs. A. D. Richardson, Miss Edna K. Neugebauer, Mrs. S. A. Briggs, Miss Ruth B. Randall, Mrs. Maria Wilkes, Mrs. F. E. Betts, Mrs. E. J. Morgan and Mrs. M. B. Darrow. These weekly classes were a part of the Arboretum's developing educational program. A special thanks is expressed to Mrs. Harold Wilcox, president, and Miss Marguerite Dumbauld, class organizer, for their enthusiastic cooperation in carrying out the details of the Herb Classes.

RARE TREES IN ELYSIAN PARK

THEODORE PAYNE

THIS IS THE HISTORY of the collection of rare trees and shrubs in Elysian Park; where they came from and how they happened to be planted there.

Back in 1890 an Englishman named H. A. Brydges established a nursery at 440 South Broadway. Two years later this nursery was taken over by Lyon and Cobbe. The firm of Lyon and Cobbe was succeeded in turn by Lyon and Company; Ethelind Lord; Lord and Evans; Evans, Boyson and Saint; Evans and Saint; and Hugh Evans. On November 3, 1903 I purchased the nursery from Hugh Evans for the sum of $800.00.

So being, as we might say, the legal heir to the firm of Lyon and Cobbe, and as all these rare plants were grown in the Lyon and Cobbe nursery, I feel it my privilege to write this story.

At a meeting of the local horticultural society, it was proposed to establish a small botanic garden of rare plants in Elysian Park and for this purpose the Park Department set aside an area at the head of Chavez Ravine. A botanic garden committee was appointed, the members of which were—William S. Lyon, J. C. Harvey and Austin Campbell-Johnstone. William S. Lyon was a well known horticulturist and botanist who did considerable collecting in Southern California and on Catalina Island. The tree Lyonothamnus "Catalina Ironwood" was named after him. Also *Prunus lyonii* "Catalina Cherry" and many other plants. Before going into the nursery business he was the first State Forester of California, serving in that capacity from 1887 to 1892. He wrote a book, "Gardening in California" published by George Rice & Sons of Los Angeles; a fine work now long since out of print. Later he took a government position in the Philippines and died there some years later.

J. C. Harvey was an official of the Stan-

Calodendrum capense, "Cape Chestnut", in full bloom growing in Elysian Park
Photo by Ralph D. Cornell

A close-up of the lilac-pink flowers of the "Cape Chestnut"
Photo by Ralph D. Cornell

dard Oil Company. He was an enthusiastic horticulturist and an authority on tropical and semi-tropical vegetation. He traveled a great deal in various countries and collected many of the seeds from which these trees were grown.

He and Lyon more than any others were responsible for this project; they shared the expense and donated the trees to the Park Department.

Austin Campbell-Johnstone and his brother Conway were the owners of the Campbell-Johnstone Ranch near Pasadena, including Johnstone Lake. He was an authority on Australian flora, especially the eucalypts and acacias. While interested in horticulture generally, his special hobby was bulbous plants of which he had a fine collection at his home on South Fairoaks Avenue in Pasadena.

Charles Russell Orcutt, a well known botanist of San Diego, took quite an interest in this undertaking and collected some of the seeds. Possibly William S. Lyon imported some kinds.

The Botanic Garden Committee and members of the horticultural society used to gather in the Park on Sunday mornings. The trees and shrubs were planted out in 1893 and 1894. Ernest Braunton, an employee at the Lyon and Cobbe Nursery, did the actual planting.

I met Mr. Lyon a few days after arriving in California in June of 1893, and made the acquaintance of Charles Russell Orcutt, Austin Campbell-Johnstone and J. C. Harvey soon after entering the employ of Germain's in April of 1896.

Much of the above information together with a list of plants was given to me by Ernest Braunton many years ago.

Today about fifty of these trees are still growing in the park. It is not my intention to list all of them but simply to mention a few of the most interesting species.

By far the most beautiful tree in the park today is *Calodendrum capense* "Cape Chestnut", from South Africa. With its rich dark green foliage and numerous terminal panicles of lilac pink flowers it is indeed a pleasing sight. This tree has a spread of 67 feet and when in bloom carries thousands of flower spikes. It is most likely the parent of all trees of this species in California today.

Just across the path from the foregoing is a fine specimen of *Castanospermum australe,* "Moreton Bay Chestnut" or "Black Bean" from Australia. A handsome evergreen tree producing quantities of yellow orange or orange red flowers. When this tree is in bloom it is visited by immense numbers of hummingbirds and has become known to some of the local population as the "hummingbird tree".

There are two very large specimens of *Tipuana tipu* "Tipu Tree" from South America. Handsome trees with pinnate foliage and quantities of yellow flowers.

Chorisia speciosa "Floss-Silk Tree" from Brazil is an odd looking specimen with a swollen trunk which looks almost like a barrel. The trunk and branches are of a greenish color and are covered with immense numbers of stout thorns. The soft silk or cotton from the seed vessels of this tree is used for pillows and cushions.

Cedrela odorata "Cigar Box Cedar" from the West Indies and South America is a large spreading tree with pinnate leaves sometimes over two feet long. It furnishes a fine wood used for cigar boxes and furniture. Interesting for its large clusters of opened seed vessels which look like small wooden flowers.

A large specimen of *Cupressus guadalupensis* "Guadalupe Cypress" is quite interesting. It has many trunks from the base and the reddish brown bark is smooth.

Not far from this cypress is a very tall, straight specimen of the*Agathis australis* "Kauri Pine", from New Zealand. This tree must be well over 100 feet high.

There is a fine specimen of the *Macadamia ternifolia* "Queensland Nut", with rich green foliage.

Dalbergia sissoo "Sissoo" from India is described as growing into tall tree, however the specimen in the park is probably not over 25 feet tall but has a spread of 40 feet.

Across the road from the other trees is a fine specimen of *Schotia latifolia,* a native of South Africa. This particular plant is not very tall but has a spread of over 30 feet and the foliage completely covers the ground.

Of special interest is a very fine specimen of *Pinus cembroides* var. *parryana,* "Parry's Nut Pine" a native California species. This tree is about 40 feet high and has a trunk diameter of 20 inches three feet from the ground. It is doubtful whether there are any trees in the wild state larger than this one.

Another unusual plant, also a California native, is a very large specimen of *Simmondsia californica* "Goat-Nut" or "Jajoba". This plant is 10 feet high and has a spread of 12 feet. I have never seen anything in the wild state to compare with it for size. A few years ago it was really taller than now. It was about 14 feet. Then it fell over and continued to grow in a reclining position. It is the most intricately branched plant I have ever seen. The branches twist and turn in every direction forming a fantastic mound of intertwining vegetation.

It would be well worthwhile for any lover of plants to visit this site and see this interesting as well as botanically historical collection of fine specimen trees.

COVER PICTURE

A recent view of the Herb Garden looking north from Tallac Knoll. In the right foreground, one sees the "Pattern" Garden. Leading from this garden to the left is the allee bordered by flowering plum trees. Toward Tallac Knoll, left foreground, will be the Medicinal Garden. North of the allee can be seen the Kitchen Garden. A detailed story of the development of the Herb Garden appears within the pages of this issue.

MANFRED MEYBERG

The Southern California Horticultural Institute and the California Arboretum Foundation share with the rest of the community, a deep sense of loss in the passing of our member and friend Manfred Meyberg. We feel privileged in being given permission by Mrs. Meyberg to include in our official journal, the eulogy honoring Manfred, as delivered by his friend Mr. Charles S. Jones.

WE ARE GATHERED here as friends to say farewell to one of God's noblemen—Manfred Meyberg. Few men ever lived who had so many friends or so well deserved them—Manny knew and understood better than most men the truism "Friends are not made—they are recognized." The warmth of the man—the excellence of his character—the completeness of his integrity was deeply impressed upon all who have had the good fortune to know him.

Manny finished out his three score and ten; God has been kind to him. The *vigor* of the man, the *brilliance* of his mind kept him constantly busy until the hour of his passing doing things for his fellow man, planning things for the future which would bring happiness to others.

He leaves a heritage to his community which cannot be measured with exactitude any more than it is possible to evaluate a sunset, a rainbow, or a view of the grandeurs of nature.

At a time when so many have been overburdened with the materialistic necessities of life, Manfred has given to this community a greater appreciation for the intangible values which have made this a finer and more beautiful place for us all.

There are many facets of his life that we could dwell upon at great length, all of which bring out the splendid qualities which are the measure of our friend.

He was a devoted husband whose foremost purpose in life was to provide a home in the truest sense of the word. He lived for the happiness of his loving wife Elza and her son Melville, who gave his life for his country in World War II. Elza has stood at his side and has entered into his activities with understanding and encouragement. Their home life has been a superb example to all who undertake burdensome responsibilities in the business and civic world.

Manfred was a devoted son of parents who were pioneer residents of Los Angeles. His mother was born here, and his father came here in 1876 to take a leading role in the early development of this community. As a young man, Manfred demonstrated qualities of strong character, unbounded energy and a willingness to give of himself to any worth while project in which he believed. These qualities, combined with an appreciation for the beauties of nature, led him to a highly successful career as a horticulturist. At the age of 35 he was entrusted with the responsibility of one of the leading horticultural firms in the United States. In this capacity he served until his passing.

But Manfred Meyberg was more than a successful businessman. He was a creative genius in his field and his firm became a leading developer of All-American roses which became world-renowned.

That his firm became one of the nation's largest seed distributing firms is a tribute to his leadership—that the members of his fine organization respected and loved him is a tribute to the high principles which motivated his conduct. He had a deep and abiding affection for his co-workers who were in a true sense members of a family working together for common objectives.

Manfred was a successful businessman who recognized and accepted a full measure of civic responsibility. He gave of himself unstintingly in causes for the beautification and betterment of our community. Those of us who worked with him have been constantly impressed by his boundless energy, his great tolerance, his generosity and his selflessness. He was never one to seek credit for himself. He was a motivating force in many successful community enterprises in which he preferred to remain in the background and gave generously of his time and his substance to these causes.

We all will remember him for his in-

spirational leadership in the California International Flower show which he helped develop into the leading institution of its kind in the world. There are innumerable organizations with which he was actively affiliated, such as the California Arboretum Foundation, the California Institute of Technology, Los Angeles Beautiful, and the Los Angeles Business Men's Garden Club of which he was a founder. There was no organized effort for the beautification of the Los Angeles area in which he did not have an active and interested participation. Many of us here today have worked with Manfred in these endeavors —we will all know how greatly his enthusiasm and counsel will be missed. His work will continue through those who have been inspired by his love of our community and his love of beauty.

Manfred believed in the good that is established by the Creator and he endeavored in every way possible to bring out the beauty in life.

My own life has been enriched to an unusual degree by my association with Manfred, but I am only one of many whose lives have been benefited by the generous manner in which he gave of himself in service to his fellow men. We all know and loved Manfred Meyberg—We shall always cherish his memory.

From sense to Soul my pathway lies before me,
From mist and shadow into Truth's clear day;
The dawn of all things real is breaking o'er me,
My heart is singing: I have found the way.

I reach Mind's open door, and at its portal,
I know that where I stand is holy ground;
I feel the calm and joy of things immortal,
The loveliness of Love is all around.

The way leads upward and its goal draws nearer,
Thought soars enraptured, fetterless and free;
The vision infinite to me grows clearer,
I touch the fringes of eternity.

Vaya con Dios, Manny. Go with God, under whose protecting and understanding arm you have walked all of your fine, honorable and constructive life.

CHARLES S. JONES

EDWIN OWEN ORPET

VICTORIA PADILLA

LIKE SO MANY of the plantsmen who have contributed to California horticulture, E. O. Orpet (as he prefers to be known) is an Englishman who at an early age came west to find his fortune. Even if he had wanted to, young Orpet could not have escaped his destiny as a plantsman, for his father, a professional gardener, reared him among plants; and at fourteen he was apprenticed to learn gardening on a large estate. Here he learned by doing, aided by such notable works as the *Gardener's Chronicle,* the *Gardener's Assistant,* and *Nicholson's Illustrated Dictionary of Gardening,* which he endeavored to memorize. He became interested in ferns, the growing of fruits, and the cultivation of rare plants, particularly orchids. He made a large and comprehensive herbarium, which proved to be a great aid in helping identify plant material.

After four years, Orpet found gainful employment in another estate and then later at a well-known nursery. It was in 1887, when Orpet was but twenty-four years, that his employer sent him to New Jersey to take charge of the nursery of Woolsen & Company in Passaic. A feature of this business was the propagation and export of new American plants, especially of native California lilies which were collected for the firm by the late Carl Purdy. At this time Orpet began the long series of horticultural articles which were to appear constantly through the years—the first being on *Narcissus cyclamineus.*

The next twenty-two years of Orpet's life were spent as superintendent of the estate of E. V. R. Thayer in South Lancaster, Massachusetts. Here he began to work in earnest with the epiphytes to which he had been attracted in his earlier days. Not satisfied with the collections of orchids which he could purchase, Orpet

A recent photo of Mr. Orpet and his wife, Mildred
Photo by Ralph D. Cornell

soon began to hybridize and raise his own seedlings. In October, 1900, he exhibited at the Massachusetts Horticultural Show a collection of hybrid Cattleyas which he had raised from seed. This was the first time that any hybridizing of Cattleyas had been done in this country, and his display created no small furor. For this collection he was awarded a gold medal—the first of a number which he has received.

In 1910 upon the death of Mr. Thayer, E. O. Orpet became manager of the estate of Cyrus McCormick in Lake Forest. Here he remained for nearly eight years in an entirely different environment working with vast masses of outdoor material. He had to give up orchid culture, but his herbacious borders became famous and he received many awards for the perfection of his perennials.

But for years Orpet had desired to go to California, and so it was that in 1917 he accepted the position of chief propagator for the United States Department of Agriculture at its station in Chico. After five years of raising plants, the seeds of which had been sent by the Department's explorers, Orpet decided to look elsewhere in California for a permanent place in which to reside.

It was on Thanksgiving Day in 1922 when Edward Owen Orpet first arrived in Santa Barbara. As his train pulled into the station, the first thing that met his eyes was a great mass of lantana in full bloom. A land which could boast of such a colorful floral display at the beginning of winter appealed to this lover of plants, and here he has resided ever since. Six months after his arrival in Southern California, he was made Superintendent of Parks in Santa Barbara, a position which he held for ten years. Much of the horticultural beauty of this city is due to Orpet's extraordinary talents. The planting along Cabrillo Boulevard and the islands in the Bird Refuge, the rows of olive trees the length of Olive Street, the cork oaks which he raised from seed on Samarkand Heights, the beautiful *Erythea edulis* on upper State Street bear silent tribute to this farsighted plantsman.

During the years he was working for the city of Santa Barbara, Orpet was also busy experimenting with new plant material at his home. David Fairchild sent

him seeds of all the new plants which he thought might be of interest to him. Orpet had purchased six acres of gently sloping land, where the soil was unusually rich, and upon which he erected his home, two greenhouses and two lath houses. He was chiefly interested in plant material that was rare and unknown, and yet not too difficult to grow. He had not been long in Santa Barbara before he realized that the plants which would do best were those that could withstand long periods of drought. So it was that his interest turned to succulents and cacti. He saw many possible uses of Mesembryanthemums, especially for highway use. With the help of Kate Sessions of San Diego, he introduced three species—*Hymenocyclus croceus, Hymenocyclus purpureo-croceus* and *Hymenocyclus luteolus*—which can be seen today in areas south of Santa Barbara.

From Dr. Marloth in South Africa, Orpet obtained seeds of some of the finest aloes and has grown superlative specimens of *Aloe candalabrum, A. supralaevis, A. Marlothii* and *A. speciosa.* These aloes have been used extensively in parkways and intersection plantings in Santa Barbara, and at the present time there is a spectacular grouping of them outside the wall of a residence on Channel Drive. Orpet's interest spread to aeoniums and euphobias, and he has done much to popularize these interesting plants.

The exotics that E. O. Orpet has introduced into Southern California are legion. Many of the trees and vines which Californians today accept as always having been a part of the landscape are those which were tried out as experiments in his garden. There lived happily plants, the seeds of which came from the farthermost corners of the globe. From East Africa he brought the now familiar *Thunbergia Gibsonii,* from Chile he obtained the startlingly beautiful terrestrial bromeliad *Puya alpestris,* from the Himalayas he secured seeds of the beautiful tree *Luculia gratissima.*

Always on the lookout for plants that could be counted on to flower in the late summer, Orpet began to experiment with amaryllids and did much to create an interest in this very interesting bulb family. He found them to be particularly adaptable to Southern California growing conditions, the plants requiring a period of drying off in the early summer in order to produce flowers. From Mrs. Bullard, who had imported much interesting bulbous material, Orpet obtained some white forms of *Amaryllis multiflora,* which he used in his early hybridizing, creating the famous 'Orpet white'. Later, with the assistance of Mr. Dickinson of Las Positas, he brought in more of the whites, including 'Hathor'. As a result, both the white and colored *A. multiflora* are well established in and around Santa Barbara.

Orpet has collaborated with others in introducing some notable plant material. He was associated with Hugh Evans in the introduction of the popular *Chamaelaucium uncinatum,* and the two men were responsible for bringing into California many beautiful dwarf flowering eucalypti.

In 1930, due to the serious illness of his wife and also to the fact that his nursery required all his time, Orpet resigned from his park work. Mrs. Orpet died in 1931, but the following year he married Mildred Selfridge. This was a happy choice, indeed, for she is a woman possessing a keen intelligence, a gracious personality, and a great enthusiasm for the work of her husband. For the past 23 years she has been his closest companion, and through much writing has done a great deal to perpetuate his place in horticulture.

Although Orpet did not arrive on the horticultural scene in Southern California until 1922, his place as one of its leaders is undisputed. Not only would Southern California gardens lose much of their charm if those plants which he introduced or popularized were taken away, but if he had not been attracted by the lantana abloom at the station in Santa Barbara, California would have been denied one of its most colorful and dynamic personalities.

(At the June meeting of the Southern

California Horticultural Institute, a special award was given Mr. Orpet in recognition of his outstanding achievements in horticulture and in particular for the contributions he has made to the horticultural scene in Southern California.)

SELECTIVE WEED CONTROL IN DICHONDRA TURF WITH CMU

BOYSIE E. DAY AND CHESTER L. HEMSTREET

BOTH GREENHOUSE and field experiments indicate that mature dichondra has a practical degree of tolerance to CMU. Some injury usually appears after treatments but this can be minimized by washing spray residues from the foliage by sprinkler irrigation. Otherwise, foliar absorption of the herbicide causes chemical "burn" and chlorosis of the leaves. Injury from foliar absorption is superficial and temporary with plants recovering normal vigor and appearance within about six weeks after treatment.

CMU is the abbreviation of the chemical name of the herbicide 3,*p* chlorophenyl 1, 1-dimethylurea. CMU is widely used for weed control on rights of way and industrial sites and has limited agricultural uses. It is most effective when leached into the soil to be taken up by plant roots. The action of CMU is not widely selective between species although older plants are more resistant than immature plants.

Applications of CMU at high rates (20 or more pounds per acre) render the soil sterile to the growth of virtually all plants for a number of years. Established perennials and well-developed annuals vary in their response to low rates of CMU. When the soil is treated with rates of one to four pounds per acre, we find that some species are susceptible while others are resistant. However, the seedlings of nearly all species of plants are killed by applications of CMU at low rates. It is thus possible with low-rate treatments to selectively sterilize the soil in which mature plants of relatively resistant species are growing and prevent the establishment of competing weeds from seed.

Certain economic plants including pineapple, sugar cane, asparagus, grapes, and citrus, once established, are relatively resistant to CMU. The soil in which these plants are growing may be selectively sterilized prior to the germination of weed seeds by low rates of CMU. For example, California citrus orchards may be maintained entirely free of weed growth indefinitely by treating the soil with CMU at the rate of two pounds per acre at intervals of three to six months.

Weed control by selective soil sterilization should be particularly advantageous in established turf in those cases where the turf species are sufficiently tolerant to the herbicide. Machine methods of weed removal are of limited usefulness in turf and the chemical methods, now available, do not control all of the common weed species. Crabgrass (*Digitaria* spp.) and other weedy grasses are resistant to the growth-regulator type of herbicides. In addition, turf species vary in their resistance to herbicides. Dichondra (*Dichondra repens* Fordst), for example, is sensitive to most of the herbicides now in use and the control of weeds in dichondra lawns is largely limited to hand methods. Control of weeds is a major limitation in the culture of this attractive species.

In the course of a screening test on a number of turf species we observed that dichondra was relatively resistant to CMU. The present paper reports the results of experiments made to verify this finding

and to test the feasibility of using CMU for selective weed control in dichondra plantings.

METHODS

Experiments were conducted with a commercial formulation of CMU containing 80 percent active ingredient *Karmex W*, supplied by the DuPont Company). Rates of application are expressed as pounds of the 80 percent material per acre of turf treated. Following the initial field tests which indicated appreciable tolerance of dichondra to CMU, tests were made in the greenhouse, using turf grown in ten-inch pots and in flats. Chemical injury was judged by visual ratings of foliage symptoms and loss of vigor.

In greenhouse tests, CMU, which is only slightly soluble in water, was applied by spraying suspensions of the wettable powder formulation in the dichondra foliage. In some tests the spray residue was washed from the leaves into the soil by sprinkler irrigation. In other instances, the effect of permitting CMU to remain on the foliage was observed.

Field studies on mixed stands of dichondra and weeds were conducted at two locations in San Bernardino County. Spray suspensions were applied to small test plots with either a compressed-air knapsack sprayer or a hand-propelled boom sprayer. In large-scale tests, a power sprayer equipped with a twenty-foot spray boom was used. Visual ratings of turf injury were made. Weed control was evaluated by visual estimate, and in one case by counting the number of weeds of each species appearing in randomly-placed quadrats.

In one test, the effect of a treatment on both dichondra and weed density was measured by a point-transect method in which a wire grid was thrown at random and the plant (if any) appearing directly beneath each of sixty points on the grid was recorded. The density of dichondra, weeds, and bare soil was calculated and evaluated statistically. Ten counts of 60 points each constituted a measurement.

RESULTS

Mature dichondra turf in pots was treated with CMU at rates of 1, 2, and 3 pounds per acre by foliage spraying, followed by daily sprinkler irrigation. The dichondra was observed and compared with untreated control plants over a period of several weeks. Treated plants did not show symptoms of injury, nor were they measurably retarded in growth.

In another tolerance test, flats of turf were treated with CMU at rates of 3, 4, 5, 6, 7, and 8 pounds per acre, applied as a foliage drench. The spray residue was allowed to remain on the foliage for 24 hours prior to the initiation of daily sprinkler irrigation. Injury, consisting of marginal browning and slight chlorosis of leaf tissues, appeared within three to five days after treatment. The severity of injury was roughly in proportion to the amount of CMU applied.

Injury reached a maximum two weeks after treatment and was followed by rapid replacement of injured foliage. All flats were judged to be fully recovered two months after treatment. A summary of observations at the time of maximum injury is given in Table I.

TABLE I

HEIGHT AND ESTIMATED INJURY TO FOLIAGE OF DICHONDRA TURF FIFTEEN DAYS AFTER TREATMENT WITH CMU

Rate of Treatment (Pounds of 80 percent CMU per acre)	Height of Growth (Inches)	Leaf Tissue Killed (Percent)	Remarks
Untreated	4	0	Normal growth
3	3½	20	Browning of leaf margins only
4	3½	20	Browning of leaf margins only
5	2½	45	Some killing of entire leaves
6	2½	35	Largely injury to leaf margins
7	2½	50	Many dead leaves
8	2	60	Many leaves dead and dry

Rapid kill and browning of leaf tissues, as appeared in this test, is not a characteristic symptom of injury to plants growing in soil treated with CMU. Soil treatments normally cause gradually increasing chlorosis over a period of one to three weeks followed by the drying of leaf tissues to a light straw color. These factors along with the rapid and vigorous recovery of the plants to normal growth suggested that the injury was a direct chemical "burn" of the foliage rather than systematic injury due to root absorption. If injury were the result of foliar absorption, washing of the leaves by sprinkling with water soon after application of the spray would be expected to reduce or eliminate injury. An experiment was carried out to test the effect of rinsing residues from the leaves.

Four flats of dichondra were sprayed with CMU at the rate of 2½ pounds of 80 percent CMU per acre applied as an 0.62 percent suspension in water. Two flats were immediately sprinkled with water to rinse the herbicide residue from the foliage into the soil. The foliage of the other two flats was rinsed four days after treatment. To avoid washing the foliage during the four-day waiting period, the flats were sub-irrigated daily by placing them in shallow pans of water. On the fifth day sprinkler irrigation of all flats was resumed. Control flats were similarly irrigated but were not treated with the herbicide.

The leaves of the dichondra in the flats that were rinsed immediately developed slight chlorosis visible only upon careful inspection. The foliage of the plants in the flats first sprinkled four days after treatment was severely injured. Many leaves were killed and those leaves that survived developed chlorosis and browning of the margins. The injured plants recovered rapidly, regaining normal appearance about six weeks after treatment. It would appear that injury to dichondra by low rates of CMU is caused predominantly by foliar absorption and that injury can be largely eliminated by sprinkler irrigation.

Five field tests of CMU in established stands of dichondra turf were conducted in San Bernardino County. Treatments included 100- and 300-square-foot, replicated plots and two unreplicated field trials. The larger of the field trials was a nine-acre field of dichondra grown for seed production. Results from these tests are summarized in Table II.

The field data provide further evidence of the tolerance of dichondra to CMU. Where appreciable injury occurred the symptoms were of the "chemical burn" type which presumably could have been largely prevented by rinsing the foliage

TABLE II

SUMMARY OF FIELD PLOT DATA

Date Treated	Size of Plots	Number of Replicates	Rates (Pounds per acre)[1]	Turf Injury	Duration of Weed Control (Months)[2]
April 12, 1955	100 sq. ft.	1	1	None	Undetermined
			2	None	Undetermined
			3	None	Undetermined
Sept. 8, 1955	100 sq. ft.	4	1	Trace[3]	2
			2	Slight[3]	3
			3	Slight[3]	3½
November 15, 1955	300 sq. ft.	4	2	Trace[4]	4½
			3	Trace[4]	5
November 15, 1955	⅓ acre	1	2	Trace[4]	5
December 13, 1955	9 acres	1	2	Moderate[5]	4

[1]Rates expressed in pounds of 80 percent formulation per acre.
[2]Period of time after treatment that germinating weeds were controlled.
[3]Temporary chemical burn of foliage.
[4]Turf slightly lighter color for several days after treatment.
[5]Temporary browning of foliage.

TABLE III

DICHONDRA AND WEED DENSITIES (PERCENT) IN TREATED AND UNTREATED PLOTS AFTER FIVE MONTHS

	Treated Plots	Untreated Plots
Dichondra	63.4	63.4
Broadleaved weeds	0.2	10.4
Grasses	0.0	1.9
Bare soil	36.4	24.3

after treatment. The spray residue was rinsed from the foliage shortly after application to the plots treated on April 12. The foliage was washed by flood irrigation or rainfall soon after application in the other tests, except the nine-acre field trial. Injury was negligible in all except the latter test. Here the chemical remained on the foliage for several days causing some browning of the leaves.

In the replicated plot tests begun on November 15, 1955, the dichondra stand was spotty, covering about 50 percent of the soil surface at the time the plots were treated. On April 16, 1956, about five months after treatment, dichondra and weed density measurements were made by point transects in the control plots and in the plots treated with three pounds per acre. Data are given in Table III.

The 0.2 percent density of weeds in the treated areas represents more than 98 percent reduction of the weed population as compared to the control plots. Dichondra density was not affected. It is also evident that the encroachment of weeds into the untreated plots was primarily into the areas of bare soil.

On April 1, 1956, more than three months after the herbicide was applied, quadrat counts of weeds were made in the nine-acre treated field and in an untreated control strip through the field. Counts of 31 quadrats showed an average of 138±22 weeds per square foot in the control area and none in the treated area. Species composition of the weed population in the control area is given in Table IV.

Stands of the weeds listed in Table IV germinated in the treated area following each rain or irrigation. Seedlings grew normally for a few days after emergence, then became chlorotic and died. Dichondra *seedlings* were no exception. They appeared to be no more resistant to CMU than seedlings of the weedy species. The development of resistance by dichondra appeared to be correlated with maturity and the assumption of its creeping habit of growth.

CONCLUSIONS AND DISCUSSION

Results with respect to weed control are in agreement with the results of numerous experiments conducted by the authors in orchards and nurseries under

TABLE IV

SPECIES COMPOSITION OF WEED POPULATION IN UNTREATED AREA

Species	Common Name	Percent of Population
Gnaphalium spathulatum Lam.	Spatulate cudweed	72.4
Linaria canadensis Dum.	Blue toadflax	8.7
Poa annua L.	Annual bluegrass	5.5
Cotula australis Hook.	Australian brass buttons	3.9
Capsella Bursa-pastoris (L.) Medic.	Shepherds purse	2.8
Sisymbrium Sophia L.	Flixweed	1.6
Senecio vulgaris L	Common groundsel	1.4
Chenopodium album L.	Lambs-quarters	1.2
Sonchus oleraceus L.	Sow thistle	0.9
Erodium cicutarium L'Her.	Red-stem filaree	0.7
Sisymbrium Irio L.	London rocket	0.4
Lupinus bicolor Lindl., Var. *microphyllus* C. P. Sm.	Lupine	0.3
Bromus rubens L.	Red brome	0.2
Lotus strigosus (Nutt.) Green	Lotus	0.1

a variety of conditions in southern California. That is, applications of CMU formulation at the rate of two pounds per acre may be expected to control germinating weed seedlings for two to five months per application. The effective life of the herbicide in the soil is shorter in summer than in winter. Higher dosages are required in clay soils and soils high in organic matter than in light, predominantly mineral soils.

On our suggestion, CMU has been successfully tested in a number of home-garden plantings of dichondra. *The principal limitation in the use of CMU on dichondra in mixed ornamental plantings is the hazard to other plants present. The tolerance of most ornamentals to CMU is not known.* Its use, even at low rates, in the root zones of trees and shrubs may cause yellowing, defoliation, and in some cases death.

The persistent nature of CMU in the soil along with its extreme toxicity to plants make it imperative to avoid accidental overdosing. Spilling a spoonful of the innocuous-appearing powder could easily result in the sterilization for several years of a score or more square yards of soil. For this, and other reasons, it would seem unwise to recommend CMU for widespread use in the home garden. For widespread use in lawns the ideal herbicide should be non-injurious to the turf species and to trees and shrubs and yet control all common weeds. We are now experimenting with new chemicals similar to CMU which appear to meet these requirements.

Respectively, Assistant Plant Physiologist, University of California, Citrus Experiment Station, Riverside; and Farm Advisor, San Bernardino County, California.

NAMES, NOTES AND NEWS

Distinguished Service. At the Golden Anniversary Banquet of the Botanical Society of America, Dr. Frits Went was among 50 distinguished scientists to be given the Society's Award of Merit.

In honoring these men and women, the Society presented each one with a scroll citing his particular field of study and contributions to science. That of Dr. Went's read as follows: "To Dr. Frits Went for his breadth of constructive interest in botanical science and especially for his contributions in fields of plant physiology and ecology. The first botanist to put the assay of auxins on a quantitative basis, he subsequently has added substantially to our knowledge of the hormonal relations of plants. He has also been an outstanding investigator of the growth of plants under controlled environmental conditions."

The Botanical Society of America held its annual meeting August 26 through 30 at the University of Connecticut, as a section of the annual meeting of the American Institute of Biological Sciences.

* * *

The Editorial Committee of *Lasca Leaves* wishes to express its appreciation to Mrs. Gladys Nolan for her voluntary service in compiling the index for Vol. VI, 1956.

* * *

Dawn Redwood Cones. Dr. Mildred Mathias reports that one of the Dawn Redwoods *(Metasequoia glytostrobus)* in the UCLA Botanic Garden produced 19 pistillate cones this year. Observations of such cones on trees at other locations along the Pacific coast have been reported in the past. The appearance of staminate cones and resulting viable seeds has not been reported however. Dr. Mathias and *Lasca Leaves* will be interested in learning of the location of any trees producing staminate cones this coming year.

* * *

Swimming Pool or Garden? During the summer, the Arboretum received many inquiries about plant material suitable for use around swimming pools.

Will our readers please send, bring or advise us of their own experiences regarding this special gardening problem. Which plants have survived repeated dosages of chlorinated water? Which have not? What tricks have you employed to overcome this dilema, a swimming pool or a garden?

LASCA LEAVES REPRINTS

The Arboretum will furnish reprints of articles appearing in *Lasca Leaves* at the following prices:

	Cost per 100 copies	
2-page reprints	$4.00	(minimum order $5.00)
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1955 — LASCA WEATHER RECORDS — 1955

MONTH	TEMPERATURES AVERAGE MIN.	AVERAGE MAX.	PEAKS MIN.	PEAKS MAX.	MEAN	RAINFALL INCHES MONTH	EVAPORATION INCHES MONTH
January	34.6	64.6	31.	80.	49.6	5.82	.885
February	38.0	69.2	30.	87.	53.6	1.26	2.580
March	43.9	73.8	35.	89.	58.8	1.06	3.570
April	43.9	75.6	36.	88.	59.8	1.50	5.135
May	49.2	75.7	39.	92.	62.4	1.51	3.700
June	53.4	81.7	45.	94.	67.6	.03	5.440
July	56.5	87.1	49.	96.	71.8	.....	6.825
August	61.4	93.5	54.	108.	77.5	.03	7.455
September	59.5	92.3	44.	114.	75.9	.....	7.100
October	51.3	78.5	46.	99.	64.9	.....	4.105
November	45.5	74.5	34.	91.	60.0	1.53	3.085
December	43.7	63.7	32.	82.	53.7	1.33	1.555
					Total in inches	14.07	51.435

J. T. McGah

GENERAL WEATHER OBSERVATIONS

The highest temperature of the year was recorded on September 1, 1955 when the thermometer went to a record high of 114°. During the first seven days of September the peak high did not go below 106°. On twelve days during the year the temperature reached 100° or more. Ten of these days were in the month of September. A temperature of 90° or over was recorded on sixty-eight days during 1955.

The lowest temperature of the year was recorded on the nights of February 4, 20, 21. A temperature of 40° or less was recorded during eighty nights. On fifteen of these nights the thermometer went to 32° or lower.

Frost was observed on forty-four mornings.

Smog was observed on one-hundred-sixty-five days. The intensity of Smog was greater during the period of June through October.

Rainfall for the year 1955 was measured on thirty-five days for a total of 14.07 inches. The heaviest precipitation fell during the storm of January 10th when 1.72 inches was measured.

Evaporation measured 51.435 inches which figure is greater than any previous year since the Weather Station was installed in October 1950.

Except for the unusual hot spell in early September, the year 1955 was a favorable one for plant health and growth due chiefly to no extreme low temperature and an even distribution of rain.

J. T. McGah
Plant Recorder and Weather Observer

WEATHER RECORD — 1955

University of California, Los Angeles
Subtropical Horticulture Area

1955	TEMPERATURE AVERAGE MIN.	AVERAGE MAX.	PEAKS MIN.	PEAKS MAX.	PRECIPITATION TOTAL MONTH
January.....	40.2	61.6	34	82	5.18
February....	40.4	65.5	32	79	0.70
*March.....	44.2	69.5	36	85	0.65
April.....	51.0	69.1	41	83	1.71
May.....	51.5	68.7	42	87	1.66
June.....	54.0	71.4	46	79	0.00
July.....	59.5	75.6	51	86	0.00
August.....	58.1	81.4	50	102	0.00
September...	58.2	82.0	48	108	0.00
October.....	50.4	70.3	42	88	0.00
November...	45.6	69.9	35	85	1.26
December...	45.7	61.6	31	79	1.75
				Total inches	12.91

*Data unavailable for four days

Prepared by Lyle Pyeatt

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LASCA LEAVES

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Lasca Leaves

WINTER 1957

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VOL. VII JANUARY, 1957 NO. 4

CONTENTS

Supervisor Herbert C. Legg addressing the invited guests and friends of the Arboretum during the Dedication Ceremonies on December 14, 1956. The Administration Building and Gatehouse were presented to Dr. W. S. Stewart, Director, by Supervisor John Anson Ford, Chairman of the Los Angeles County Board of Supervisors. Photo by L. B. Martin.

ARBORETUM DEDICATION PROGRAM

WILLIAM S. STEWART

THE LOS ANGELES State and County Arboretum came of age on December 14, 1956 when the new Administration Building and Gatehouse were dedicated before an audience of over four hundred. The program was opened with an invocation by Reverend Dr. J. Davis Barnard, Minister of the Arcadia Presbyterian church followed by the Flag Raising and Pledge of Allegiance by Boy Scouts of Troop 106 of the Arcadia Hugo Reid Elementary School. The development of the Arboretum from its initiation by the Southern California Horticultural Institute to the present time was reviewed by Mr. Robert Casamajor, a Trustee of the California Arboretum Foundation, Inc. Dr. F. W. Went, President of the Foundation and Master of Ceremonies then introduced the guests seated on the platform.

Mr. Robert Hamill, Southwest editor of Sunset Magazine presented awards of $100 to each of the four winning landscape architects in a design competition sponsored by the California Arboretum Foundation. The winners were: Mr. Bettler Baldwin and Mr. Junichi Asakura of Los Angeles; Mr. Owen H. Peters of Temple City, and; Mr. Manabu Sakamoto of Gardena.

Night lighting of the Administration Building entrance creates interesting patterns of lights and shadows. Photo by L. B. Martin

From the designs a single Master Plan will be developed for four demonstration model gardens for home owners. Garden structures such as fences, paths, benches, and pergolas are being designed for construction by do-it-yourselfers.

Following remarks by the Honorable Herbert C. Legg, Supervisor of the First Supervisorial District of Los Angeles County, Mr. Millard Sheets, Director of the Los Angeles County Art Institute spoke very appropriately on "Why We Have An Arboretum".

The new buildings were then presented to Dr. W. S. Stewart, Arboretum Director, by the Honorable John Anson Ford, Chairman, Los Angeles County Board of Supervisors and Chairman, Board of Supervisors' Committee for the Department of Arboreta and Botanic Gardens.

In accepting the building, the Director dedicated it to achieving the objectives of the Arboretum and to furthering all aspects of appreciation of plants. The building was then opened by movement of the leaves of the *Mimosa pudica* (Sensitive Plant). The plant transmitted the signal to open the building by closing an electrical circuit resulting in the ribbon across the entrance parting. There was a tense moment of suspense in this horticultural ribbon snipping when after the plant transmitted the signal nothing happened until a loose connection was discovered and corrected. Then there was an enthusiastic round of applause when the ribbon separated.

The program was closed with the audience joining in singing America The Beautiful. Both before and after the program a quartet of Mexican troubadours added to the festivities with Mexican and old Californian music.

Following the formal program there were conducted jeep-train tours of the grounds and inspection of the new buildings.

The second day of activities in connec-

These troubadours added colorful fiesta music and costumes to the Dedication Program and the Mexican Posada and Festival of the Pinata.

tion with the dedication was the initiation of a Home Owner's Lawn Day, on Saturday afternoon, December 15th. The program attended by nearly two hundred was organized by Dr. Louis Martin, Arboretum Plant Physiologist, who presented speakers and authorities on the lawn problems which face the average home owner.

The lawn specialists who consulted with home owners were: Robert Berlin, Occidental College, grasses; Eric Johnson, Sunset Magazine, irrigation; Ralph G. LaRue, Los Angeles County Farm Advisor, fertilizers; Dr. Robert Atkinson, Mirror-News Garden Editor, insects and diseases; J. Griffin, California Polytechnic Institute, weed control; Philip A. Chandler, University of California at Los Angeles, soils; and, Dr. Mildred Mathias, U.C.L.A., weed identification.

Four grass specialists presented fifteen minute lectures in the Historical Area of the Arboretum on the following topics:

1.) Dr. Victor Youngner, Department of Horticulture, U.C.L.A., "Lawn research projects in the Los Angeles County Area".

2.) Dr. R. Lunt, Department of Soils and Irrigation, U.C.L.A., "Lawn irrigation and soils".

The home owners are crowding the Lawn Information area, questioning the turfgrass experts about their individual lawn problems. Photo by Denis Kucera

3.) Mr. Marston Kimball, Agricultural Extension Specialist, U.C.L.A., "The Zoysia and Bermuda Grasses for southern California".

4.) Mr. John J. Stark, Los Angeles County Farm Advisor, "Weed Control in Lawns".

During the afternoon home owners inspected plots of various lawn grasses, fertilizer trials, overseeding for winter color, an identification display of common lawn weeds, a display of seeds of lawn grasses, and a display of books on lawn installation and maintenance.

In view of the great interest by the public in this first lawn field day it is hoped to hold similar lawn days in the spring and fall when the demonstration plots will be at different stages of development.

The third event of the dedication celebration occurred late Sunday afternoon at 4:30 P.M. It was an authentic Mexican Posada and Festival of the Pinata presented by the Children's Theatre of Arcadia. The Posada and Festival were staged in the setting of the old Hugo Reid Adobe and the candle-lighted procession of costumed children at dusk along with a full moon rising over the mountains made an unforgettable scene. The presentation was followed by inspection of the new buildings. Arboretum Foundation members and Arcadia neighbors of the Arboretum were especially invited. The Mexican Troubadours again added the final touch to the program.

In conclusion a word of gratitude should be said for the weatherman who gave us three days of perfect weather for the out door events, and so more than did his part for the dedication.

AFRICA, PLANTS, ELEPHANTS AND HIPPO POOLS!

PEGGY SULLIVAN

GOING TO AFRICA is like going home. At least, to a California horticulturalist, this is true. For the eastern and southern areas of this sun-drenched, grassy continent are overgrown with all *our* garden plants. But these plants are growing wild for them. One feels as if the natives had stolen them from our gardens, planted them around their huts, and that the plants had reseeded themselves into the jungles. But botanists say it is the other way around! We stole from them.

Therefore, a journey about Africa by car at forty miles per hour, over rutted dirt roads can be a frustrating experience for anyone interested in plants. One cannot scream "stop" at the sight of every Gloriosa lily in full bloom, but one does! This in turn becomes extremely annoying to other passengers, who for some unexplainable reason do not become hysterical over a *Haemanthus multiflorus* in full flower on an ant hill. It was explained that to stop at *every* flower would find the group still on the Congo River where the trip started. Perhaps the only way for a horticulturalist to tour Africa is alone on a bicycle—but then there are lions.

Which brings to mind some fantastic partnerships. Where one looks at wild plants in Africa, he also sees or feels the presence of wild animals. At close range this can be paralyzing, as the animals are capable of dispensing with frail man with just one bite. Our gophers, aphids and snails cannot compare! Perhaps one of the most incongruous pairings was seen in the Hluhluwe River. As a blanket of beautiful blue waterlilies was being admired, there emerged silently and in all its ugliness, the long toothy head of a crocodile. Here was surely beauty and the beast. In Albert National Park a stop was made along the Rwindi River to closely admire magnificent clumps of *Phoenix reclinata*, yet to concentrate on the palms is impossible. For

the river mud over which the tall trunks gracefully curve is honeycombed with hippo pools—and they are occupied ! One notices the fronds waving, yet there is no breeze. A second look reveals three gigantic elephants heading down for a drink. No cluster of palms stops them, they merely force the trunks aside, as though they were papyrus stems.

In a more gentle way, a smaller animal, the Weaver bird is associated with this very common Phoenix palm. Although the palm is found frequently in Africa, the Weaver bird evidently occurs only in Uganda. As only here was seen the ludicrous sight of dozens of large Weaver bird nests suspended from the fronds, like Christmas balls from a decorated fir. No doubt they feel very safe there, but what do they do for their babies in a windstorm? Dramamine?

As a landscape architect, the writer hears many complaints from clients concerning the difficulties of properly maintaining a garden. But after Africa, no local complaint will seem valid. Over there, they *really* have troubles. Mrs. Peter Potter, wife of the head of Hluhluwe Game Reserve in South Africa, despairs of ever having a beautiful garden. The wart hogs will not let her. They casually drop in every afternoon—at tea time—stumble through the beds in order to reach the lawn, where they root through the turf. Not only that, but also a giraffe who defoliates the trees.

At Maweya Lodge, in Queen Elizabeth Park, Uganda, this garden problem has a dangerous side. Here the hippo from Lake Edward have discovered the simple rose garden adjacent to the manager's home. In two nights previous to our arrival they sauntered up at dinner time and reduced every plant to its "bare root" appearance. A fence was suggested but it seems that the elephants resent the camp, primitive as it is, and will rip out any fencing, post by post. Needless to say, no one tours the garden there at night!

There is a new game reserve at Murchison's Falls, where the Nile begins its 3000 mile trip north to the Mediterranean, and while visiting its Paraa Lodge it was noticed that not a single cultivated plant was growing within camp. This was unusual, since the head of the lodge was British, and they are ardent gardeners. It was explained that to grow anything would be impossible as entire herds of elephants tramp through camp frequently, leaving all planting squashed underfoot. That night a certain young lady spent the entire sleepless night shaking on her cot, hoping that a very small, filmsy tent with brightly glowing lantern would not be annoying to a seven ton African elephant.

Even one's dignity is jeopardized in Africa. While stalking close to a magnificent male ostrich ,with bright pink neck and legs, this photographer stumbled over a lush, pink crinum and fell full length into the marsh. But where else but in that ever amazing land can one see animal and flower sharing the same shade of pink?

All these animals, fierce or friendly, are interwoven with the wild plants to form a fascinating fabric. Yet the native also is part of the weave. For, in Uganda, he plants many Dature shrubs in hedges beside his hut, and the white fragrant trumpets add a touch of luxury to his simple existence. Even the pigmy, camping about the Ituri Forest, throws elephant ears and Bamburanta as skin over a skeleton of woven branches. His hut resembles a compost pit!

Even a tourist lives like a native. For as sleep approaches and a hyena laughs, one's eyes rest overhead upon the exposed Eucalyptus beams and thick papyrus thatching. Actually "our" *Eucalyptus globulus* are all over Africa. How did a botanist decide they were born in Australia? As one drives through main thoroughfares in the capital of Ethiopia, constant attention must be paid to the dodging of great mounds of Eucalyptus branches heaped on little donkeys. Only the skinny legs are seen as the mounds bump into town to warm the cold wet nights in the 8000-foot high city. For Addis Ababa spreads through a forest of tall *Eucalyptus globulus.* Over on the

An example of the flower of *Sterlitza nicholai*. The standard is white, the tongue dark blue to blackish. The boat of flowers may measure to 24 inches in length. Photo courtesy of Huntington Botanic Garden.

shores of Lake Kivu in the Belgian Congo, a deeply thrilling evening was spent leaning against a tree trunk of the same species, while watching the verile volcano, Nyiragongo, reflect its fiery heart against the clouds gathered over the cone. Down in South Africa, the seven hundred mile horizon between Johannesburg and Capetown would be unbroken if it were not for the tall robust clumps of this seemingly international tree.

As an interesting contrast, Cairo and Luxor glisten with the polished greenery of countless *Ficus nitida*. One tends to remember Egypt as all Nile, tombs and Ficus! But then, a moment of amazement must be remembered when the first branching palm, *Hypaenae*, was seen. Almost like a *Washingtonia filifera* gone wild.

There is much to amaze a horticulturalist in East Africa, even at twenty miles per hour. The car, as it bumps down the single lane dirt or mud road, depending on whether pre-storm or post-storm, brushes past great masses of well-known garden plants. *Crotalaria agatiflora* stretches its long canary blossoms into the road, with the twining stems of *Thunbergia gibsoni* adding orange flowers to the color scheme. Dead trees are clutched by the tendrils of *Gloriosa rothchildiana*, and this magnificent climbing lily never had a more dramatic support. During this summer period the whole countryside is afire with the flaming torches of *Erythrina tomentosa*. By contrast, the salmon flowers of wild gladiolus appear pale. Blue, although an uncommon color in Africa, is well represented by *Clerodendron myricoides* growing in high thickets along the roadside.

Unfortunately, being in a car dulls the senses and there is not complete enjoyment of the plants. But with good luck, flat tires and broken steering rods occur, the car stops, and the senses are shielded no more. It is then possible to sit and admire the fragrance of *Gardenia thunbergi* or peer into impenetrable clumps of *Grewia caffra* in full bloom.

While driving near the Indian Ocean in South Africa one becomes acutely conscious of a color scheme composed mainly of yellows and oranges. The massive reddish orange Aloes like a grotesque tree, countless *Erythrina caffra* brilliant orange against the deep blue sky, swamps of apricot Tritoma, yellow Gazania creeping into the road bed, and the dignified *Strelitzia reginae* blooming brilliantly amid the dry chaparral.

But then in Capetown area the pastels of Proteas predominate, all complementing the silver patina of *Leucadendron argentea.* This Silver Tree chose well, when it chose the noble Table Mountain as its homestead.

These memories do not pass away—they shall not fade. This is a continent that grows *Strelitzia nicolai* thirty feet high in its wet canyons. On its plateaus are Silk Cotton trees encrusted with the papery jewels of Staghorn Ferns. Nearby is a herd of elephant—keeping one in the car—the motor running—and a telephoto lens on the camera!

Landscape Architect

Los Angeles, California

EXPERIMENTS IN AIR-LAYERING

FRANCIS CHING

AIR-LAYERING is a method of propagating difficult-to-root and/or stiffly erect plants. This means of propagation has two advantages: first, the new plants are genetically like the parent plant; second, branches many times longer than the usual cutting may be rooted.

Previously, only a very few plants were propagated by air-layering; however, with the advent of plastic wraps, many other plants were deemed suitable for this method of propagation. Many plants, nevertheless, are still difficult to root, even when using plastic wraps, and the use of a root inducing substance in air-layering has been of questionable value. Another problem involved in air-layering is that though the newly formed plants form a substantial amount of roots, the plants may not survive transplanting.

This article presents the results of an investigation designed to determine the most suitable and practical methods for rooting plants by air-layering and for removing the air-layer for further development of the new plant.

Preliminary trials were made on several varieties of rose plants, the results indicating that the Queen Elizabeth variety was difficult to root by ordinary air-layering methods. A more detailed program of experimentation therefore was planned, using this same variety.

Method

Stems, approximately one-quarter inch in diameter and not more than a year old were completely girdled. Alpha naphthaleneacetic acid (NAA), a root inducing chemical, at 10 and 100 p.p.m. (parts per million) was incorporated into the rooting media, sphagnum moss. This was done by soaking the moss overnight in the different concentrations of NAA. The moss was squeezed of excess moisture and applied around the girdled area of the stem. Two colors of polyethylene plastic film, black and white, were used as wraps. Six weeks after treatment, the air-layers were removed by severing the cane below the girdled area. The cuttings, decapitated two nodes above the girdled area and with

one-half the remaining leaves removed, were transplanted to four inch clay pots.

Results

The data obtained from the experiments indicated that the method and materials were favorable to the propagation of certain difficult-to-root plants.

The various concentrations of NAA produced different types of root formation. Fifty per cent of the air-layers that were treated with 10 p.p.m. NAA produced moderate to heavy root formation while another 50 per cent produced a heavy callus formation only. In the former, the roots were white and non-suberized and in some cases, branched.

All but one of the air-layers that were treated with 100 p.p.m. NAA produced heavy root formation. In this case, the roots were short and stubby, which at the time, indicated that NAA at 100 p.p.m. may seriously have inhibited subsequent root growth.

With air-layers that were not treated with NAA, only one plant produced roots.

Fig. 1. Queen Elizabeth rose canes showing the white and black polyethylene plastic wraps used in air-layering. Photo by author.

Fig. 2. Variation of rooting and top growth response of two air-layered cuttings of Queen Elizabeth rose canes treated with 100 ppm N.A.A. Photo by author.

Subsequent root and top growth after transplanting indicated that different concentrations of NAA had a residual effect on the plants as to the type of growth that was produced.

Plants that produced roots when air-layered with 10 p.p.m. NAA produced a considerable amount of root growth four weeks after transplanting. These roots were branched.

Plants that formed short, stubby roots when air-layered with 100 p.p.m. NAA produced heavy root growth four weeks after transplanting. There were no branch roots present. After eight weeks, these same plants produced very heavy root growth and in a few cases, top growth. Where top growth was present, there was a development of branched roots which indicated a correlation between top growth and type of root growth. Eight weeks after transplanting, a few of the plants that formed only a callus as a result of air-layering with 10 p.p.m. NAA produced a very light to moderate amount of roots. A new callused area formed at the base of the cuttings and it was from this area that most of the roots originated.

Non air-layered cuttings, potted at the same time the air-layers were transplanted, were examined after four weeks and with one exception, all of these plants were

without any visible roots. Shoot growth of these plants developed immediately but by the end of the fourth week, most of these plants had lost their mature leaves and were dead.

Fig. 3. A close-up of roots shown in Fig. 2. Examined eight weeks after transplanting, plant on left had no branch roots, while plant on right showed branch roots and top growth. Photo by author.

Cuttings that were treated with 10 p.p.m. NAA developed substantial shoot growth one week after transplanting, although the mature leaves were lost by the fifth week. Only three of the plants that were air-layered with 100 p.p.m. NAA produced shoot growth after five weeks but ten weeks later, all of the plants still retained their mature leaves.

While there were no apparent differences in root formation when the plants were air-layered with white or black polyethylene film, the lower temperatures recorded when white polyethylene was used for wraps indicated that this color may be most favorable to use. Most air-layering is practiced in the spring and summer when air temperatures are high and when light intensities are strongest. As the maximum temperature for optimum root formation is approximately 85.0°F., white polyethylene film will keep the internal temperature of the air-layers nearer this optimum.

Research Staff
Los Angeles State and County Arboretum

This work was undertaken at Michigan State University.

HELLEBORES IN SOUTHERN CALIFORNIA

MILDRED DAVIS

MOST OF THE INFORMATION about the culture of Hellebores makes the average person afraid to attempt to grow them. There are many conflicting cultural instructions, most writers stressing the difficulties. Yet with the possible exception of *H. niger*, they are almost foolproof to raise. Planted in a humus type soil, given adequate water, good drainage and partial shade they will thrive. Most of the species are quite cold tolerant.

Now to disprove some of the "don'ts" in the culture of Hellebores.

They prefer a neutral soil; they can be balled and moved even when in bloom; the old leaves may be cut off to improve appearance. In fact, on some hybrids which have excessive foliage the leaves should be thinned to let the blooms show. At the end of the blooming season, the foliage may be cut almost to the ground level for new shoots will soon come up.

The Hellebores will readily fend for themselves as a ground cover beneath trees and shrubs provided there is water and food. *H. foetidus* grows natively in hedgerows and thickets in rather dry soil. Superphosphate applied in late summer and again during blooming period will prove beneficial. At other times, a balanced commercial fertilizer will suffice. It takes several years for large clumps to develop, so divisions should be infrequent. Seedlings take from two to three years to bloom, while divisions taken after blooming or in late summer usually bloom the next season.

The entire clump can be dug and divided or small divisions taken off around the outside of the mother clump.

Most of the Hellebores will cut, some species lasting longer than others. The orientalis hybrids resent impalement on a pin frog in shallow water, a condition in which they wilt quickly. If the stems are burned or slit from the base upward along the stem before being placed in deep water, they will last for days. *H. niger* is perhaps the best keeper under most circumstances.

In the coastal areas where cold is not the order, *H. niger* is the least happy species in cultivation. Therefore, I would suggest caution in planting it in quantity. Most of the Hellebores sold as *H. niger* (in this area) are not that species but orientalis hybrids. The former is lower growing, the roots are black, the leaves are widest in the middle, the flowers are large, usually white and borne singly or at most in twos. The flower stem is never more than once forked.

The orientalis hybrids, *H. orientalis* (Lenten rose) are from mixed parentage and have considerable variation in size and form of leaf. They exhibit a great color range in blooms. The true petals are inconspicuous; it is the large broad sepals which form a corolla-like bowl that we speak of as the flower. Color may be white, pale green, pink, rose, purple or reddish mahogany. Many have curious dots or spots in them. A mature clump may be two feet wide and from fifteen to eighteen inches tall, carrying 50 to 100 blooms at a time. In the past, many hybrids were raised in Europe, particularly in France. Many named hybrids in separate colors were once available also. Most of these now appear to be lost, but as they grow readily from seed there are many possibilities for color variation. In order to buy a particular color, it is necessary to buy a plant in bloom or get a division of a known color.

Seeds set freely on most varieties and if this seed is allowed to fall to the ground at the base of the parent plant, remaining undisturbed, it will germinate by the following spring or early summer. These seedlings should be transplanted early, for they send down a tap root. Germination of bought seed is apt to prove discouraging, for while fresh seed sprouts readily, older seed usually takes over a year to germinate.

While all the orientalis hybrids have attractive foliage, somewhat like eastern peony, it is really their bloom that is outstanding. For foliage, *H. corsicus* is the most valuable. This species has sculptured grey-green leaves, spiny on the margin and immense trusses of pale green bloom. Usually with us, it grows about three feet in height and somewhat more in width. From October until well into May, it bears flowers. Unless spent flowers are removed, the blooming season is apt to be curtailed. The plant sets many seeds which fall to the ground and which germinate readily. Old leaf stalks past their prime may be cut off to the base. This particular species is beautiful combined with *Mahonia bealei* and *M. lomariifolia.* It also makes a spectacular container plant. While it is more tender to cold than other species, it is somewhat more sun tolerant. Its native habitat is the Island of Corsica from sea level to mountain side. Even there, those growing along streams are the more outstanding.

Helleborus lividus is similar to the above but the leaves are not toothed and the stems are deeply tinged and mottled red. The flowers are more slate than green but unfortunately this species is not easily obtainable.

Another good foliage Hellebore is *H. foetidus.* The leaves are much more narrow, the flowers borne in profusion but inconspicuous because of their smallness and coloring. They are only about three-quarters to one inch wide, greenish with a pencil margin of purplish red. It is a native of England. A mature plant has an airy, shrub-like appearance.

At present, the supply of good hybrid Hellebores is not equal to the demand. This makes the initial outlay for them seem expensive; however, the future dividends of beautiful blooms and many plant divisions more than repay the cost.

Landscape Architect
Santa Monica, California

PROGRESS IN BOTANICAL ILLUSTRATIONS

SCOTT E. HASELTON

Pictures, in some form, have been used since the earliest records of man. With their beginning as hieroglyphics chiseled into the rock, to the present day printing of millions of copies of a single picture, we can boast that considerable progress has been made. Illustrations of plants along with religious symbols were among the first subjects used.

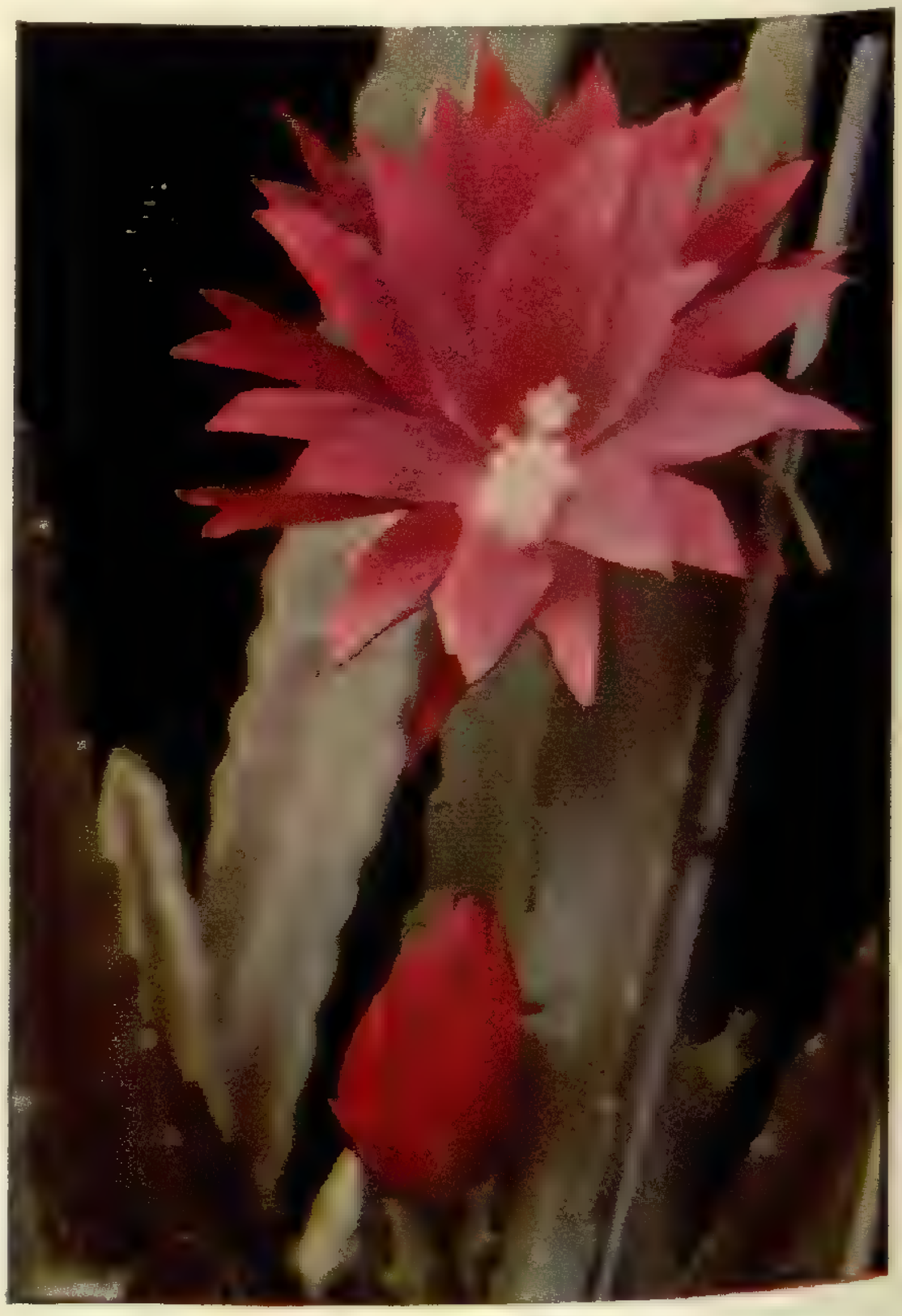
Woodcut from Blanc's
Catalog of 1880

The earliest reproduction process was known as the woodcut which can be traced to the Chinese as far back as 700 A.D. and later to Japan and European countries. This process was the cutting away of the background on fine, side-grain wood and later end-grain blocks of wood, leaving in relief, fine lines and masses to produce in black upon the paper. The final effect would appear similar to a pen and ink reproduction which we use today. The illustrations by the late Alfred C. Hottes which have appeared in *Lasca Leaves* can hardly be distinguished from woodcuts.

Printing from woodcuts in Europe dates back to the fourteenth century. Playing cards were also among the early subjects with the prints hand colored. With the increase of pilgrimages towards the end of the fourteenth century, many woodcut prints of sacred subjects were sold to the pilgrims who took them home to insert into books of devotion or to put upon the wall, thus establishing a private shrine.

The popularity of medicinal plants led to the publishing of herbals which are among our earliest illustrated books. The art of engraving was practiced by goldsmiths who mastered unbelievable fine lines and intricate designs. Even up to Civil War days the intricate war scenes were a challenge to the engravers, many of whom signed their names on the woodcut as do painters of today. Plant catalogs, plant dictionaries, and botanical books were fully illustrated without the aid of any mechanical process in making the printing plates.

While wood engraving was being per-



A four color reproduction from a Kodachrome. See the four steps on opposite page.

Color separations are made so that the primary colors, when printed one on top of the other, result in a full color reproduction.

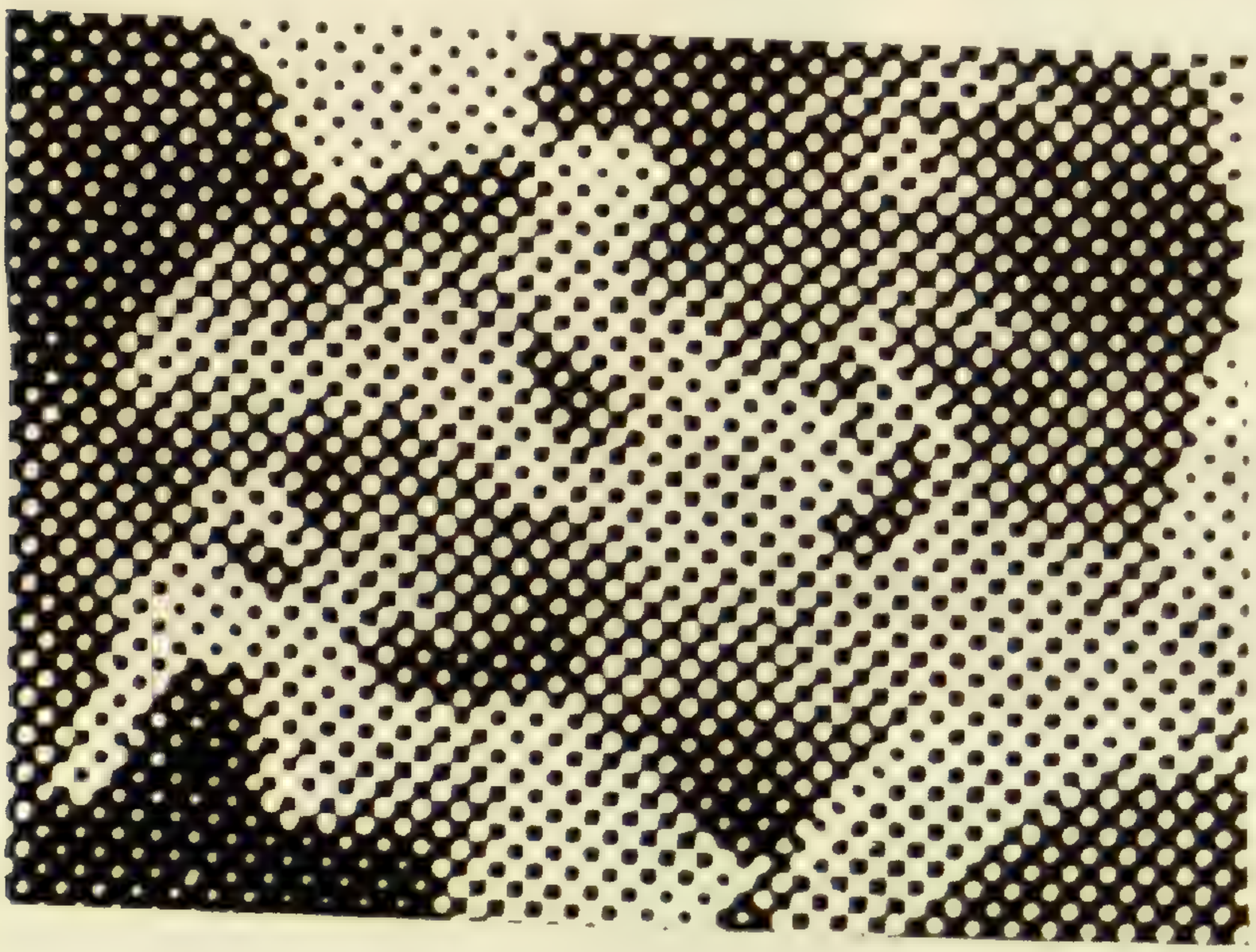
fected, another process and material was taking the place of wood. Copper plates were used in which to engrave the printing lines. The design was incised, not elevated above the printing surface, and when filled with ink gave a relief appearance when applied to paper. These early engravings can be detected by an impression on the edge of the plate or a slight inking of the corners and background. Later these copper plates were etched with acid after the drawings were transferred to the treated copper.

The finest botanical work appeared with the advent of lithography about 1800. This process was the drawing on the surface of a polished stone in greasy crayon. In printing, water and ink were applied; the ink being taken up by the grease while the water covered the remaining surface of the stone. Only the inked portion was reproduced. The cumbersome stones gave way to lighter sheet material and our offset-lithography of today was the outcome of this process. Hand coloring the early lithographed prints was practiced until the appearance of color photography fifty years later.

The development of the photographic process in the middle of the eighteenth century replaced the wood and copper hand engraving and made possible the reproduction of photographs by the halftone process. This chemically etched copper plate is composed of fine dots which faithfully reproduce all tones instead of the black lines of the former processes. The photographs in *Lasca Leaves* are all half-tone engravings.

This present day is not only an age of pictures but now color is a requisite. Hand tinted prints have been superseded by the so-called "four-color process". In this process the subject is broken down into its three primary colors and by printing a yellow, blue, and red plate one after the other, the results are a full color reproduction. One may ask, "Why not make all pictures in color?" The answer is one of simple mathematics—color prints such as were used on the cover of the autumn issue of *Lasca Leaves*, Vol. V. No. 4, cost eighty to one-hundred times as much as a black and white picture.

We can see the progress that has been made in the reproduction of botanical subjects, where pictures are of so much value. We have passed through the tedious stages of hand engraved wood cuts, hand engraved copper plates, hand drawings and the transfer of designs to stone, to the photographic application of pictures on copper with practically no hand work, and now the rendition of subjects in full color. It is difficult to foretell what the next advancements may be but it is a certainty that color will be the dominant factor.



An enlarged section of a halftone to show how a plate is broken into dots.

The Linnaean Botanic Garden in Uppsala, Sweden. The plants are laid out in parallel rows, perpendicular to the broad central walk. At the end of this walk is the greenhouse.

A VISIT TO LINNAEUS'S BOTANICAL GARDEN

ELIZABETH MCCLINTOCK

"UPPSALA, THE COUNTY SEAT of Uppland, is situated at the meeting place of two old traffic routes, the river Fyris and the Uppsala ridge, and is one of the oldest and most remarkable towns in Sweden"—so reads the introduction to a small pamphlet, *Uppsala for Tourists,* which I acquired shortly after arriving in this beautiful and charming city. At the beginning of the 13th century there was already established a harbor and market place on the site where the city now stands, and by the beginning of the following century the village had developed into a town of some importance. In 1435 the Cathedral, begun shortly after the Archbishop's throne was moved to the city in the latter part of the 13th century, was consecrated. The beautiful gothic cathedral and the old Vasa Castle, which dates from 1540, rise high above the other buildings in the city and dominate the flat landscape for miles around. Uppsala University, the oldest and largest university in Sweden, was founded in 1477. Today Uppsala is an important agricultural and industrial center. However, this city has one other claim to fame which you, who are interested in plants, will appreciate.

Uppsala was for many years the home of Carl Linnaeus (1707-1778), one of the world's best-known botanists. To botanists the most important of his works is the *Species Plantarum* published in 1753. This was a reference work to the plants of the world known to Linnaeus in which prac-

View of courtyard in front of house at Hammarby taken through second story window

tically every species was given a binomial, that is a generic and a specific name. These two names replaced the more cumbersome polynomials used at that time.

Linnaeus in 1728, at the age of twenty-one, entered the University of Uppsala. There he studied medicine and botany. One of his teachers was Olof Rudbeck, in whose honor Linnaeus named the genus *Rudbeckia*, the American coneflowers. It was Rudbeck's father, Olof Rudbeck Senior, who in 1655 founded the first botanical garden at the University of Uppsala. The plants in this garden served as the basis for one of Linnaeus's first published works (1730), which bore the latinized title *Hortus Uplandicus*.

Linnaeus remained at the university in

Uppsala until 1735. In April of that year he left for the continent where after a brief stop at Hamburg in Germany he went to the little university town of Harderwyck in Holland. He had gone to Harderwyck to obtain his Doctor of Medicine degree since medical degrees were not at this time obtainable in Sweden. Linnaeus spent most of the next four years in Holland where he came to know some of the prominent botanists of his day. It was during these years that he published several manuscripts previously written and others which he wrote while there. By the time he returned home to Sweden in 1739 he had become well known for these accomplishments.

In 1741 Linnaeus returned to Uppsala where he was appointed Professor of Botany and Medicine at the university, a position which he held until 1776, two years before his death. As a teacher Linnaeus was unexcelled. He attracted many students from abroad, some of whom later became well known in their own rights. Many travelled to then unexplored regions and brought back plants which Linnaeus named, described and sometimes grew in his botanical garden.

The Botanic Garden of the University of Uppsala first laid out by the elder Rudbeck had been much damaged by the fire of 1702, and even in Linnaeus's student days it was not completely restored. In March 1742, Linnaeus complained to university authorities of the neglected state of the botanical garden, requesting that it be restored and that it be provided with a warmed glasshouse for the growing of tropical plants. His requests were granted and the old garden was completely rearranged. New plants were procured through his many friends in Holland, England and France, a glasshouse or Orangery was built, and the old stone house built by the elder Rudbeck was rebuilt and became the home of Linnaeus and his family for the rest of his life. This garden ceased to be the official university botanical garden after 1787 when King Gustav III presented the garden of the Castle to the University, an area several times larger and which allowed for an expansion not possible in the smaller original garden. Under Carl Thunberg, who in 1787 succeeded to Linnaeus's chair at the university, a new Botanic Garden was laid out. The garden of Linnaeus fell into decay until 1917 when the Swedish Linnaean Society was organized. This Society undertook the task of restoring the garden as it was in Linnaeus's day, following the plan he outlined in his *Hortus Upsaliensis* in 1745.

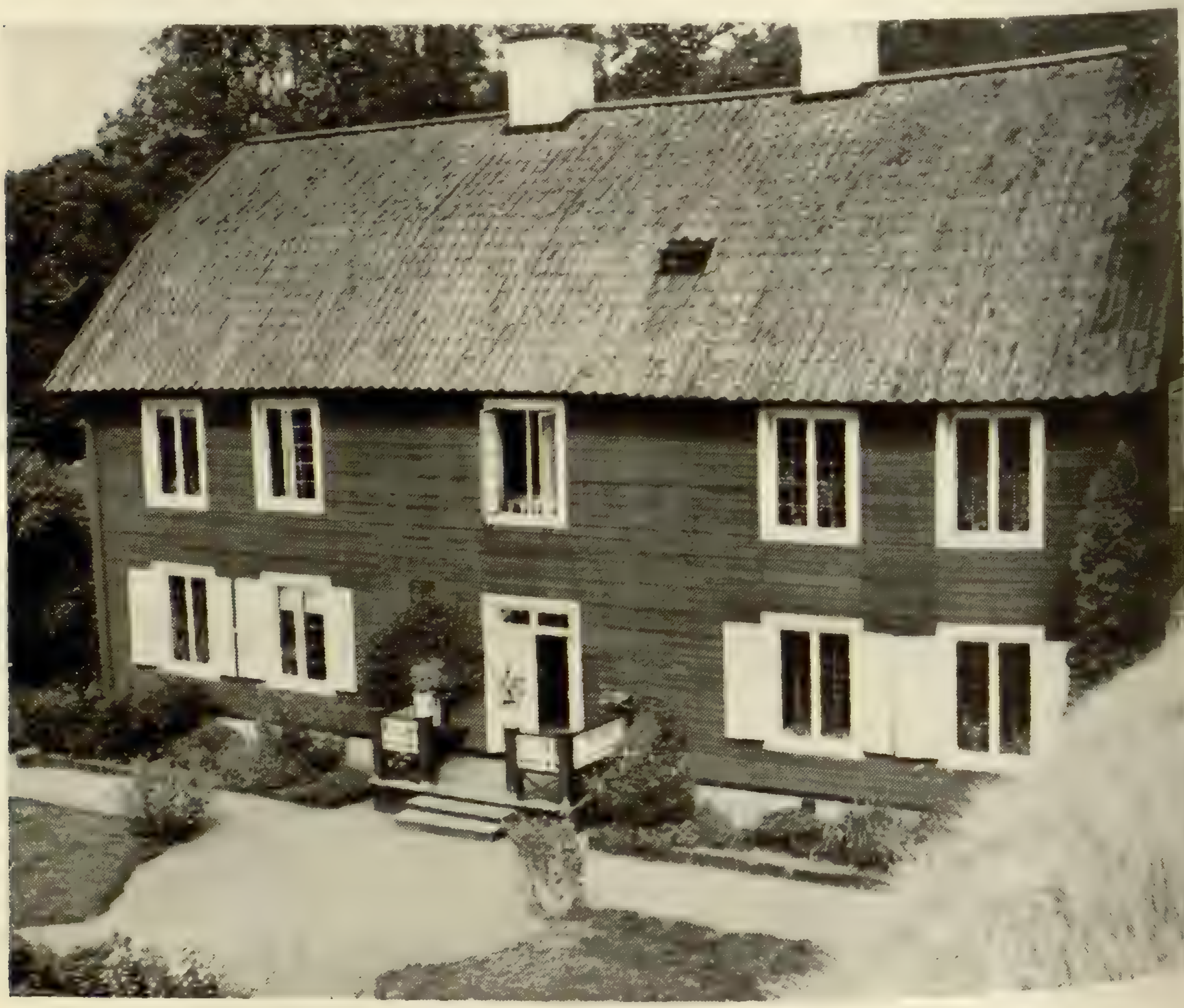
Today the garden is said to look just as it did when Linnaeus walked in it. About five acres in area, rectangular in shape, annual plants are to the right, perennials to the left, in the rear is the orangery, and in the front in the right-hand corner is the house which was once Linnaeus's home. It was restored in 1937 and is now preserved as a Linnaean Museum. The garden was laid out in formal style, row following row, as was so often the plan in the days of Linnaeus. The plants are those which were available to him for illustrating his system of classification. This system contained twenty-four classes and numerous orders, all based on the numbers of pistils and stamens. The plants described in Linnaeus's great botanical classic *Species Plantarum* published in 1753 are arranged according to this system. Linnaeus's botanical garden was, therefore, strictly utilitarian and designed to illustrate his system of classification of the flowering plants known to him.

In Linnaeus's later years he purchased a farm at Hammarby about six miles southeast of Uppsala which he and his family used as a summer home and where the family lived until after his death. It remained in the Linnaeus family until 1879, when the Swedish government purchased the buildings and land for a museum. The house, a simple, unpretentious wooden structure, is somewhat the same in plan as the house in Uppsala. Around the house is a garden, not of the formal type, in which Linnaeus planted a number of foreign plants, such as *Epimedium alpinum, Lilium martagon, Vinca minor, Corydalis nobilis,* which are still growing there. A pear tree, *Pyrus baccata,* and a hedge of *Caragana frutescens* in front of the house

have also survived since Linnaeus's time. On the top of a little hill behind the house, Linnaeus built a small brick building in which he kept his valuable collections. On his death these collections passed into the hands of his son, also a botanist, who survived his father by only a few years. After the death of the younger Linnaeus, the collections were sold to the English botanist Sir James Edward Smith, and today they are in the care of the Linnaean Society of London at Burlington House where botanists may study them.

Assistant Curator in Botany
California Academy of Science
Golden Gate Park, San Francisco

EDITOR'S NOTE: Illustrations through the courtesy of "Flower Grower" magazine. Cuts loaned by Spartan Typographers, Hackensack, New Jersey.



Front of house at Hammarby

CORAL TREES IN SOUTHERN CALIFORNIA

PHILIP EDWARD CHANDLER

MOST GARDEN-MINDED property owners in Southern California know the coral tree, *Erythrina.* Few persons realize that there are seven distinct species and one hybrid from which to make specimen selections in the Los Angeles nurseries today. There is never a month in the year when at least one of the corals is not in bloom. Blossom color ranges from light shrimp-orange, *E. lysistemon,* and light bronzed red of high light intensity, *E. crista-galli,* through various shades of orange and orange-red to pure red, *E. bidwilli* and *E. coralloides.* Most forms of this genus are deciduous or almost so, and all possess strong structural value in or out of leaf.

Erythrina caffra (formerly known as *E. embryana* and as *E. constantiana*) is the largest growing, at least twenty-five feet in height, with an ultimate spread of at least forty feet. It starts the calendar year by dropping its heavy canopy of leaves early in January, or earlier if weather is hot and dry, and bursting into bloom immediately if there is plenty of sun. Its large, heavy clusters of burnt orange flowers drip with honey. Some years it breaks into solid color overnight, some seasons sparingly, with its great show in late winter, usually winding up in early March in a mass of fresh, bright green leaves as gay and lush as its flowers. This African native is a bit tender to frost. It usually blooms best where there is no lawn around it; its roots should not be overly wet at any season. Some specimens bloom early in life, others not until long established. Where space permits, there is no equal for its great limb spread, its strongly tropical look.

Erythrina speciosa furnishes the design-conscious gardener with a thorny, free-form small tree, crooked and interesting with very large compound leaves, ribbed above and hairy beneath. Flowers appear in early spring (following mild winters) at branch ends, firecracker like, a brilliant light orange-red. Normally, the plant's height will achieve twelve to fifteen feet. It likes hot sun, tolerates little frost and prefers light watering when mature.

The most recent addition to California's corals is *E. falcata.* So far, three years, it has remained green throughout the winter and grown exceedingly well. Most of the plants in the market are not old enough to bloom. Any particular weakness and growing needs have not been determined, but the prevalence of this species in southeastern South America indicates considerable water tolerance.

Best known of the pure red corals is *Erythrina coralloides* (formerly known incorrectly as *E. poianthes*). It is a March through May performer of gaudiest poinsettia scarlet on naked, twisted boughs. This species is somewhat more cold hardy than *E. caffra* and *E. speciosa.* achieves medium height and spread, twenty-five by twenty-five feet, and seems to bloom equally well with lawn watering or in a drier exposure. Its shade is dense, its foliage brilliant yellow in late fall and its limb structure when bare is strongly bizarre and arresting.

From the rainy sections of Brazil, comes the coral longest in cultivation in California, *Erythrina crista-galli.* It is probably the species responsible for the popular name "coral tree," because the long, thorny spikes of light bronze-red flowers appear coral in color from a slight distance. This species varies greatly from seed, a superior strain preserved only when propagated vegetatively. In areas of heavy frost, all

Two clusters of the pure red flowers of *E. coralloides*. Blooming period is from March through May. Photo courtesy of Huntington Botanic Garden

growth dies back each season, followed by copious blossoms on new growth the following summer and fall. Where frosts are light to absent, this species grows to a multiple-trunked tree of fifteen to twenty feet height and spread. But wherever or however grown, old bloom carrying limbs should be cut back severely immediately after blossoms are past. This method of pruning results in several waves of bloom —in mild areas, three or sometimes four blooming periods—spring, summer, fall and occasionally winter in fairly rapid succession.

Erythrina bidwilli, a hybrid between *E. herbacea* (which is not in the Southern California markets) and *E. crista-galli*, is usually a shrub but occasionally tree-like after some years. It is the most cold hardy of the corals, bearing long, willowy limbs with many spikes of purest red flowers. It blooms from the advent of warm weather until early the following winter, provided the spent blooms are carefully removed and no dead wood is allowed to accumulate. Culturally, *E. bidwilli* has wide tolerance but it prefers fairly good drainage, hot sun and an uncramped position.

Fast becoming one of the most popular and significant of the coral species grown here is *Erythrina humeana*. It is a fairly recent introduction from Africa. One of its best attributes is the extremely early age at which it begins to flaunt its brilliant red-orange banners. A second stamp of merit is its long season of great show—July to December. The third feature is its speed of growth; and fourth, its medium size

maximum height which permits its use in fairly small gardens. Although frankly deciduous, December to March, it is questionably hardy in cold areas. Culturally it seems equally happy with lots of water (except perhaps in cold weather) or with very little, in heavy soil or sandy.

A large tree, less fast growing than most, with generally poorer quality foliage is *Erythrina lysistemon* (formerly mistaken for *E. caffra*). This species is one of the older corals in California. In mild seasons, its orange flowers occur in abundance intermittently from October to May, rarely in summer. Its numerous black thorns on light beige to gray bark are conspicuous features on young trees. Established specimens tolerate occasional intense cold of brief duration. It does poorly in heavy, wet soils and blooms much better outside lawn areas.

Evans and Reeves Nursery

NAMES, NOTES AND NEWS

BIRD NOTES

The extensive development and increased activities at LASCA seem not to have made any noticeable changes in the bird life. The rare resident, the Red-bellied hawk nested last spring. Other residents: the Pied-billed grebe, Redwing, Mourning dove, Tule yellow-throat, Black phoebe and Song sparrow are still plentiful. Winter visitors such as: Chipping, Gambel and Fox sparrows, Canvas back, Shoveler and Ruddy duck came in this fall. Two new additions to our bird list, the Buffle-head duck and the Wilson snipe (bringing the official count to 165) were seen this fall.

Last spring we saw two beautiful wild ducks, probably a pair, out on the lagoon. These ducks were not listed in any of the North American bird books. Our guess is that they were gypsy-footed ducks from Mexico or Central America, probably a romantic lad and lassie who were 'born the next of kin to the wayward wind' and just couldn't resist the temptation to spend a day or so at the scenic and historic lake.

An invitation is extended to all to come and enjoy the hobby of bird watching. The Arboretum sponsors early morning bird walks on the first and third Sundays of each month. These walks start from the Gatehouse, 301 N. Baldwin Ave., at about 8:00 a.m. and last approximately one hour and a half. Mr .Gerry Patten, Arboretum Research Aid, conducts the walk.

W. Dan Quattlebaum

Annual Descanso Gardens Camellia Show to Attract National Attention. Camellias from southern and western states of the nation will compete with locally grown Southern California Camellias at the Annual Descanso Gardens Camellia Show in La Canada, California from March 2 through March 10, 1957. Co-sponsoring the Camellia Show will be the Los Angeles Camellia Council, Ltd., and the Department of Parks and Recreation of Los Angeles County. On the closing days, March 9 and 10, a special Camellia Arrangement Show will be presented which will feature Camellias in flower arrangements of every conceivable type.

LASCA LEAVES REPRINTS

The Arboretum will furnish reprints of articles appearing in *Lasca Leaves* at the following prices:

	Cost per 100 copies	
2-page reprints	$4.00	(minimum order $5.00)
4-page reprints	$8.00	(minimum order $8.00)
8-page reprints	$16.00	(minimum order $16.00)

The cost per page is $2.00. A single page takes a 2-page price; 3 pages a 4-page price; 5, 6, and 7 pages take an 8-page price.

Orders for reprints must be placed before *Lasca Leaves* goes to press. We suggest that orders be placed at the time the author is notified of article acceptance.

COVER PICTURE

Against fresh white clouds and blue sky, stands the new Administration Building of the Los Angeles State and County Arboretum. This building and its facilities marks a high point in the planning and development of the Arboretum. In time, other buildings, greenhouses, and workshops will be added; however, none will create the feeling of establishment which this building announces to the horticultural world and the people of the Arboretum. All hail this edifice—long and distinguished may its history be. Photo by L. B. Martin.

IN MEMORIAM

The members of the Southern California Horticultural Society and the California Arboretum Foundation, Inc. express their deep regret and share in sorrow with Mrs. Orpet, the recent death of her husband, Edwin Owen Orpet. A brief account of Mr. Orpet's life and horticultural achievements appeared in *Lasca Leaves,* Fall, 1956.

BOOK REVIEW

Art of Growing Miniature Trees, Plants and Landscapes, by Tatsuo Ishimoto. New York, Crown Publishers, Inc., 1956. $2.95. 143 pp.
Bonsai Miniature Trees, by Claude Chidamian. Princeton, New Jersey, D. Van Nostrand Company, 1955. 96 pp. Indexed. $3.95

Bonsai, or the art of dwarfing trees in small containers is centuries old in China and Japan, but new to the United States. These two books give essentially the same information in entirely different presentations.

Mr. Ishimoto in his *Art of Growing Miniature Trees, Plants and Landscapes* has given us the most authentic and practical exposition of this art published to date in this country. His purpose is to present a simplified, quicker method of growing bonsai for the speedy American, who does not want to wait fifty years for results. Actually he has written a pictorial handbook on the science and technique of bonsai culture. The complete procedure is described—selection of trees, where to find miniature trees, selection and preparation of a container, how to remove tree from nurseryman's can or pot, how to plant the miniature tree, transplanting from one container to another, how to design miniature landscapes, how to shape the tree with wire, how to shape by pruning and pinching, how to change form by wiring and pruning, how to care for trees—in fact every detail of this delightful art is clearly explained and illustrated. The whole book is beautifully illustrated by photographs from the author's collection of bonsai; the photographs showing pruning methods and other instructions are easy to follow. Although written for the layman, the information imparted in Mr. Ishimoto's lucid style and by his excellent photographs would be of great interest to the horticulturalist.

Mr. Chidamian's *Bonsai Miniature Trees* is written in essay style with a few illustrations and ten pages of line drawings throughout the text to show procedures. He gives more background information on the early history of bonsai in China and Japan; Siebold was the first to write about them in the West in his *Flora japonica.* He discusses the Buddhist philosophy behind the arrangement of natural scenes recreated in he bonsai bowl. He philosophizes about the character and home life of the Japanese. His information as to procedure in selection and cultivation of bonsai is the same as Mr. Ishimoto's.

Both books make one wish to start a bonsai garden, but neither paints it as an easy art; patience and skill are required. There seem to be no discrepancies in regard to cultural practices in growing bonsai plants.

DORA M. GERARD

Alice Eastwood's Wonderland; the adventures of a botanist, by Carol Green Wilson. San Francisco, California Academy of Sciences, 1955. 222 p. $4.50.

Mrs. Wilson draws an admirable picture of Alice Eastwood, an indefatigable spirit who hiked all over Colorado and California with her prized copy of Gray's Manual in her youth, and later botanized with famous botanists. During her lifetime which spanned 94 years she became recognized as one of the world's outstanding botanists. Her contribution to the botany of California was enormous.

The author wrote from personal conversations with Miss Eastwood, from her partially completed Memoirs, her "line-a-day" diary, her published writings, from letters, scrapbooks, and official records of the California Academy of Sciences. This reviewer wishes that she had used more direct quotations from letters and diaries to lend verisimilitude to her character. In a biography of this nature one misses the humor and self-criticism of an autobiography.

The book begins with Alice Eastwood's arrival at the 7th International Botanical Congress in Sweden in 1950, where at 91 she had the intense pleasure of sitting in Linnaeus' chair. We are then taken back to her childhood in Denver, her early years of teaching a variety of subjects, interspersed with botanizing in all her spare time. Eventually she became associated with the California Academy of Sciences and devoted the rest of her life—61 years—to the development of its department of botany and herbarium. The institution of today is tremendously indebted to her work. During her life many honors came her way, she traveled to Kew, Cambridge and Paris, went on a valuable collecting trip to the Yukon, studied at the University of California at Berkeley, the Gray Herbarium, and the New York Botanical Garden.

The description of the San Francisco earthquake in 1906 and Alice Eastwood's part in saving the Academy's herbarium specimens is one of the most interesting parts of the book. Botany was her vocation and recreation, with no retirement desired, nor any surcease from mental development. Throughout her life one gets glimpses of famous botanists—Brandegee, Muir, Burbank, Eisen, Hooker, Hertrich, Engler, Hutchinson, Wallace, Britton, Loomis and others. One learns something of the origin of *Leaflets of Western Botany* and *Zoe*.

From reading this book one realizes the world-wide camaraderie among botanists, and the tremendous energy of this woman, her capacity for friendship and her disregard of material values. Immortality is assured in the names of plants—*Mertensia eastwoodiae, Eastwoodia elegans*, and *Zauschneria eastwoodae*.

The book has an attractive format with a cover design of *Eastwoodia elegans* by Gertraud Duell and chapter heading of pen and ink florals by Toshio Asaeda.

DORA M. GERARD

* * *

Native Australian Plants: Their Propagation and Cultivation, by A. M. Blombery. Sydney, Angus and Robertson, 1955. 107 pp. Indexed. 17/6

In its treatment of the seeding and propagation of native plants, this book actually precedes Taylor's *Wild Flower Garden* as a companion volume. Plants native to Australia grow in profusion in Southern California and are of great interest to us. There are similar climatic hazards in Australia—hot, dry winds and forest fires, but a difference in timing of the seasons; so when Mr. Blombery mentions the month one must keep Australia in mind, otherwise we can assume conditions of summer, autumn, spring and winter are the same.

The explicitly detailed instructions in this book combined with the fine line drawings illustrating plant organs and materials used, make it an admirable course in plant propagation for the beginning horticultural student. The repitition of simple facts has been done purposely to emphasize their importance. Descriptions are given of seeding patterns of various plants, methods of collecting and sowing seed, seed boxes, types of seed, propagating by seed and propagating by cuttings. Propagation by cuttings has been found more satisfactory than transplanting of seedlings.

The author is more encouraging than Mr. Taylor in his presentation. For instance, all the plants he mentions have been grown around the environs of Sydney and no attempt has been made to replace soil to resemble natural soil for native shrubs, nor are isolated native gardens recommended, but rather native plants intermingled with other garden flowers.

Scientific terms and botanic names are used accurately throughout the text. The information given on the propagation and cultivation of the 40 species listed is derived from actual experience of the author. The same rules would apply to a wide range of native species. Seeds are described, but not the whole plant. There is a list of botanic and common names in the back.

"As built-up areas expand into rural zones our native species are becoming increasingly rare in their wild state." This quotation from the forword by K. Mair sounds like a description of the Los Angeles area. The cultivation of natural plants is encouraged to preserve the natural flora of Australia.

DORA M. GERARD

Exotic Plants Illustrated: Their Requirements and Background, by Alfred Byrd Graf. 3d ed. Rutherford, New Jersey, Julius Roehrs Company, 1955. 96 pp. $2.50

This is an unusual and interesting volume. Published by a nursery, it should be valuable to nurserymen and botanists for plant identification. There are 1400 tropical and subtropical plants illustrated with cultivation requirements; this is done in a small space by use of a key. The first page is "Your Key to care of Exotic Plants", thus:

"*Saintpaulia amaniensis* (Tanganyika) from Usambaras near Amani 3000 ft., habit similar to *diplotricha* with medium blue-violet flowers. WAHFM 908

1. Temperature
   W—Warm: temperature 65-80°F.—18-26°C.
2. Location
   A—Temperate to warm greenhouse; suitable for heated apartment or home decoration.
3. Soil
   H—Soil rich in humus or leafmold, peatmoss and some rough manure; add small amount of loam.
4. Light
   F—Filtered or difused sunlight. Preference: 1000-3000 foot candles for average daylength. Tolerance: 10-1000 foot candles, based on 16 hr. illumination. For maintenance most plants in this group in good condition in the home, light intensity may go as low as 25 foot candles, though 100 would be better.
5. Moisture
   M—Moist: keep moist but don't let soil become water soaked. If standing in a saucer, such plants like to be watered from the base, for even moisture.

908 refers to photograph number.

All this information is contained in the two lines quoted above. For those dismayed by keys or codes, this one is very simple. There is also a "World Map showing the Tropic Belt", "Temperature and Rainfall of typical locations in the Tropic and Subtropic Zones of the World", "Insect Enemies of Your Houseplants" with a 10 point key for controls, then the photographs of 1400 exotic plants alphabetically listed by family—Begonias, Bromeliads, Ferns, Ivies, Marantaceae, Orchids, Philodendrons, Saintpaulias, Succulents with Cacti. There is an aerial view of Roehrs greenhouses and most interesting background and habitat pictures.

Mr. Graf says "this picture book is intended to acquaint all plant lovers with the large variety of good house plants and conservatory ornamentals in cultivation."

DORA M. GERARD

Ground Cover Plants, by Donald Wyman. New York, Macmillan Company, 1956. 175 pp. $4.75

A publication by Donald Wyman of the Arnold Arboretum is always worthy of note, especially as in this case it is the only comprehensive work on ground covers or soil covering plants to take the place of grass. It is a subject of great interest in Southern California with our hillside and beach homes and freeway development. This book is a gem for the home gardener, landscape architect, horticulturalist and for the agriculture librarian who has many questions on this type of plant. The author has done a fine piece of work in describing 250 kinds of woody plants and herbaceous perennials that can be used as ground covers in the central and northern parts of North America. Although there is only one plant for Zone 9 (Southern California) listed and some names familiar to us are not given because of the geographic area covered, many of those listed are common here such as Euonymus, Geranium, evergreen Candytuft, some of the Juinpers and variegated ground ivy. Chapters discuss the uses of ground covers, hardiness, planting, general maintenance, winter protection, pruning, propagation and equipment for propagation. Useful details are given on interplanting with bulbs, bank planting, fertilizing, heaving of small plants in cold weather, replanting, mulching, division, layering, seed, cuttings, root cuttings, the plastic unit, rooting medium, electric hotbed, building the frame, preparing the hotbed, covering the hotbed and the heating element.

As an aid to the home owner in suiting his needs one chapter lists ground covers for special purposes: plants that increase rapidly, evergreen ground covers, flowering ground covers, groundcovers for seashore planting, ground covers that can be cut with a lawn mower, etc. The last chapter gives an alphabetical list of plants used as ground covers under the scientific name, with size, zone, common name, description of flowers, foliage, habitat and method of propagation, accompanied by a descriptive paragraph on the habits and merits of each plant.

In his clear concise style which makes good reading, the author imparts many facts helpful to the gardener and does not pre-suppose technical knowledge on the part of his reader. Information is up-to-date including the use of polyethylene film for propagating and keeping soil moist.

The end-papers consist of a hardiness zone map to which the reader may refer while studying a particular plant. Line drawings illustrate the chapter on propagation, there are 41 black and white photographs of attractive ground covers in the middle of the book, and an excellent index at the end.

DORA M. GERARD

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CONTENTS

Horticultural Research Notes on Gibberellic Acid

W. S. Stewart and F. T. Ching

Gibberellic acid, a relatively new chemical in the field of plant hormones, is now readily available for research and horticultural uses and is being widely advertised. One company is selling the crystalline potassium salt of gibberellic acid under the trademark of "Gibrel". In general it has the effect of causing elongation of plant cells and when applied as a foliage spray it frequently induces the stems to grow longer. This response may have numerous horticultural and agricultural applications when it is desired to obtain taller plants faster(1).

Another response induced in some plants by gibberellic acid is an acceleration of flowering and breaking dormancy. Lettuce, a biennial which requires a cold winter before flowering, will flower without the cold treatment when sprayed with gibberellic acid(2, 4). Hyoscyamus, another plant which requires a winter dormant period prior to flowering, has flowered in response to gibberellic acid applications without the dormancy(3).

In view of the wide popular interest in gibberellic acid results obtained from experiments at the Los Angeles State and County Arboretum during the past eight months are presented here in the form of a brief progress report.

In these experiments gibberellic acid was applied either as a drenching foliage spray or in lanolin as a narrow ring about 3 mm (⅛ inch) wide around an elongating stem.

The first series of experiments, initiated in September, 1956, were with greenhouse grown tomato seedlings var. ponderosa (Ferry Morse selection) about 15 cm (6 inches) in height at the time of treatment. The expected stem elongation resulted from both the lanolin ring applied around the stem at the cotyledonary node and the foliage spray. An unexpected difference

Fig. 1. Tomato seedlings sprayed on October 26, 1956 at 10 A.M. (left) or 3 P.M. (center) with 25 ppm gibberellic acid. Nonsprayed plant at right. Average height November 5, was 24 cm., 27 cm., and 14 cm. respectively. The differences were statistically significant at 5%.

was found between sprays applied at 10 A.M. or 3 P.M., the latter inducing a statistically significantly greater elongation than the 10 A.M. spray. This difference may be due to a physiological difference within the plant at these hours of observation. However, it could be due to some other factor, for example, relative humidity, which only influences the penetration of gibberellic acid into the plant. The experiment should be repeated to confirm these results.

The second test plants used were *Eranthemum atropurpureum* seedlings grown in the greenhouse. An application of lanolin paste containing 25 parts per million (abbreviated "ppm") gibberellic acid was made on September 17, 1956, at the uppermost node. Subsequent measurements showed that, as expected, both the internode above and below the treated node

FIG. 2. Rooted cuttings of *Eranthemum atropurpureum* treated September 17, 1956 at the uppermost node with: left, a ring of lanolin containing 25 ppm gibberellic acid; right, lanolin only. Photographed November 6, 1956.

grew significantly longer than those on the untreated stem.

The third series of test plants were greenhouse grown seedlings of *Carica papaya* var. *solo*. On October 26, 1956, when the seedlings were 15 cm (6 inches) in height, gibberellic acid was applied either as a foliage spray or in lanolin as a ring around the stem about 5 cm (2 inches) above the ground level. The spray induced the expected stem elongation. The lanolin ring application, however, failed to induce elongation but instead caused the stem to grow in thickness at the site of application. This experiment was repeated with similar results. A ring of pure lanolin (no gibberellic acid) failed to induce stem thickening. In both experiments the increase in stem diameter compared with nontreated stems was statistically significant. Microscopic observation showed that apparently all stem tissues had been increased in thickness in the same proportions as in the nontreated stem. Further studies should be made to determine if cell size or cell number was increased by the treatment.

A fourth series of tests was initiated to determine the effect of spray applications of gibberellic acid on young grape clusters, at the suggestion of Mr. Gwynn Wilson, of Coachella Valley, California. The object was to determine if the fruit stems could be induced to elongate sufficiently to avoid the necessity of cluster thinning. In cooperation with Mr. Wilson and Mr. Dean Halsey, University of California, Riverside County Farm Advisor, experiments were initiated in Coachella Valley on March 7, 1957, using both Thompson Seedless and Perlette grapes. Though not yet harvested it appears as though strikingly favorable results are being obtained.

The fifth series of horticultural experiments with gibberellic acid was to determine its effect on the stem of pansy flowers when applied as a foliage spray. Pansy varieties "Pay Dirt" (yellow) and "Sea Blue" were sprayed with a 100 ppm solution of gibberellic acid on March 18, 1957. Measurements on March 28, 1957, showed a statistically significant increase in flower stem length of 46%.

FIG. 3. Stem of *Carica papaya* var. *solo*. Left, nontreated; right, treated November 9, 1956, with 250 ppm gibberellic acid in lanolin applied as a ring around the stem. Photographed March 28, 1957.

In the sixth series of tests acceleration of germination of seeds of *Gilia capitata chamissonis,* a native California annual, was observed after soaking them in 100 ppm gibberellic acid solution.[1] The germination was 32% for the treated seeds compared to 2% for the nontreated. This difference was statistically significant.

These examples of various and assorted growth responses to gibberellic acid show the wide range of horticultural applications gibberellic acid can have in horticulture. Complete details of these experiments and of other studies on orchids will be reported later.

[1]This work is a portion of the "Flower Carpet" research project supported by a grant from the Longwood Foundation. The seed was graciously supplied by the Rancho Santa Ana Botanic Garden.

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BOOK REVIEW

Native Plants for California Gardens. Lenz, Lee W., 166 pp. Rancho Santa Ana Botanic Garden. 1956. $3.85 from the Abbey Garden Press, 132 West Union Street, Pasadena, California.

During the past one hundred years of cultivation California plants have become garden favorites throughout the world, better known abroad than in their native state. This attractive volume is an outgrowth of the *Leaflets of Popular Information,* a series published by the Rancho Santa Ana Botanic Garden and for many years a reliable source of information concerning the culture of our native plants. It introduces the average home gardener to one hundred and one native plants which are outstanding ornamentals. Each plant is described and its propagation and garden use discussed. The information is based on years of experience with these plants under cultivation at Rancho Santa Ana Botanic Garden and on the author's personal observations. The book is profusely illustrated with one color plate and one hundred half-tone illustrations which will assist the gardener in his recognition and choice of plants.

The recommendations of plants are primarily for southern California but the use of the book will extend far beyond that geographical area to wherever a zealous gardener is interested in trying unique material. It is a must for every gardener's reference shelf, for the nurseryman and for the landscape architect, a source of information not otherwise readily available on the cultivation of some of the finest ornamental plants.

The author is to be commended for the organization of the book and for the interesting introductory chapters. The discussion of major vegetation types in California will contribute to the gardener's understanding of the cultural requirements of many individual plants. This chapter together with those on propagation and handling of native plants and on their garden uses are of particular interest. The chapter on the botanical and horticultural history of the state will give the reader a new appreciation of the unique character of the California flora and its numerous contributions to horticulture.

A greatly reduced illustration from the book

—MILDRED E. MATHIAS

CITRUS FOR ORNAMENTAL PLANTING IN CALIFORNIA

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INTRODUCTION

THE USE OF CITRUS for ornamental purposes has been a much-avoided subject. Although the beautiful appearance of a citrus tree and its fruit were chiefly responsible for its world-wide spread up until the 18th century, only a few articles discuss entirely or, in part, the decorative nature of citrus.

In the first published book devoted entirely to citrus, Ferrari(5) in 1646 illustrated numerous citrus varieties and "orangeries". The "orangeries" depict citrus planted as espaliers, pot varieties, hedges and in other landscape situations. Tolkowsky(12) traced the history and use of citrus fruits from its origin to modern times, and lavishly illustrated its ornamental use through reproductions of archeological specimens, relics, mosaics, tapestries and paintings from the European archives. Dooryard citrus plantings in Florida are discussed by Granger(7) but most of the article is devoted to cultural practices and pest control, rather than citrus varieties and how they might be used ornamentally. For California conditions, Bitters(4) presented data on dwarfing citrus rootstocks and the possibilities they would have for home use, but did not adequately consider the top varieties with which they might be used. Subsequently, dwarf citrus varieties were considered and evaluated for California use(1).

The climatic adaptation of citrus and the use of microclimates in California home plantings in order to expand the range of citrus were further elaborated in 1953(2). Further consideration of what to plant and where to plant was later more extensively discussed in 1955(3). None of these articles bring all the interesting or pertinent factors together; a little history, a little legend, some landscape principles to be considered, an evaluation of varieties, dwarfing, espaliers, pot varieties, special considerations, etc. It is for this purpose that the present article is intended in order to acquaint the home grower with the situations where citrus may be used in his landscape design and with the varieties available to plant for such purposes.

HISTORY AND LEGEND

Any discussion of citrus for ornamental purposes would not be complete without a review of the history and distribution of *Citrus* itself. The ornamental aspect of the trees and fruit, and the pride and distinction that accompanied possession of such trees were perhaps more important in the spread of *Citrus* than the edibility of the fruit.

Most historians will probably agree that citrus was native to southeastern Asia. Regardless of origin, mention of miscellaneous citrus species is first made in early Chinese writings before 2000 B.C., occasionally in the eleventh and twelfth centuries B.C., with frequent reference occurring in poems and lyrics of the third and fourth centuries B.C. Citrus was not, however, associated with the poorer class of people, but rather with the nobility. The term "mandarin" has come down through the centuries as applied to the loose-skinned oranges (tangerines) which originated in China and were associated with the Mandarin ruling class. The fingered citron, *(Citrus medica* var. *sarcodactylis)* was known as "Buddah's hand". Ancient urns and later even teapots were cast after its image.

After the early Chinese reports, citrus is frequently mentioned in the ancient writings from Japan and India. The fruits were reserved for and treasured by the rich.

The Medes and Persians in their conquests became acquainted with the citron and spread it to the shores of the Mediterranean. They were perhaps the first to use it in religious rites. Among relics uncovered from ancient archeological ruins are coins bear-

ing the image of citrons. Other articles bearing citron fruits imprinted thereon have also been found. The citron became an important part of the Hebrew's religious rites, and the Etrog citron is currently utilized in certain Jewish services, namely the Feast of the Tabernacles. The Bible, however, makes no reference to citrus fruit. The term "apple" was loosely used as a term for fruit in general, and the citron is still occasionally referred to as the Persian apple or Median apple.

The conquest of Alexander the Great introduced the citron to Greece. Later, conquests by Rome extended it to the shores of Italy. Both Greece and Rome recognized its decorative value and ancient mosaics, murals and sculpturings, found in their temples, public baths and other public buildings included the citron. Such mosaics were found in the ruins of Pompeii, Tusculum and other Roman cities.

There are many legends concerning citrus in ancient mythology; only a few are mentioned in this article. One of these suggests that at the wedding of Jupiter and Juno, the king and queen of the gods, a tree sprang up bearing golden fruit. So proud were the gods of this fruit, but so fearful of its being stolen, that they placed it on the Isles of Hesperides with Atlas the giant to guard them. The hero, Hercules, was assigned as one of his twelve tasks, the feat of obtaining some of these "golden apples of Hesperides". As you know he succeeded, although the giant Atlas almost tricked him into holding up the sky. Apparently later Perseus who slew the Gorgon (from out of whose body sprang Pegasus, the winged horse) must have also visited the Isles of Hesperides. Atlas, fearful that Perseus was going to steal some of the "golden apples," tried to force Perseus to leave, and Perseus, holding up the head of the Gorgon, turned Atlas to stone—and the Atlas mountains in northwestern Africa hold up the sky today.

There is also the story about the Grecian maiden Atlanta, who was as fleet of foot as she was beautiful. She had many suitors, but her conditions for marriage included beating her in a foot race. If they did not, they lost a very important part of their anatomy when they were beheaded. One of the suitors, Hippomenes, obtained some of the golden apples and beat her in the foot race by rolling the apples at her feet as she passed him, and won as she stopped to pick them up.

These are but a few of the legends and myths. How and when these legends arose is not known, but it should be pointed out that the citron was apparently the only citrus fruit known to these countries; the sour orange and the sweet orange were introduced centuries later. The citron is also frequently mentioned in the writings of Theophrastus, Vergil, Pliny and other writers of that period.

In passing, it might be of interest to briefly mention the origin of the name "citrus". The citron fruit had many uses. Among these were an exquisite odor (perfume), a cure for poison, correcting feted breath, relief to asthmatics, protection against moths, a remedy for rheumatism and sore mouth, a cure for intestinal disorders and a cure for dyspepsia. According to one explanation, since the fruit had the same general uses as the wood of the Sandarak tree, *(Callistrus quadrivalis)* the ancient name of this wood was applied to the fruit as *Mala Citrea.* The naming of the Median apple as the citrus apple led to the application of the name "citrus" first to the citron and later to other citrus fruits. According to another explanation, the word citrus was derived from the Roman designation of the African citre (*Citrus lybica* Varron). The African citre was cypress-like in appearance and was valued for its beautiful wood. This wood later became extremely rare, and while wood of the citron bore no resemblance to it, the high esteem with which both were regarded probably led to the application of the term "citre" to the Median apple.

The Moors or Arabs in their era of conversion by the sword, spread the sour orange throughout northern Africa and into Spain. They recognized the ornamental value of the sour orange and incorporated it into their planting designs. Beautiful mosques were built in Cordoba, Granada, Seville and many other Spanish cities. Supposedly, the largest and

FIG. 1. The "Mosque of the Omayyads" and the "Patio de los naranjos" built in Cordoba, Spain in 976 A.D. by the Moors, illustrating the use of sour orange in landscape design.
(After Tolkowsky)

most magnificent in all Islam was the Mosque of the Omyyads, built at Cordoba in 976 A.D. In connection with it, the "Patio de los naranjos" or courtyard of the oranges, was completed at the same time. Sixteen rows of sour orange trees, each running up to one of the arched entrances of the mosque, were orientated so the axis of the orange rows were in direct line with the pillars inside. This is one of the best examples of the symmetry and integration of planting design with architectural design which is so characteristic of the moslem architecture. The lemon was also introduced to Europe by the Arabs, a little later than the sour orange.

The Crusades opened to the people of Europe those areas which had been closed by the expansion of the Arab empire and re-awakened a taste for arts and luxury. The Crusaders were men of the highest class and rank, and were attracted by the desirable products of art and agriculture in the new lands, and sought them for their homes in their native lands. As a result the sour orange, lemon and lime were soon widely cultivated. The sweet orange reached Europe around the 15th century, probably an introduction of the early explorations of the Portuguese.

According to another legend, the King of Spain and his court highly prized the sweet orange. When the French Ambassador in his visit to the court first saw an orange tree, he was greatly intrigued and wanted to present one to the King of France as a gift. The King of Spain, proud of these trees, would not part with any. Later at night while walking through the King's garden, the French Ambassador came across a pretty girl who was weeping. Upon asking why she was crying, the maiden replied that she was engaged to be married, but her father who was the King of Spain's gardener was so poor he could not furnish the dowry. The French Ambassador rose to the occasion and supplied the dowry in exchange for propagating material of the citrus. The girl was married, and in appreciation for the part the orange played in obtaining her dowry, wore orange blos-

soms at her wedding, and as the story goes, so started the custom of orange blossoms at weddings.

"Orangeries", or buildings for growing citrus, spread throughout Europe during the Middle Ages and the Rennaisance as a result of the Crusades. The first published book devoted entirely to citrus was printed in 1646 A.D. It was written by Ferrari and titled, "Hesperides". In it may be found a number of drawings of these orangeries. The art of budding, espaliering, growing trees in small containers, the "Verdelli" practice of making trees bloom off season were apparently well known at that time.

By far the most elaborate of these orangeries was that built by Louis XIV at Versailles, France in 1682 A.D. The main body of this building was 500 feet long and 40 feet wide, supplemented by wings 350 feet long at both sides. Louis XIV used the potted citrus as ornamentals about the courtyard and in the palace, especially in entertaining at state occasions. His gardeners too used the "Verdelli" practice, and Louis had the scent of orange blossoms at his disposal the year around. This building still exists and is currently used for this purpose.

Modern transportation and world trade brought to an end the monopoly that the noble and rich held on citrus, and by the end of the 17th century even the commoner was becoming acquainted with, and enjoying the taste of citrus fruits. Familiarity depreciated the intrinsic value of the fruit and the trees, and its novelty as an ornamental faded as the fruit became of increasing commercial value.

LANDSCAPE PRINCIPLES

A good discussion of landscape principles may be found in Robinson(9). Whether these principles are acceptable today or not, they serve to point out the importance of the three design factors: color, texture and mass and what to look for in citrus varieties to be used for ornamentals in a landscape design.

COLOR: The landscape gardener has at his disposal a range of plants from small flowering succulents, through herbaceous plants and vines, to trees. In addition, they may be deciduous or evergreen, and have various foliage colors as well as the tremendous range in color of flowers, size of flower and season of bloom. In citrus, color is more limited. In those which might be used as ornamentals, the color of the leaves is, more or less, a basic green. One can also consider the color of the new growth, which is in some instances, a reddish purple, and also the flowers, which are generally white, although some are pinkish or tinted with purple. Bloom is generally confined to the spring season. The fruits, however, may be very striking in color, generally orange, but may be green, blue, brown, yellow or even red. The fruits also vary widely in size, in number and the length of time they are on the tree.

TEXTURE: Texture in landscaping refers to the degree of fineness or coarseness, as it pertains to plant parts. A catalpa tree has a much larger and leathery leaf, for example, than the finely divided, feathery leaf of a jacaranda tree. A fan palm is much more coarse or rougher textured than a cocos palm. In citrus too, texture is a factor although confined chiefly to size and spacing of leaves. The size of the leaves and the distance between the leaves varies greatly. The shape of the leaf, whether compound or simple, and the surface texture of the leaves are further factors for consideration. The shaddock leaf may be eight to ten inches long and four to five inches across, whereas, that of the finger lime may be one inch long and one-half inch across. Leaves of the box orange are almost round and leathery, while those of the orange jessamine are finely divided and fragile.

MASS: Mass in landscape design refers to the size and form of a plant. Some plants are markedly dwarfed while others grow quite high. Plants are variously shaped—some grow as mats, others as hedges, some are dome-shaped, egg-shaped, vase-shaped, pear-shaped, columnar, etc. In citrus, considerable size variations occur. Some plants such as the ponderosa lemon are inherently dwarfed and slow growing, and may be grown in

pots; others, such as the sour orange, grow large enough to make excellent shade trees. Citrus trees also vary in shape and many withstand pruning to shape.

In any planting design it is desirable that two of the three design factors be kept constant, one may vary. For example, if mass and texture are constant, color may vary. If color and mass are constant, the texture may vary, etc.

In applying these three important design factors to a planting, their use is governed by five simple principles which are important considerations. The principles are: simplicity, scale relationship, balance, sequence and focalization. These principles apply very well to the use of citrus in a planting.

SIMPLICITY implies restraint in use of plants. Don't over-do the planting or the design factors. It is best accomplished by repetition and the use of a few forms so as to emphasize a singleness of impression. A few citrus trees go a long way.

SCALE RELATIONSHIP involves a knowledge of the ultimate size of the citrus plants as well as their texture. Don't plant a citrus tree that will have an ultimate growth of 15 feet, for example, in front of a four foot window. Likewise, this will avoid planting tall or vigorous citrus in front of slow growing or dwarf selections.

BALANCE calls for related organization of the plants as far as their distribution and use in a planting. It is brought about by uniformity of contrast and symmetry. Thus tree roses are planted on both sides of a walk—not the tree roses at one side, and hollyhocks on another. Likewise at the entrance to a driveway one doesn't plant a Lombardy poplar on one side and a cypress on the other, the trees are paired. This consideration should be given to the use of kumquats, calamondins and citrus trees with similar growth characters.

SEQUENCE is concerned with proper graduations of the design factors; color, texture and mass. Sequence is thus a uniformity of change, movement or transition from one line to another, one mass to another, one color to another, etc. In a planting, a tall variety should not be planted next to a dwarf variety, but rather plants of intermediate height are used from border to background. Likewise certain colors clash and varieties should be planted in which colors blend well or moderate one another. Be familiar with the citrus varieties, particularly their size and texture and how they may be associated or blended with other plants in the planting.

FOCALIZATION is a uniformity of emphasis. It is the proper use of plants to accent or highlight, and in some instances subordinate, a particular object, or modify line or form. Plants may be used to attract attention to a fountain or sundial, or to modify the sharp angle of a roof or gable, or to hide a compost pile. The striking color of citrus fruits will readily attract attention and the compact, dense foliage provides a good screen.

In a planting design, citrus may be used for the following purposes: hedges, basal plantings, shade, corner accent, framing, individual specimens and backgrounds. Special consideration may be given within these situations to the use of espaliers, variegated varieties, oddities, dwarfing rootstocks and even specimens that can be confined to small containers. In the discussion which follows, the author indicates the citrus varieties which he thinks have ornamental possibilities and suggests how they may be used. While the number of citrus varieties available for such purposes is very limited, they are deserving of special consideration for planting. Most citrus has beautiful dark-green, glossy, evergreen foliage. Secondly, while the blooms are not very showy, they are exceptionally fragrant and several selections are nearly everblooming. Lastly, the fruit is in many instances edible or useable in one form or another, besides being attractive and showy, and may hang on the tree for long periods of time.

By the term "citrus" the author is referring to the taxonomic classification of W. T. Swingle(11) which refers to those plants in the orange subfamily *Aurantioideae* in the plant family *Rutaceae* and includes those genera and species of the Tribes *Clauseneae* and *Citreae*. In this article both citrus and the citrus relatives are referred to under the general heading of citrus since they are so closely related, may be generally intergrafted

or hybridized and have similar potential ornamental qualities. The author has also confined his remarks chiefly to specimens with which he is familiar and has observed in the citrus variety block at the Citrus Experiment Station or in various landscape plantings throughout southern California. For lack of any simple systematic way in which to discuss these potential ornamental specimens, they are principally presented according to specific grouping and within the group in the alphabetical order of their commonly known names.

If the same amount of care is given to a citrus tree as to a rose, gardenia or camellia plant, the results will be equally as satisfying. Cultural practices, irrigation, pest control, fertilization, etc. are thoroughly discussed by Johnston (8) and will not be gone into here.

VARIETIES TO CONSIDER

The Sour Orange Group

BOUQUET SOUR ORANGE: The Bouquet Sour Orange has been occasionally grown in both California and Florida as an ornamental shrub. The variety has been very often confused with and mistakenly called the Bergamot Orange. It is apparently identical with the Bouquet des Fleurs and generally just called Bouquet. The Bouquet is a type of the sour orange with very closely spaced leaves. Specimens rarely grow over eight to ten feet high and are somewhat spreading with dense foliage which tends to cluster because of the short internodes (distance between leaves). The leaves are more rounded than those of sour orange and the fruits are not as large or as conspicuous in color, in addition to containing fewer seeds. An extensive hedge of this variety may be found at the Citrus Experiment Station, Riverside, California. This hedge is now 40 years old and is still healthy and beautiful, requiring a minimum of pruning. It appears to be well adapted for this purpose, but is not nearly as fruitful as individual specimens. As a shrub it could be used in situations similar to those in which pittosporum is commonly grown. It is generally propagated by budding. The fruits are sour, like a sour orange and can probably be used for making marmalade or even pie. The tree could also be used for framing, corner accent, an individual specimen or even backgrounds. This variety has been extensively grown in southern France where the flowers are used in the manufacture of perfume.

CHINOTTO AND MYRTIFOLIA ORANGES: Although somewhat distinct the Chinotto and Myrtifolia orange *(Citrus aurantium* var. *myrtifolia)* will be discussed as a group since they are so similar. Both are apparently variants of the sour orange.

The Chinotto has a slightly broader leaf than the Myrtifolia and a more open type growth. The flowers are not as showy. It annually bears a very heavy crop of deep orange-colored fruits, slightly flattened in appearance, and about one and three-eights inches in diameter. This profusion of bright colored fruits, which persist throughout the season, superimposed on the dense, fine textured foliage make this variety *ne plus ultra* of the natural dwarf selections. The juice is usable for making a refreshing drink. Some strains are seedless and are prized for the preparation of candied oranges, jellies, preserves and other similar products of distinctive character. This variety makes an excellent pot variety or individual specimen and can be used satisfactorily for framing purposes or basal plantings. It would also make a good hedge. It may be budded on other stocks and has been successfully grown from seed, a limitation with the seedless varieties.

The Myrtifolia is a small dwarf tree or shrub, with thornless branches and very small, closely set leaves. The leaves are only about one-third as large as a standard sour orange and their close spacing presents a rosette type growth. The foliage is thus very dense and compact and the tree is very symmetrical. Growth is generally slightly columnar to conical and mature trees 25 years old at Riverside are only about ten feet in height. The tree has a prolific bloom but in contrast to the Chinotto sets very few fruit. The Myrtifolia is similar in appearance to pittosporum and could be used for hedges, backgrounds, individual specimens or corner accent very effectively.

SALICIFOLIA: Another similar but less known selection is *Citrus aurantium* var. *salicifolia*, which as the name implies, is a willow-leaved variety. It is a larger tree than either the Chinotto or Myrtifolia. The leaves are about one-half inch wide and three inches long and are more of a yellowish green in color giving a slight golden cast to the tree. It has fruits similar to the Myrtifolia, more in number but not as numerous as the Chinotto. The fruits are not showy or large, are a yellowish orange, coarse and not edible. This variety has not been observed outside of the Citrus Experiment Station variety collection.

SOUR ORANGE: The sour orange *(C. aurantium)* has many varieties. The species has been known and grown for hundreds of years. It was a favorite with the Arabs who probably introduced it to Spain and the rest of Europe. Chiefly valued then for its ornamental value, the sour orange was extensively used in the landscaping of the mosques, courtyards and public buildings. In recent years its principal value has been as a rootstock and in the manufacture of marmalades. An excellent pie may be also made from the fruit. However, because of its very attractive, bright-colored, reddish-orange fruits and its lush, dense, dark green foliage, the sour orange still has considerable merit as an ornamental. Certain varieties have long, lanceolate, willow-like leaves, others variegated (sectoral) fruits of contrasting colors. Certain towns recognizing its beauty have used sour orange as shade trees in their roadside plantings. A planting of this type may be seen in Tempe, Arizona and mixed planting near Litchfield, Arizona. Some institutions, viz. Scripps College for Girls, Claremont, California have effectively used sour oranges in patios, courtyards and drives. It may best be used as a shade tree, individual specimen, background or corner accent. Sour oranges probably should be budded. Seedlings may be grown, but they tend to be more columnar and thorny.

The Lemon-Lime-Citron Group

CITRON: The Citron, *Citrus medica*, is one of the oldest of the citrus fruits and certainly one best known to Mediterranean countries during ancient and medieval times. It is not commonly grown in the United States because the trees are fairly sensitive to frost—but no more so than the limes. Many areas in California would certainly possess a suitable micro-climate for its planting. The trees are generally grown as cuttings and are dwarf in size. They tend to be short-lived. The citron blooms almost throughout the year. The leaves resemble a lemon, but are generally coarser and more leathery. The tree is generally open or sparsely foliated. The fruits are large, averaging five to seven inches in length and three to five inches in width. The fruit is principally used for its peel. The rind is generally more than an inch thick and is used in the production of candied peel which is extensively used in the flavoring of confections and cakes. The pulp is not eaten. "Citron water" may also be manufactured from the fruit and may be used in flavoring of liqueurs and vermouth and for medicinal purposes. Because of their thick rind the fruits keep for a long time and are very attractive when used in table displays. The Etrog variety is used by the Jewish people in the ceremonies connected with the Feast of Tabernacles. The trees could probably best be grown as individual specimens and could also be espaliered.

FINGERED CITRON: The fingered citron, *Citrus medica* var. *sarcodactylis*, although not known to be in California as an ornamental at the present time (1957), has been introduced under the University's new citrus importation program, as a result of numerous requests by garden clubs. The variety is also known as "Buddah's Hand". While it is a horticultural monstrosity, fruits of the fingered citron are highly esteemed for their fragrance and used extensively by the Chinese and Japanese as sachets for perfuming rooms and clothing. The floral end of the fruit is split into a number of finger-like sections, hence the name. The plant may be grown from cuttings. Since it is a dwarf, it can be grown as a potted plant or as an individual specimen.

LIMEQUATS: The limequats are hybrids of the lime, *Citrus aurantifolia*, with the kumquat (*Fortunella* sp.). The crosses were made to provide the tender lime with some

of the hardiness of the kumquat. All of the limequats have fruits resembling the lime in appearance and character, and are used as a substitute for it. While they are more hardy than the lime, they are still sensitive to frost, and this with their thorniness and poor fruit characters make the limequats not too desirable in most locations. The Eustis and the Lakeland are the best varieties, but some fine specimens of Tavares have been observed. Limequats can be grown as potted plants or as dwarf specimens.

MEYER LEMON: The Meyer lemon is also referred to as the Dwarf Lemon. The variety is perhaps a hybrid of orange and lemon and has some of the characters of both. It is a semi-dwarf tree, spreading in character, almost thornless, with dense lemon-like foliage. The fruits are very smooth-skinned as well as thin-skinned. The fruits are elliptical in shape, and obtain the size of a commercial lemon. The fruit is light orange in color with similarly colored flesh. The flesh is juicy, lemon flavored and of medium acidity. Fruit is available more or less throughout the year. It is an excellent variety for home use and is an acceptable substitute for a lemon. This variety is nearly as tolerant to cold as standard citrus trees. While it is generally grown as a cutting, the Meyer lemon grows well-budded on sweet orange or rough lemon stock. Its principal use is as a dwarf variety, used as an individual specimen or a basal planting. However, it should be pointed out that as the Meyer grows older, either as a cutting or a budded tree, it may grow to large size. The Meyer has also been used as an espalier, and has successfully been grown as a hedge. Frequent use of it as a pot plant has also been made. The Meyer lemon is very precocious in bearing and one year old cuttings will set and bear a few fruits.

PONDEROSA LEMON: The ponderosa lemon is also sometimes called the Wonder lemon or American Wonder lemon. It is a small tree, eight to ten feet tall at 20 years of age, depending on growing conditions. While it resembles a lemon, it is undoubtedly a hybrid, possibly with the citron. The fruits are large (hence the name, ponderosa) are slightly obovate (tear-shaped), and may average up to five or six inches in diameter and weigh more than a pound apiece. The fruit is seedy, but juicy and sour. While the flavor of the fruit is not as good as the lemon, it could be substituted for it. The fruits resemble a lemon in color and are available throughout the year. This variety is frequently grown as a pot plant by nurserymen in the northern United States. It is perhaps best adapted for this use, but may be used as an individual specimen as well. The variety roots easily from cuttings.

RANGPUR LIME: The Rangpur lime is an acid lime, sometimes called a red lime. It has at times been confused with the Otaheite orange and substituted for it, although the Otaheite is seedless (the Rangpur not) and the Rangpur highly acid (the Otaheite not). The Rangpur lime is easily rooted from cuttings and is frequently grown as a shrub or in the capacity of a dwarf. It has a bushy type growth and may eventually reach a height of 15 to 20 feet. Apparently there are strains within the variety and fruit color and shape vary somewhat. Generally the fruit color ranges from yellow orange to reddish orange, the flesh is also a deep orange. The fruit is generally ablate in shape and ranges up to two and one-half inches in diameter. The fruit could easily be mistaken by the layman for a tangerine and this confusion has probably led to its limited use. The juice is orange in color, has an excellent lime-like taste and could easily be substituted for limeade. The chief use of this variety is as a dwarf in early years, but older trees grow large and make an attractive individual specimen or background.

OTAHEITE ORANGE: The Otaheite orange is somewhat of a misnomer since it is not an orange but is probably nearer to being an acidless lime or a hybrid thereof. This variety is inherently a dwarf variety and is easily grown from cuttings. The variety is nearly thornless and spreading in growth. The flower buds are tinted with purple, and the new growth is a deep purple—in contrast to the Rangpur lime. Fruit color ranges from orange to reddish orange. The fruits are chiefly spherical in shape and range in size up to about one and three-fourths inches in diameter, and thus is smaller than the Rangpur lime. The fruits have orange-colored flesh, are seedless or have abortive seeds,

have the odor of a lime, but are flat and insipid in flavor. The Otaheite is frequently grown as a potted ornamental. They are especially attractive at Christmas time since plants a foot or so high may be carrying up to a dozen fruit in addition to producing flowers at the same time. This would appear to be its most practical use.

The Mandarin Group

CALAMONDIN: The calamondin *(Citrus mitis)* belongs to the tangerine (loose-skinned) group, or is closely related to it. The tree tends to grow tall and columnar, and is very shapely in appearance. As an ornamental it has been widely used in Florida and to a lesser extent in Arizona and California. The calamondin is very cold resistant and easy to grow. The tree is a prolific bearer and may have hundreds of fruit at any one time. The Chinese name for it is "Sechi Chieh" (meaning four seasons), which is very appropriate since it is in fruit the year around. The quantity of fruits make the tree spectacular in appearance, actually thousands on a mature tree. The fruits are orange-colored, slightly flattened in shape and about three-fourths to one and one-half inches in diameter. The fruits make excellent marmalade and the acid juice makes a very presentable drink when sweetened with sugar. The fruit has a slight soapy taste and is inferior to the Shekwasha or Cleopatra mandarin. Since this tree is tall and columnar, it may best be used as a background tree, a shade tree, an individual specimen or for corner accent. On occasions, it has been used in hedges. On a dwarfing rootstock it makes an excellent pot variety. A variegated selection is also available.

FIG. 2. The Calamondin used for corner accent at the Citrus Experiment Station, Lake Alfred, Florida. The Cleopatra mandarin and the Shekwasha could be used for similar purposes.

CLEOPATRA MANDARIN: The Cleopatra mandarin is also a loose-skinned variety. It is sometimes referred to as the spice tangerine and the Ponki. While it is best known for its merit as a rootstock, its ornamental value has not generally been recognized, although some attractive specimens may be found in Florida. In California it is a very symmetrical tree with dense, dark foliage and myriads of bright orange-red fruits. These fruits are somewhat flattened and average up to one and one-half inches in diameter. It is not as columnar as the calamondin but is slightly more bushy. Like the calamondin, however, the fruits hang on the tree from one crop to another, so it is possible to have the tree

covered with beautiful fruit the year around. The fruits are seedy and are too small to be of commercial value but do have an excellent flavor. Trees of this variety would best be used for background, individual trees or corner accent. Its somewhat pendant branches would not adapt it for shade purposes.

SKEKWASHA: The Skekwasha, *Citrus pectinifera*, has characters very similar to the calamondin and the Cleopatra mandarin. The fruit is about the same size as the Cleopatra, more yellow in color, less seedy and of better eating quality. It could be substituted under similar situations.

Citrus Relatives

CHINESE BOX ORANGE: *Severinia* sp., commonly called the box orange are additional citrus relatives. In habit of growth they very closely resemble the common box *(Buxus sempervirens)*. There are many forms differing slightly in height, character of growth, size and shape of leaves, thorniness, etc. Generally they are a low shrub or dwarf tree with somewhat rounded leathery leaves about one and one-half inches long (varying with the variety) and attached by short stalks to the twigs. The internodes are short, so the leaves are densely crowded on the branches providing a very compact growth. Some varieties are thorny, others are spineless. The flowers are small, white, inconspicuous and lacking in aroma. The fruits are small (about the size of a pea), round, dark blue (nearly black) and filled with one or two large seeds. This species may be propagated by cutting, seed or budding. It is compatible with citrus, trees 26 years of age are growing on it in the rootstock plots of the Citrus Experiment Station at Riverside. The chief value of this species is its foliage. Its symmetrical shape and beautiful, dense, vivid green foliage would make the small leaved varieties an excellent substitute for the common box as a hedge. The large leaved varieties as an individual specimen in any situation where pittosporum or carissa might be used. It stands pruning well but is compact enough not to require pruning. In addition to being quite tolerant to cold, it also appears to have a high resistance to insect pests and diseases.

FINGERLIME: The *Microcitrus* species are near relatives to citrus. They are frequently referred to as the Australian Wild Limes and some of the species as Fingerlimes. Most of the species grow into tall shrubs or small trees and make handsome ornamentals.

FIG. 3. Severinia, the box orange, used as a hedge surrounding the Post Office at Orlando, Florida.

The seedlings are very spiny. The leaves are probably the smallest of any of the true citrus and the citrus relatives averaging about one inch long and one-fourth to one-half inch wide. The habit of growth is such that young trees especially have the appearance of a very dwarfed fir tree. New growth is long and pendant, and purplish in color. The flowers are small, pink and fairly attractive. The fingerlime produces a fruit about three inches in length and three-fourths inches in diameter. The fruits are very aromatic and could probably be used for making pickles or preserves. Since most of these varieties are quite vigorous, they could be used for hedges or windbreaks. Pruning the lower branches would produce an attractive shade tree and it could be used as an individual tree or a backround specimen. Propagation may be made by budding on citrus, by cuttings or seed.

HESPERETHUS ACRENULATA: This citrus relative has some promise as an ornamental because of the pendant nature of its beautiful, feathery green foliage. It is compatible with citrus. Experience is lacking with this variety but it does deserve consideration.

FIG. 4. Kumquat trees for framing at stairway entrance to a sunken garden.

KUMQUATS: The kumquats or *Fortunella* sp., are also citrus relatives. There are a number of varieties commonly grown in the United States, the best known of which are the Nagami, Marumi and Meiwa. *F. hindsii.* a very dwarf small fruited variety is also now available. All are truly deserving of the Chinese synomyms "golden orange" or "golden bean". The various species, although inherently dwarfs, differ in their growth and are generally propagated on trifoliate orange stock which markedly dwarfs them further. The tree and the fruit resemble a miniature orange. The leaves are one-fourth to one-half the size of the average orange leaf and are more lanceolate (narrow and pointed). The fruits are small, seldom more than an inch in diameter and vary in shape with the variety. The fruits are bright orange in color and have a thick, fleshy sweet, edible peel—a unique feature in citrus. The pulp is mildly acid and contains several seeds. The fruit is generally eaten in its entirety. The author believes the Meiwa is the sweetest of the common varieties. The fruits also make excellent pickles, marmalade and

candied fruits. The fruits may also be used as attractive and distinct table decorations, particularly during the Christmas and New Year holidays, and are generally clipped with a short section of the stem and a leaf or two attached. Kumquat trees have a high ornamental value because of the numerous, small but highly colored fruits it bears which remain on the tree nearly the year around. They may be grown as pot plants but are most effectively used as individual specimens for corner accent and as framing plants. In China it is frequently the custom to place bearing potted plants on the table during dinner where the guests can pick off the fruit and eat them between food courses. The kumquat would probably make a fine hedge. These plants are very resistant to cold and can be grown in many sites where other citrus will not tolerate the temperatures.

TRIPHASIA TRIFOLIA: *Triphasia trifolia* or limeberry, is yet another of the citrus relatives. It is widely grown as an ornamental shrub in many tropical and subtropical areas. In some instances it has been used for a hedge. It has a compound, trifoliate leaf and fragrant white flowers, followed by dull red fruits about one-half inch in size. The foliage is an attractive, shiny dark green. The plant makes a small, round-topped shrub, suitable for dooryard plantings or potted specimens. It has become naturalized to certain sections of the United States, is now at Riverside and seems very worthy of consideration for ornamental use.

PONCIRUS TRIFOLIATA: The Trifoliate orange, because it tolerates cold, is widely propagated in the East as far north as New Jersey. It has a trifoliate leaf, is extremely thorny and is deciduous. The flowers are very conspicuous in the spring since they precede the leaves. The fruits are about the size of a golf ball, very seedy and inedible. It is frequently used for hedges but appears to have no place in areas with temperatures which other citrus varieties will tolerate. Dwarf varieties are known.

SINTON CITRANGEQUAT: A very attractive ornamental in Florida and has recently been introduced to California. It is a trigeneric hybrid of trifoliate orange and sweet orange crossed with kumquat. The fruits are a very deep reddish orange and are very conspicuous throughout the winter and spring. The fruit is not edible. The trees are very hardy and could be grown out of the range of normal citrus.

ORANGE JESSAMINE: *Murraya* sp. *(Murraya exotica, Murraya paniculata, Chalcas exotica)*, frequently called the "orange jessamine", is a citrus relative perfectly adapted as an ornamental. It has a compound leaf, finer in texture than that of the Wampee, very similar to a wisteria leaf but more delicate. The small leaflets are a shiny dark green. The twigs are thin, spineless and flexible, providing a dense but pendant type of foliage. The flowers are white, fairly large and conspicuous, hanging in large panicles (clusters) at the terminals of the twigs or on laterals. These blooms are exceptionally fragrant and reminiscent of jasmine. This tree is practically an everbloomer at Riverside and its delightful fragrance graces the air throughout the season. The Murraya is fairly fruitful and the species at Riverside sets a small red fruit about one-half inch long and one-fourth inch wide. The variety question is a little confusing with Murraya. Specimens observed in Florida were more fruitful but less vigorous than those observed in California. The red fruits, on a contrasting green background coupled with the attractive and fragrant bloom, make the variety the acme of citrus ornamentals. Murraya at Riverside withstands cold as well as commercial citrus and is practically pest free. The plant withstands pruning well. It may be grown as a basal planting—such as cotoncaster or abelia, as a corner accent plant, as an individual specimen or as a background plant. A very attractive hedge may be found in Riverside. Generally, not compatible with citrus, it is best grown as a cutting although the author has successfully grown it from seed. The foliage provides excellent greens for floral arrangements. *Murraya koenigii* which is more tree-like in growth is in California. Its leaves are used in making curry.

WAMPEE: The Wampee *(Clausena lansium)* is not a true citrus, but is a citrus relative. It grows as a tree and may attain a height of 20 feet or more. The leaves are compound, somewhat similar to those of a native black walnut in size and shape. The leaves

FIG. 5. Flowers of the Wampee. These are white and borne in a cymose cluster similar to a lilac inflorescence. For photograph of fruit, see cover.

are rougher in texture than most citrus and more yellow-green in color. The nodes are very close together giving a rosette type of growth to the twig and consequently providing a very dense foliage. The flower is unique in that it is large and occurs as a large panicle (cluster) at the ends of the branches, much like a lilac type of bloom. The fruits at Riverside are mature in the early fall and occur in open clusters much like a thin bunch of grapes. The fruits are yellowish-brown to russet-brown in color, attain about the size of a quarter and are almost round. The fruit is edible and highly prized by the Orientals. The peel is very thin and the pulp very tender—very similar to a grape or a litchi. At Riverside, many of the fruits are one-seeded and some only have abortive seeds. While the Wampee can be budded on citrus it may best be grown as a cutting or from seed. It would make an excellent shade tree, a background tree, or an individual specimen, but is probably too course in texture for other purposes. The Wampee appears to be much freer of insect pests than our standard citrus varieties.

SPECIAL CONSIDERATIONS

ESPALIERS: Espaliers are trees trained to grow flat as against a wall or trellis by selective pruning procedures. The most common types of espaliers are the Cordon, tier, candelebra and fan. Such plants do not take up a great deal of room and may also be exposed to a smaller microclimate and kept warm by heat radiated from the wall. Citrus may thus be extended beyond its normal climatic zone. Certain varieties, particularly the lemons because of their habit of growth, best lend themselves to this procedure. The summer navel may also be adapted for this purpose. Adequate fruiting occurs under this procedure.

VARIEGATED VARIETIES: Occasionally citrus varieties mutate to different characters than those normally associated with the variety. One of these is a leaf variegation and/or fruit variegation. In the leaf variegation certain sections of the leaf may be devoid of chlorophyll (green color) while other sections may be characterized by different layers

or intensity of green such as in a variegated ivy. If a plant has variegated leaves it also has variegated fruit, but it may possess variegated fruits without having variegated leaves. When this occurs in the fruit, various peel sectors of the fruits are of contrasting color. Sweet orange, lemon and sour orange selections are available in this form. One variety of lemon in addition to having the variegated leaf and variegated fruit also has a pink flesh, a novelty indeed.

FIG. 6. A variegated lemon—showing leaves and fruit and the contrasting densities of chlorophyll (green) or the lack of it. (Courtesy H. B. Frost)

DWARFING ROOTSTOCKS: Common varieties of citrus may be held to small stature for the convenience of the home grower by having them propagated on dwarfing rootstocks(1). Such trees not only require less space, but are easier to pick and to spray for pest control. These trees are generally very productive in proportion to their size and the small size enables one to grow more trees or more varieties in a smaller space. The trifoliate orange is generally used as the dwarfing stock although other stocks are capable of dwarfing and are used to a limited extent. Varieties may be dwarfed up to fifty per cent of normal size in this manner and in some instances more. Some top varieties are inherently dwarfed and an additive effect may be secured here.

In addition to dwarfing rootstocks it is also possible to reduce the size of the tree by removing a ring of bark and inverting it when it is replaced. In some instances a small strip of the original bark is left in place. The degree of dwarfing varies with the width of the ring or the width between rings, if a second ring is used. This procedure has been tried with apples(8) but is not common or accepted practice as yet. Similar experiments are under way with citrus.

UNUSUAL VARIETIES: The home grower seldom has adequate space to grow all the citrus fruits he would like. Standard varieties such as Valencia or navel oranges which may be used in large quantities for juicing or eating should because of space limitations, be given secondary consideration unless on a dwarfing rootstock. Old trees, however, do make excellent shade trees or may be used for corner accent. Thought should be given

rather to varieties of excellent eating quality which are generally not available on the market. Among some of these are the Kara mandarin, Dweet tangor, Frua mandarin. Satsuma orange, Torocco orange, Bearss lime and others.

POT VARIETIES: In some areas, favorable weather for growing citrus prevails except for a very short period in the winter months. Several fruiting varieties mentioned previously can be confined to a small container or tub and moved inside for protection during cold temperatures. Varieties best suited for this purpose are the Meyer lemon, ponderosa lemon, Otaheite orange, kumquat and Chinotto.

The ornamental qualities of citrus are well summed up by Gallesio(6) who states, "Of all the plants spread by nature upon the surface of the globe, there are none more beautiful than those we know under the names of citron, lemon and orange trees which botanists have included under the technical and generic name, Citrus. These charming trees are both useful and ornamental. No others equal them in beauty of leaf, delightful odor of flowers, or splendor and taste of fruit. No other plant supplies delicious confection, agreeable seasonings, perfumes, essences, syrups, and the valuable aides so useful to colorers.

"In a word, these trees charm the eye, satisfy the smell, gratify the taste, serving both luxury and art and presenting to astonished man a union of all delights.

"These brilliant qualities have made the citrus a favorite in all countries."

FIG. 7. Robertson navel on a dwarfing rootstock grown as a pot variety. (Courtesy Floyd C. Dillon)

COVER PHOTO

Fruits of the Wampee. The fruits are brown in color, about one inch in diameter, have a thin skin, about one seed, and a flavor somewhat like a grape.

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BOOK REVIEW

Wild Flower Gardening, by Norman Taylor. Princeton, New Jersey, D. Van Nostrand Company, Inc., 1955. 128 pp. Indexed. $3.95

Anyone beguiled by the title of this book will soon discover that there is nothing simple about the cultivation of a wild flower garden. It is not a matter of sowing native plant seeds and waiting for them to grow, naturalizing a few bulbs, or growing native plants among other garden flowers. Mr. Taylor's conception of the wild flower garden is the more ambitious project of imitating the natural habitat of the plants be it woodland, meadow, or bog. Plants described are restricted to areas of the eastern United States as far as eastern North Dakota, Nebraska, Kansas, Oklahoma and Texas; the Pacific Coast and the Rockies are excluded.

The theme of the book is ecology. The author starts with a fundamental chapter on the "Woodland Garden" in which the importance of reproducing the natural background for each plant is emphasized. It is necessary to transplant carefully at the right time of year in order to have any success with a wild flower garden. He discusses acidity and alkalinity of soil, the necessity for determing the pH value before transplanting, soil moisture rules for transplanting, and winter care. He does not take up propagation.

In pursuing the subject, plants for the various types of wild gardens are given with accurate descriptions and environmental needs. In "Plants for the Woodland Garden" Mr. Taylor tells how to clear the undergrowth and make narrow, winding paths to keep out wind and sunshine. The plants listed "For Thickets and Open Places" are easier to establish than the other groups. In "Sands and Seashore" he distinguishes between pure sand and salt impregnated sand and points out the unfavorable ecological conditions of open sand which make growth difficult. None of the sand plants are sold by nurseries, so the gardener must collect his own. There is a distinction between plants of the hot dry dunes and plants that gro win flat, often wet places behind the dunes. "Swamp, Marsh, Meadow or Bog?" defines these areas which have profound differences in suitability to plants. There is a chapter on "Native Orchids"—over 60 in the eastern part of North America. These are also differentiated as to those that grow in bog, woodland or meadow. The last chapter "Only for the Expert or Patient Grower" lists the native plants most difficult to raise, all but one of which belong to the Ericaceae. Transplanting of these mycorrhizal plants is hazardous; it should be done while the plants are dormant, or better still, they can be purchased from a nursery. There is a list of "Native Plant Dealers" from the files of the Massachusetts Horticultural Society; Pacific Coast dealers are not included. All names follow Gleason's revision of Britton and Brown's *Illustrated Flora of the Eastern United States and Adjacent Canada.* There are 88 colored photographs of plants and a few line drawings by Tabea Hoffman.

DORA M. GERARD

THE ZOYSIA LAWN GRASSES

H. R. HALSEY

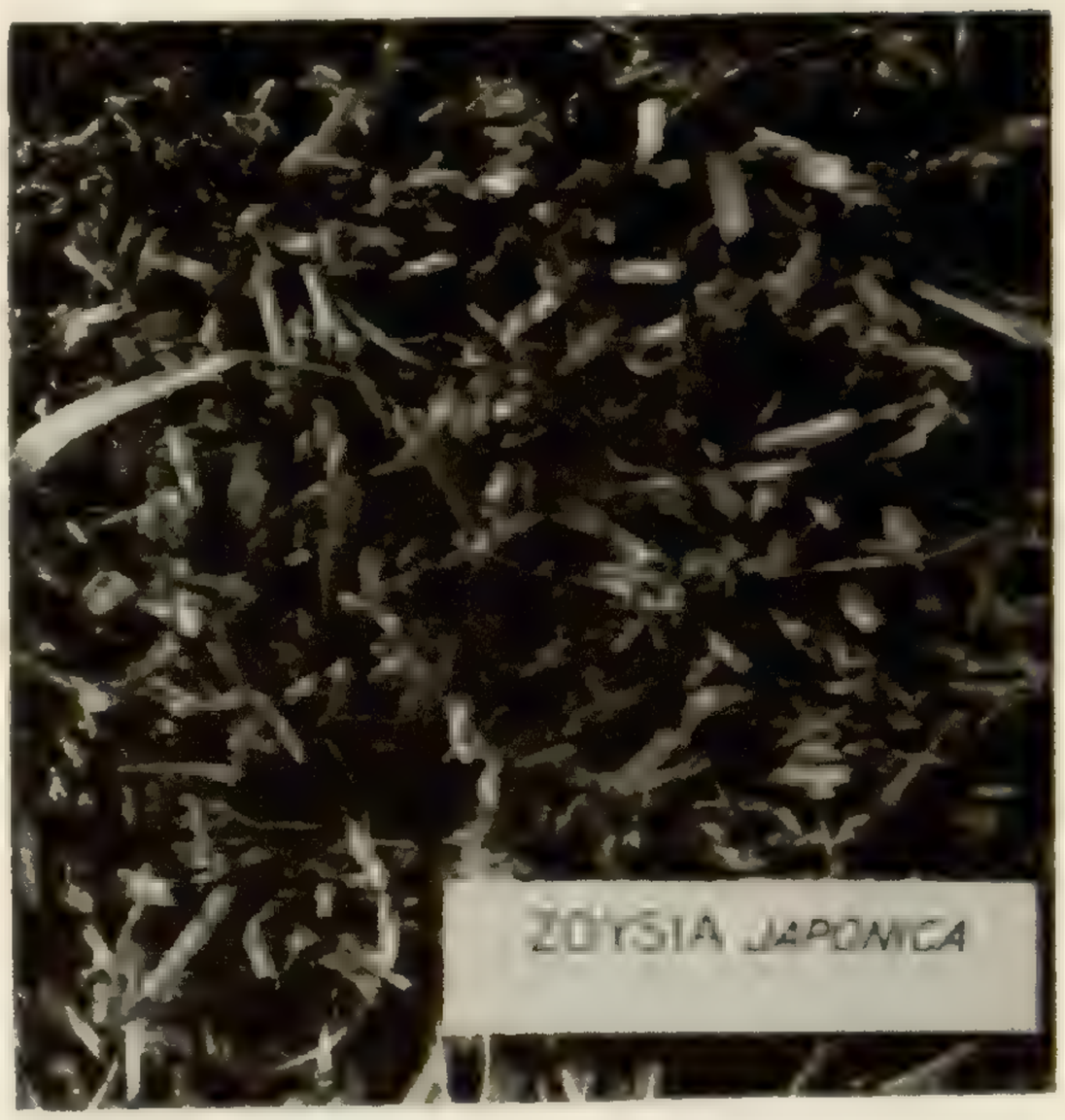
THE WORD Zoysia is rapidly becoming quite a familiar term in horticultural circles of southern California. It is the genus name of a relatively new lawn grass to our area. Two species in particular are now on the market, namely, *Zoysia japonica* var. "Meyer Zoysia" or Z-52 and *Zoysia matrella* or Manila grass.

In the past year, nearly every trade journal has carried articles and advertising explaining the characteristics and culture of these two grasses. The professional turfmen and nurserymen have been literally deluged with questions by the public for information and sources of supplies of one or the other of these two grasses. With the approach of another season of lawn planting and care, the Zoysias will, no doubt, again take their place as the number one lawn query here.

Recently, an article appeared in *The National Horticultural Magazine* (Vol. 35 No. 3, July 1956) which should be read by all Zoysia enthusiasts and potential Zoysia lawn owners. The author, Dr. Halsey, was from 1935 to 1942 Fourth Corps Area Educational Adviser, Civilian Conservation Corps. Since his retirement, he has devoted much of his time to furthering the use of Zoysias lawns in the South. The present article is based on some fourteen years of experience and research with the Zoysias. His present address is Atlanta, Georgia. Space does not allow us to reprint his complete article. However, with permission of the publishers, The American Horticultural Society, we have abridged the article to bring those parts significant in the cultivation of the Zoysias in southern California.

The Zoysia Lawn Grasses

"During the nineteen thirties there were three species of Zoysia grass grown in the United States: the *japonica*. the *matrella*. and the *tenuifolia*. These were introduced by plant explorers of our national Department of Agriculture, who collected sod



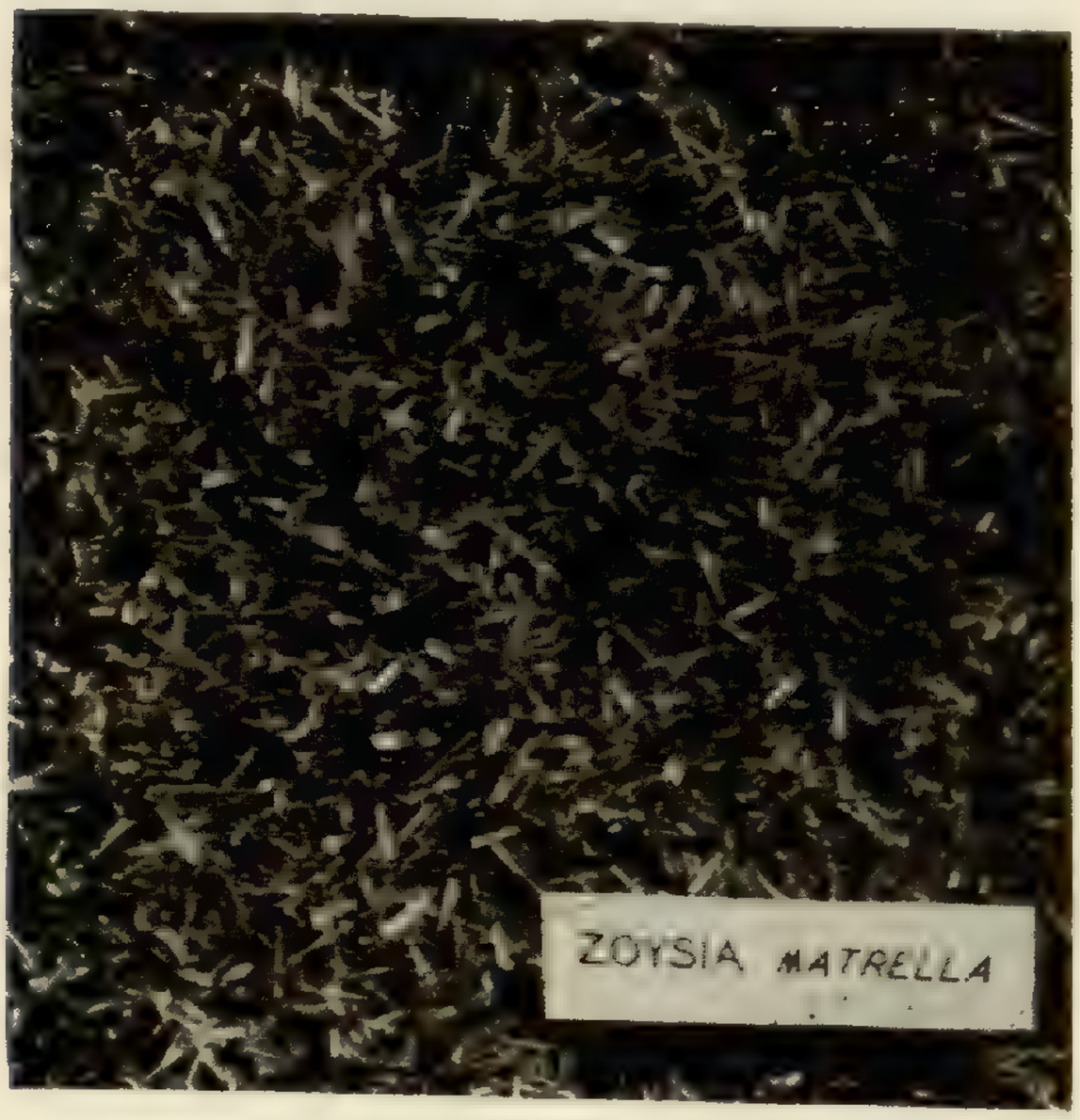
and seed from various parts of Asia and the South Pacific. The writer has not been able to satisfy himself completely about the origins of earlier introductions. These grasses were, however, allocated to the South and tried in Florida, Alabama and Georgia under various auspices and with various degrees of interest. For none of them was seed available in any appreciable quantity and the slow process of vegetative reproduction discouraged most of the commercial interests. But the three species did find their fields of usefulness and their limitations.

"All of the Zoysia grasses have a mass of interwoven roots spreading from rhizomes or stolons to make an exceptionally uniform turf. The *japonica* blades are flat and rather stiff, varying in width from about three to five millimeters. The *matrella* blades are somewhat more flexible and their width runs from slightly over one to three millimeters. The *tenuifolia* is by far the softest and finest and shortest bladed of the genus.

"Of these three, the *tenuifolia,* or Mascarene grass, is the most attractive in appearance, but the least satisfactory for lawn use. It does not survive cold weather.

It buckles and wrinkles in growth. Its root system is rather shallow. It is used to some extent in Florida and southern California, but in very limited areas.

"The *japonica,* or Japanese lawn grass, is the most aggressive of the three, the most hardy, and the least attractive in appearance. It covers ground more rapidly than either the *tenuifolia* or the *matrella,* and has a root system deeper than the *tenuifolia,* but not so deep as the *matrella.* Its coarse blades have the appearance of straw during the winter, but it is superior to most of the non-Zoysias for lawn use in its own area.



"*Zoysia matrella,* or Manila grass, has a root system forming a very thick and tough turf, unsurpassed for wear resistance, and thus for children's play areas, by any grass known. . . . The spread of this species is mostly by stolons. The arching of these stolons into the air and back to the ground is a never-failing source of interest to the new Zoysia lawn owner. The nodes from which roots strike into the soil are at about half-inch intervals as against one to two inches in *Zoysia japonica* or in Bermuda grass. The resulting root system is, then, naturally more dense.

"The zonal range of *Zoysia matrella* was at first thought to be limited to the 'Deep South,' but it is growing now in Ohio, New York and Connecticut, among other more northern states. It is seldom advisable to draw sharp zonal limits for any plant that can survive a good freeze. . . . It is not so much the severity of the winter weather that limits Zoysia as it is the brevity of the growing season. The slow growth of *Zoysia matrella* requires two summers in Minnesota to accomplish what it can do in one summer in Georgia. The *Zoysia japonica* grows much faster than the *matrella* and is able to survive a longer and colder winter. Several lawns of Meyer Zoysia, a strain of the *japonica,* are reported flourishing in the Detroit area. . . .

"Fertility of the soil is not so important as the first dealers in Zoysia grass and suppliers argued. Any good complete fertilizer can be broadcast, about twenty pounds to the thousand square feet, and tilled into the soil. A starter solution of any good soluble fertilizer is worth using as a wetting agent in which to soak the sod to be planted. The sprigs of grass vary in size with the different operators, from three inches of a single stolon or rhizome with roots and shoots to a small handful of the material. The important thing about the planting is to get the roots down into the soil without drying out, and a portion of the stems up in the air. It is fatal to cover the whole plant, although Bermuda grass is very effectively planted by covering completely. To make easy the planting of Zoysio sprigs, the tilled soil is furrowed with a pointed hoe, about two or three inches deep and at intervals between the furrows of from six to ten inches, depending on the type of Zoysia grass and the plan for its growth. Probably the most frequently used interval for the *matrella* planting has been ten inches. Sprigs torn from the moist sod are dropped into these furrows at intervals of not more than ten inches, and the soil on both sides of the furrow is packed about the roots and lower portion of the stem.

"After the planting, the soil must be kept moist. At this stage deep wetting is not necessary, but the rapidity of growth depends very largely upon the continuous supply of moisture to the sprigs. This need continues throughout the time required to cover completely the area planted, but, after the lawn is established, *Zoysia ma-*

trella is unusually drought resistant. An established Zoysia lawn is a paragon of lawn virtue, requiring less water and less fertilizer, less weeding and less mowing, less edging and less worry than any other grass known. Its beauty is surpassing, its permanence has not been challenged. No diseases or insect enemies have yet made any serious threat. The only disease of *Zoysia matrella* seen by the author in fourteen years of observation has been the fungus fairy ring, and that was a single case apparently not of much consequence. It is well to remember, however, that new diseases and pests do from time to time remind us of the vulnerability of all life.

"The best time of the year to plant Zoysia is undoubtedly just before warm and moist weather sets in, but, since long time forecasting is not generally successful, the planting in Georgia is done at almost any time of the year except in freezing weather. Once the sprigs are in the ground, the average winter weather of this state does not harm them. . . .

"Mowing of the Zoysia lawn is done during the first year chiefly to keep the weeds down. If there are few weeds, if weed killers have been used, the mowing may be postponed. But an unmowed Zoysia lawn is never so attractive as is one cut to uniform height. . . . This grass will flourish under mowing to less than one-half or more than three inches. A longer cut affords somewhat more of the luxurious 'nap' of the carpet, but the shorter cut is neater in appearance and freer from the danger of exposing a loss of color at the stem base following a decided change in mowing height. Frequency of mowing must depend on the rapidity of growth and the lawn owner's standard of judgment. . . .

"The Zoysia grasses are not evergreen except where there is no frost. The *matrella* loses its color after the first severe frost, usually a few weeks after Bermuda grass has become dormant, and it does not regain the green until after the freezing weather has made its last appearance for the year. During the winter season many Zoysia lawns are kept clean cut and swept with a decidedly attractive appearance not unlike a beige rug. The care required to keep the rug free from fallen leaves and twigs and other debris is not inconsiderable. In case the price is too high, it is possible to console oneself by allowing a light leaf covering to keep the Zoysia partially green throughout a mild winter.

"Overseeding the *Zoysia matrella* with rye grass can produce a winter rye grass lawn, but the same amount of care devoted to the beige carpet will produce even more satisfactory results. And rye grass does delay the recovery of the Zoysia in the spring. Annual blue grass frequently establishes itself in the open spaces of an unfinished Zoysia lawn, and it is even more objectionable than rye grass in interfering with the growth of the Zoysia.

"The Zoysia grasses must not be covered for any length of time during their growing season. While a light leaf mulch during the winter may keep the grass green, a heavy mulch during the summer will kill it. Thus top dressing is dangerous to Zoysia grass. A very light top dressing can be used with extreme caution early in the growing season, but the grass must not be completely covered at any point. It is well to remember that weed seeds are constantly falling from the air and that they germinate and grow more easily on top dressing than upon Zoysia grass blades.

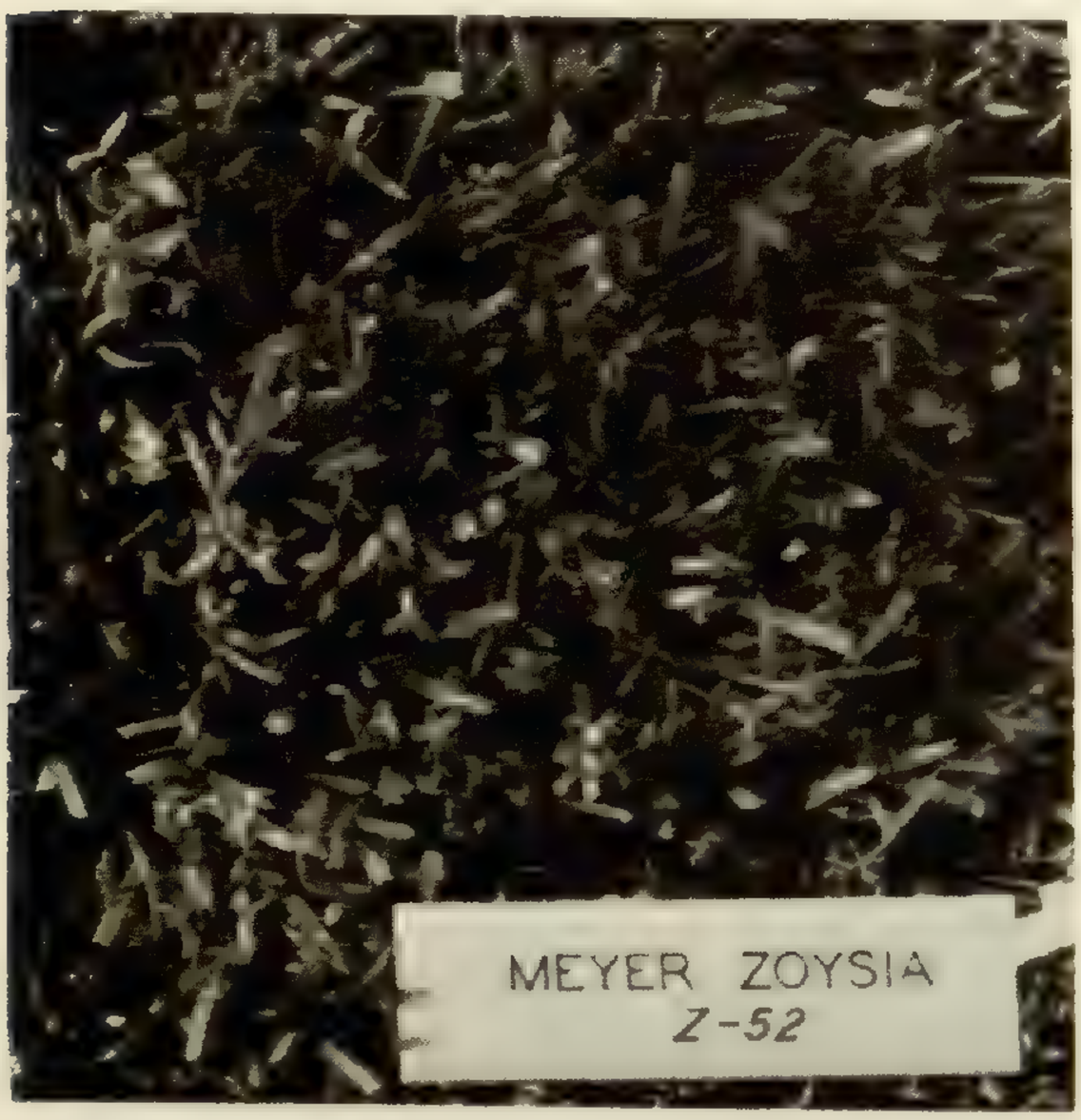
"The clippings of *Zoysia matrella* are unlike most grass clippings in that they do not readily decay. They should be removed from the lawn unless they are very short. Since they do not ferment and heat rapidly in piles, they can be used as mulch for many shrubs. In the compost pile they need chemical aid to produce humus within several years.

"One characteristic of *Zoysia matrella* that is somewhat unique is its very slow but steady spread over a concrete walk. In the course of several years it may cover such an area to a distance of a foot or more away from the soil in which it is growing. . . . This very slow spread to an adjacent area keeps the Zoysia grass from becoming a troublesome invader of gardens. . . . The rate of spread for *Zoysia matrella* is usually counted as five inches a year, but it can be made greater than that, and for the

japonica it is almost always greater. . . ."

Skipping ahead in Dr. Halsey's article, we pick up the thread again as he introduces certain other Zoysia species.

"The Meyer Zoysia is a greatly improved strain of the *japonica,* capable of making a very handsome turf during the growing season and lacking the loose straw appearance associated with the common *japonica* during the winter. It can be distinguished instantly from the *matrella,*



however, by its coarser blade, and in the autumn by its earlier discoloration. Its spring recovery is excellent—almost simultaneous with the *matrella.* It does not thrive so well in the shade as does the *matrella,* but the faster growth with full sunlight tends to exaggerate this difference. The mature turf is not so thick as that of *matrella.*

"According to the service bulletin of the National Better Business Bureau, dated February 27, 1956, the Meyer Zoysia was selected from plants grown from seed by the United States Department of Agriculture in 1941 and developed by the Department, the United States Golf Association and Agricultural Experiment Stations. It was named for Frank Meyer, plant explorer, introducer of Centipede grass. The director of the U. S. G. A. Green Section during the years of initial promotion was Dr. Fred V. Grau, who was chiefly responsible for the success of that promotion.

"In the spring of 1955, another new Zoysia was released to nurseries for propagation, this time a hybrid cross between the *japonica* and the *tenuifolia,* named Emerald Zoysia. . . .

"Emerald Zoysia is an excellent grass. It has a beautiful color, as have all of the Zoysias when growing vigorously. It has a leaf slightly finer than that of the *matrella.* It grows faster than the *matrella,* but does not grow so tall. Its stems are shorter than *matrella* stems and this may reduce the discoloration that can follow 'scalping' with the mower. Its shade tolerance seems to be good. It forms a thick wear-resistant turf and has shown no susceptibility to disease or insect enemies. In short, it appears to have the good qualities of *Zoysia matrella,* to be slightly finer leaved and to be a faster grower. . . . Characteristics of the Emerald to watch are shade tolerance and drought resistance. . . . The zonal range of Emerald Zoysia has not yet been determined, but there is at present no evidence that this grass will not succeed wherever any Zoysia may be grown."

Dr. Halsey concludes by saying, "We have reached a time in our national life, however, when we can consider the beauty of our homes and parks, our cities and countryside, of vital importance. Our physical environment is not simply the concern of the very wealthy, and of garden clubs, and of old men, and of professional landscapers. It is a matter of national pride, of state and city and neighborhood pride, and above all, of personal enjoyment in adding beauty to our own property. For this purpose the Zoysia grasses are proving of immeasurable value."

NOTE: Readers wishing further information about the culture of the Zoysias may contact Dr. Halsey by writing to him at 1092 Springdale Road, N.E., Atlanta 6, Georgia.

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SCIENCE ON WHEELS

LILLIAN OVERLAND

IN AN AGE in which growing specialization often tends to create a strange breed of "armchair scientists", each complacently burried in his own specialty and who literally "cannot see the forest for the trees", it is both reassuring and refreshing to see a happy union of the theoretical and practical. In Caltech's newest addition, the Mobile Desert Laboratory, there is incorporated such a spirit of scientific research in its broadest aspect.

For many years now Dr. Frits Went, professor of plant physiology at Caltech has found a strong fascination in the vegetation of the desert. As he pursued his investigations, despite lack of adequate equipment, a mobile desert laboratory which would enable more precise and extensive studies, was his fond dream. Today, thanks to his keen imagination and vision, and to the kind gift of Mrs. Pearl McManus of Palm Springs, the laboratory is at last a wonderful reality.

But why should the desert, a place of extremes of climate, where relatively sparse vegetation stands in sharp contrast to the luscious green usually associated with botanical science, evoke such interest? The answer lies in the question itself . . . It is the very uniqueness of desert plants which permits them to grow under adverse conditions which turns the desert into a most intriguing place of study. For in seeking the answers to such questions as how plants can grow with practically no water, what are their mechanisms of germination and survival, and what relationships exist between the animals and plants, a fascinating story of Nature's ways and means of evolution is revealed. Thus, whereas to the uninitiated the desert might evoke visions of barren ugliness, to the

The Mobile Desert Laboratory, fully equipped and self sufficient in the middle of the wilderness, stands as a symbol of man's ingenuity and as an instrument to help gain a better insight into nature's laws.

curious it is ever a challenge and place of unique beauty. With a scientifically equipped mobile laboratory the answers to the above and many other fundamental questions will be sought.

But why the necessity of a *mobile* laboratory? There are several reasons for its desirability. Perhaps the most obvious one is that it enables study of more remote and interesting places than would otherwise be feasible. However, of greater importance, it permits the scientist to follow the rain, upon which all life in the desert depends. Since very often, such as at the present time, there are prolonged periods of drought, the usefulness of a stationary laboratory might suddenly be drastically reduced by finding itself completely out of range of living plants. Furthermore, a mobile laboratory permits such basic measurements of photosynthesis, transpiration, water content, etc. to be made on plants in their natural environment. From such fundamental studies, which cannot readily be carried out in the artificial environment of a laboratory, not only is a better understanding of the growth and survival of desert plants gained, but it is hoped that this theoretical knowledge may ultimately be applied to make the desert a more productive place for the betterment of mankind.

The value of the mobile laboratory is even further enhanced by what might be termed a symbiotic relationship between it and the Earhart Plant Research Laboratory at Caltech. The latter, because of its unique controlled conditions, makes it possible to duplicate the climate in nature, while eliminating or reducing the number of variables. For instance, the effect of such single factors as temperature, rainfall, etc. may be tested while daylength and nutrition are constant and disease is eliminated. Thus, the observations made in the field may be tested and analyzed, and in turn, the predictions made on the basis of laboratory tests may be studied in the natural environment. In this way both field and laboratory work gain a much greater significance than each would have separately.

In the broadest sense the reason for, and spirit behind, the mobile laboratory can be summarized in the words of Mrs. McManus, its benefactress, who at the age of 78 has a refreshingly young attitude:

"We are all children and must keep on learning all of our lives."

Science is a cooperative seeking of the Truth, a process which, continuous from age to age ,is somewhat analogous to the formation of a beach by the deposition of individual grains of sand. These 'grains', the result of individual and combined efforts are chiefly a result of the process of learning—that which Einstein called 'holy curiosity'. As an instrument to foster such learning and to inspire more 'holy curiosity' which will result in the addition to the total body of growing knowledge, the desert laboratory is unique.

As strange a 'caravan' as ever pioneered the wilderness, the mobile desert laboratory is a sharp contrast to traditional desert associations of camels laden with water bottles. Instead, it consists of a beautiful two-toned blue house-trailer which might easily be mistaken for just another tourist group. In fact it is not uncommon to have fellow trailers honk a cheery salutation from a distance, only to gape with astonishment as they come in sight of the name proudly engraved on its side: "California Institute of Technology Mobile Desert Laboratory." The secret to its self-sufficiency lies in the large red truck which pulls it. Housed herein is a 500 gallon water tank, a generator, air compressor, and a stock of gas, oil, and miscellaneous tools, with the result that the trailer has hot and cold running water, electricity, refrigeration, gas, and is fully air-conditioned. The interior resembles an ordinary house trailer with such exceptions as drawers filled with beakers, slides, petri dishes, etc., a small library, microscopes, balances, and other special pieces of apparatus for measuring transpiration, etc. Thus, not only is it equipped for the comfort of the workers, an important factor in pursuing desert research, but also it provides the essential tools to add to the scope of the research.

Stationed at Rancho Senora de Lago near Palm Springs, the laboratory is in the capable hands of Mr. Lloyd Tevis Jr., a

As strange a caravan as ever pioneered the desert wilderness, the Mobile Desert Laboratory is a sharp contrast to traditional desert associations of camels laden with water bottles.

Caltech research fellow. An excellent ecologist and zoologist, Mr. Tevis conducts full time research on the animal-plant relationships of the desert. In cooperation with the Earhart Laboratory, this work is gradually elucidating some fascinating aspects of desert life survival and evolutionary methods. It will be discussed later.

From this convenient location in the desert, many interesting and varying types of desert are easily accessible. Included are such areas as the Salton Sea, numerous desert canyon washes such as Box Canyon, sand dunes and Joshua Tree National Monument.

In the brief time since the inauguration of the mobile laboratory last summer, investigation of a number of intriguing problems has already begun. Although actually still in the organizational stage, with each trip there is a chain-like reaction fostering new prospects to explore and opening wider and wider horizons.

In order to gain some idea of the scope of desert research and the usefulness of a mobile laboratory, let us look briefly at a few of the problems.

One of the first questions to arise in the mind of the observer of desert vegetation is—how can plants grow under such dire conditions of daily temperature fluctuation, prolonged drought, sudden bursts of rain, wind, sand storms, etc. and why will they not grow elsewhere where conditions are apparently more favourable?

For instance, it is found that such desert trees as Palo verde, Smoke tree, and Ironwood occur only in washes. The secret to their survival here lies in a controlling mechanism of germination which assures an adequate supply of water for survival of the seedling. Germination after merely a moderate shower would prove fatal and in the course of evolution a mechanism has developed to prevent such loss. This is found in the seeds, all of which are extremely hard. All attempts to germinate them in the laboratory, regardless of amount of moisture supplied, proved futile, but when abraded, they germinated readily. This is exactly what occurs in nature. During the floods which occur in the area of their growth, sand, rocks, etc. carried by the rushing waters provide a grind-

ing action on the seeds which permits them to germinate. At the same time, part of this water sinks into the bottom of the wash, providing water for further growth. Thus, in areas where normally rainfall is very scarce we find luscious green Palo verde and beautiful Smoke trees—all because nature has provided a scheme of insurance for survival of the seedlings. Further adaptations, such as a long vertical root which the seedling is able to produce rapidly in order to reach the moisture below, indicate the uniqueness of these hardy desert plants.

By tampering with the natural environment, man often upsets Nature's ways sometimes with drastic results. A striking example of this was observed near the All American Canal recently. It was found in one area that there was a sharp division of vegetation. On the one side a healthy growth of Palo verde, Smoke tree, and Ironwood, and on the other, a noticeable lack of all these trees and a generally poor state of associate shrubs. The disappearance of the vegetation on the latter side was entirely of man's origin. The whole area which originally had been a wash had been partly blocked to flood waters in order to prevent clogging of the canal. The results were clear-cut. Where nature had been tampered with, death of the vegetation dependent on floods had disappeared.

The mobile laboratory makes it possible to study the survival of vegetation under the extremes of desert conditions and thus to gain a more comprehensive view of the factors involved. At present, the results of a prolonged drought are being investigated to see which shrubs have survived. Only those which are able to exist under most extreme conditions are found to be still alive. For instance, near Palm Springs where often Franseria and Hymenoclea grow in association, Franseria is seen to be the first to be dying off. In areas where hillsides result in an accumulation of rain water thus effectively increasing the total, sharp differences are noted from nearby flat places. Hence, in a particularly dry area near the All American Canal, it appeared, on preliminary investigation, that no germinations had occurred as the result of a recent light rainfall. A little further search, however, revealed an abundance of seedlings on the hillside, in contrast to the barren ground all around. In the White River (dry) area near Palm Springs, a similar drainage effect was noted. Whereas in the area receiving the benefit of drainage, many seedlings of Atriplex were found. A short distance away most of the old Atriplex bushes had recently died and no seedlings were found. Indication of the dropping of the water table here was found in the poor condition of the Mesquite, whose extensive roots ranging from 30-100 ft. always signify a water table about 30 feet below the surface.

In observing the differences of behavior of desert shrubs, one wonders what the reasons are. To find the answers, we must go to the basic physiological processes of the plants, such as photosynthesis, respiration, transpiration, etc. It is one of the objects of the laboratory to study these in detail in the natural environment. By learning the unique adaptations of desert plants, much basic knowledge of these fundamental processes can be gained and perhaps, eventually, application of it will make the desert more productive for man. The present equipment for these purposes is as yet incomplete but preliminary investigations have been made. In desert plants, where moisture is at a premium, loss of water through transpiration could be serious. Nature has ingeniously endowed these tough dwellers with the means for their protection as seen from measurements. Thus, Hofmanseggia showed practically no measurable transpiration at all, and both Creosote bush and Ironwood showed a marked decrease during the hotter part of the day. After watering the last two shrubs, Creosote bush showed an increase in transpiration within one day but Ironwood had not as yet changed.

In the ability of many desert plants to vary the size of their leaves or even lose them depending on the availability of moisture, is seen another of nature's methods of protection. Thus, Creosote bush *(Larrea tridentata)* one of the sturdiest of desert bushes, will after a long drought

lose its olive green leaves, retaining only brownish green ones, and if the drought continues, it may drop them altogether and still live for some time without rain. Dew is believed to be of importance in supplying moisture to plants which apparently have no other source. However, very little work has been done on these problems and this and many other questions as yet remain unanswered.

Whereas perennial shrubs in the desert depend for their survival mainly on tolerable growing conditions throughout the year, this is not true of annuals which, under unfavourable conditions, are tided over for varying lengths of time by dormant seeds. In order to study the nature of such germination, twelve stations have been marked off in Joshua Tree National Monument and rain gauges stationed in each one. After a rainfall the seedlings can then be counted and the survival pattern studied, all in relation to the amount of rainfall. Searching for desert seedlings is one of the most fascinating of occupations. Few people have ever seen these beautiful frail-looking plants because of their minute stature; in order to find them one must lie flat on the ground (because of which they have been called 'belly plants'). Perhaps the most remarkable thing in connection with these annuals is that once they have germinated, regardless of the density in a given area, survival is almost 100%. The reason here once more lies in the nature of the seeds, which germinate only after sufficient rainfall has occurred, because of inhibitors associated with them which must be leached out. This has been confirmed by laboratory experiments in which water supplied from below failed to cause germination, whereas when artificial rainfall of sufficient amount was given from above, enabling the required leaching to occur, germination followed. Furthermore, it has been found that the nature of the annuals which will germinate after a rainfall depends on the subsequent temperature, which accounts for the fact that massive flowering occurs only after a November or December rainfall.

Observation of the remarkable survival of desert annuals makes it necessary to reconsider some of the conventional ideas of the nature of evolution. It is Dr.

Searching for desert seedlings is one of the most fascinating occupations of research workers. (Dr. Frits Went at right)

Went's belief that the concept of competition and struggle for survival is highly over-emphasized in general, but rather that evolution operates mainly through a process of control of germination, or in other words, a form of 'birth control'. This is dramatically demonstrated in the desert annuals which, rather than compete, share the available water, light, nutrient, etc. although these are at a premium. Much more work remains to be done in this respect to further the understanding of the ways of evolution.

No study of desert vegetation, no matter how extensive, could be complete without a consideration of the relationship to animals. For to the various animals existing in the desert, such as ants, rodents, rabbits, snakes, etc. plants and especially seeds, are of essential importance as their food supply, and consequently the effect on the plant's survival and on evolution cannot be overlooked. For this reason, the study of animal relationships will occupy an equal place with that of plants in the program of the mobile laboratory.

Mr. Lloyd Tevis is presently undertaking a long term study of the relation of ants to desert annuals in this respect. This is done by marking colonies (of Black Harvester ants) and then following their fate over a period of time. By digging up their storage granaries, or simply by robbing the ants of the seeds which they are carrying, it is possible to study the types of seeds upon which they depend for their food. It was found that of the 15 odd kinds of seeds which they collected, over 90% of these were of Plantago and Pectocarya, which also were found to be staples of the kangaroo rat. The question, therefore, arises, what is the effect of this on the survival of the plants? If sufficient seeds are eaten by animals so that germination is drastically reduced, then it might be expected that over a long period of time this plant would disappear. In order to study the types of plants which have seeds in the vicinity of the colony under observation, equal plots were marked off and watered once at different times of the year. As previously shown, germination depends on the temperature subsequent to the watering and such was the case here. Thus, as a result of watering in the warm months of July to September, Euphorbia and Abronia, summer annuals germinated, whereas, October's and November's watering produced Plantago and Malvastrum, respectively. It is of interest to note that Pectocarya, one of the staples of the ants' diet, did not germinate at all as a result of any of these waterings. Whether or not it will do so under natural conditions or if the ants will change to another source of food should this supply be reduced remains to be seen.

In cooperation with these field studies, soil samples are tested in the Earhart Laboratory under different temperature and moisture conditions to provide a more detailed picture of what seeds are present and under what conditions they germinate best. Also, unknown seeds collected from the ants, as well as those deposited by the ants can be grown and identified. It has been found that of seeds collected from 11 feet below the surface of the earth in the ants' granary, almost 100% germinated, whereas of those discarded by the ants, only a very small percentage proved to be viable. If the viability can be related to the nutrition within the seed, it would appear, therefore, that the ants are efficient housekeepers.

The problems indicated here are but a few of the numerous possibilities which a set up such as the mobile desert laboratory can cope with. It is hoped that its unique facilities will be used by many scientists of all fields and all countries so that a well rounded ecological picture may be painted.

In pursuing such studies as are permitted by the Laboratory, the effect on the research worker himself cannot be overlooked. For science is the result of the imagination of man and among that which feeds the imagination, man's contact with nature is perhaps the greatest. The desert, which is a place of extreme beauty of colour and form, of deep calmness and of peace, cannot fail to have a stimulating effect on him who comes to study its mysteries. In observing the plants of this area of extremes, can one fail to absorb some

of its philosophy? For the laws of nature apply equally to plants and man, and if desert plants can survive and bloom in the face of such apparent odds, surely man can live happily with his abundance of natural blessings. Wordsworth expressed this more aptly:

"One impulse from a vernal wood
May teach you more of man,
Of moral, evil, and of good
Than all the sages can."

The mobile desert laboratory, fully equipped and self sufficient, in the middle of the wilderness, stands as a symbol of man's ingenuity and as an instrument to help gain a better insight into nature's laws. In a complex civilization, often too hurried and too confused, it brings the scientist back to the natural world to study its basic laws. For to those who would learn the secrets of nature, the clues are present and the study is well rewarded. Or, as is enscribed over the entrance to the Biology Building at Columbia University:

"For the advancement of Natural Science, speak to the earth and it shall answer thee."

Earhart Laboratory
Caltech

Demonstration Home Garden of Native Plants at the Santa Barbara Botanic Garden

KATHERINE K. MULLER

THE GROWING INTEREST of visitors to the Santa Barbara Botanic Garden in the use of native California plants for home landscaping has been strongly indicated in recent years by the frequent questions asked of the Garden staff. To illustrate the use of native plants in an area of limited space and to show the means of using them to meet numerous landscape problems of home owners in the Santa Barbara area, the Botanic Garden recently completed planting of a demonstration home garden.

The site selected for this demonstration garden measures approximately 57 by 61 feet. It is located north of the Strawberry Meadow and readily accessible to Garden visitors. Grape stake fences along the two sides and a steep bank at the back, below Mission Canyon Road, enclose it as a distinct unit. Because of the sloping site, the garden was laid out with two terraces, a lower broader one which includes an outdoor living area as well as planting space, and a narrower one occupied by path and planting beds. Construction materials were selected to harmonize with the native plants. Railroad ties were used for steps, a blue-grey shale for paths and outdoor living area, and natural sandstone rock for low retaining walls. The basic plan was done for the Garden by the office of Cornell, Bridges and Troller.

Only plants known to be available in at least some nurseries and to be relatively easy of culture were used in the home garden. Thus a shady corner includes Columbine, Bleeding Heart, Wild Ginger, Barberry, Alum Root, Douglas Iris and Yerba Buena. A hot dry section is planted principally to Buckwheats, Sages and Monkeyflower hybrids. Prostrate Ceanothus and Manzinitas are used on the bank between the terraces, while the upper bank includes a variety of ornamental shrubs and perennials. A screen planting at the back is composed of Toyon, Lemonade Berry and Fremontia. The showiest of our chaparral shrubs have been placed as accents against the fences or in especially selected spots. Small beds have been left for spring wildflowers and free flowering perennials such as Penstemons.

It was felt that labels placed near the plants would destroy the effect of a home garden. In their stead, a numbered map has been used with each plant indicated by a number and a list of the corresponding names attached. This is posted on a fence

at the side of the garden where it is readily seen. It is also included in a small folder on the home garden which gives suggestions on the cultivation of native California plants.

Although the garden was completed only last fall and many of the plants are small, it has already aroused much interest and served as an example to numerous gardeners who visit it frequently to watch the growth of these plants before making their own selections.

Director,
Santa Barbara Botanic Garden

Home garden of native plants at the Santa Barbara Botanic Garden

COVER PICTURE

Through arrangements negotiated jointly by County Museum Director Jean Delacour and the Sacramento National Wildlife Refuge near Willows, California, the Arboretum received 31 of the injured but now recovered waterfowl.

Hopeful that the birds will decide to make the Arboretum their permanent refuge, the following numbers and kinds were released on May 15: 10 Snow geese; 5 Cackling geese; 3 White-fronted geese; 6 Mallard ducks; 3 Pintail ducks; 2 Green winged Teal and 2 Widgeons.

The cover picture, taken by Denis Kucera, captures the release of some of our new waterfowl. Aiding their flight from the cages are: Mrs. Dolores Hubble, Mr. Gerry Patten and Mr. Juventino Herrera.

THE BAMBOO STORY

H. H. BENSON

BAMBOO is one of the most useful and interesting members of the family of grasses. It belongs in a separate grouping with those that have branched woody stems. There are well over one thousand known species, with about seventy kinds native to the Americas.

They are found for the most part in the tropics, and seem to grow at their best in the monsoon regions of Asia. The temperate zones lay claim to some of the sturdier varieties. Two of these, native to North America, grow wild in our southern States and are known by the familiar name of 'Cane Brake'. One of them, *Arundinaria gigantea*. grows from fifteen to twenty-five feet high, and is called 'Large Cane'. The other, *Arundinaria tecta,* grows from two to twelve feet, with common names like Small, Switch or Scutch Cane. The name 'Cane Brake' however is in general use for either kind.

Unlike most other plants, bamboo is found growing at all elevations, from sea level to as high as fifteen thousand feet. In some instances it has been known to survive zero temperatures. Many of them grow under all sorts of adverse conditions, with drought, rocks or sandy soil seeming to offer no particular draw-back to their development. Those that grow near the water are usually evergreen. Species that are normally deciduous when growing away from water, become evergreen when moved near a water supply.

From sixty to seventy kinds may be grown successfully in the southwestern part of the United States. It is interesting to note that over fifty varieties are growing under test on the Arboretum grounds.

The range of size and shape is tremendous. Some only reach a height of about ten inches when fully grown, and have ground cover possibilities where plenty of room is available. Others grow well over a hundred feet tall, with a culm or trunk diameter up to fifteen inches. There is of course every size in between these two dimensions.

In color the leaves range through many shades of green, which in some species turns to yellow as the season advances. There are a few kinds with variegated leaves in white, silver or yellow. Other parts of the plant may sometimes join in this parade of contrasting color. The culms or trunks, tho' generally green, are often purple, reddish brown or golden yellow and even these, like the leaves, change color with age. Stems in some instances are purple, black, green, brown or yellow. The nodes also come in for their share in the color scheme with rings of purple, blue, black, white and brown. Even the petioles add a distinctive touch here and there with green, yellow, purple and brown.

Foliage arrangement and manner of growth give many of the Bamboos an additional claim to charm and beauty. There are kinds that have a dainty appearance, with small leaves spaced at little intervals along slender canes, presenting an attractive and lacey silhouette against a back-ground of sky that is really eye pleasing. In others, the leaves grow in greater numbers, are larger and nearer together, and from the ground up seem to billow in lush surges of lovely green, one above the other, in a way that is truly fascinating. Another stands quite tall, with a long bare culm and the foliage all bunched at the top. Some have a plume like manner of growing, and these huge plumes, swaying lazily in the slightest breeze, gives one an entire new conception of foliage beauty. The differences in foliage arrangement are almost endless.

Bamboo blossoms are what you would expect to find on any grass, a delicate tassel-like cluster of feathery beauty. Some of the species flower on leafy branches, while on others the leaves fall off before the bloom appears. On still others the flowers grow on separate leafless stems.

There are kinds that flower every year, the way most other plants do, and others

that probably have never been observed at blooming time. The reason for this is because anywhere from thirty to fifty years may elapse without a bloom appearing. This makes many of the species hard to classify, as the bloom has been considered necessary for positive identification.

There are certain kinds in which the flowering process does not exhaust the plants' vitality, and they keep right on growing. In others the plants die completely, even to the roots underground. When this happens whole forests of the species may disappear, and years pass before the seedlings that survive grow enough to repopulate the area. They all bloom at the same time, old and young plants alike, so when this belated bloom time does come, it could spell catastrophe for the natives who use this particular forest as a source of food and for other material.

Many of the Bamboos depend on their tremendous spreading root systems for survival, but whether propagated by this method or by seeding, it spreads rapidly, forming a tough fiberous underground network. This characteristic is sucessfully used in many parts of the world to combat and control soil erosion. An odd fact is that one, or many bamboo canes may be cut from a single clump, with full assurance that other canes will be produced and ripened within a year. This is of great economic value in many Asiatic countries where bamboo is raised commercially, for it means that a crop of canes can be cut regularly from the same plantation.

But for all there is left to learn about this unusual plant, uses for Bamboo is one angle that seems to be pretty well covered. It is truly amazing the number and variety it has been put to, and how its use has spread all over the world. It's practically everywhere in one form or another. No doubt there is some in use in your home at the present time. What other plant is there that you can drink out of, fish with,

"Buddha's belly" or *Bambusa ventricosa* showing globular internodes which give culms a zigzag appearance.

Bambusa multiplex 'Alphonse-Karr' is a clump type bamboo, sporting yellow culms stripped with dark green. Photo, L. B. Martin

smoke through, write on, walk with, blow through for music, shoot with, cut with, sit on, climb up, cook in, eat and use for money in some parts of the world?

This is only a starting point for its unlimited variety of uses. It supplies food for humans in a sprout that can be cooked like asparagus. It can also be candied or pickled. Floor mats are made of it, and carpeting. Hollowed out in various sizes it is used as measures of quantity. Scaffolding and lookout towers have been constructed, and bridges swung across rivers and canyons. Cooking utensils and cups are fashioned from sections of culms, and since the culm is sealed off naturally at each node, the utensil thus formed has a good serviceable base and does not leak. A native on a journey can easily make one of these at meal time, then pick a few bamboo sprouts and cook them in this kettle over a fire, possibly made from bamboo. All this could come from one kind of bamboo, and there would be no need to keep the kettle for another could be made just as easily when meal time came around again.

Following is a list showing some of its uses, but no list however long, could be complete, for the plant is so versatile it seems that whenever a need developed for anything in the way of material, the use of bamboo was found to be the answer. The list follows:

baskets
trellises
flower pots
vases
plant stakes
umbrella frames
cages
chop sticks
fans
toys
place mats
walking canes
pipe stems
phono needles
kites
hats
punting poles
rafts
boat landings
masts
musical instruments
sail booms
ladders
fences
roofing tile
curtains
water pipe
dikes
wind breaks
wall cover
floor joists
cable

buttons	rope
ski poles	wind wheels
knives	furniture
blow guns	paper pulp
tent poles	wheel axles
fish poles	bee hives
traps	

Certain kinds of bamboo are used in many parts of the world as fodder for cattle. They are considered as good fattening food, as the protein content is three to four times greater than the average for other grasses.

Bamboo is often used for special landscape effects, and the result is always a pleasing one. A point of interest to home gardeners is that some are adaptable to small garden use, provided the roots are properly confined by underground barriers.

One of the taller growing varieties, *Sinocalamus oldhami,* has been planted along one of the boundary fences at the Arboretum. In the years to come this will effectively screen out any surroundings that might clash with the purpose of other plantings inside the grounds. Unquestionably it will make a beautiful back-drop for the Arboretum scene.

Many of the other Arboretum test plantings are even now offering visual proof the Bamboo, besides being one of the most useful of the world's plants, is also, 'a thing of beauty and a joy forever'.

From 10 to 20 feet tall, these plants of *Sinocalamus oldhami* form a screening hedge on the Arboretum's southeast fence line along Baldwin Avenue. Photo, L. B. Martin

Dedication evening, the Plant of the Month exhibit, *Dyckia altissima*, was seen at the entrance to the main exhibition hall. Photo, L. B. Martin

HORTICULTURAL HALL

Wednesday evening, May 29, marked the opening of the official dedication exhibition and ceremonies for Horticultural Hall, a recent addition to the California Museum of Science and Industry, 700 State Drive in Exposition Park.

Dr. Rufus B. von KleinSmid delivered the dedication speech. He emphasized that this hall has been added to the Museum to provide a location to exhibit annual and special horticultural shows and other temporary exhibits.

Donald P. Loker acted as Master of Ceremonies. Norman M. Lyon was chairman of the dedication ceremonies. Other distinguished guests included C. A. Neyman, Chaplain, University of Southern California who delivered the invocation, Jesse M. Unruh, State Assemblyman, Ransom M. Callicott, City Councilman, Ray Nortvedt, deputy to John Anson Ford and Don M. Muchmore, Museum Director.

Participants in the show included the Agricultural Extension Service, University of California, Los Angeles, Southern California Floral Association, California Institute of Technology, Descanso Gardens, Los Angeles State and County Arboretum, Los Angeles City Recreation and Parks Department, Los Angeles Beautiful, Southern California Turf Grass Council, Huntington Botanical Gardens and Southern California Horticultural Institute.

A specialty of the show was the "Plant of the Month". This marked the beginning of a program of presenting a special plant each month under the sponsorship of the Southern California Horticultural Institute. The plant for the month of June, exhibited by Huntington Botanical Gardens, San Marino, is *Dyckia altissima*. A succulent, this plant is native to Brazil and belongs to the family, *Bromeliaceae* or Pineapple Family. It has a blooming period

(at Huntington) from May through June.

Exotic and rare plants were displayed in an exhibit by the Los Angeles State and County Arboretum and Descanso Gardens.

U.C.L.A. exhibit, with a theme of Design in Horticulture featuring three dimentional treatment, depicted the use of plants in and around the home. Ceramic art, oil paintings, textiles and ground coverings were blended with plant life.

Los Angeles Beautiful participated in the exhibition by providing a display of street trees which can be successfully used for street adornment. Also, Los Angeles Beautiful presented the visitor with a gift of coral tree seeds donated by Dr. Samuel Ayres, Jr.

Southern California Turf Grass Council presented turf grasses and California Institute of Technology an exhibit of the effects of climate on the growth of African violets.

JOAN D. CASE, *Director,*
Public Relations
California Museum of Science
and Industry

The exhibit of the Los Angeles State and County Arboretum and Descanso Gardens. Photo, L. B. Martin

AN ORCHID FOR A MEMBER

Until September 30th, 1957, each new member to the California Arboretum Foundation Inc., will receive a cypripedium orchid plant. This same offer is extended to any person securing a new member. The gift of an orchid plant was made possible through a generous donation of such plants to the Foundation.

ANIGOZANTHOS MANGLESII

FRITS W. WENT

Anigozanthos manglesii, the kangaroo paw of Western Australia, is a very striking plant when flowering. It grows in open Eucalyptus forests and is quite common in Kings Park in Perth, where in September its striking red inflorescences with violently green flowers stick out above the multicolored low flowering shrubs and herbs. Deep-blue masses of Leschenaultia and Dampiera alternated with yellow and orange and brown Oxylobium, pink Hypocalymma, yellow Hibbertia, or purple orchids, but the inflorescences of Anigozanthos almost eclipsed all these other striking flowers.

The plant itself is not at all striking; on the contrary, without flowers it resembles an iris, freesia, or any other similar plant with sword-like leaves which are not particularly neat, and of which the tips are usually almost black, as if they were singed. It grows easily from seed, and it can stand almost any temperatures above freezing.

After about a year, the oldest part of the plant may start to shoot. At first the inflorescence is light-green and somewhat fuzzy due to hairs on stem (and some on bracts), but then, as the stem elongates, the color changes, and soon the hairs have turned a brilliant vermillion red. Since the hairs are branched and feathery, they largely cover the green stems, and thus the whole stem looks red. At the end the flowers develop. The inferior ovaries (Anigozanthos is an Amaryllid) are soon fairly large, and, although they themselves are yellow in color, they are so densely covered with hairs that they become the reddest part of the inflorescence. The corolla on top of the ovaries gradually elongates and bends down in a graceful curve. It is deep-green, and whereas the hairs on it are first red or purple, these turn green before the flower opens, and turn red again after fading of the flower, giving it an olive color.

The green color of the stem is due to chlorophyll, and the yellow or orange hue of the ovary is caused by carotenoids, the same pigments which give the orange color to carrots. These pigments are not water soluble. Therefore when spinach or carrots, colored by chlorophyll or carotene, are cooked, the water in the pan does not become colored. But the red color of the hairs of Anigozanthos is caused by an anthocyanin, a highly colored pigment which is water soluble, and which is related to the red color of pelargoniums and table beets or the blue of pansies and larkspurs. We all know how the red color of the beet comes out into the water in which they are cooked.

A portion of the sword-like basal leaves, the vermillion red flower stalks, and clusters of Kelly green flowers of *Anigozanthos manglesii.*
Photo, L. B. Martin

These anthocyanins or flower pigments have other interesting properties. They change color as they become more acid or more alkaline. The red pigment of the Anigozanthos flowers possesses this property, and, therefore, when some red hairs of these flowers are placed in an alkaline solution, they turn purple, and change back again to red when put in an acid solution.

Using the amphoteric property of this pigment, some interesting experiments can be made with Anigozanthos flowers. When such a flower or a whole inflorescence is placed in a jar, in the bottom of which some spirits of ammonia are poured, the ammonia vapors will spread inside the jar and will penetrate slowly into the red hairs. These then turn purple, changing the color of the whole plant. When they are not left too long in the ammonia vapor, the hairs are not damaged. When the stem is then placed in a jar with essence of vinegar in the bottom, the vinegar vapors will counteract the alkalinity of the ammonia which has penetrated into the cells, and after some time the hairs—and the whole stem—turn the same brilliant red they were before. This can be repeated many times, and thus this plant could be made to conform with the color scheme of the room in which it is used!

The essence of vinegar vapors cause another change. The hairs on the corolla. which first were green, turn red too, and thus not only the color of stem and ovaries changes, but that of the flowers too.

All sorts of variations on this general theme can be produced. If a jet of ammonia vapor is directed on a short segment of the stem or on one flower only, this segment or flower only changes color. Or with the proper dilution of the vapor inbetween colors can be produced.

In the Earhart Plant Research Laboratory of the California Institute of Technology a number of Anigozanthos plants were raised from seed. When they were big enough, they were transplanted and groups of four plants were placed in five different greenhouses under five different temperature conditions. In the hot greenhouse they were kept at 86° during day and at 73° during night, in the warm greenhouse at 80° and 68°, in the temperate greenhouse at 73° during day and 63° during night, in the cool greenhouse: 68° day and 57° night and in the cold greenhouse they grew at 63° during day and 53° during night. For many months the plants grew well under all five conditions, only somewhat slower in the cold greenhouse. When they were about ten months old, the plants in the cool and cold greenhouses, and a month later also in the temperate greenhouse, started to form inflorescences. In the warm greenhouse one plant has finally started to form a very poor stalk, but in the hot greenhouse no trace of inflorescence formation can be seen. This experiment shows that in *Anigozanthos manglesii* flowers can only be formed under cool temperature conditions. Therefore this plant flowers in spring when the low temperatures during winter have induced flower formation (in Australia spring comes in September, of course).

The temperature treatments caused other responses as well. In the temperate greenhouse much less red pigment developed in the hairs, therefore the stems appeared pink and the ovaries orange. Also a much smaller number of flowers opened; most of the earlier flowers aborted. Therefore, when one sees these plants growing outside, it is possible to tell what the growing conditions were during the development of the flowers.

Every plant is the product of its internal potentialities (hereditary background) and the environment under which it developed. To get a really first class plant it is not enough to select one with a desirable parentage, and to feed it properly; one has to take care to give this plant just the right growing conditions as far as light and temperature is concerned. We hope that the Arboretum, in cooperation with the Earhart Laboratory, will contribute much useful knowledge about the optimal growing conditions of some of the more spectacular garden plants. This is not just theoretical knowledge; through shading or growing plants in different exposures, a gardener has a fair range of possibilities, in his own garden, even without the help of a greenhouse.

FIRE CONTROL BY PLANTS

Richard M. Straw

Fire control by plants is a research project which has been in progress at the Los Angeles State & County Arboretum since 1953. The Malibu burn of December, 1956 afforded a comparison of fire resistance among certain natives and horticultural plants.

For two weeks prior to December 26, 1956, the hot, dry desert winds (Santanas) had poured over the Santa Monica Mountains toward the Malibu coast area of northwestern Los Angeles and adjoining Ventura counties. On that fateful Wednesday morning, the first of a series of fires broke out that eventually ravaged some 40,000 acres of chaparral, beach and mountain residential areas. The fire was called a national disaster.

This report is based on two observational tours of a portion of this area soon after the fire. In addition, to his own impressions, the author interviewed nurserymen, home owners and fire control officials with the hope of obtaining information relative to the role played by the vegetation, particularly trees and shrubs, in protecting property from fire damage.

The most conspicuous plantings in the region burned were groups or lines of the Tasmanian blue gum, *Eucalyptus globulus,* primarily used as windbreaks. The leaves of this and other species of Eucalyptus were found to have been killed by the fire or its heat but not to have been consumed; they *did not burn,* except where young trees were closely surrounded by other fiercely burning brush. Nor was there any evidence that they flamed from the effects of the volatile oils in the leaves and furthered the fire without being destroyed themselves. In the Nickerson nurseries in Dume Canyon, above Zuma Beach, a fairly extensive plantation of young *Eucalyptus* species was burned into by a fire in heavy grass and weeds, but the trees, although their leaves were largely killed, did not contribute to the fire at all and none, apparently, were permanently damaged. In other areas, as in Las Flores Canyon, Eucalyptus trees were surrounded and passed by the fire without having their leaves consumed, and although it was earlier thought that the trees themselves might have been killed, it was found in mid-February, 1957, that only the smaller branches were seriously affected.

Other plantings, primarily shrubs, also suffered the death of their leaves but were not totally burned, and in some cases it could be seen that only the sides of the shrubs toward the fire were affected at all. Notable among such plantings were those of Oleander (*Nerium oleander* cultivars) and especially Ngaio (*Myoporum laetum,* often called Sandalwood locally). These two shrubby species, the first from the Mediterranean area and the second from New Zealand, develop a dense low growth that, if it proves as effective as it then appeared to be, may provide protection from the low ground fires. The *Myoporum,* which grows particularly well in coastal areas, is credited with some protective results in the Zuma Beach fire district by at least one landscape designer, but the details were not clear and other factors may have been equally or more effective than these plants. A number of other kinds of plants were seen which survived the fire in various areas but not frequently enough to justify even suggestions as to their values along these lines.

On the negative side of the ledger, apparently some plant types to be avoided, especially in close proximity to buildings, are the native shrubs—sumac, ceanothus, etc., which burn readily, and conifers in general. In the same situation where Eucalyptus suffered temporary damage, pine trees lost their entire foliage to flames and contributed to the fire. The ice-plant (*Mesembryanthemum* spp.) commonly planted along slopes and roadsides for erosion control, proved to be more of a possible menace than of help in a fire, since the large quantities of dead debris which

accumulates underneath it burn readily, serving to carry a fire across a strip that otherwise appears quite safe.

In summary, it is best only to say that species of Eucalyptus, oleander and Myoporum, in the fire areas visited, appeared to have been less completely burned than the native shrubs and pines, and they may in some instances provide a degree of protection to houses and other buildings in fire areas. In no event, however, should any of these plants be depended upon for these effects, and the best protection available at this time is probably a fire-break continuously maintained around the residences to cut down ground debris and provide access to fire fighters.

Acting Taxonomist
Los Angeles State
& County Arboretum

BOOK REVIEW

What Flowering Tree is That? A handbook for the tropics, by Edwin A. Menninger. Published by the author, Stuart, Florida, 1956. 110 p. Indexed. $3.00.

From the writings of Edwin Menninger one gathers the impression of a stimulating individualist in our age of conformity. This trait has been a boon to the landscape of Southern Florida where gardeners follow his precept and plant rare exotic trees. According to a recent article by M. H. Moon in *Baileya,* Mr. Menninger's tree-nursery hobby which started over twenty years ago, has led him to contact hundreds of botanists and local plantsmen all over the world in an effort to secure information about the flowering trees of tropical countries. Through the years his tree introductions have increased from 25 to over 500 new kinds in one year. He uses the whole community as his laboratory, but naturally not all the species have propagated successfully.

Mr. Menninger's aim has been to introduce Florida gardeners to the wide range of showy-flowered tropical trees not previously available in this country. His book presents "non-technical descriptions of 1,000 kinds of exotic flowering trees to be found in my garden at Stuart, Florida, and mostly available from time to time to homeowners who will struggle with the unusual in preference to accepting the commonplace." For the native of Florida a price list may be obtained to accompany the book; of the 576 trees listed herein, Mr. Menninger believes 136 are his own introductions. Descriptions in the book are for the layman, but are well authenticated by many references and quotations gleaned from the author's research in his extensive library. The style is conversational, lively and interesting. For instance, in regard to the Australian Wattles (*Acacia*): "They have a tendency toward a short life and a merry one." On the Baobab (*Adansonia digitata*) he quotes Sturtevant, Monteiro, Colthurst and Chinese Wilson; Menninger himself says "In Florida the tree is pot-bellied but has not shown any tendency to develop an exceptionally big trunk . . ." Sometimes he cites volume and page, often just an author; but in either case the reader is not bothered by footnotes or bibliography, which makes good reading and a pleasing assumption that we know the sources quoted.

There are 175 excellent photographs in black and white and 4 full-page colored plates: Silver Trumpet (*Tabebuia argentea*), Frangipani (*Plumeria acutifolia*), Royal Poinciana (*Delonix regia*) and Florida Orchidtree (*Bauhinia variegata*). The arrangement is alphabetical by scientific name of the family, giving both common and botanical names of each tree. Small type is used for trees that have inconspicuous flowers because the book is mainly concerned with showy blossoms. Descriptions vary from a few lines to a paragraph. Although primarily for use in Florida, botanists and gardeners in any region will find this volume useful for plant identification.

DORA M. GERARD
U.C.L.A.

* * *

How to Landscape Your Own Home, by Robert S. Malkin. New York, Harper & Brothers, 1955. 432 p. Indexed. $4.95.

Notwithstanding the copious literature on landscaping from *House and Garden* to Sunday supplements, Mr. Malkin feels

there is need for an explanation of procedure in adapting to one's own property many things which are usually photographed—an outdoor fireplace, a lovely garden. He re-defines landscaping as "the arrangement of the land around the home so that it is pleasant both to look at and to be in. Anything which accomplishes these results, even if plants are not used at all, is 'landscaping'." He has produced a helpful manual to be used by the homeowner as a guide to landscaping his own grounds with or without the aid of a professional architect. An amateur can do all but the heavy work himself. Often people who "do" things do not study books; the best cooks vary the recipe, the best gardeners have a green thumb, those designing a property copy the grounds of a friend. Although much of the material can be found in other books, Mr. Malkin has given detailed information on every conceivable aspect of home landscaping from selecting the site to placing the last flower, which will provide expert guidance to the most ardent do-it-yourself proponent.

The book is arranged in three parts: Design, Construction and Plants. In discussing design the author places emphasis on the arrangement of the layout. He starts with two sketches of the same garden arranged in different ways to illustrate the benefit of imagination in planning. There are 514 such sketches by the author; various arrangements of the same scene, line drawings, illustrations of procedure, etc. The sketches make the book a manual rather than an essay and will be valuable to amateur and architect. The headings under design include drainage, location of doors and windows to secure benefits from sun and wind, traditional styles of landscaping, dramatization of a view, what to do with the sides of the homes, and planning the front layout.

Construction involves specific materials which will be used. The subjects covered in this part are rough grading, fill and cut, slope in front, moving earth, pavings, fencing and other types of wood construction, eye catchers and potted plants. Definite specifications and materials are given.

The section on plants is placed at the end to stress the fact that "there is more to the garden than just plants". It is decided where plants will be used in the general arrangement, then the sizes and shapes of the plants to be used in planted areas, then the location of each plant, and last the particular plants which will meet the requirements. The preparing of soil, planting and transplanting of trees and shrubs, lawn making, pruning and maintenance are discussed in some detail.

Mr. Malkin recommends the hiring of professional help for those who do not have know-how and skill. In reference to this he lists cost comparisons of materials and labor which will give an approximate idea of how costs run, even though dollar values fluctuate. The Appendix contains more than the usual share of lists: plant suggestions, hardiness zones, kinds of trees and shrubs for varied uses and locations. The format is attractive and there is a good index. This book is recommended to anyone faced with an empty lot or a house on bare ground.

DORA M. GERARD

* * *

A new edition of the "Plant Buyer's Guide", to be published by the Massachusetts Horticultural Society late in 1957, is now being prepared by H. Gleason Mattoon of Arlington, Vermont. The sixth edition of this vital source book will contain the most complete list available of seeds, plants and bulbs which can be purchased by mail from American firms. In addition, a representative list of European sources will be included.

For several years, gardeners, nurserymen, arboretum directors and horticultural specialists have been looking forward to a new edition. The last was compiled in 1948 when the nursery industry had not yet recovered from the effects of World War II.

In contrast to the 35,000 plants which comprised the available list in the last edition, this new volume is expected to have more than twice as many, including new species, hybrids and varieties.

All nurseries which issue catalogs or plant lists have been asked to cooperate. Announcements have been sent to more than 5,000 American firms and several hundred foreign dealers.

Old Shrub Roses, by Graham Stuart Thomas, with chapters on the "Evolution of Our Garden Roses", by Dr. C. C. Hurst. London, Phoenix House Ltd., 1955. 224 p. Indexed. 3/26 ($4.56)

This treatise on old shrub roses has the charm of a gardening book written at the turn of the century. Each chapter is headed by a poetical quotation on roses and the author writes in the graceful style one associates with English literature. In her forword, V. Sackville-West says that Mr. Thomas' book takes her back to the leisurely days before the two world wars, when rush and speed had not entered into man's conception of the desirable life. It is also a remarkable study of bibliography on the rose; volumes familiar to our library assume new significance upon reading this work—Gerard's *Herbal*, Redoute's *Les Roses*, Wilmott's *Genus Rosa* and many others. In fact the whole book is imbued with historical and bibliographical information.

Mr. Thomas started his renowned career as a rose collector at the age of eight. By the outbreak of World War II he had become enamored of old roses and started serious collecting. Although there was little time for roses during the war years, at the request of Constance Spry in 1941 he propagated old species from her collection to insure their perpetuity in case the old bushes died. He has collected from America, from Bobbink & Atkins in New Jersey, Lester Rose Gardens in California, and the Morton Arboretum in Illinois, as well as from sources in Denmark, France and Germany. Mr. Thomas has contributed representative collections to the Royal Horticultural Society's Gardens at Wisley, Northern Horticultural Society's Gardens at Harrowgate, and to various collectors abroad. A duplicate of nearly every variety has been accepted by the John Innes Horticultural Institute, where the National Rose Collection is being brought together by Mr. G. D. Rowley. "The complete classification of the wild species roses in botanical beds, and the pedigree collection tracing the evolution of our modern roses, has thus been amplified by a planting of the popular roses of the past; all these can therefore be utilized for genetical and other studies."

Following this chronicle of the author's "personal" approach to roses is a chapter on the "Rise of the Old Roses". The shrub roses under consideration are the *Gallicanae* group—the Gallicas, Damasks, Provence, White and Moss roses. He traces their history through the literature from the 12th century B. C. to the 20th century. The chapter on "Revolution" describes three steps in the revolution of the rose: the introduction of the China rose, *Rosa chinensis,* in 1789; the French Revolution, which indirectly produced Josephine's great collection at Malmaison; and the gradual advent of the Austrian Briar, *Rosa lutea.* Subjects discussed in other chapters are cultivation, pruning, old roses in the house and garden, old roses in Paris, and old roses in pictures.

According to Mr. Thomas, inclusion in his book of Dr. C. C. Hurst's "Notes on the Origin and Evolution of our Garden Roses" adds immeasurably to the value of the publication. Dr. Hurst conducted his research into botanical and cytological evolution of the genus *Rosa* at the Cambridge University Botanical Garden from 1922 onwards.

Part II of this book comprises vivid descriptions of "Old Roses in Cultivation Today"—Provins, Damask, White, Provence, Moss, Bourbon, and notes on the Old Yellow Roses and a few others. Many references to accurate pictures are given to save others from searching. There are 9 lovely colored and 21 black and white plates. A bibliography and index conclude this erudite and delightful work on

"Roses, the garden's pride,
Are flowers for love and flowers for Kings,
In courts desirèd and Weddings."
—Thomas Campion

DORA M. GERARD
U.C.L.A.

* * *

The Annual Fuchsia and Shade Plant Show, sponsored by the California-National Fuchsia Society, will be held in the main building of the Hollywood Park Race Track, Inglewood, California, on Saturday, August 3rd and Sunday, August 4th. It will be open from 2 P.M. to 10 P.M. on Saturday, and from 10 A.M. to 10 P.M. on Sunday. Admission will be 45c.

Branches of the society from 28 different communities in California are planning to make this year's show better than ever.

The displays will feature colorful garden scenes, out door living, areas, unusual ideas, and natural settings. Individual exhibits, open to the public as well as to members, will include fuchsias, ferns, African violets, gloxinias and bromeliads. There will be separate classifications for novices who have never entered plants in a show before and for experienced amateur gardeners. Prize ribbons and trophies will be awarded in each classification.

Anyone wishing to enter exhibits is urged to do so. Commercial displays will be present to show the very latest in equipment and material for the gardener. Entrants please contact

MR. LOREN PAULSOHN, Show Chairman
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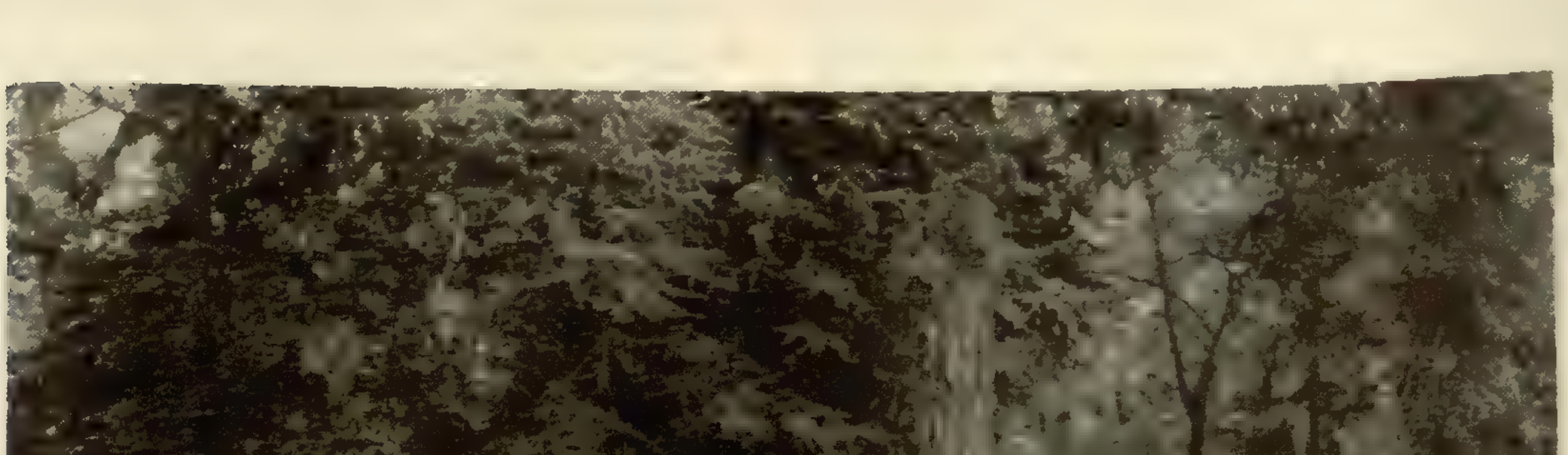

Learning about trees from Denis Kucera . . .

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BOOK REVIEW

Illustrated Reference on Cacti and Other Succulents, written and photographed by Edgar Lamb. London, Blandford Press, 1955. 311 p. 45/ ($6.31)

The growing of succulents is as popular among plant lovers as growing *Saintpaulias.* This volume is a useful tool for identification of cacti and other succulents. Mr. Lamb has photographed many of the plants in his personal collection of over 4,500 species. They are more easily identifiable than pictures of desert specimens growing in their natural habitat. The fact that his is a greenhouse collection grown in the South of England adds piquancy to its use in Southern California, as most of the varieties can be grown outdoors here.

The arrangement is by genera and species: the Cacti—*Opuntia, Cereus, Pilocereus, Echinopsis, Echinocactus, Mammillaria, Epiphyllum,* and *Phyllocactus,* and *Hatiora* and *Rhipsalis;* other succulents alphabetically by genus. The brief, non-technical descriptions comprise a one page discussion of each genus; then under the photograph of each species there is the scientific name, botanical authority, native habitat, color, size (most of plates about half-natural size), and a note giving cultivation requirements. Soil mixtures have been omitted because they are covered fully in other books; however, Mr. Lamb often mentions type of soil needed—e.g. sandy and well-drained. He says that if a reader considers his soil mixture "average", "the cultural notes with each photograph can be applied by adding a little extra leaf mold to some species, or sand to others as may be indicated in the Note on a particular plant." At the end of the book is general cultural information for growing succulents in more southern latitudes (than Britain) and an index of genera. His notes on cultivation are the result of personal experience.

The value of the book lies in its identification aspects rather than as a guide to cultivation. The plates are examples of superb photography in themselves and the reproduction is excellent. There are 32 colored and 214 black and white photographs, most of them of the plant in flower. The material shown is but a small part of Mr. Lamb's representative collection of succulents which he has been growing for over twenty years. Species not shown are listed for each group.

DORA M. GERARD
U.C.L.A.

WEATHER RECORD—1956

Los Angeles State and County Arboretum, Arcadia, California

	TEMPERATURES					RAINFALL	EVAPORATION
	AVERAGE		PEAKS			INCHES	INCHES
MONTH	MIN.	MAX.	MIN.	MAX.	MEAN	MONTH	MONTH
January	43.5	67.0	36.0	83.0	55.25	10.31	1.830
February	37.3	64.6	30.0	74.0	50.95	.95	3.310
March	44.0	75.1	35.0	86.0	59.55	Trace	4.120
April	46.8	70.5	34.0	90.0	58.80	3.49	3.115
May	52.5	77.4	44.0	102.0	64.95	1.03	4.555
June	57.1	87.0	49.0	99.0	72.05	....	6.400
July	60.1	90.3	53.0	90.3	75.20	....	7.595
August	59.6	89.0	54.0	106.0	74.30	....	7.210
September	59.6	95.2	55.0	107.0	77.40	....	6.830
October	53.5	79.8	43.0	93.0	66.65	.51	4.175
November	48.2	83.7	38.0	98.0	65.95	....	4.380
December	42.9	76.6	35.0	87.0	59.75	.45	3.220
					Total inches	16.74	55.740

GENERAL OBSERVATIONS

The lowest temperature, a 30 deg. F., was recorded on February 17. The highest temperature, a 107 deg. F., was recorded on September 9. During the year, there were 55 days of 40 deg. F. or less; 25 of these occured in February. Seven days were recorded with a temperature of 100 deg. F. or more. A temperature of 90 deg. F. or more was recorded for 85 days. Frost was observed on 52 mornings.

Rain was recorded on 22 days of the year for a total of 16.74 inches. The greatest precipitation fell during a three day storm, January 25, 26 and 27 for a total of 9.59 inches.

A yearly total of 55.74 inches of water evaporation was recorded.

Summary

Generally, this was a year of stress for plant growth. The scant precipitation from May through December can be held accountable for this condition.

T. McGAH

WEATHER RECORD—1956

University of California, Los Angeles. Subtropical Horticulture Area

	TEMPERATURE				PRECIPITATION
	AVERAGE		PEAKS		TOTAL
MONTH	MIN.	MAX.	MIN.	MAX.	MONTH
January	43.0	62.7	35	79	0.10
February	37.6	62.5	31	69	1.37
March	44.0	69.9	36	84	0.00
April	48.1	66.5	37	79	3.16
May	52.3	72.1	46	99	0.54
June	55.8	76.3	49	91	0.00
July	58.5	77.8	53	84	0.00
August	58.5	78.0	53	91	0.00
September	56.1	84.3	49	100	0.00
October	52.4	72.5	43	86	0.25
November	47.0	79.0	35	95	0.00
December	42.8	70.3	37	80	0.35
				Total inches	14.77

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VOL. VII OCTOBER, 1957 No. 4

Tree and Shrub Planting for Tomorrow's Highways

RALPH D. CORNELL, F.A.S.L.A.

Presented before the Western Chapter, National Shade Tree Conference, Yosemite Valley, May 8, 9, 10, 1957

THE TITLE assigned to this paper would seem to indicate, at least by implication, that highway planting of the future may well be somewhat different from that of the past. This may be a well taken point for two reasons; first because of changing attitudes and abilities within the field of highway planning and planting: and second because of changing conditions which the future highways of America probably will project into the problems involved in their planting and maintenance.

Considerations which relate to highway planting seem, basically, to be twofold. They involve aesthetics and economics. The ruling motivation to govern much of this work, in the past, has been that of appearance—of aesthetics. Presumably this was the dominating incentive in the treatment of the early parkway plantings and the rows of highway trees that were planted in the horse and buggy days. This, in itself, was and still should be sufficient reason for wishing to provide the roadsides with shade trees, flowering plants and attractive foliage. One need go no farther than that for justification of the expenditures required to plan, construct and maintain proper highway planting.

Currently, however, the rapid rate at which urbanization of our nation is being accomplished brings a changing appearance to the countryside through which one travels wherever he may go. Country roads give way to expressways, to turnpikes, to freeways. All of these erase much of the intimate loveliness of the old roads. Simple roadways, winding through picturesque countryside, give way to surfaces of billiard-table smoothness, and to the monotony of high speed lanes along which the landscape becomes but a blurr. Thus, in increasing measure, the ways of modern travel stress the need for aesthetic planning as well as for engineering planning in the construction of roads of all classes.

The aesthetic planning of future highways is full as important to our national life, health and economy as is their engineering planning. And it should be said with emphasis that the aesthetic planning of highway construction involves far more than a palliative planting of a few neglected plants along the rights of way. Aesthetic planning is equally concerned with road alignment in relation to natural conditions of land formation and configuration; with cut and fill banks as they are laid out in cross-section and degree of slope; with the niceties of engineering which may make the difference between a cold, mechanical result and one that is done with refinements of good taste. A job which is built in a purely mechanical way may embody sound engineering principles and yet fall far short of being an attractive thing to see. The day has passed when we can afford to overlook the elements of beautification that make a livable environment.

The gap, if such exists at all, between the aesthetics and economics of highway planning and planting is much less than might be expected in casual consideration of the matter. Actually, good aesthetics in planning and planting generally do constitute good economics, for some of the things that are done primarily for appearance may also reduce construction and maintenance cost. For example it is more economical to maintain a gently sloped bank than it is one which is too steep to handle properly. Wind breaks and dust control planting may reduce highway hazards and maintenance problems at the same time that they enhance the beauty of the roadsides. Plantings which reduce or eliminate headlight glare and transmittal of noise or which screen from view unsightly and distracting objects may be attractive, in themselves, at the same time that they reduce or even eliminate driving hazards. Thus the aesthetics and economics of planning become inextricably entwined to the

point where they cannot, in logic, be considered as separate and distinct matters for consideration. The skilled highway planner must take into account all of the values which relate to his work in any way.

This all puts into the program the matter of highway planting as part of the basic design and structure which should be considered integrally with the engineering facts and controls. Each item relates to the other and it is disastrous to end-results if an attempt is made to consider them separately and apart the one from the other. Total planning must take into account all values.

As human beings, most of us cling tenaciously to things of habit,—of custom. We do things as we do because those before us did them that way and because we learned to do them in just such manner. Thus, it was our custom for years and generations to plant street trees in continuous and monotonous rows that paralleled the road right of way. There were times and places when this procedure was good. But the plan never was so good that it should be repeated endlessly down the decades without thought of change or variation. For example it is seldom that the roadside conditions of soil and drainage are continuously the same for any great stretch of distance. Roads have ways of going through cuts, over fills, across bogs, into alkali spots, over hill and dale with ever changing conditions that bear direct relationship to roadside vegetation. For this reason alone, many roadside plantings have failed over a stretch of distance simply because the plant variety could not adjust itself to the rapid change in environment. Nature varies her plantings as the growing conditions which she provides may vary. Highway plantings, to be man's best effort, must be adjusted and adapted in like matter so that they may have a chance to survive under the difficult and varying conditions of the roadside.

There are other reasons why it often is

The Scarlet Flowering Gum, *Eucalyptus ficifolia*, represents a typical city "parkway" planting. Straight rows and uniform sequence are very good in the proper place.

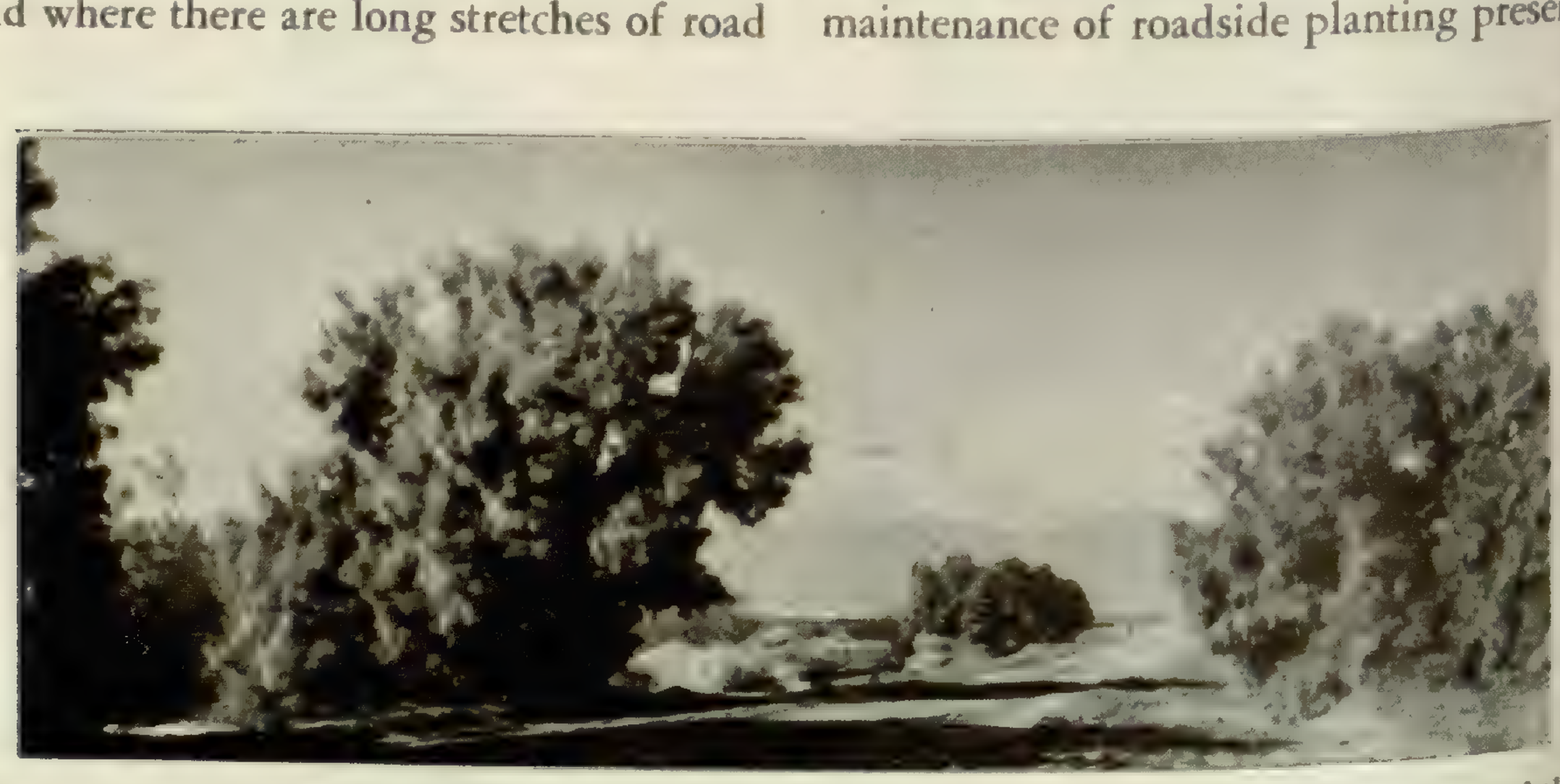
inadvisable to plant trees in continuous straight lines along highways. For one thing, modern, mile-a-minute speeds are such that uniformly spaced plantings may become monotonous and sometimes even hypnotic to the point of creating driving hazards. The rhythmic blur of muted forms at the side of the road and the even pattern of light and shadow cast on the pavement may create eye strain that becomes a serious menace to safe driving.

With all this in mind there is much to be said in favor of scattered, rather than continuous, highway plantings. Clusters of trees or shrubbery at intervals of considerable distance may be much more pleasing and economical than a monotonous overplanting of material, tightly grouped. Such design-approach permits greater freedom and makes it possible to locate trees and shrubs in soil pockets where they may be expected to thrive,—while skipping the poorer spots. Such planting may emphasize certain views or vistas, perhaps hide unsightly spots. Intelligent application of the theory may accomplish very interesting results at the same time that it saves both capital outlay and maintenance costs by reducing the quantities of material and the amount of care necessary.

This type of highway planting has been done along some of our California highways in a more or less limited way. In some of the desert sections, for example, where it is too dry to grow trees without water and where there are long stretches of road without suitable soil, trees have been planted at the spots where the roads cross natural water channels. Maybe it is one or two trees, or a half dozen, that have been planted in the earth-fill abutting road culverts. With the help of a little water to establish them, perhaps even with some continued maintenance, these desert trees have developed into attractive plants very refreshing to the passing motorist. They provide a definite lift to the highway traveller and certainly at a minimum of maintenance effort and cost. They may be spaced at very wide intervals but present-day auto speeds take care of that. They suggest what might be done on a larger scale.

In all such roadside planting it is appropriate to use native materials, indigenous to the region, whenever they are suitable and available. Many natives are difficult to grow and to establish but, when they are appropriate, they stand a better survival chance than do some of the exotic types of material. However, there are always certain immigrants, from other regions, that seem to be even more hardy than our own natives. Thus there is no infallible rule to be followed. Experience and good planning are the best guides. In any case it is necessary to give intelligent attention to soil conditions since few plants will grow and thrive in poorly drained soils, in saline or alkaline soil or under generally difficult situations.

There are sections of the country where maintenance of roadside planting presents



This open type of occasional planting is very effective in open country where traffic is fast and the scenery attractive. This planting is of *Tamarix aphylla*.

relatively no problems, and where irrigation is not a need as it is in most of California and some other western states. Such areas may be treated with greater freedom and lushness of growth but the planning of tree spacing and grouping is as important in one section as in another.

We have discussed design and maintenance almost as one topic. They do relate very closely. But still there are design thoughts and principles that may apply to highway planning regardless of the region where they are to be used.

In residential areas of cities, for instance, there would be places where it might be very effective to cluster or group several trees at the ends of blocks instead of standing them like poles in a block-long, straight row. This surely would be a less costly way to provide street planting and, if it also were more attractive, there would be a two-fold gain. If width of streets permit, the trees might be spaced not only at irregular intervals but they might be placed at varied distances from the centerline of the road or from the property line. One or two or three might be placed in a tight cluster, such grouping to alternate with single trees at random spacing. There are many ways to give character and interest to planting. The thing against which to guard is that type of design that will mechanize an attempt at casualness. If irregularities become fixed or monotonous they will defeat the purpose for which they are undertaken.

Little has been said about shrubbery but it, also, can bear an important part in the roadside design. Shrubbery is very effective for screening both sight and sound, for shutting out headlight glare on two-way roads and as a windbreak and dust shield. It should be handled in a manner to avoid traffic hazards by creating blind spots but, other than that, much freedom and ingenuity are possible in its use. Shrubbery often will provide flower color in a manner and degree impossible with trees alone. It responds and matures more quickly than do trees and should not be overlooked in the planning of highways.

Conifers, such as the Italian Stone Pine, *Pinus pinea*, may provide very satisfactory street trees when space is adequate and conditions suitable to their growth.

This type of natural growth never should be marred by artificial planting. Trees are the Kukui Nut, *Aleurites moluccana.*

Then, too, there are times when no street trees or shrubbery at all should be planted. the reason for not planting trees could be one of many. Where roadways wind through picturesque and lovely country which already is wooded and verdant, it could be highly possible that artificial roadside planting would distract from rather than add to the aesthetic appearance. Where soil and rainfall conditions will not support satisfactory plant growth it is better not to plant anything than to fail in an ill-advised attempt at planting. Where toes and tops of cuts and fills come so close to the roadway as to make it impractical, the conventional type of street trees in rows should be avoided. In the higher type of residential development, in which spacious grounds prevail and planting is lush on property adjoining the street, there may be times when added street planting would create confusion rather than add beauty to the landscape. Other streets simply do not provide sufficient space for proper development of trees between curbs and property lines.

Suffice it to say that the planting of highways becomes a matter of selectivity rather than a rule-of-thumb procedure that can be taken from a book. Each highway should be personalized to express those qualities and characteristics which are inherent in its

environment and in a way to bring out its highest potential in aesthetic and economic planning.

The points that I would like to stress and leave as the theme thoughts are: that planting is just as much an organic part of highway development as is the engineering; that there are large aesthetic potentials in engineering, as such; but that engineering does not reach the heights of perfection of which it is capable excepting as it assigns full value to the aesthetic possibilities of that work which is being planned. An aesthetically engineered "job" to which have been added the values of well-planned planting can be a work of art.

The beautiful Royal Palm, *Roystonea regia*. Properly used, straight rows of vertical, columnar palms may be very effective as street trees.

COVER PICTURE

For those of our readers who have journeyed to Hawaii, we selected a roadside planting of *Cocos nucifera*, the Coconut Palm as a cover picture. Mr. Cornell commenting on this setting stated that: "Clustered plantings of such material may be very casual and satisfying, both in open country and built-up areas." We all concur on this; unfortunately for southern California, we must still dream of such enchanting roadside plantings, as well as, the many other lures of tropical Hawaii.

EFFECTS OF GIBBERELLIC ACID SPRAYS ON THOMPSON SEEDLESS GRAPES

W. S. Stewart, F. T. Ching, and D. D. Halsey

Harvest data from experiments reported earlier *(1)* showed that a single application of water spray of either 10 ppm (parts per million) or 100 ppm gibberellic acid resulted in larger clusters of fruit, about 50% larger than on nonsprayed plants. The gibberellic acid was applied as a drenching spray at flowering. Growth measurements showed that within a week after treatment the stems and cap stems of the sprayed flower clusters elongated more than the nonsprayed and that this effect diminished during the third week after spraying.

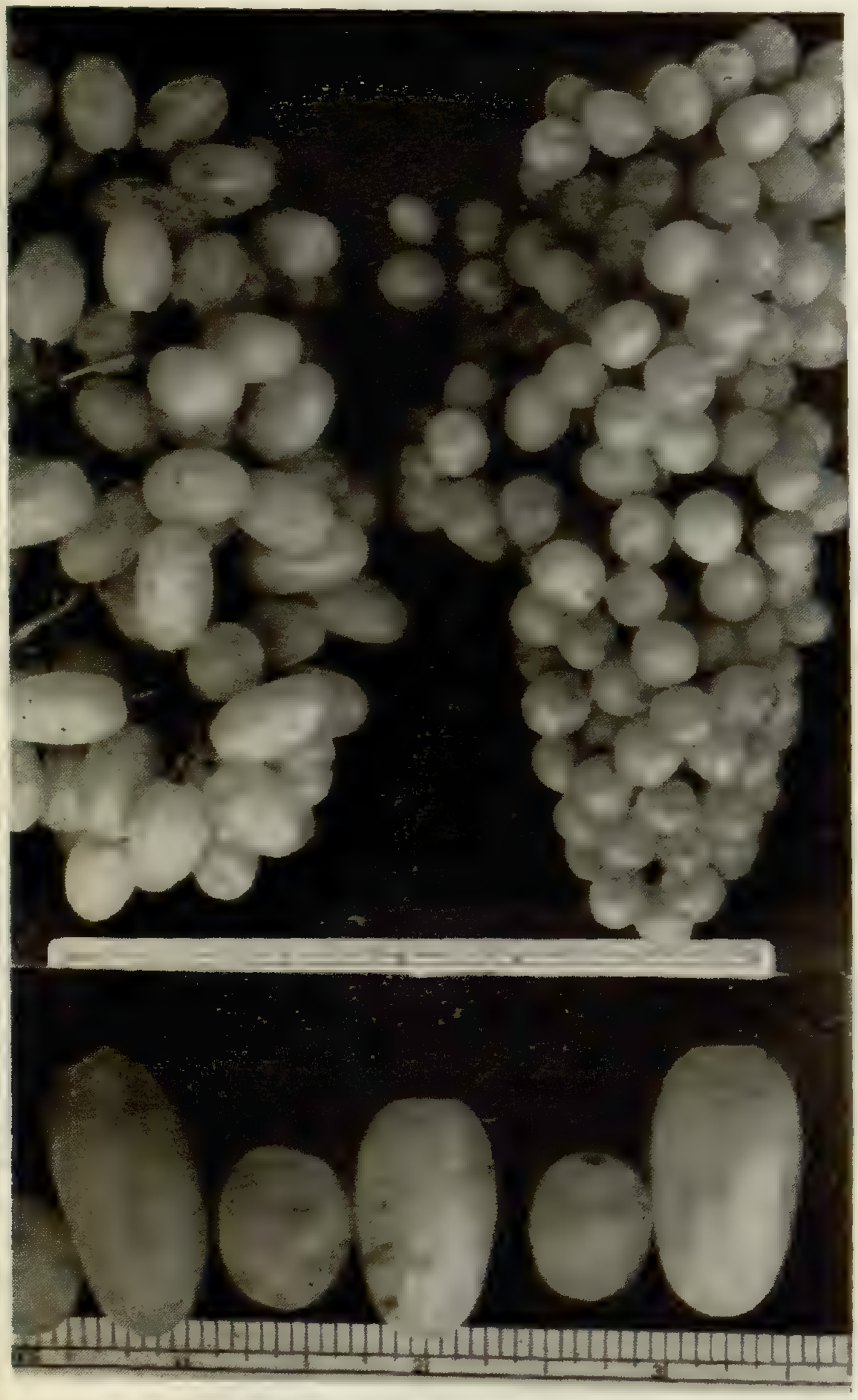


Fig. 1. Thompson Seedless grapes harvested June 21, 1957, from flower clusters sprayed with 100 ppm gibberellic acid on April 9, 1957. Above, left, sprayed; right, nonsprayed. Below, close-up view of individual fruits, alternating nonsprayed and sprayed from left to right. Experiment at Gonzalez Ranch, Coachella Valley.

Fruit growth responses were similar whether or not the vines had been girdled and the flower cluster hand-thinned as is commercial practice. Weekly applications of 100 ppm sprays to the same cluster for four consecutive weeks resulted in a greater number of undeveloped berries ("shot" berries) at harvest than on nonsprayed clusters.

Flower clusters sprayed with gibberellic acid on a single Perlette grape vine appeared to respond similarly to the Thompson Seedless flower clusters.

In addition to increasing fruit size the sprays induced elongated fruit and fruit with a higher sugar and lower acid content than from nonsprayed clusters.

In view of these results an extensive test on a commrcial basis is warranted. A spray of 100 ppm applied once at the time the clusters are about one fourth in bloom is suggested. The response expected would be an increased fruit size and an earlier harvest than from nonsprayed clusters. Until more experience has been obtained, this spray should only be tested, on any extensive basis, on vines that have been girdled and thinned. Whether or not gibberellic acid can be used to partly or entirely eliminate girdling and thinning must be determined by further studies.

Technical details and statistical analyses of the results presented here will be published in the Proceedings of the American Society for Horticultural Science.

Literature Cited

1. Stewart, W. S. and F. T. Ching. Horticultural Research Notes on Gibberellic Acid. Lasca Leaves 7:26-28. (1957)

CHARACTERS USEFUL IN THE IDENTIFICATION OF SPECIES OF FICUS

IRA J. CONDIT

IN NUMBER OF SPECIES the genus *Ficus* is one of the larger genera of plants. Volume 1 of the Kew Index and its eleven Supplements list 1,887 species, only a small fraction of which have been introduced into cultivation. I have had under personal observation in Cuba, Florida and California, some 157 species. There are now growing in California 65 species, about half of which I have introduced as seeds, cuttings or rooted plants. There are also under cultivation approximately as many plants labeled simply *Ficus* as there are plants with specific names.

Fig species are indigenous to practically all the tropical and subtropical countries of the world as shrubs, trees (large and small, evergreen or deciduous), lianas or climbers, epiphytes, all these quite often growing in nearly impenetrable jungles.

It is not strange that the systematic botany of this genus is probably in a more confused state than that of any other large group of plants as botanists have found in their efforts to produce satisfactory keys to separate the species. It is the intent of this paper to call attention to some of the distinguishing characters of fig species in the hope that they may serve as a guide to those who wish to pursue the subject further. First let us consider the floral characters.

FLORAL CHARACTERS

Theophrastus and other ancient writers regarded the fig as a flowerless plant. The Chinese gave it a name that means a fruit without a flower. It has long been known, however, that fig flowers are borne on the inside of a hollow receptacle and that these flowers are either staminate or pistillate. The systematic classification of fig species is based on arrangement and structure of the flowers in the receptacles and the manner in which the receptacles are borne on the plant. Botanists have separated the species of the genus into several subgenera. For example, the common fig, *F. carica,* belongs to the *Eusyce,* with receptacles having long-styled flowers produced on one plant, while receptacles with both short-styled flowers and staminate flowers are borne on a different plant.

There are characters other than structure and arrangement of flowers which must be used to separate one fig species from another in botanical keys. Let us now discuss these characters in the following order: plants, leaves, fruits.

PLANT CHARACTERS

In humid countries many figs start life as epiphytes, i.e. the fertile seeds left by birds on a tree or palm germinate and produce roots which gradually grow downward and encircle the host. These strangling figs are sometimes a pest and seriously damage timber trees in tropical forests. *Ficus retusa* becomes a strangling fig in Hawaii. The dry air of California does not favor this epiphytal habit of growth. In general, fig plants are either vine-like (including sprawling or prostrate types) or tree-like with one or more trunks.

Ficus pumila and its variety *minima* are the best-known examples of the climbing species. Others are: *F. megacarpa* of the Philippines which grew luxuriantly in a California propagating chamber but failed to thrive in dry outside air; *F. villosa* not yet established here but thriving at Missouri Botanical Garden; *F. quercifolia* and *F. radicans,* both finding favor as potted specimens.

Species growing as shrubs are: *F. erecta* which is deciduous and hardy but not especially ornamental; *F. diversifolia,* the Mistletoe fig, grown in college conservatories for class use.

Seedlings of several species, especially those from Mexico, develop bulbous bases even when they are very young. Some species develop surface roots in profusion. One fine specimen of *F. elastica* on Painter Avenue in Whittier, California, had to be removed because of the damage done by these roots to sidewalks and curbs.

In Florida, some introduced species of Ficus develop prop roots or multiple trunks as shown here on a tree of *F. elastica* at Fort Myers.

A characteristic feature of some species of figs is the development of aerial roots so well exemplified in such banyan trees as *F. bengalensis* and *F. altissima. F. rubiginosa* is a very variable species in several respects. Most specimens are devoid of aerial roots but one tree of this species growing near the roquet court in Balboa Park, San Diego, and another in a Santa Monica yard, do show aerial roots in abundance.

The tips of fig branches have sheathing stipules which protect the buds while they are dormant. Most fig species have two opposite stipules, usually somewhat different in size and shape. A notable exception is *F. elastica.* It has but one sheathing stipule, which when ready to drop may be over six inches in length.

In some species color of terminal buds when dormant is a character which may be relied upon to distinguish one species from another. *Ficus monckii* and *F. ovata,* for example, have buds colored brown or scarlet while *F. religiosa* and *F. benjamina* have green buds. Many others have terminal buds tawny, gray green or only slightly off the green color.

In most species of *Ficus* the interior of young branches is completely filled with a white, spongy pith. Young branches of the common fig with the pith removed have actually been used as stems for tobacco pipes. On the other hand, a few species have branches which are hollow, i.e., devoid of pith. Examples are *F. hispida* and *F. nota.*

LEAF CHARACTERS

The usual arrangement of leaves on fig branches is alternate, i.e. only a single leaf to a node. The leaves of a few species, however, are opposite, i.e. one pair to each node, as found in *Ficus hispida.*

Selection of ornamental figs is generally in favor of those which have evergreen foliage. The two species most commonly propagated for pot culture, *F. elastica* and *F. pandurata,* have green leaves which persist for several years, a feature which is certainly important from the commercial standpoint. Examples of deciduous species of *Ficus* are *F. roxburghii, F. erecta, F. monckii* and *F. eximia glabra.*

Leaves of ornamental figs vary tremendously in size and shape. Sizes naturally depend somewhat upon the kind of care

given the plant. The largest borne by introduced species are those of *Ficus pandurata* with blades often up to 18 inches long and 12 inches broad, and by *F. roxburghii* the leaves of which sometimes reach a length of 16 inches. The linear leaves of *F. pseudopalma* are often 25 inches long, while the leaves of *F. eriobotryoides* reach 21 inches in length on vigorous trees. Small leaves are borne by *F. pumila minima* and by *F. megacarpa,* those of the latter measuring only one inch long and half an inch broad.

Next to shape of blade the characters of apex and base are of importance in identification of species. The leaves of *Ficus religiosa* can be recognized by the caudex or tail-like extension of the apex. Leaves of *F. retusa* have a rounded apex while those of the variety *nitida* have the apex more or less acute. As to basal characters the blade may be truncate at base as in *F. religiosa,* cordate as in *F. petiolaris,* rounded as in *F. bengalensis,* or acute as in *F. volkensii.* Venation of blade is another character which is widely used by botanists in distinguishing species of *Ficus.* Most species have pinnately or feather-veined leaves but a few such as *F. carica* and *F. fulva* are palmately veined. In texture, fig leaves may be described as thick and rubbery, leathery or coriaceous, subcoriaceous, thin

Aerial roots are not commonly seen on fig trees in California. This tree of *Ficus rubiginosa* in Balboa Park, San Diego, has well developed aerial roots. Photo: Ralph Cornell.

and papery, brittle or soft and pliable.

The key which I have constructed to identify ornamental figs uses two prominent characters for separation into groups, first the margin of leaves, whether entire or variously notched. Leaves of *Ficus retusa, F. elastica, F. mysorensis,* and numerous others are entire, while those of *F. quercifolia, F. roxburghii,* and *F. asperrima* are serrate, crenate or somewhat lobed. The second character used is the presence or absence of pubescence on twigs, buds or leaves. A hand lens is an essential piece of equipment to determine this character as in some cases, notably on lower side of *F. bengalensis* leaf, the puberulence is hardly visible to the naked eye. *Ficus elastica, F. retusa* and *F. benjamina* are examples of species glabrous in leaves, stems and fruits. *F. rubiginosa* and *F. macrophylla* have a scurfy material on the lower surface which can be partly rubbed off. *F. doliaria* has buds and leaves which show a prominent, rusty pubescence. There are two forms of *F. mysorensis,* one much more pubescent than the other. Some fig leaves are so rough on the surface that they are actually used for scouring wood and metals. Examples are *F. asperrima* and *F. stenocarpa.*

In color, fig leaves are various shades of green above and usually show a somewhat lighter green below. Some species like *Ficus nympheaefolia* have leaves conspicu-

Cauliflory, the development of fruit or flowers from tubercles on trunk and larger branches, is well illustrated in this tree of P.I. #139,365.

Fig seedlings develop prominent bulbous bases as shown in *Ficus continifolia*, left, and *F. petiolaris*, right. Both are native to Mexico.
Photo: Harold Loomis

ously glaucous or greenish white on the lower surface. The new foliage of some deciduous species is brilliantly colored and very ornamental. A striking example is *F. roxburghii* the large leaves of which show a beautiful mahogany-red coloration. Leaves of *F. infectoria* are sometimes brightly colored when they first expand.

FRUIT CHARACTERS

In general there are two groups of fig species based upon the location of the fruits or syconia on the plant. One group produces fruits in axils of leaves or of leaf scars. A few species have only one fruit in a leaf axil, examples being *Ficus mexicana* and *F. radulina*. Most species commonly show two fruits in the axils of some leaves, a single fig in other leaf axils. In the second group of species belong those which are cauliflorous, i.e. the fruits are borne in clusters on trunk and larger branches. *F. racemosa*, *F. capensis* and *F. sycomorus* are all cauliflorous species. *F. roxburghii* bears its fruit not only on the trunk but also in clusters like mushrooms from the crown roots or base of trunk.

Fig fruits may be borne on a peduncle or they may be sessile in the leaf axil. The fruits themselves naturally vary greatly in size and shape. Tiny fruits are produced by *F. Hillii* and *F. jacquinifolia*. The fruits of *F. pumila* are oblong and often over two inches long, while the fruits of *F. roxburghii* reach a diameter of 2½ inches. At the base of fig fruits there are usually three bracts which may partly sheathe the body or flare outwards in various ways. One variety of *F. retusa* has been named *nuda*, or naked, since these bracts are missing. At the apex of the fruit is a characteristic opening, the ostiole, which is more or less closed by bracts. These bracts are sometimes conspicuous and brightly colored but may be so deeply borne within the ostiole that they can hardly be seen.

The fruit surface may be glabrous, pubescent, or scabrous, smooth, somewhat tuberculate, or more or less ribbed. Most figs have flecks of white or light green scattered over the surface. The ornamental value of some species is greatly enhanced by the bright coloration of the fruit. Thus, *Ficus benjamina* has small red figs which contrast strongly with the green foliage,

whereas the variety *comosa* has yellow fruits. *F. altissima* also produces scarlet fruits; those of *F. mysorensis* are orange yellow.

In the introductory paragraph of this paper I showed that only eight per cent of the named species of the genus *Ficus* have been introduced into cultivation. The surface has therefore hardly been touched. There undoubtedly are many scores or even hundreds of named and unnamed species which should be obtained and given a thorough study. It is my hope that some interested horticulturists either by cooperation with the Federal Plant Introduction Section at Beltsville, Maryland, or on their own initiative may obtain material for this purpose.

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THE HOUSE OF THE SCOTCH PAISANO
Archaeological Investigations at the Hugo Reid Adobe, Arcadia, California

WILLIAM J. WALLACE, ROGER J. DESAUTELS, GEORGE KRITZMAN

PREFACE

This is an account of archaeological work at the Hugo Reid Adobe on the grounds of the Los Angeles State and County Arboretum in Arcadia, California. The project was proposed by Aubrey Neasham, Historian, and Glenn Price, District Historian, Division of Beaches and Parks, and was carried on under a contract between the Division of Beaches and Parks and the Department of Anthropology, University of Southern California. Equipment and laboratory facilities of the U.S.C. Department of Anthropology were utilized.

Work began on November 10, 1956, and is continuing. At this writing, approximately 600-man days of work have been completed. The initial excavating was done on weekends by the Archaeological Research Associates. The following members participated: Robert Ariss, Harford Bridges, John Butts, Lily Colvin, Gary Coon, Taylor Dark, Roger Desautels, Lynd Esch, Jean Gardner, Richard Geiger, Robert Hammond, George Kritzman, Gray Lange, Lee Lange, Bonnie Menditto, Ernest Phillips, Dorothy Piper, Mary Ellen Quirk, Peter Redwine, Charles Rozaire, William Ver Steeg, Claudia Ver Steeg, Edith Wallace, William Wallace, and Mildred Wissler.

On February 23, and from April 4 to May 18, 1957, a class in archaeological field techniques from the Department of Anthropology, University of Southern California worked at the Adobe on Saturdays. The digging crew consisted of fourteen students. Abigail Boedecker, Donald Breidenbach, Gary Coon, John Crone, Kenneth Dampf, Donna Evleth, Richard Friedman, Abraham Gruber, George Kritzman, Vaughan Lamb, Michael MacDonald, Lee Payne, John Von Helf, and John Yates. The class excavated under the direction of William Wallace. During this period Archaeological Research Associates members dug on Sundays.

The Archaeological Survey Association of Southern California was invited to excavate at the site on two weekends. Charles Rozaire, Field Chairman, supervised this work. A.S.A. members who participated were: Douglas Huntingdon, Ben McCowan, and Edward Tate. There were also many volunteers who dug on one or more occasions. These included: Ronald Duthweiler, Jack Elliot, Irving Engleman, James Fisher, Paul Grumbling, John Halligan, Bud Hatcher, Julie Hatcher, Joan Hunt, Stanley Hunt, Keith Johnson, Eleanor Lander, Edward Phillips, Willis Piper, Robert Russell, and Pat Templeton. The present phase of work is being done by Gary Coon, Kenneth Dampf, Roger Desautels, and George Kritzman.

Deepest thanks are expressed to all of these people for their aid and interest in the project. Without their willingness to work long hours, the investigation could not have been carried on successfully. Many other persons have also assisted in one way or another. The personnel of the Los Angeles State and County Arboretum under Director William S. Stewart are to be thanked for their hospitality and their many and varied services. Jack Fawcett of the Arboretum has furnished much useful information on the Baldwin period of occupancy of the Adobe and has made available his personal photographs of the various structures and the Baldwin family. The Division of Architecture employees, under the direction of Orvel Johnson, James Maltby, and Jay Turner, who are working on the restoration, have cooperated in every way and have taken great precautions to avoid damaging exposed archaeological features.

Gratitude must also be expressed for the encouragement of the members of the

Historical Committee, under the co-chairmanship of Mrs. Richard Y. Dakin, and Mrs. John R. Mage for their valued suggestions and support. Glenn Price, Division of Beaches and Parks, and Walter A. Walton, Division of Architecture, have been most helpful throughout the progress of the work.

The Authors
August 12, 1957

INTRODUCTION

THE HUGO REID ADOBE, one of the oldest surviving buildings in southern California, is located on the grounds of the Los Angeles State and County Arboretum in Arcadia, California. The house stands on a slight rise on the southern shore of a natural, spring-fed lake. The lake is surrounded by flat and slightly rolling land with some low marshy terrain. A few hundred yards west of the Adobe is a large, oak-covered hill (Tallac Knoll) which rises abrubtly to an elevation of about 50 feet above the surrounding land. The Reid home and the surrounding 127 acres of the Arboretum grounds are all that is left of the more than 13,000 acres of the Santa Anita Rancho.

The broad outline, though not the details, of the history of the Reid Adobe and the Rancho is known. Following the establishment of the San Gabriel Mission in 1771, the property was developed as a mission rancho, being maintained primarily for cultivation rather than for cattle-raising. A *molino* or grist-mill was erected on the hill above the lake. There may also have been an adobe house to shelter padres from the mission when they visited the rancho or to house Indian laborers.

In 1841, Hugo Reid, a Scot who settled in California and became a Mexican citizen, was given provisional title to the land but not until four years later did he obtain full legal ownership. Here he built an adobe house, planted orchards and vineyards, and sowed wheat. Later, he grazed his cattle and horses on the land. Although Reid maintained a more elaborate home at San Gabriel, he and his family spent considerable time at Santa Anita.

Becoming hardpressed for funds as a result of several unprofitable business ventures, Reid, in 1847, sold the rancho to Henry Dalton, an English merchant who had taken up residence in California. Dalton, already a large landholder, did not live at Santa Anita but at his Azusa rancho, adjoining Santa Anita on the east. Additional acreage was planted to vineyards. Whether the Reid Adobe stood idle during the period of Dalton's ownership is not known. Possibly it housed Indian vaqueros and farm-hands. In any event, the home seems to have suffered from neglect.

In 1854, the landholding was purchased by Joseph Rowe, circus owner and performer. Unsuccessful as a cattle-raiser, Rowe soon returned to his former profession, leaving a foreman to run the rancho until it could be disposed of. Albert Dibblee, a prominent San Francisco businessman, and his partner, Los Angeles trader and promoter, William Corbitt, bought it as an investment in 1858. It was managed as a cattle ranch by a younger brother of Dibblee for several years. But the severe drought of the early 1860's, when thousands of cattle died on southern California ranchos, led to the failure of this enterprise.

Rancho Santa Anita was next, in 1865, sold in two parts. A 2000-acre parcel on the west was purchased by Leonard Rose; the remainder including the house, was acquired by William Wolfskill, early Los Angeles settler and horticulturist. Wolfskill put much of the land under irrigation for fruit trees and vineyards. Louis Wolfskill, his younger son, inherited the rancho upon his father's death in 1869. From time to time he sold acreage.

Harris Newmark, pioneer Los Angeles merchant, bought Santa Anita, reduced by sales to 8000 acres, in 1872. Additional acreage was placed under irrigation for orchards and vineyards. Sheep were pastured on the hills. Newmark did not live at the rancho

but made use of the adobe house during his frequent visits. To encourage railroad development, he deeded some land to the Southern Pacific.

Three years later, Elias J. "Lucky" Baldwin, enormously wealthy from the sale of his share in the Ophir mine in the Comstock Lode, purchased Santa Anita from Newmark. The new owner raised livestock, including race-horses, and poultry; fruit and nut trees, vines, and grain were cultivated. Many improvements, including the planting of ornamental shrubs and trees, were made. Baldwin built the Queen Anne Cottage, completed in 1881, where he entertained friends, and the lavish Coach Barn to house his carriages and horses. He himself lived in the Reid Adobe and here he died in 1909.

After Baldwin's death, his younger daughter, Anita, operated Santa Anita successfully as a stock ranch, but did not live on it. There were many years when nobody, except perhaps a caretaker, dwelt in the old house and it and other structures deteriorated badly. The rancho stayed in the Baldwin family until the heirs sold it to Harry Chandler, owner and editor of the *Los Angeles Times* and possessor of vast real-estate holdings. In 1936 Chandler set up a corporation to develop a residential subdivision. The Hugo Reid Adobe, Queen Anne Cottage, and other buildings remained empty and neglected. Vandals caused great damage.

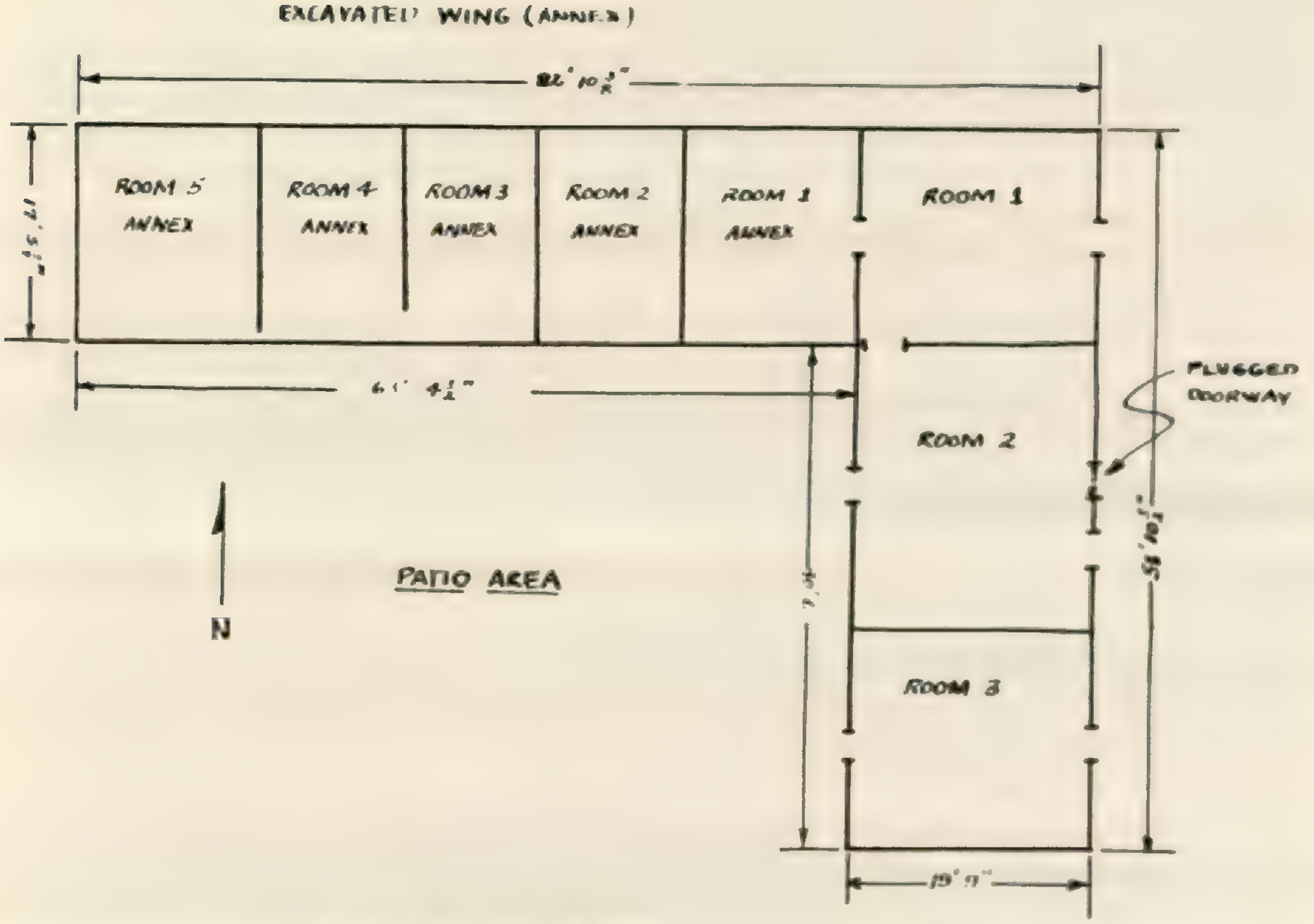
Little remained of the once great landholding in 1947 when the California State Division of Beaches and Parks purchased 111 acres, including the homesite, from Chandler's corporation for the establishment of the Los Angeles State and County Arboretum. Additional small parcels of land were acquired by Los Angeles County, bringing the total to 127 acres. As part of a developmental plan for the Arboretum, an advisory Historical Committee, made up of a group of citizens whose knowledge covers the fields of history, anthropology, architecture, and botany, was set up to plan restorations in a 9-acre "Historical Preserve." This includes the Queen Anne Cottage and Coach Barn besides the Reid Adobe. The Queen Anne Cottage, badly damaged by the elements, termite infestation, and vandalism, was restored with private funds raised by the Historical Committee. Money has now been allocated by the Division of Beaches and Parks for a full and authentic reconstruction of the Reid Adobe and Coach Barn. Each architectural restoration, on completion, will be further enhanced by plantings of its period. Prior to any rebuilding of the Reid home, which is to be restored to its original form of 1840, an archaeological exploration is being undertaken by the Department of Anthropology, University of Southern California, with State funds.

EXCAVATION

The archaeological investigation of the Reid Adobe has been essentially an architectural study designed to provide information for its reconstruction. The first and pressing concern therefore has been an accumulation of data on overall size, floor plan and details of construction of the original house. Exploration has been complicated because as the adobe passed through the hands of successive owners, each left some imprint on it. There have been at least two major remodelings. Following the period of neglect under Dalton's ownership, Rowe spent $6,000 on repairs, a considerable sum in the 1850's. Baldwin demolished one adobe wing and replaced it with a wooden frame building. Others patched, rebuilt when necessary with adobe, brick, stone, and wood. To confuse matters more, adobe bricks, and perhaps other materials, were salvaged and reused. All of this makes it difficult to determine what is original and what has been added or altered in later times.

For ease in recording in excavation and for general reference, the building has been divided into two major parts, designated as the Hugo Reid Adobe and the Baldwin Annex. The former is the standing adobe; the latter, the frame wing added by Baldwin. Within these, each room has been assigned a number. A narrow, roofed "Breezeway" between the Adobe and the Annex has been considered as a separate unit.

The archaeological methods employed are the same as those devised for extracting



HUGO REID ADOBE
FLOOR PLAN

FIGURE 1

knowledge from man's past from a prehistoric habitation or settlement. Before any work was done, record photographs were taken of all outside sections of the building and of the interior of each room, and a master plan of the structure was drawn. Excavating was done, as far as possible, with trowel and brush, stripping off the soil in 6-inch levels. In some spots, small mattocks were needed to break through hard, compacted soil. After being loosened and examined, the earth was shoveled into a ¼-inch mesh shaker screen. All material caught in the mesh was looked over carefully before being discarded to insure against missing any historical objects. All important features encountered were cleaned, measured, drawn to scale and photographed. A plan was made of each section of outside wall and room as it was exposed. Objects unearthed during the digging were placed in paper sacks, labeled as to where found and at what depth. These artifacts were later taken to the laboratory for cleaning, numbering, and restoring, activities which are continuing.

The original plan was to follow around the outside edges of the building in order to expose original foundations. An exploratory trench, 5 feet wide and 60 feet long, starting at the northeast corner of the Reid Adobe, was dug along the north wall. This excavation revealed no early construction, as the lower part of wall had been faced with fired brick or strengthened with a concrete footing. A shorter, 5 x 20 foot, trench was begun at right angles to the first to determine the nature of the soil between the adobe and the lake. This was abandoned after digging disclosed great recent disturbance and nothing of particular interest or significance. The soil was a heavy, dark gray clay in these two trenches.

Realizing that little information on the Reid building was to be obtained through

digging outside, it was decided to shift operations indoors. The next excavation was in the Breezeway. After wooden flooring was removed, the entire section was investigated. Here the first evidences of the original construction were found. A section of a buried adobe brick wall was exposed along the north side of the Breezeway.

Explorations were then made in the Reid Adobe itself. The wooden flooring was first taken up and then each large room was divided into four quarters and each smaller one into two halves for ease in excavating and recording. Digging was continued until a hard yellow layer of clay, presumably an earthen floor, was encountered. This was exposed over the entire floor area of each room. Later, a 5 x 5 foot or larger test pit was carried down through the compacted layer in the corner of each room except Number 3 (where a unique flooring of adobe blocks was encountered). The test pits revealed the buried courses of adobe bricks underlying the standing walls. The same procedure was followed in the Baldwin Annex where adobe walls were found beneath the frame structure. The wooden wing was demolished after archaeological work in it was nearly completed.

The deposit overlying the clay surface or floor in each room was a loose black earth. Scattered through it were bits of building materials—broken adobe bricks, pieces of plaster, lumps of asphalt from the old roof, fragments of wood and rusted nails. Broken crockery, glass bottles, animal bones and other debris were also imbedded in it. The black soil ranged from 18 to 24 inches in depth.

Upon completion of initial excavations within the building, a 5-foot wide trench was excavated along the northwest corner of the Baldwin Annex and along its entire south wall to expose outer surfaces of the buried adobe bricks. The west wall, which is of stone, will be investigated in a similar manner. Further digging will later be done in the Reid Adobe to obtain additional information on door openings and on the subsurface masonry.

ARCHITECTURAL REMAINS

Excavation has revealed the remains of an L-shaped, adobe-walled structure (Figure 1). One wing (Hugo Reid Adobe) is oriented north and south; the other (Baldwin Annex) lies in an east-west direction. Originally there was no Breezeway between the two. The building has many typical characteristics of a southern Californian ranch house of the Spanish-Mexican period.

Many changes have taken place in the old home since it was built more than a century ago. There have been major repairs, additions and re-buildings, as well as many minor alterations through the years but these will be mentioned only when relevant to the discussion of the 1840 Reid house. The following room-by-room description of architectural features applies therefore only to the L-shaped adobe. Room measurements given were all taken inside from the base of one wall to the base of the one opposite.

HUGO REID ADOBE

This wing has three rectangular rooms, varying somewhat in size. Its still-standing exterior walls are built of large, 21-inch thick, rectangular adobe bricks laid in even courses.

Room 1.

Dimensions: north-south, 14 feet 3½ inches; east-west, 16 feet 1¾ inches.
A hard-packed layer of yellow clay, extending from wall to wall, was encountered under 12 inches of accumulated dark earth and household refuse. This has been interpreted as being the earthen floor of the 1840 house. It slants perceptibly from south to north.

Excavation beneath the clay showed that on the north, east and west sides of the room, five rows of adobe bricks extended downward to a depth of 42 inches below floor-level. The present exterior walls rest upon buried masonry.

An adobe brick partition separates Room 1 from Room 2. The brickwork at its base

extends only slightly (10½ inches) below the clay floor. This dividing wall, because it differs in appearance and construction from the other walls, is considered to be a later addition, not part of the 1840 building.

The two doorways, one midway in the west wall and the other directly opposite in the east wall, look to be part of the Reid dwelling. Each has a hand-hewn log lintel still in place. It could not be determined whether the window in the north wall is original or not.

Room 2.

Dimensions: north-south, 19 feet 1¾ inches; east-west, 15 feet 7 inches.

There were several unexpected features in this, the largest, room. A line of adobe bricks was exposed along the base of the partition between it and Room 1. This was first met with above the clay floor and was found to extend to a depth of 42 inches below it. This presumably is all that is left of one of the inner walls of the 1840 house. A space of only one inch separates the buried masonry from the existing partition.

A double line of adobe blocks was found at the south end of Room 2. As the bricks also protrude above the clay floor, this feature was first believed to have been a bench and it could have been so used. Further digging, however, showed that the inner row extends downward to the same depth as the masonry on the north side of the room. This also was assumed to be the remains of a former inside wall. The second line of bricks is now being investigated.

Stripping away of plaster on the east wall brought to light a walled-in doorway. This is in line with the door opening in the center of the west wall. As both have logs spanning the opening, they can be regarded as belonging to the 1840 house. The present doorway in the east wall (a few feet south of the walled-in opening) has a milled lumber lintel and can be presumed to have been cut through at a later date. There is a window aperture in the west wall but its age has not been determined.

Dr. Wallace (right) is assisted by Mr. Desautels in obtaining the dimensions of the adobe brick floor in Room 3. Mr. Kritzman records their measurements.

Room 3.

Dimensions: north-south, 16 feet 2½ inches; east-west, 16 feet 3¾ inches. An unusual feature here is the flooring. The entire room is paved with evenly-laid, close-fitting adobe blocks. Those adjacent to the walls have been carefully cut to assure a tight fit.

The base of the east wall and three-fourths of the adjoining south wall have undergone extensive repairs. This corner of the room must have become insecure and it was found necessary to replace the adobe with fired, red bricks in order to stabilize it. It is interesting that the latter are joined with clay mortar.

There are two doorways in Room 3, one in the center of the east wall and the other opposite on the west. Their lintels are of commercial lumber with sawn ends. They may, however, be 1840 openings as they conform in position and size to doorways in Rooms 1 and 2. Their log beams may have decayed and were replaced. The window in the south wall has nothing to demonstrate its antiquity.

* * * * *

There are many details regarding this wing which are not yet clear. Thus far, 1840 door and window openings have been difficult to establish with certainty. Original door openings have been identified solely by the presence of hand-hewn lintels, rather insecure evidence. No window apertures definitely attributable to Reid's time have been discovered. The present-day openings may represent the position though not the dimensions of the originals as they are quite large when compared with those in other ranch houses of the Reid period. It is conceivable that there were no windows whatsoever in the 1840 dwelling.

Nothing has been found to prove the former presence of a corridor or covered porch running around the house. Posts, postholes or other remains of such a construction may be uncovered when more digging is done outside of the walls. Another consideration of importance, yet to be worked out, is the original height of the Reid home. It evidently was never more than one story high but its exact height is hard to establish because the pitch of the roof has been changed and new roofing has been put on several times.

The buried courses of adobe bricks present a problem. There are two possible explanations for their presence. One is that they are all that remains of a former house. Hugo Reid may have found an adobe building, erected while Santa Anita was still a mission rancho, already on the site. If so, it must have been in an advanced state of ruin. Otherwise, he probably would have rehabilitated it. If this conjecture is correct, the upper part was razed and leveled off, leaving only five courses of brickwork upon which to erect new walls. Reid's Indian workers must also have done a certain amount of filling in with earth until the desired floor level for the new dwelling was reached. No visible openings for doors have been detected in the subsurface brickwork and no well-defined floor has been found at its base.

An alternative, and perhaps more satisfactory interpretation, is that the buried masonry is a foundation. Adobe bricks may have been laid in excavated trenches to give a firmer footing to the walls, though no traces of such trenches have been found during the clearing of the brick. Why adobe, a not too suitable material in damp soil, was employed in constructing a foundation instead of the usual field stone is not known. Certainly the latter material, in the form of granite cobbles, was available at no great distance. If the subsurface brickwork represents a foundation the apparent absence of door openings becomes understandable.

BALDWIN ANNEX

Beneath the Baldwin wooden frame structure were found remnants of the walls of an adobe wing. The south wall proved to be only two bricks high; the north has five, more carefully laid, courses of brickwork. There is no foundation, the lowest bricks resting on native soil.

This section is made up of five small rooms, each separated from its neighbor by an adobe wall. The dividing partitions, which run up to but do not interlock with outside walls, are thin and weak. A hard-packed clay floor was found in each compartment. As in the other wing, it is considerably higher at the south end. There is not a great amount of difference between the rooms, so only a brief description of unusual features in each will be given.

Room 1.

Dimensions: north-south, 13 feet 9 inches; east-west, 13 feet 11 inches.
Most of the west wall and adjoining sections of the south wall have deteriorated badly as a result of seepage from a stall shower installed in Room 2 in recent times. Bricks in this corner were damp and crumbly and difficult to recognize and trace. The clay floor has been damaged by rodent burrowing in several spots.

Room 2.

Dimensions: north-south, 13 feet 9 inches; east-west, 9 feet 7½ inches.
In the southwest corner of this room, which was directly beneath the cement floor of the shower, the same moist conditions prevailed as in Room 1, again making it difficult to clear the courses of adobe satisfactorily. The bricks were in such a soft condition as to be barely distinguishable from the ordinary loose dirt surrounding them. The partition between Room 1 and Room 2 has been constructed with a poorer grade of adobe brick than that used in other dividing walls, adding to the difficulties of excavation.

Hugo Reid Adobe and Foundation under Baldwin Annex. Looking east: Ken Dampf shovels out back dirt; Dr. Wallace cleans about pipe in pit; Gary Coon searches rocker screen.

Room 3.

Dimensions: north-south, 13 feet 9 inches; east-west, 9 feet 6 inches.
A piece of the north wall of Room 3 was destroyed during the digging of a trench across the room for laying a huge iron drainage pipe. The south wall is also incomplete. Part of it was removed in the same pipe-laying operation but additional masonry, for some reason, was taken out, leaving a large gap. The opening does not have the appearance of a doorway.

Room 4.

Dimensions: north-south, 13 feet 10 inches; east-west, 10 feet ½ inch.
The north wall of this room is interrupted by a curious feature. Near its center is a small cistern-like construction of adobe. Its exact form and possible function remain to be determined.

Room 5.

Dimensions: north-south, 13 feet 10½ inches; east-west, 13 feet 5¾ inches.
There has been considerable rebuilding in Room 5. Over the entire west wall and the connecting one-third of the south wall, adobe bricks have been replaced with rough stones, irregularly coursed and mortared with concrete. A minor feature is a large irregular hole cut through the clay floor and subsurface soil to a depth of about 18 inches. It was filled with black earth and debris of occupancy. The use or meaning of the depression is not known.

* * * * *

There are questions regarding this wing also. Means of entrance to the rooms has not been established as no door openings have been observed in the remains of the walls. It is not known, for example, whether there were communicating doorways between the compartments or whether all led directly out-of-doors. As upper sections of the walls have been entirely demolished, it will not be possible to ascertain the position and size of window openings, if any existed.

The north and south walls differ in appearance and seem to have been erected at different times. Brickwork along the north side of the building is superior to that on the south. The bricks are like the buried ones in the Reid Adobe wing, well-finished and meticulously laid in regular courses. In contrast, the blocks making up the south wall appear to have been hastily manufactured and placed in position with less care.

There are no buried courses of adobe brick here. The digging of 5 x 5 foot test pits in corners of four of the rooms failed to turn up any lower masonry. This seemingly has an important bearing on the problem of the original form of the Reid home. If the brickwork in the other wing is a foundation. its absence here makes it almost certain that Reid did not construct this section. It is doubtful that a builder would place a firm footing under the walls in one part of his house—a 3-room affair and nothing in another—a 5-room dwelling. A later owner perhaps Rowe, must then have added the five-roomed wing. Observable differences in the quality of workmanship in the two sections of the house give added weight to the suggestion that they were not erected simultaneously. Thus the 1840 building apparently was rectangular and not L-shaped.

BUILDING MATERIALS

Adobe clay, the most common structural material, was evidently obtained close by as it is the same soil around the house. A detailed physical analysis of the adobe bricks from different parts of the house is now being conducted. When completed, this will aid greatly in determining what is original construction and what was added later. A superficial examination indicates that at least three types of brick, differing in composition and appearance, were used. The rectangular sun-dried blocks also vary in size from one section of the house to the next. Despite damp conditions in the surrounding soil, the brickwork, with a few exceptions, is in good state of preservation.

The adobe blocks have been laid lengthwise in even courses with bonding or breaking of vertical joints between courses to secure greatest possible strength. Adobe mud, containing sand, has been used to make the mortar placed between individual bricks and courses. It is generally of a lighter hue than the bricks. There are noticeable differences in the care with which the blocks were laid. Builders of newer portions of the walls were not as careful as earlier workmen who joined the bricks neatly and meticulously trimmed away excess mortar.

A heavy (¼-¾ inch) layer of adobe mud and sand has been applied to the walls, inside and out. This has dried as hard as stucco. Though walls are occasionally undulating or bumpy, they generally are even-surfaced with only faint smoothing lines discernible. A thin coating or two of white plaster was smeared over the walls to give them a gleaming white surface.

Throughout the house (excepting Room 3 in the Hugo Reid Adobe wing) the floor is of hard-packed clay. A clean, fine-grained yellow clay was spread evenly over the ground and tramped down. It is fairly smooth though it presents a sloping surface in each room. The flooring material could have been gathered nearby as a layer of yellow clay underlies the darker, heavier surface soil. Little has survived of original timbers. The hand-hewn lintels, still bearing marks of the workman's axe and plane, are the only ones noted. They are small-diameter (ca. 4 inches) logs, given one more or less straight edge and straight sides. Their ends are roughly chopped. One surface is left rounded with the bark still on.

The original roof covering was presumably asphalt, chunks of which were found in the excavation. Many pieces bear imprints of tule, coarse marsh grass or some similar plant material; a few have impressions of small poles. It can be supposed that tule or grass was strewn over a framework of light poles, supported by heavier rafters and cross beams, before hot *brea* was poured on to give a thin but waterproof roof.

A quantity of building hardware, including an excellent assortment of nails, was unearthed. These materials are listed in a following section.

ARTIFACTS

From within the house and from the outside trenches have come hundreds of objects, lost or discarded by various occupants. As the soil, even beneath the wooden flooring, is fairly damp, conditions were not favorable for the preservation of perishable materials. Therefore the great bulk of the collection is made up of items of metal, porcelain, glass and other decay-resisting substances. There are, however, a few things made of leather, wood, or even paper.

Artifacts of Caucasion Manufacture—All commercially manufactured objects recovered appear to date from the post-Reid period. At least no item contemporary with Reid has as yet been definitely identified in the collection, though it is possible that it does include some. As the identification and analysis of the artifacts has just begun, they can only be listed at this time. Individually and collectively, when thoroughly studied, they will illustrate some aspects of the manner of living of the occupants of the house.

Metal

Nails—square, wire
Spikes
Staples
Screws
Hinges
Lock fragment
Links of chain
Axe blades
Horseshoe
Animal traps
Melted lead fragments
Pistol balls
Pistol caps
Cartridges—various calibers, fired and unfired
Knives
Forks
Spoons

Thimble
Pins—straight and safety
Hooks and eyes

Glass

Bottle fragments—many types and colors
Drinking glass fragments

Belt buckles
Wire jar handle
Pen point

Kerosene lantern chimney fragments
Flash bulbs of old type
Window glass fragments

Porcelain and Pottery

Dish fragments
Bowl fragments
Cup fragments
Figurine (minus head)

Doll arm
Marbles—variety of sizes, colors, etc.
Clay pipe stems

Perishable Materials

Leather shoe and sole
Playing cards

Bits of newspaper—printed in English and Chinese

Miscellaneous

Buttons—a wide assortment
Poker chips
Tiddly winks

Mother-of-pearl chandelier ornament or earring
Tortoise shell hair pin

Artifacts of Indian Manufacture—A fair number of Indian objects were unearthed within the house and in the trenches outside. These include:

Stone arrow points
Glass arrow point
Glass scraper
Shell beads

Stone drill or graver
Handstones
Milling stones
Potsherds

It is quite possible that the adobe was built on the site of a former Indian village. This would account for the presence of some artifacts in the outside trenches. Their occurrence within the house and above the earthen floor as well as below it indicates either use of the adobe by Indian workmen of Reid or later tenants or by roving bands of Indians. It is doubtful that mission neophytes were still making flaked stone (or glass) arrow points and modeling native pottery as these arts fell into disuse soon after first contacts with European culture so that the arrow points and pottery may have been left by renegade Indians who occasionally camped in the adobe. In 1847-48 there were several raids, Indians driving off horses, killing cattle, and even murdering a vaquero at Santa Anita.

FOOD REMAINS

Hundreds of animal bones, many sawed, cut or chopped, were unearthed within the rooms and beyond walls. A smaller quantity of bird bones, presumably of chickens and turkeys, were also found. There were some remains of plant food in the form of shells of walnuts (English and black), pecans, almonds, and Brazil nuts, pits of apricots, peaches, plums, and olives, seeds of watermelon, and corncobs. These food remains throw some light on the diet and food preferences of the former tenants.

SUMMARY AND CONCLUSIONS

From the archaeological evidence thus far secured, some tentative conclusions can be drawn as to the original Hugo Reid home. The three-room (Hugo Reid Adobe) wing

can with some assurance be identified as the 1840 home. The other (Baldwin Annex) wing appears to have been erected at a later, as yet unknown date.

The 1840 house was a simple, solidly built, rectangular structure, more or less identical in outline and size to the surviving adobe house. It was divided into three rooms by two adobe brick partitions, both long since removed. Each room has two doors leading out. A definite conclusion as to whether the rooms also had windows cannot be reached at this time.

Archaeological work within the house is not yet complete and new discoveries are still to be expected. Not all of the area beneath the yellow clay floor within the Hugo Reid Adobe has been fully explored. The lower adobe masonry is only partially uncovered.

There must be much still buried evidence beyond the walls of the house as well. If Hugo Reid followed the usual early Californian custom, there must have been outbuildings of various sorts. Like all other households the Reids also had to have places for disposal of trash. That some refuse was thrown into the lake is likely, but it is also probable that pits were purposely dug near the house for disposal or that excavations opened for other purposes were used for dumping debris. Trash pits of this kind generally contain quantities of discarded household objects and are rewarding to dig. Prior to landscaping or other disturbance of the soil around the house, it would be highly advisable to search for the remains of other structures and trash pits.

There is great need for archival and library research on the history of the Reid Adobe and Rancho Santa Anita, as any meaningful discussion of the archaeological findings is dependent upon a thorough knowledge of all documentary sources. An exhaustive search should be made of mission records, official reports, accounts of visitors or travelers in the area and other sources for possible information on the appearance of the Adobe. Contemporary sketches, or original paintings, if any can be located would, of course, be of immeasurable assistance in establishing certain facts concerning original construction. Photographs would aid in documenting major changes in the building. With a more complete historical and pictorial record, a larger number of the archaeological findings could be explained with more certainty.

Though, as indicated, there is much still to be learned, a significant amount of information has been revealed by trowel, brush and careful recording. If nothing else, the exploration has demonstrated how successfully archaeological techniques can be employed to produce otherwise unrecorded and unobtainable data from an old building. Where a historical site is meagerly or vaguely described, as in this case, the archaeologist's trowel can often turn up physical evidence in the earth to supplement documentation.

THE COVER

This was probably the last picture taken of the Hugo Reid Adobe showing the condition of the building before the restoration work began. The picture was taken December 1, 1956 and shows portions of the south and east walls of rooms 3 and 2. This, and the pictures within the article were taken by Mrs. Wallace.

BIRD NOTES

Modesty would prevent Dan Quattlebaum from telling one anything about his charming and interesting booklet "The Song of Birds, Informal Ideas of an Amateur". Now that you are in the "know", maybe he will autograph a copy for you!

Mr. Gerry Patten of the Arboretum staff continues to lead the Sunday morning 'Bird Walks', the first and third Sunday of each month. Won't you join him at the Gatehouse, 8:00 A.M. some Sunday soon?

Young trees in containers, *Ficus retusa* on left with branches drooping at tips; *F. nitida* on right with upright habit of growth.

THE FICUS RETUSA—NITIDA COMPLEX

IRA J. CONDIT

A RECENT SURVEY of the opinions of California nurserymen and horticulturists reveals some disagreement regarding the distinctive characteristics of *Ficus retusa* and *Ficus nitida*. In an attempt to help clarify some of the confusion, this article will consider the botany of these two figs, their distribution, and will conclude with some personal observations both here and abroad.

The Indian Laurel, as *Ficus retusa* is commonly designated, is probably the one species of the genus most widely planted along streets and highways throughout subtropical countries. In India, South China, Philippines, and parts of Australia, it makes a handsome tree for avenue borders. It is a very common street tree in Algiers where Dr. Louis Trabut observed three forms, one less subject to attacks of thrips than the other two. Towns and cities of Mexico have many magnificent specimens often five to six feet in diameter of trunk, growing from sea level to an elevation of 5,000 feet at Guadalajara. The main highway traversing the Island of Cuba is frequently lined on both sides with trees of *F. retusa* and the more drooping specimens of *F. benjamina*. In Brazil the Indian Laurel is a tree of beautiful shape with dense, green foliage. There as elsewhere, it is often pruned into fantastic shapes or kept dwarf by frequent clipping of twigs.

In the Ryukyu Islands, south of Japan, the tree of *F. retusa* is found to be highly resistant to salt spray and is useful for windbreaks. It is especially valued as a potted plant for dwarfing. Over a century ago a writer in the *Gardener's Chronicle* told about a 200-year-old specimen of *F. nitida* which had been dwarfed in China and then sent to London by way of India. The late Dr. Harold Lyon reported that there are several varieties of the Chinese Banyan or Indian Laurel in Hawaii, some producing aerial or prop roots to a much greater extent than others. One tree in Thomas Square, Honolulu, has never produced any prop roots.

Dr. Franceschi, who introduced *F. retusa* into Santa Barbara, stated in 1911 that of all the members of the genus, it has probably gained the widest reputation as an avenue tree. He added that there were formerly some fine specimens in the center of Los Angeles, but these had to give room to sky scrapers. A large-scale introduction and propagation by seed of *F. retusa* in California was made by a Los Angeles nursery in 1941, the fertile seeds coming from Hawaii. The seedlings were widely distributed and other nurseries multiplied them by cuttings.

It may be well to review here the botanical background of the "*retusa-nitida*" complex. An excellent account of *Ficus retusa* and the variety *nitida,* has been published by Mary Barrett in the Bulletin of the Torrey Botanical Club for January 1949. This account should be consulted by any who wish to study further the systematic botany of the species.

Ficus retusa was described by the botanist Linnaeus in 1767 and *F. nitida* by Thunberg in 1786. For almost one hundred years the two were considered as separate species. In 1861, however, George Bentham expressed the opinion that *F. nitdia* was a synonym of *F. retusa* and most botanists of the 20th century have accepted *nitida* as a variety. Approximately twenty-eight botanical names have been given plants or specimens similar to *nitida* but these are all now regarded as identical with or synonymous to it.

Botanically the variety *nitida* is characterized by its banyan habit of growth found in favorable locations only. The trunk has buttresses. The leaves are glossy above, slightly narrowed and then abruptly short-blunt-acuminate at the apex and taper to the petiole at the base. The lateral sets of slender almost parallel veins number 4 to 7. The glabrous receptacles (figs) are sessile, axillary, paired but sometimes appearing crowded on the twigs, depressed globose, from ¼ to ⅜ inch in diameter. Miss Barrett's description was made from living trees observed at numerous places in Florida and from herbarium specimens seen mostly at the New York Botanical Garden. The name *nitida* is derived from the Latin, *nitidus*, signifying either the luxuriant growth of tree or the clear lustrous surface of leaves.

The typical form of *F. retusa* has by comparison with variety *nitida* only a few or no aerial roots and usually none which forms a secondary trunk. The leaves, less glossy above, are broad-ovate or broad-elliptic instead of obovate, and have an obtuse, apicular, or barely elongated apex and a rounded or very slightly narrowed base. The receptacles are almost twice the size of those borne by variety *nitida* reaching ⅜ or ⅝ inch in diameter. The word *retusa* means notched and is hardly appropriate for use in describing the leaves of *F. retusa*. The receptacles, however, sometimes have a retuse or depressed apex.

My personal acquaintance with the Indian Laurel extends over two decades at least, although the acquaintance has never been as intimate as I would now wish it had been. During a year's residence at Lingnan University, Canton, China, in 1934-35, I remember that trees of this species were commonly used as ornamentals along roads and streets. They were not as umbrageous as those of the same species seen elsewhere, and the fruits were infested by a specific fig insect. In addition, various insect predators, mess-mates, and parasites were present in the fruits.

During the course of several trips to Mexico, from 1947 to 1957, I have seen scores of specimens of the Indian Laurel from Sonora in the north to Chiapas in the extreme south, apparently all of the *nitida*

Typical leaves of *Ficus retusa*, left, and of *F. nitida*, right. Upper from illustration by King, 1887. Lower from California trees.

type. According to my notes, aerial roots were common on trees at Mazatlan and at San Blas. But I do not remember seeing any with well-developed prop roots or multiple trunks such as are found on certain other species of *Ficus* native to Mexico. Most trees of this species are planted along streets. Multiple trunks would, therefore, be undesirable even though the aerial roots did become anchored to the ground before the tips dried out in the arid climate. A species of thrips commonly infests the leaves causing them to become curled or folded and to assume a reddish-brown color. One large tree at Oaxaca provided excellent shade, but was messy on account of the almost continuous dropping of leaves and figs onto the patio and surface of the water in the adjacent swimming pool. My friend, the late Henry Dutton, published in *Trees Magazine* for June 1954, an account of a tree of *F. nitida* which was being cut down along a street in Oaxaca. A count of the growth rings on the cut stump seemed to indicate an age of 1,000 years for the tree. But city records showed that the tree had been planted only 80 years previously. Apparently the rings were not annual but monthly averaging 12.5 for each year of tree growth.

In California, I have not found trees of the Indian Laurel comparable in size of trunk and spread of branches to trees of *F. macrophylla* or of *F. rubiginosa*. Like *F. elastica*, the branches and foliage are subject to frost damage except in the most protected places. Dr. V. T. Stoutemyer, University of California at Los Angeles, stated in 1954 that *Ficus retusa* is no longer approved for planting in colder sections of that county. Medium-sized specimens are found in Balboa Park and on Coronado Island, San Diego, and doubtless in other localities such as Santa Barbara.

California horticulturists most familiar with the two forms agree to the following conclusions. Trees of *F. retusa typica* are distinguishable even at some distance by the fairly open top and the spreading branches which droop at the top. They are poor for hedging but excellent for espalier or for culture in tubs. Leaves are broad with rounded base and slightly protruding apex. Figs are ⅜ to ½ inch in diameter and somewhat oblate or flattened. Trees of *F. retusa* var. *nitida* have an upright, dense habit of growth and are, therefore, excellent for hedge or screen planting. Leaves are elliptical, narrowing from the broad middle towards both base and apex. Figs are smaller than those of *F. retusa*, measuring about ¼ inch in diameter.

Trees of two forms produce aerial roots in California only under unusually humid conditions. Both forms can be readily propagated from cuttings. Certain *retusa* types are being selected as especially suitable for propagation and multiplication for use in espalier treatment. A recent cen-

sus of twenty young plants on the campus of the University of California at Riverside showed them to be all of the *nitida* type, of an upright growth habit, with glossy leaves, and fruits when present small in size.

University of California
Riverside, California

CORAL BELLS

HOWLAND ATWOOD

AN ANTI-AMERICAN riot and the interment of a young physician during the Mexican War effected the discovery of Coral Bells, a dainty Mexican plant that has become a favorite garden subject from coast to coast.

Coral Bells, *Heuchera sanguinea,* was discovered by the traveler, author, physician Frederick Adolph Wislizenus (1810-1889), a native of Germany. His first noteworthy adventure after he came to America in 1835 was the famous journey of 1839 to the Rocky Mountains and into the present state of Idaho.

An accounting of this early journey into comparitively unexplored country, the experiences of an American interned in Mexico for the duration of the war, his botanical forays, his plant collections, and the discovery of a new member of the genus *Heuchera* may be found in a report by Dr. Wislizenus (1) following his release and return to the United States. Dr. George Engelmann (2) authored the botanical description of *Heuchra sanguinea* in 1848.

Later explorations by other botanists revealed the extensive distribution of *H. sanguinea* from northern Mexico into Arizona's Cochise, Santa Cruz and Pima counties to southern Apache County (3).

Heuchera sanguinea, a member of the Saxifrage family, grows in leafy clumps that average four or five inches in height and eight inches in width. Mature leaves of the plants usually seen in gardens are about two inches across and heavily veined. The stems, undersides and dentate edges of the lobed, rather heart-shaped leaves are quite hairy and the upper sides are smooth, dark green, with grayish-green mottling high lighting irregular areas between the main veins, suggesting another member of the *Saxifragaceae,* the plant commonly called strawberry geranium, *Saxifraga sarmentosa.* Slender, wiry, brownish-green stems, occasionally with a reddish cast, extend to fourteen inches in length from the stubby rootstocks, bearing on their extremities numerous reddish or coral-pink bell-shaped flowers in the form of a nodding raceme.

How and when *H. sanguinea* became a part of American flower gardens is somewhat of a mystery. Probably the first cultivated plants came from the mountains of Arizona. Plants were no doubt, brought from the wilds by the "women folk" to beautify the yards of the early homesteaders. Friends and strangers, rewarded for their admiration of the plants, carried "slips" to their own homes. Eventually, Coral Bells attracted the attention of nurserymen and quickly became a commercial item.

The plant was introduced into England about 1882 by a Mr. Ware of Tottenham. It was at once a "hit", but did cause some consternation for a time among gardeners and nurserymen who had spent their lifetime developing huge and grandiose flowers which by 1903 were generally regarded as vulgar according to publications of that period. Professional tradesmen, however, soon sensed the public acclaim of small flowers and articles recommending Coral Bells for perennial borders, rockeries, woodland dells, cut flowers, etc., began to appear in garden literature.

Coral Bells reached continental Europe at about the same time and was equally sensational. Messrs. Victor and Emile Le-

moine of Nancy, France in the Lorraine are responsible for many of the finer named Heuchera hybrids.

Cultural practices for Coral Bells are quite general. Any good textured well drained, deep rich loam seems to be very satisfactory but they are sometimes seen growing very happily in afternoon sun in heavy California adobe with the poorest of drainage. The plants seem to be fond of lime and growers of the old school often incorporated fragments of lime plaster generously during soil preparation. Coral Bells requires little care. The plants are neat the year around. In most areas of the country, Coral Bells is grown chiefly in sunny locations, but in Southern California morning sun seems preferable with light shade in the afternoon. Hybrid Heucheras, however, seem to thrive in full sun. As far as is known, Coral Bells is perfectly hardy anywhere in the United States and is considered evergreen.

Propagation is quite simple, the most satisfactory method being the division of old clumps. The time depends somewhat on the locality, but may be done in the fall or in early spring just before active growth starts. The divisions may be planted directly in the soil or may be placed in a cold frame until sturdy plants develop for transplanting to the garden. Coral Bells grow easily from seed (germinating within three weeks) and may be increased by leaf cuttings, but these later methods are rather slow and tedious.

Some of the uses of Coral Bells have already been mentioned. It is drought resistant and its flowering is apparently unaffected by such conditions. Coral Bells makes a nice potted plant and is frequently forced by florists. Its value as a border plant or for edging walks, flower beds and terraces can hardly be over-estimated. Large groupings are very effective in the foreground of herbaceious perennial and shrub plantings or for perennial borders featuring red flowers. It is very useful as a companion plant for narcissi whose soon disappearing foliage would otherwise leave large bare spots in the garden. It combines well with white pansies, violas, blue columbines, arabis, mertensia, shasta daisies, white sweet William and dwarf campanulas. It is especially adaptable to wild flower gardens.

Truly, Coral Bells has a place in every garden.

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TREES OF NOTE—ITALIAN STONE PINES

FRANK E. COLLIER

OUTSTANDING SPECIMENS of the Umbrella pines, *Pinus pinea* are to be found a few miles from the Arboretum in South Pasadena. These were planted about 1905 on property then belonging to Margaret Collier Graham, an early California writer. A goodly number of them are still there and are magnificent specimens with a spread of forty feet or more. The original planting was from seeds brought from Italy to the Graham place by Mrs. Katherine Hooker, the wife of John D. Hooker, who donated funds for the hundred-inch telescope on Mt. Wilson.

The average circumference of six of the larger trees is eight feet ten inches at five feet from the ground.

For the best view of these large spreading trees, go west on Monterey Road in South Pasadena about a half mile from Fair Oaks Avenue to Glendon Way; then turn left one block to Lyndon Street, thence right or west on Lyndon. You will see five large spreading trees to the rear of the residences on the north side of Lyndon Street. To the south on the hillside can be seen a few taller trees, which display the umbrella form.

VEGETATIVE PROPAGATION OF EUCALYPTUS

FRANCIS F. T. CHING AND ANDREW M. EDWARDS

ALTHOUGH *Eucalyptus ficifolia* is a popular shade and street tree in southern California, nurseries have refrained from increasing their stock as flower color and tree form is unpredictable when plants are grown from seed. Although species of *Melaleuca* can be propagated by cuttings, no success has been reported on the vegetative propagation of Eucalyptus except by grafting and inarching (1). A claim of propagation by cuttings of Eucalyptus has been made but no data has been presented (2).

Work in the past few years on air-layering with plastics and root-promoting substances has given new impetus to the propagation of difficult-to-root plant materials. A review of this literature is presented elsewhere (3). Because of the recent success in air-layering of many plants that have not been known to root, this experiment was undertaken to determine whether *Eucalyptus ficifolia* can be propagated by air-layering and thus a means of preserving desirable varieties. Work on this project was initiated in February, 1957, at the Los Angeles State and County Arboretum and the following is a progress report.

Five trees of *Eucalyptus ficifolia* were air-layered with a polyethylene plastic, sphagnum moss and with root promoting substances, indolebutyric acid (IBA) and naphthaleneacetic acid (NAA) used in the following concentrations:

10 ppm IBA
100 ppm IBA
500 ppm IBA and NAA
1000 ppm IBA
Water.

Sphagnum moss was soaked in these solutions overnight previous to application.

Branches, approximately one-quarter inch in diameter, were scored by complete girdling. Sphagnum moss, which had been soaked overnight in the different solutions, was squeezed of excess moisture and placed around the scored area. Six inch squares of black polyethylene .0015 inches thick were used to hold the sphagnum moss in place and were secured, above and below, with "Twist-Ems". All layers were checked once a week to determine the extent of drying.

Ten weeks after treatment, all layers were removed from the parent plant and observations were made on the amount of roots and/or callus present. The new plants were then pruned back by one-third and potted in one-gallon cans. On September 14, the plants were removed from the cans, soil was washed away and again root and/or callus formation noted.

Results of air-layering indicated that root promoting substances, depending upon the concentration used, influenced callus growth. Roots were not visible although, in some layers, callus growth took on the

Fig. 1. Callus formation on *Eucalyptus ficifolia* layers as influenced by different concentrations of IBA. Left to right: 1000 ppm, 0 ppm, 100 ppm, 10 ppm.

appearance of roots that were deeply fasciated. At 10 ppm IBA, callus formation appeared to be enhanced while with increasing concentrations of IBA, the number of layers with a heavy callus decreased as those with a light callus, increased (Fig. 1). At 1000 ppm IBA, half the layers were killed. With layers that received no root promoting substances, two-thirds of the layers possessed a light callus while the remaining layers had a moderate to heavy amount of callus.

Two weeks after the layers were canned in a potting soil, 65% were lost, possibly due to drying. The weather was unseasonably warm at this time and while the plants toward the rear of the greenhouse and somewhat shaded, remained in good condition, those placed near the center aisle and more exposed to sunlight and drying winds, dried out.

During the first week of August, new vegetative growth was evident on the remaining plants, but during the following weeks, growth was slow and chlorotic. With an application of Hoagland's nutrient solution, the leaves of the new vegetative growth turned dark green which was an indication that roots were present.

On removal of plants from the cans, it was observed that all of the remaining layers that did not receive a hormone treatment, rooted and that most of these layers possessed the heaviest amount of roots (Fig. 2). Half of the remaining layers that had been treated with 10 ppm and 100 ppm IBA had no roots, while the remaining layers possessed a light to moderate amount of roots.

The overall results observed indicated that vegetative propagation of *Eucalyptus ficifolia* is possible by means of air-layering. It is also likely that layers need not be treated in any way with growth substances, as callus formation, although stimulated by a low concentration of IBA may retard root growth and development. Also, the factor inhibiting root formation may be overcome by removing the layer at an earlier date or by replacing the treated sphagnum moss with fresh untreated sphagnum.

The high mortality rate is nothing new to workers experienced in air-layering and

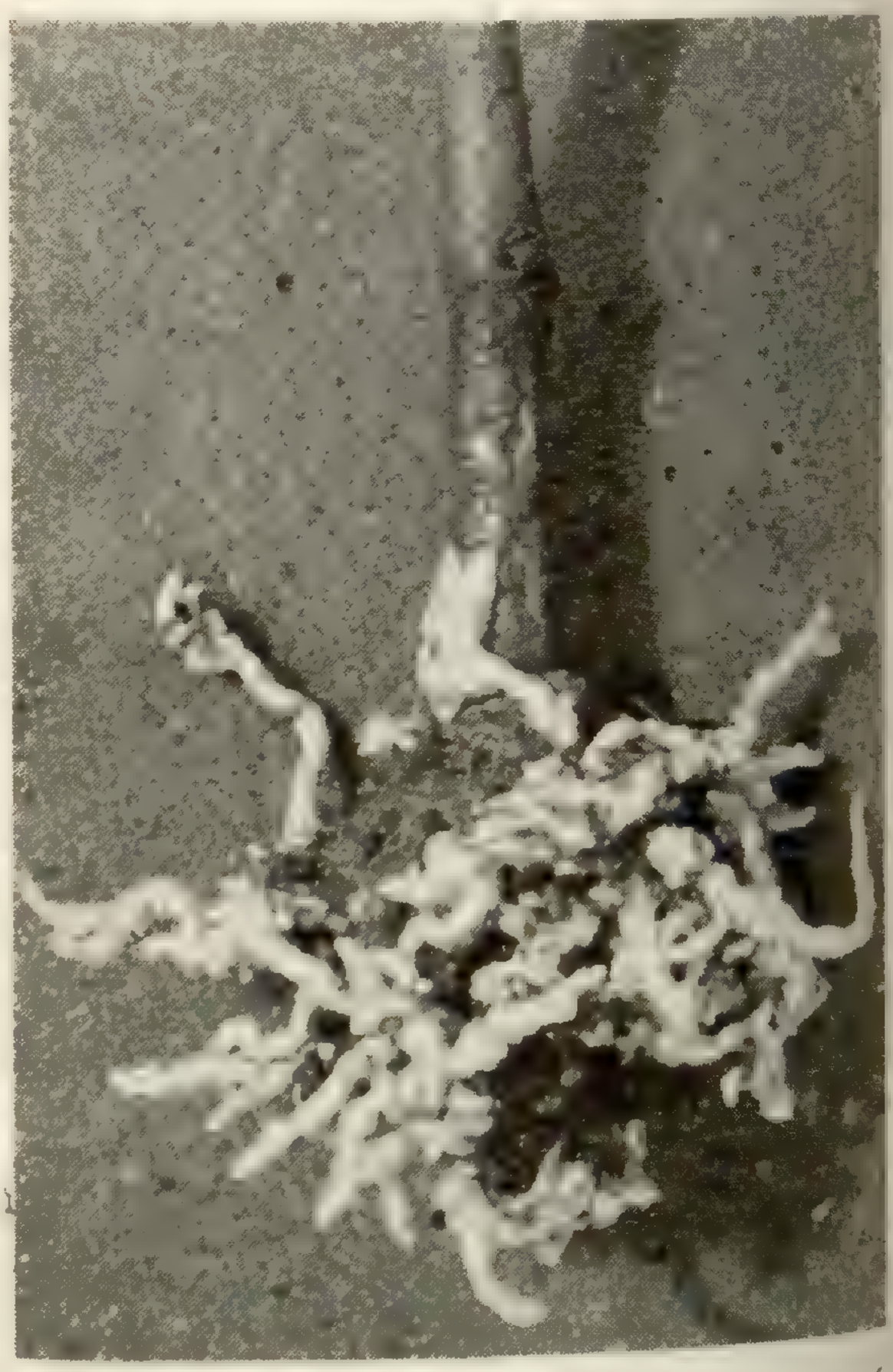

Fig. 2. Root growth of *Eucalyptus ficifolia* 16 weeks after removal from parent plant. This plant received no treatment with growth regulators.

if the loss of these layers were due to drying out, this situation may be corrected by placing the newly formed plants in the shade with frequent syringes or by placement in a mist chamber.

Further experiments on propagation of Eucalyptus will be initiated to determine the most suitable and practical means of air-layering and to determine if propagation by cuttings is possible.

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HORTICULTURAL EFFECTS OF GIBBERELLIC ACID

FRANCIS F. T. CHING AND WILLIAM S. STEWART

Summary of a paper presented at the AIBS annual meeting. August 25-29, 1957, Stanford University, Palo Alto, California

CYPRIPEDIUM ORCHIDS

Clonal varieties of *Paphiopedilum Maudiae 'magnificum'* (*Cypripedium Maudiae* or commonly called Lady Slipper orchids) were treated with gibberellic acid (GA) in various ways over a period of 16 weeks. When two drops of 25 parts per million (ppm) GA were placed in the apex of each plant growth, one, two and sometimes three flower buds were produced on a single stem. Occasionally, only one of these buds expanded into a full flower. On two treated plants, when two flowers on the same stem expanded, the first flower possessed a 'leaf bract' in place of the normal bract (Fig. 1). From the center of this 'leaf bract' the stem of the second flower developed. Under these conditions, internodes of the plant elongated, the new lateral stem growth developed at a higher position and also expanded at a later time than normal and in a few cases, new multiple lateral vegetative growths developed. When only one shoot growth instead of the apex of all shoots was treated with the same concentration of GA, but in different amounts, no visible responses were evident. Clonal plants of *P. King Arthur* 'Burgoyne' were treated in the same manner as the *P. Maudiae,* but no visible effects were evident.

Fig. 1. Flower formation of *Paphiopedilum Maudiae 'magnificum'* when treated with 25 ppm GA for 16 weeks. (1) leaf bract, (2) remains of first flower, (3) second flower, (4) undeveloped third flower.

Additional studies are necessary to determine the full effects of gibberellic acid on *P. Maudiae,* although it appears, at this time, that the effects are non-beneficial, commercially.

CARICA PAPAYA

Gibberellic acid and indoleacetic acid (IAA) were applied at various concentrations, in lanolin, to the basal portion of stems of *Carica papaya.* An increase in stem diameter was evident in the area of application for the following treatment concentrations: 25 ppm GA, 250 ppm GA and 25 ppm GA plus 100 ppm IAA. The greatest increase in diameter was observed in stems treated with 250 ppm GA. At the same time, there was no increase in plant height.

This increase in stem diameter in response to a localized application of gibberellic acid is evidently an isolated case, although there have been reports that peduncle diameters of grapes (1) and apricots (2) have increased when sprayed with gibberellic acid. In the case of papayas, the results indicate that gibberellic acid applied in a lanolin paste is not translocated in the plant.

CALIFORNIA ANNUALS

A marked increase in the germination of seeds of certain native California annuals was observed following treatment with GA. *Gilia capitata* var. *chamissonis*

(Globe Gilia) seed, collected in 1948 was treated with 0 ppm, 10 ppm, 25 ppm, 100 ppm and 250 ppm GA. Seed collected in 1953 were treated with 0 ppm, 100 ppm and 250 ppm GA. A second experiment was carried out using seeds of *Eschscholzia caespitosa* var. *Kernensis* (Gold poppy) collected in 1948 and 1953. The seeds were treated with 0 ppm, 25 ppm, 100 ppm and 250 ppm GA.

The results observed strongly indicated that gibberellic acid is not only effective in increasing seed germination but that it also appears to be more effective on older seeds. With Gilia, germination of 1948 seeds treated with 250 ppm GA increased by 13 times over the controls while with 1953 seeds, using the same concentration of GA, the increase was only about 5 times.

Similar results were observed with Eschscholzia seeds. With treatment of 250 ppm GA, germination of 1948 seeds increased 26 times over the controls while germination of 1953 seeds increased about 6 times over the controls.

Further germination tests along with bio-assay determinations will be initiated to ascertain the full value of the observations reported here. This work was supported by a grant-in-aid from Longwood Gardens and the Longwood Foundation, Kennett Square, Pa.

LITERATURE

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2. Item #382 Abstracts, American Society for Horticultural Science, Fifty-Fourth Annual Meeting

A CONSERVATORY—JUST THE BEGINNING

GLENN H. HIATT

WHERE BETTER to justify Webster's definition of a conservatory—"a glasshouse or greenhouse for growing and displaying plants and a place for their preservation and safe keeping"—than the Los Angeles State and County Arboretum?

We are destined to have one of the most outstanding collections of orchids and tropical plants in the world. The present and future plans for the Arboretum assure conditions for "displaying" and "preserving" rare, awarded, unusual, and proven parent plants known to many by name only. In addition, "safe keeping", where all plants will be grown to specimens, not broken up unless necessary, and not for sale.

One might ask what the Arboretum's present culture and display facilities are and of the extent of our present orchid and tropical plant collections. The following may surprise some of our readers:

1. An 18′ x 40′ aluminum greenhouse (Douglas Memorial House) with controlled temperatures of 60°F. minimum to an 85°F. maximum. Here, Cattleyas and allied hybrids are grown.
2. A second 18′ x 40′ aluminum greenhouse (Casamajor House) has two sections: (a) 65°F. minimum to 85°F. maximum (b) 55°F. minimum to 80°F. maximum. This house is used for the cultivation of Cypripediums. These two houses are located north of the Administration Building, and to the west of the Service Unit. Each of these houses was constructed as a result of generous gifts of money to the California Arboretum Foundation.
3. A third greenhouse, the Arboretum's original glasshouse, plays an important role in accepting the load of botanical orchids, anthuriums, vandas, begonias, vines, phalaenopsis, tropical plants, and more cattleyas, all of which will eventually be on display.

So much for the physical facilities for housing the collections. Now, the collections themselves. Again, the plants were received as gifts to the California Arboretum Foundation.

1. Approximately 1000 Cattleyas and allied hybrids, including many new hybrids flowering for the first time.
2. Approximately 1750 Cypripediums, including many awarded and seldom seen plants.

3. Many botanical orchids, some with flowers no larger than a pin head and others the size of a salad plate.
4. Approximately 325 recent vanda hybrids, both terete and strap leaf types.
5. Approximately 750 large seedling Cymbidium plants, most of which are in eight to ten inch pots. A large majority of these are now in spike and will bloom for the first time this coming Spring.
6. Another large group of Cymbidiums are planted under oak trees on Tallac Knoll and are spiking generously, promising a spectacular show this coming Spring.

What is currently in flower? Since November, about 500 Cypripedium plants have come into bloom. These flowers last from one to three months, so with the additional plants blooming since that time, we are assured of a continual show of flowers with a wide range of color and form, with names to excite the advanced hobbyist and commercial man, and also to stimulate a new hobby or appreciation in the minds of many visitors. The many Cattleya plants in flower now will continue to be colorful throughout the winter and all year, as seasonal hybrids follow the succession of bloom. The Cymbidiums added to this show of flowering plants by Spring, mixed with other genera not even mentioned above, will draw many repeat visitors.

All plants in flower will show clearly the name of the plant and its parents. Each plant is displayed to its own best advantage in viewing the flowers, size of plant, growing medium, etc. Each plant also is displayed in close proximity to near relatives to help the visitor study and compare. Finally, all plants are displayed to harmonize with our concept of agreeable design.

It is well to have plants of exceptional quality, rarity, and beauty, but unless displayed for the comfortable enjoyment of the thousands of visitors to the Arboretum, all purpose is lost. It might seem that to grow these plants and then display them in the present facilities would be a difficult task, but since all problems are relative, this is "just the beginning—conservatory". Plans are being worked on for a large display and research house to be built with funds from a very generous donor. We still must have a large conservatory. We still must increase our variety of species plants of all genera, first generation hybrids of all genera, plants or divisions of awarded plants, and plants or divisions of the proven parents that are responsible for the awarded plants. Our objectives are high, but with the strong foundation of the plants and greenhouses at hand, we, even now, have a conservatory—just the beginning.

BOOK REVIEW

"Gardening, a New World for Children" by Sally Wright. The MacMillan Co., New York. 1957. 183 pages. $2.75

This amazingly varied collection of ideas and plant projects is based on a solid foundation of experience plus imagination. These are practical suggestions to fire the interest of a child whether his enthusiasm runs to giants or midgets, specialties or science, pocket money or parties, food, freaks or fragrance! Titles for some of the chapters bear out these ideas: 'For the Youngest Beginner', 'Pet and Wildlife Garden', 'For the Young Scientist', 'Lilliputian Garden' and 'Odd Behavior Garden'.

The chapter titled, 'Getting Down to Earth' deals with the fundamentals of gardening or the actual 'how to' of garden work. A list of 44 books or pamphlets is included under the heading of 'Suggested Reading'. Many of these books are for the inspiration of adults counseling children on gardening. 'Source of Supply' lists plant material and the company from which seed or plants may be obtained. Unfortunately, many of these are eastern concerns.

You may find here how to give the key to a life long pleasure by "introducing your child to gardening through his own peculiarly personal character and favored diversions . . . the rewarding task of making the garden trail enticing is in yours hands".

Here is a handbook for the layman adult to inspire a future gardener and to have a lot of fun.

GERTRUDE WOODS

"The U. C. System for Producing Healthy Container-Grown Plants." Edited by Kenneth F. Baker. California Agricultural Experiment Station Extension Service Manual 23. 332 pp. 1957. $1.00.

New concepts in the commercial propagation and growth of nursery plants are rarely found. The publication "The U. C. System for Producing Health Container-Grown Plants" Manual 23, edited by Dr. Kenneth F. Baker, Professor

of Plant Pathology, College of Agriculture, University of California at Los Angeles, however, presents an entirely new philosophy in this field. The manual is designed for the commercial nurseryman; nevertheless advanced amateur horticulturists will find a wealth of useful information in this book.

A leaflet "U. C. Type Soil Mixes for Container Grown Plants" by O. A. Mathin and Phillip A. Chandler presents a summary of the soil and fertilizer aspects of this new method. This leaflet gives the various formulas in ready reference form and is suitable for posting. It may be obtained free of charge from Agricultural Publications, 22 Giannini Hall, University of California Berkeley 4, California. The 332 page paper bound manual which should be consulted for details may be purchased for $1.00 from the same address.

It is stated that the dual purpose of the manual is: 1) To provide a method and plan for present production of container grown plants, and 2) To explain the scientific basis underlying the method. It is expected that one of the principal uses of this manual will be as a reference work and it has been arranged with this in mind.

The various sections of the handbook have been written by different authors who are specialists in their subject. The sections are indicative of its nature and contents. These are: The U. C. System: A general Summary; Today's Nursery Problems; Damping-Off and Related Diseases; The Salinity Problem in Nurseries; The U. C.-Type Soil Mixes; Components and Development of Mixes; Nitrogen in Nursery Soils; Heat Treatment of Soil; Principles of Heat Treatment of Soil; Equipment for Heat Treatment of Soil; Chemical Treatment of Nursery Soils; Treatment of Nursery Containers; Development and Maintenance of Healthy Planting Stock; Beneficial Soil Microorganisms; Importance of Variation and Quantity of Pathogens; Grower Experience with the U. C. System; and Mechanization and the U. C. System.

The text is followed by an appendix containing the following information: a) Literature references to the sections; A Glossary of Terms, and Some Computation Methods; Weights and Measures; Sources of Equipment and Materials; and Sources of Fungicides and Chemicals. In addition there is a very complete subject index.

In conclusion the authors are to be complimented for the presentation of this new concept in production of nursery plants and for the clear, complete, accurate, and readily understandable manner in which a very complex process is presented.

WILLIAM S. STEWART

"A Summary of the Culture of California Plants at the Rancho Santa Ana Botanic Garden 1927-1950," by Percy C. Everett. 223 pp. 1957. Published by the Rancho Santa Ana Botanic Garden, Claremont, California. ($3.50)

One of the functions of a botanical garden is to keep a complete record on introduction, propagation and culture of the plants in the garden, not only a record of successes but also of failures. Many gardens have partial or complete records of this sort but the information on any plant or group of plants may be obtained only by a personal visit and consultation of the files.

This small paper back volume summarizes all the information of the cultivation of California native plants at the Rancho Santa Ana Botanic Garden from 1927 to 1950, a period when the garden was located in Santa Ana Canyon, Orange County. The introduction describes the conditions at the old site and discusses the nursery, soil mixtures, etc. Following the brief introduction is an alphabetical list by scientific name of all the plants tried, from *Abies* (five species) to *Zigadenus* (three species). For each species there is the complete scientific name, common name, family, and growth type (tree, shrub, annual, etc.). For some species there are notes as to ornamental use, pests, special problems, etc. Each accession is itemized with exact source of original collection and results of planting. The samples below indicate the type of information provided.

MILDRED E. MATHIAS

CORNUS GLABRATA Benth. DOGWOOD FAMILY SHRUB

This vigorous growing species seemed to be entirely at home in the old Garden site. Seeds and plants were first collected in San Mateo, Santa Clara, and Los Angeles cos. during 1931 and 1932. The few losses were more than compensated for by the vigorous creeping rootstock that took over considerable areas when given enough moisture. It proved to be a good erosion control plant for moister situations.

NO. 1195. Los Trancos Creek, San Mateo Co., 300 ft., 8-20-31.—8-24-31: 28 brp. to 5-gal. cans. loam. 2-14-33: 21 planted, nw. slope, dark brown clay loam. Oct., 1948: 20 alive, 4-8 ft. tall, spreading widely.

NO. 1198. Mayfield-La Honda road, Santa Clara Co., 300 ft., 8-20-31.—11-11-31: 6 oz., sand & loam. 3-24-32: 300 potted, loam. 2-14-33: 117 planted, same site as above. Oct., 1948: 102 alive, same as above. An unrecorded number was planted in a 600 ft. ravine shaded by sycamores where an occasional irrigation was provided. The entire ravine was completely covered by this plant in 1950, and many of them were 10 ft. or more tall. Seeds and plants had washed down into another canyon where other large clumps started.

VIOLA ADUNCA Smith. VIOLET FAMILY PERENNIAL

NO. 4035. Stone Lagoon to Freshwater Lagoon, Humboldt Co., semishade, moist, sandy humus on west bluffs facing ocean, 100 ft., 2-25-41.—3-10-41: 93 brp. to 4" pots, lfm. and sand; plunged in deep leaf mold in the lath house. At the same time 40 runners were taken from the plants and rooted in sand in a cold frame. 2-18-42: 13 planted, semishade, open area adjacent to a building with sandy loam covering clay. They had adequate water and care but failed to respond and soon died.

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PTERIS SPECIES CULTIVATED IN CALIFORNIA

BARBARA JOE

A WIDE SELECTION of ferns is cultivated in California. The brake fern, *Pteris,* a large tropical and subtropical group, is represented in our ornamental flora by seven species with many cultivars. They are frequently encountered as dish garden or bedding plants. Most of the species are hardy to semi-hardy and while some require shade many can tolerate strong light with indirect sun and *Pteris vittata* and *P. tremula* can withstand some direct sun. The brakes are easy to cultivate and will grow in a fairly wide range of soils. They may be propagated by divisions.

The genus *Pteris* is terrestrial with a short, scaly rhizome. The fronds are clustered, pinnate or pinnately decompound, never finely divided, herbaceous to leathery, smooth and the veins free or united. The sori are narrow, linear, continuous along the margin except at the ends of the segments and sinuses, and are covered by the reflexed leaf margin. The brake ferns may be distinguished from the bracken, *Pteridium,* by the absence of hairs on the rhizome and frond. They may be separated from the cliff brake, *Pellaea,* by having the sori borne on a continuous marginal vein rather than on free vein ends. The rarely cultivated *Histiopteris* has a wide creeping rhizome, and widely separated fronds which is distinctive from the *Pteris.*

The species are fairly easy to distinguish in their native environment but sometimes are difficult to recognize in cultivation with the many cultivars. The following key, based on vegetative characters, has been prepared to distinguish the species cultivated in California.

Fronds simply pinnate throughout . . . . . *P. vittata*

Fronds not simply pinnate throughout

Upper pinnae simple or with a few coarse lobes

Sterile segments elliptic, the tips rounded to blunt-acute . . . . . *P. ensiformis*

Sterile segments linear, the tips long-tapering

Rachis winged between upper 1st and 2nd pairs of pinnae, the segments usually more than ¼ in. wide, cartilaginous-margined . . . . . *P. cretica*

Rachis winged between upper three or more pairs of pinnae, the segments usually less than ¼ in. wide, not cartilaginous-margined . . . . . *P. multifida*

Upper pinnae regularly pinnatifid into many segments

Pinnae folded inward along the midvein . . . . . *P. dentata*

Pinnae not folded

Lowest pair of pinnae once-forked, the segments rounded . . . . *P. quadriaurita*

Lowest pair of pinnae bipinnate, the segments bluntly toothed . *P. tremula*

The species and the most commonly grown cultivars are described briefly in the following list. Hardy as applied here means the tolerance of plants to winter temperatures below 32°F. Information is often inadequate on cold tolerance but the plants listed as hardy withstood the cold winter of 1949 when temperatures reached 18°F in many areas of Los Angeles. Ferns listed as semi-hardy may withstand winter temperatures near 40°-50°F. Tender ferns are those which display poor color and growth when temperatures drop below 50°-55°F. Few commercial ferns are in this category. The names of ferns have been frequently misapplied in the trade. These misapplied names and the common botanical synonyms are italicised in parenthesis following the correct names.

Pteris cretica L. Cretan brake. The common trade species with many cultivars. Fronds simply pinnate except for lower branched pinnae. Hardy to semi-hardy. To 1½ feet.

cv. Albo-lineata. Pinnae with a white variegation along the center. To 2 feet.

cv. Alexandrae. Like the preceding except crested.

cl. Childsii. Pinnae broad, fringed, the tips crested or forked. Sterile form. To 1½ feet.

cv. Distinction. Pinnae toothed, crested and somewhat congested. To. 2 feet.

cv. Major. Like cv. Ouvrardii except smaller. To 2 feet.

cv. Ouvrardii (as applied in California trade). Pinnae broader and without yellow-green of typical *P. cretica.* Better color and growth. To 3 feet.

cv. Parkeri. Fronds larger, dark green; the sterile fronds broad, the fertile fronds much contracted into linear pinnae. Slow grower. To 3 ft.

cv. Rivertoniana. Pinnae broad, coarsely pinnatifid to toothed. To 2 feet.

cv. Wilsonii. Pinnae narrow, much crested at the tips. To 2 feet.

cv. Wimsettii. Pinnae mostly toothed and crested at tips. To 2 feet.

Pteris dentata Forsk. *(P. flabellata, P. flaccida).* Toothed brake. Like *P. tremula* in habit except with folded pinnules. Hardy to semi-hardy. To 3 feet.

Pteris ensiformis Burm. cv. Victoriae. Victorian brake. Variegated. Sterile fronds with deeply lobed pinnae, the fertile fronds much contracted, taller. Semi-hardy to tender. To 1½ feet.

Pteris multifida Poir. *(P. serrulata).* Spider brake. Many cultivars. Similar to *P. cretica* except usually smaller and the pinnae more narrow. Hardy to semi-hardy. To 1½ feet.

cv. Cristata. Crested Spider.

Pteris quadriaurita Retz. *(P. flabellata).* Bipinnate, the lower pinnae forked, making four distinct divisions at the base of the frond. Semi-hardy. To 2½ feet.

cv. Argyraea. Striped brake. Variegated. Pinnae broader. More common than the species in cultivation. To 3 feet.

Pteris quadriaurita 'Argyraea' or Striped Brake showing a variegated form.

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1. Fronds of cultivars of *P. cretica:* A) 'Parkeri', B) 'Rivertoniana', C) 'Wilsonii', D) 'Albo-lineata', E) 'Distinction', F) 'Ouvrardii'; 2. Fronds of *P. dentata:* 3. Habit of *P. tremula:* 4. Pinnule (3x) of *P. tremula* showing nature of sori and indusia; 5. Frond of *P. vittata:* 6. Frond habit of *P. quadriaurita.* Note forked lower pinnae. 7. Habit of *P. multifida.* Photos by the author

Pteris tremula R. Br. Australian brake. Fronds to 6 feet long, tripinnate, appearing like the common bracken except finer in texture and more confined in growth. Hardy to semi-hardy. To 5 feet.

Pteris vittata L. *(P. longifolia)*. Chinese brake, Rusty brake. Coarse, erect, pinnate fronds. Hardy to semi-hardy; endures sun in coastal areas. To 4 feet.

Other species reported to be cultivated elsewhere are *Pteris denticulata* Sw., *P. semipinnata* L., *P. tripartita* Sw., and *P. umbrosa* R. Br. These species may be suitable for California culture.

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COVER

A design to arouse the interest, our cover picture illustrates fronds of *Pteris ensiformis* 'Victoriae' (Victorian Brake). The center figure is the fertile frond.

ARBOR DAY

Arbor Day, March 7, 1958. A portion of the more than 500 children and adults attending Arbor Day ceremonies at the Arboretum. The Camp Fire Girls of Arcadia planned and presented this year's program in cooperation with the Arboretum. Dr. Stewart, Arboretum Director, is at the microphone. Arboretum Staff Photo

SELECTION AND PROPAGATION OF FUNTIONAL SHADE AND STREET TREES

MAUNSELL VAN RENSSELAER

Presented at the National Shade Tree Conference, Philadelphia, Penn., August 27, 1957

THE NEED FOR BETTER and more uniform street plantings has long been recognized on the Pacific Coast. Since World War II, a phenomenal population increase has brought about the development of countless new residential districts in most western cities and towns. Planning of these areas by competent public agencies has focused attention on the street tree problem and the necessity of eliminating some of the glaring mistakes of the past.

The utilitarian considerations of this problem are doubtless much the same throughout the nation. Among the essential considerations, much thought has been given in the west to the elimination of damage by tree roots to sidewalks, curbs and sewers and to the reduction of interference with overhead wires and street lights. Considerable work has been devoted to the selection and propagation of trees which might serve to improve some of these conditions. From the viewpoint of adding charm and distinctiveness to a community, attention has been directed to the advantages of the use of more flowering trees and those with dramatic autumn color. Generally speaking, small to medium-sized trees are preferred except in the hot interior valleys and in desert communities where protection from the heat of the day is an essential factor. Though many westerners express a definite preference for evergreen trees, growers and nurserymen report an ever-increasing demand for deciduous trees having vivid autumn foliage. Park superintendents and city foresters in all parts of the country have a common concern over increasing maintenance costs and will welcome new species of horticultural varieties requiring a minimum of spraying, pruning or watering.

Selections and tests are currently being made in a number of places on the Pacific Coast on the basis of the above considerations. New species and selected varieties are being introduced from east of the Rockies and from various temperate parts of the world for evaluation and testing under environmental conditions existing here. Species in use in the west for years are being carefully examined in search of variants having desirable characteristics.

At the Saratoga Horticultural Foundation, greatest emphasis thus far has been placed on selections of *Ginkgo biloba, Pistacia chinensis* and *Magnolia grandiflora.* Wide variation in form and constitution is found in seedling-grown stock of each of these species. If seedlings of a common origin are grown under comparable environmental conditions, it may be assumed that marked variation between individuals is essentially inherent. Hence, to perpetuate desirable features and to attain uniformity in streetside plantations, vegetative propagation of selected forms is essential. Since budding or grafting is the method usually employed, the importance of seed source in the growing of vigorous rootstock cannot be overemphasized.

Ginkgo biloba no longer exists in the wild state though it was once widely distributed over temperate regions of the earth. Unique among trees, it is referred to as a living fossil. Fortunately for posterity, this beautiful and adaptable ornamental was kept alive by priests in the temple grounds of China and Japan. From there it was introduced into Europe in 1730 and was brought from England to the United States in 1784. Here it has been successfully grown in most parts of the country.

The use of seedling-grown ginkgoes has long been discouraged since the resulting trees have a remarkable variation in habit of growth, and the fleshy fruits of the female tree have an offensive odor when ripe. Western park superintendents report they would

use many ginkgoes as streetside trees if they could be assured of male trees with a uniform habit of growth. Among the desirable qualities of this tree are adaptability to a wide range of climatic conditions, pest resistance and golden autumn foliage. Since 1951, twelve selections of male trees have been made by the Foundation from specimens in widely separated places in the United States and Europe. All are thriving at Saratoga. The parent trees vary in habit of growth from rigidly erect individuals (*Ginkgo biloba* 'Sentry'), through oval-upright forms ('Autumn Gold'), to low, umbrella-shaped types ('Canopy'). Other forms under test are *G. biloba laciniata* and *pendula*. For parks, other public grounds or gardens with ample space, some of the large, picturesque, asymmetrical types would add a distinctive touch to the landscape. However, it is doubtful that any of these are being propagated.

Ginkgoes may be propagated by greenwood or hardwood cuttings, or by grafting or budding. There is some evidence that plants propagated by cuttings are not as vigorous growing—at least in the first few years—as those grafted or budded on seedling stock. Budding on second year seedlings is the method preferred at Saratoga. Some observers predict that these habit types may not come true to form. Others are of the opinion that the symmetrical habit of the progeny of a clone such as 'Autumn Gold' may be lost after reaching 50 years or more of age. There seems to be no conclusive experimental evidence to support or refute such predictions. To date, after five years of growth, the vegetatively propagated progeny of several of the forms at Saratoga maintain the essential characteristics of the parent trees.

Pistacia chinensis, a deciduous species from China, is referred to as having the most vivid autumn foliage of any tree in the Pacific southwest. This, too, is a dioecious species. Though the variation in habit among individuals of *P. chinensis* is not as noticeable as with *Ginkgo biloba*, observations seem to indicate that the male tree has a more shapely habit and bears brighter autumn foliage than the female tree. The former condition may be due to the absence of an annual, heavy crop of fruit. This species withstands both heat and drought, and is free from pests, hence its maintenance cost is low. It is becoming increasingly popular as a streetside and shade tree in central and southern California, especially in the hot interior valleys. The individual selected for propagation at Saratoga is a male tree, has a known record of vigor, is now about 30 years old, has a dense symmetrical crown 38 feet in diameter, is 36 feet tall and has striking orange-red foliage in the autumn. Propagation is by budding. Second or third year seedlings grown from selected seed trees are used as rootstock.

Magnolia grandiflora, an evergreen tree native to the region from North Carolina to Florida and Texas, has long been popular with westerners and is widely planted on the Pacific Coast. Trees from seedling-grown stock vary markedly in (1) habit of growth, (2) size and shape of leaves, (3) size, shape and quantity of flowers, (4) length of flowering period, and (5) amount and richness of brown tomentum on the under surface of the leaves.

Several selected forms of *Magnolia grandiflora* have been sparingly propagated in the west. The best known of these is 'Saint Mary'. This selection was made by the Glen Saint Mary Nurseries in Glen Saint Mary, Florida, some 30 years ago. A typical 25 to 30 year old specimen in their growing grounds is 52 feet high, has a bluntly conical shape with a crown diameter at the base of about 30 feet, is branched almost to the ground, and has a trunk diameter of about two feet. The foliage is attractive and the six-inch flowers are freely produced. Plants bloom at an early age. Those who introduced this clone into California in 1939 are of the belief that the trees will grow much more slowly and may be smaller in this drier climate. Another form in the trade is *M. grandiflora* var. *lanceolata* (var. *exoniensis*). This has leaves narrower than the type and is said to be somewhat erect when mature. Thought to have originated in England, it is said that thousands of specimens cover the walls of houses near London and in southwestern

England. Another form rarely seen here is var. *goliath*, notable for its flowers one foot or more across.

Seedling variants selected in California by the Saratoga Horticultural Foundation and soon ready for distribution are 'Stalwart', 'Margarita' and a form as yet unnamed. Grafting on second or third year seedlings of the species is the method of propagation employed at Saratoga. The parent specimen of *M. grandiflora* 'Stalwart' has been carefully nurtured throughout its life and is now a mature tree about 35 years old. It has a dense crown, flowers freely, is 49 feet tall with a branch spread of 26 feet at the base, tapering slightly to the summit. Plants propagated from this tree bloom when young. 'Stalwart' is recommended for streetside planting. The parent tree of the clone 'Margarita' is now 20 years old, is 18 feet tall and has a branch spread of 20 feet. At the present time, it shows evidence of remaining a relatively small tree of pleasing proportions. The attractive leaves are glossy and the plants bloom in the first year. Tests are being made of this variety as a wall plant. The most noteworthy feature of the unnamed clone is its large, glossy, prominently veined leaves.

Selected forms of the following species are also being propagated asexually at Saratoga. Tests indicate that some of these have considerable promise as streetside and shade trees for this region.

Ceratonia siliqua—Fruitless, hardy, drought enduring strain.

Cornus nuttallii—Geographic race from the southernmost stand of this species in the Santa Cruz Mountains, California. Propagated on rootstock of *C. capitata* since the latter is more resistant to heat and drought.

Koelreuteria paniculata—Upright form.

Ligustrum lucidum—Form having narrow, conical habit.

Liquidambar formosana—Form having velvety, lavender, young leaves.

Liquidambar orientalis—Two clones: one a vigorous growing strain, and the other having delicately shaped leaves.

Liquidambar styraciflua—Form having a handsome habit and brilliant autumn foliage. With reference to the latter, the tone of color and timing are constant in the blocks of plants of this clone in the nursery where environmental conditions are controlled, but it has not been determined if this will hold true when planted in different regions under varying conditions of soil, nutrition, moisture, exposure and temperature. This form is distributed under the horticultural name 'Palo Alto'.

Liriodendron tulipifera—Two upright forms, one more columnar than the other.

Prunus lusitanica—One of the better leaf forms.

Ulmus parvifolia var. *sempervirens*—Two forms more upright than the type.

Following are some of the species being propagated at Saratoga that are relatively unknown or sparingly grown in central California. A few of these are now being tested as streetside or shade trees in communities where they were previously unknown.

Acer oblongum. *Acer paxii*. *Carpinus caroliniana*, *Cinnamomum glanduliferum*. *Corynocarpus laevigata*. *Cryptocarya rubra*. *Cupressocyparis leylandii* (a garden hybrid), *Firmiana simplex*. *Geijera parviflora*. *Idesia polycarpa*. *Liriodendron chinense*. *Olea chrysophylla*. *Persea indica*. *Quillaja saponaria*. *Sapium sebiferum* and *Tristania laurina*.

Following are some of the trees in the test plot at Saratoga that are unknown or rarely cultivated in this region. Most of them are doing exceptionally well to date.

Acer macrophyllum 'Seattle Sentinel', *Acer platanoides* var. *columnare*. *Agonis flexuosa*, *Arbutus canariensis*. *Camptotheca acuminata*. *Carpinus betulus* var. *columnaris*. *Cinnamomum pedunculatum*. *Cryptocarya miersii*. *Eucalyptus perriniana*. *Fraxinus holotricha*. *Fraxinus ornus*. *Gleditsia triacanthos* 'Sunburst', *Gleditsia triacanthos* var. *inermis* 'Moraine', *Koelreuteria bipinnata*. *Libocedras decurrens* var. *compacta*. *Mag-*

nolia delavayii, *Phellodendron amurense*, *Phellodendron chinense*, *Quercus ilex* var. *fordii*, *Quercus phellos*, *Quercus tomentella*, *Rhus succedanea*, *Robinia pseudoacacia* var. *umbraculifera*, *Sorbus cuspidata*, and *Tilia platyphyllos* var. *pyramidalis*.

Many other species and varieties are under test but it is not known as yet how well they will succeed here.

Investigation such as that outlined above must necessarily be planned on a long-range basis. Since the Saratoga Horticultural Foundation was established just seven years ago, the work here has really just begun.

The above summary represents but a small segment of the work currently in progress in various places on the Pacific Coast in the selection and testing of new species, forms, strains and races of shade, streetside and ornamental trees. It would be safe to predict that this widespread application to a given goal will bring some highly gratifying results within the next decade, and will add materially to the character and attractiveness of western communities.

HIBISCUS

Ross H. Gast

As is the case with many plant families, the botanical history of the hibiscus is fragmentary and confusing. However, we do know something of the introduction and development of the species we now call *H. Rosa-sinensis*, as well as the several other species which have been crossed with *Rosa-sinensis* to produce the hybrids which now represent the most widely planted horticultural varieties of hibiscus in America, Hawaii, Asia and Australia.

The exact date that *H. Rosa-sinensis* was brought to England has not been determined, but it was being grown in English green houses early in the Eighteenth Century. And there is evidence that George Washington grew the plant in his hot houses about the same time. Its introduction in the United States could have been direct from India or China (where it is native), or even the South Seas, or it could have come in by the way of the West Indies to which area it was introduced quite early by the English and the French. In England as well as the Colonies, hibiscus was always grown as a hothouse or "stove plant", in tubs, or as a "wall plant", trained to conservatory walls.

Hawaii, where hibiscus finds its happiest home, probably received its first Rosa-sinensis direct from China soon after the first whites arrived. Hawaiian ports were the provisioning places for vessels in the fur trade between China and the Northwest Coast of America which flourished around 1800.

Hibiscus spread throughout the South Seas very early: Dr. E. D. Merrill says that insofar as the South Seas are concerned, hibiscus was a "pre-Magellan man-introduced ornamental from the Islands to the West", meaning of course, the East Indies. The red hibiscus is mentioned quite frequently in Polynesian folklore, and inasmuch as the origin of the Polynesian peoples is said to have been southern Asia, it is possible that the hibiscus followed them in their migrations. It has not been established that they brought it to Hawaii.

So far as I have been able to learn, the first printed mention of the hibiscus species which Linnaeus named *Rosa-sinensis*, appears in Von Rheede's "Hortus Malabariensis", published in Amsterdam in 1678. The short text is illustrated with a black and white plate and shows a double hibiscus, described as being "rose red". It appears much like the double red introduced into England 150 years later.

The next mention of hibiscus is in Rhumphius' "Herbarium Amboiniensis", published in 1743, and the plant described is almost identical to that discussed by Von Rheede. He also mentioned a double white, although he did not describe it. In this connection, contrary to the accepted idea, the double hibiscus were the first to be described. As late as 1836, the "Botani-

cal Register" Vol. 21 states: "The (double) varieties of this species, crimson, yellow, buff and even white, are not uncommon in collections, but in the single state . . . though handsome, it is comparatively rare".

Both Von Rheede and Rhumphius antedate Linnaeus. However, for some time after Linnaeus brought the species and the name *Rosa-sinensis* together; there was some confusion: even such a well known plantsman Phillip Miller, director of the Chelsea Botanic Garden, and credited with being the first to grow *H. Rosa-sinensis* in England in 1731, did not follow Linnaeus. His "Gardener's Dictionary", published in 1763, described 22 species of the hibiscus family, but among them was only one that is now placed in the closely related group called Rosa-sinensis. This was the double rose-red, described by Von Rheede, but Miller referred to what we now call *H. mutabilis* as *H. Rosa-sinensis.*

The first reproduction of *H. Rosa-sinensis* in color that I have been able to find appears in Curtis' Botanical Magazine, Vol. 5, 1791. This shows one of the several forms of the flower which we now grow and call common red, which has world-wide distribution, and is found more frequently in gardens than any other variety.

During the 1820's, colored plates of *H. Rosa-sinensis* appeared quite often in horticultural publications in England, for by that time new forms were being brought in from South Asia. In fact, some hybridizing was being done, too, and several of the closely related species were being used in these crosses. Of these, *H. cameronii,* from Madagascar, *H. schizopetalus,* from South Africa, the several forms of native Hawaiian white(1) *(H. bookerii, H. waimaeii,* and *H. bellerii)* and *H. kokio,* the native Hawaiian red, have been the only ones to be successfully crossed with *H. Rosa-sinensis. H. cameronii* "blood" can be seen in modern hybrids in the form of striped petals; *H. schizopetalus* hybrids are very common throughout the tropics, and are generally characterized by a long, pendulous staminal column. Native Hawaiian white produces strong plants usually, and most of their progeny have a calyx that is much longer than usual, and smaller in diameter. One indication of *H. kokio* "blood" is bright, shiny leaves, of a heavier than ordinary texture. Many of the hybrid varieties brought from Hawaii today have all of these species in their ancestry.

The "Botanical Cabinet", Vol. 10 (1824) showed a double red much like the older variety still seen in Florida and Texas, called *lamberti.* In the same volume, several other double forms were presented in color. One was called *H. Rosa-sinensis flava,* or buff colored hibiscus. This is what we would now call a peony flowered double. It has a touch of red in the center zone; this variety is still to be found in many old collections. Another variety shown was *H. Rosa-sinensis lutea,* or deep yellow hibiscus. This is much like the double now listed as Hawaiian Golden. Still another sort to appear in this volume was the semi-double *Rosa-sinensis variegata,* or variegated hibiscus, red and white in color. We still refer to this form as semi-double, but it is popularly known as "cup and saucer". There are many beautiful hybrids now in this form.

In Vol. 21, "Botanical Register", 1836, the single that has always been known as Mrs. Hassinger was first shown in color. This is a rose-red single with a distinct dark, reddish-black center zone. It has been widely used in crossing for the past 100 years, and this is possibly the reason for the "dark eye" in many of our modern hybrids.

During the latter part of the Nineteenth Century, horticultural literature covered *Hibiscus Rosa-sinensis* quite liberally, and new hybrids began to appear. However, it was not until the turn of the century that a dedicated group of amateurs in Hawaii began to work with the plant, and it is these men and women who are mainly responsible for the gorgeous forms and colors that are available today for growing in tropical areas. Some work was done in Florida, and in the West Indies, but the Hawaiian group took the lead, and even

today they are still working toward the improvement of the plant. Florida, however, is coming to the front in this respect, particularly since the organization of the American Hibiscus Society in 1951.

Unfortunately, many of the fine hybrids produced in Hawaii and Florida are not suitable for growing in southern California. Some have been established, however, among them the ever popular Agnes Galt. This variety is a first generation cross between native Hawaiian white and an unnamed pink; it was produced by Alonzo Gartley, of Honolulu sometime prior to 1913.(2)

The important feature of the Agnes Galt is that its widespread planting here, and its adaptability to our climatic and soil conditions indicates that other crosses in the same range can produce other better varieties for our enjoyment. In fact, it was the history of Agnes Galt that encouraged the writer to establish several years ago a project for the development of better hibiscus for California, a project that is now being sponsored in part by the Los Angeles State and County Arboretum. Over the past ten years, several hundred true species and hybrids from all over the world have been planted and observed, and later used in making crosses that have resulted in the growing and testing of close to 1000 seedlings each year. Many show great promise, and several will be ready for distribution to commercial growers soon. But first, a hybrid is given a four-year test, to determine its commercial worth; it must be hardy on its own root, it must grow easily from cuttings, it must be a precocious and prolific bloomer over a long season and its petal substance must resist curling or fading under our intense sunlight. This is a big order, but results so far indicate that the time is not far distant when we in

Under southern California conditions, hybridizing of *H. Rosa-sinensis* must be carried on under carefully controlled conditions of temperature and humidity. This photo shows one section of the Gast greenhouse where 330 different horticultural species of *H. Rosa-sinensis*, together with several other closely allied species, are grown in 12″ pots. This collection forms the basis for his hybridization project.

southern California can have a wide range of color and form in hibiscus, all perfectly at home here. They may not always survive extreme low temperatures, but they will be as hardy or hardier than the limited number of varieties which we now grow.

Los Angeles Businessman

LITERATURE

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CHOOSING A TREE FOR THE AVERAGE GARDEN

MILDRED DAVIS

THE RIGHT TREE properly placed can give the most insignificant house a touch of distinction. However, a tree should be chosen with the same care as a fur coat, for given reasonable care both last a life time. Trees add value to property and impart (especially to mushrooming tracts) a feeling of permanence and stability.

Just any tree cannot fulfill a definite need, for every tree has a special growth form which distinguishes it from others. The open clover leaf like pattern of *Eucalyptus cladocalyx* silhouetted against the sky is a California landmark, likewise the tall naked bole of the Washingtonias topped by clusters of fan like foliage. These trees afford what is termed a "sky line" affect, and are especially useful where background height is needed. The thin drooping form of Casurina with its pine like foliage and sparse branching suggests an emaciated pine but serves a definite purpose as a thin screen or tracery. So we choose a tree for ability to perform a given function whether it be to frame a view, to screen an unsightly object (a telephone pole or a neighbor's second story window), to cast a shadow pattern on wall or pavement, to give shade, to provide autumnal color in its foliage or spring glory with its bloom. These are the primary reasons concerned in choosing a tree, but along with them ease of maintenance must also be considered. Obviously one thinks twice before selecting a tree which is in need of continual spraying to control pests or disease or which needs too frequent pruning to keep within bounds, or which frosts easily. Likewise one should know the tree's tolerance to water in heavy soils, its resistance to wind, its type of root system (if invasive and greedy it will prohibit growth beneath). Ultimate size too is most important for harmony in scale and design in plant materials. With the foregoing facts in mind the following trees are suggested for serving various purposes in the average garden.

Acacia vestita—a graceful pendulous large shrub or small tree, foliage small, the entire plant giving a chartreuse grey color affect. 12-15 feet tall almost the same width. Likes good drainige, useful in oriental garden. To be seen at 1100 Acanto Pl. (Bel Aire off Sepulveda).

Albizzia lophantha—feathery mimosa like foliage, chartreuse blooms, fast growing ultimate 20-25 feet, spread of same. Somewhat rigid habit of growth but can be thinned for less stylized affect. Appearance is best with adequate water but will exist with little. Group of 3, 20990 Las Flores Mesa Dr., Las Flores Canyon, can be seen from road, rear north.

Caliistemon viminalis—Weeping bottle brush—Weeping, bronzy new growth, rose red bottle like flowers. Stands lawn watering. To 25 feet in height—12-15 across. Needs occasional pruning to prevent woodiness. Fairly cold tolerant.

Caesalpina spinosa (Coulteria tinctoria)—too seldom seen or used. Rather upright stiff habit of growth but spreading crown. Multiple trunk gives best appearance. Tough, drought resistant, spines on trunk, pinnate leaves, yellow flowers, 25 feet tall—15 feet wide. To be seen at 6 Rivas Canyon Road, inside walled patio or on top of rear slope (from street) at 809 Bramble Way (Tiger Tail).

Hymenosporum flavum

By permission of Sunset Magazine, Menlo Park, Calif.
Photo: William Aplin

Cupania anacardioides—a larger tree but slow growing at first. More attractive with multiple trunks. Tough, stands most conditions. Glossy bronze foliage, white flowers (not too noticeable). Tender to sustained cold. Good shade tree. 25-35 feet high and wide.

Cotoneaster lactea—thought of as a large shrub but can be trained into a multiple trunk pendulous tree of good appearance. Excellent grey green foliage, myriads of white flowers, then large red berries. 12-15 feet tall and wide.

Eleagnus filipense—another large shrub which can be made into a weeping small tree. Silver leaves, brownish underneath, stems brownish, tiny white flowers exceedingly fragrant, bronzy berries. Excellent drainage, tender. 8-10 feet tall and wide.

Escallonia organensis—a large shrub which makes a good tree single trunk or multiple. Interesting bark, glossy bronzy green foliage, flowers in terminal clusters giving pale pink overall color. 12-15 feet tall and wide.

Feijoa sellowiana (Pineapple Guava)—excellent as a tree instead of a shrub. 15-17 feet tall and wide. Multiple trunk more interesting. Tolerant of varying soil con-

ditions, fairly cold hardy and wind tolerant. Grey foliage, deep red flowers and delicious pineapple flavored fruit. 299 No. Saltair near entrance.

Ficus retusa—small leaved rubber, neat, glossy dark green leaves, pendulous habit of growth. Slow growing eventually 25-30 feet high, 20 feet wide. Full sun coast or partial shade, inland partial shade (tender to frost). Best specimen at office of Pereira & Luckman, Sunset Blvd. at edge of Beverly Hills.

Harpephyllum caffrum (Kafir Plum)—attractive dark green pinnate leaves very glossy, new growth very bronze. Plum like fruit, dark red. Fast growing to 25 feet high and wide. Better as a multiple trunk specimen. Needs drainage, does not like wet feet. Tender to frost. Needs considerable pinching of terminal growths when young to attain good form.

Hymenosporum flavum—glossy dark green foliage, 20-25 feet tall 15 wide. Rather open growth that needs cutting back when young to produce a good compact head. Flowers in loose terminal panicles about 1-1½ inches, deep yellow, very fragrant. Not easy to find in the trade. Needs adequate water but good drainage. Peebles rear garden 2179 LevenLane, Brentwood.

Leptospermum citratum—open arching growth, bronzy linear leaves, white flowers. Delightful lemon fragrance to foliage. Needs excellent drainage. To 20 feet high 15 wide. Multiple trunk most interesting. Sun and heat.

Leptospermum Keatleyi (Lord says *Scoparium Keatleyi*)—while thought of as large shrub will attain tree size—20-25 feet tall, 15-20 feet wide. Rather stiff in habit, linear grey green leaves, one inch pink flowers off and on all year. By pruning can achieve an oriental look. Tolerant of varying soil conditions, full sun not too much water.

Xylosma senticosa—another shrub that can be a small tree. Makes a rather weeping small tree to 15 feet high and wide. Bronzy green foliage.

*All sizes given are relative as growth depends upon the environment.

A NEW PHILOSOPHY FOR DESCANSO GARDENS

WILLIAM S. STEWART

THE LOS ANGELES COUNTY Department of Arboreta and Botanic Gardens was requested on January 28, 1958 by the County Supervisors to operate Descanso Gardens effective July 1, 1958. In making the request the Supervisors accepted a tentative program for the Gardens. The emphasis and philosophy of this program is based on an educational function for Descanso Gardens.

The quest for knowledge is not what leads throngs to a recreational area but it is precisely that which will bring visitors and students alike to the Gardens. The new approach will emphasize an educational program in gardening and horticulture and will be based on mass display gardens in which the various plant societies of Los Angeles County will be given the opportunity to participate. Each month a different plant group will be featured for the general public with the outstanding Camellia display continuing to be one of the main features. The schedule for monthly displays is now being prepared. Suggestions have been: April—California Wildflowers and Bulbs; May—Iris; July—Begonias and Fuchsias; August—Ferns; September—Forest plants and Conservation; October—Roses; November—House plants, and; December—Christmas greens, berries, and Poinsettias. On each of the four Saturdays every month the educational activities may be programmed as follows, using the month of October as an example.

October—Rose month

1st Saturday. Horticultural show: plants grown by Los Angeles County amateurs.

2nd Saturday. Flower arrangers' show.
3rd Saturday. Demonstration of culture: Techniques.
4th Saturday. Show of Commercial Growers of Los Angeles County featuring recent award winners.
Months featuring other plants would follow a similar pattern for the Saturday programs.

In addition to these general educational activities, classes in gardening and horticulture will be held. Within the next three years it is planned to establish a school for professional gardeners by using the apprentice or trainee system supplemented with classes.

In cooperation with public schools, a gardening and nature study program for children will be initiated to utilize fully the gardens.

The gardens also will be available for other educational and cultural events of the County.

In keeping with the long established policy of governmental educational institutions, there will be no admission charge and so the gardens will be of greater use to more people than heretofore.

A group of public spirited private citizens who are particularly interested in the development of Descanso Gardens are now organizing as a supporting unit. It is anticipated they will be affiliated with the California Arboretum Foundation, Inc. which sponsors the Arboretum at Arcadia.

This brief outline of the proposed new program is in the early stages of planning. Suggestions and comments will be welcomed at any time. It is expected that about three years of actual experience will be needed to determine finally the role Descanso Gardens can play in our County. It is believed that if the philosophy of this program is successfully presented the results will be valuable and rewarding to the County as a whole. Certainly there must be just about as many of our people interested in gardening as there are in baseball. After all, home and civic beautification has nothing on the debit side and everything to gain for all of us.

BONSAI

JOAN CASE

SUNDAY, APRIL 27, marks the opening of the first major Bonsai exhibit ever to be staged in the United States. The California Bonsai Society, headed by John Naka, will present the First Annual Bonsai Exhibition at the California Museum of Science and Industry, Exhibition Park, Los Angeles.

Opening on Sunday, the exhibition will continue for one week through Sunday, May 4. Hours for the exhibition will be 10 a.m. to 5 p.m. daily, admission free.

Bonsai, ancient Japanese art form, are miniature representations of nature, in which beauty and health are essential. Age, alone, is not the important factor.

The Bonsai are grown in a container in a controlled manner. This is an unnatural environment for the specimen and as a result horticultural problems arise. The character of growth of such specimens is controlled, in part, by the culturalist through the selective pruning of both the branch and root structure, through a careful feeding program and by satisfying a varying range of microclimatic requirements.

Aesthetically, the specimen is controlled, to an extent, by traditional patterns governing the shaping of the specimen and its relationship to the container and supporting earth. Also it is controlled, to an extent, by the culturalist's own individuality and interpretation of nature.

This first exhibition is being staged for a dual purpose; namely, to encourage greater interest and understanding on the part of the general public about these miniature trees. And to afford the Bonsai enthusiasts an opportunity to exhibit their outstanding specimens and to gain greater knowledge about the complex art involved in Bonsai.

The exhibition will include the following displays: 1) a landscape introduction, 2) Bonsai native of Japan, 3) Bonsai native of the United States, 4) Bonsai from local nurseries, 5) photo murals, 6) horticultural problem, 7) demonstration sequence, 8) Bonsai as a work of art, 9) Bonsai as formal and 10) several individual Bonsai displays.

All of the Bonsai entered in this exhibition were developed by local Bonsai "men" who have adapted the art to the California horticultural environment.

Director, Public Relations
Museum of Science and Industry
Exposition Park, Los Angeles

Acer palmatum—Japanese maple. The container specimen is seven years old; however, the original tree was about 40 years old. Height of the plant above the container level is 23 inches. Specimen and photo by John Y. Naka.

Metasequoia glyptostroboides—Dawn Redwood. A genus of a single species. Before being prepared as a bonsai specimen this tree was six to seven feet tall. Now seven years old in the container, it measures 15 inches. Specimen and photo by John Y. Naka.

LILACS ON THE DESERT

FRANCIS H. BOURNE

THE CALIFORNIA DESERT region is a never ending surprise nursery for plants, native or otherwise. We, therefore, should not be startled to learn that there is one region of the desert which supports a thriving industry of lilac production. The following lines will introduce our readers to the history and present day activities centered around lilac growing in the desert community of Palmdale, California.

Lilacs were first brought to the Antelope Valley in the 1860's. The original bushes

The lovely Lilac Queen of the 1957 Lilac Show, Miss Anita Barton. She holds a bouquet of *Syringa chinensis;* a flower cluster of the Joshua tree is seen over her right shoulder.

are still producing, and hundreds of rootings and cuttings from these are growing in many of the yards in Palmdale and Leona Valley.

On the Ramblin' K Ranch, six acres of old-fashioned lilacs were planted 24 years ago. Today, the ranch has over 20 acres of lilacs, five of which are French hybrids of 25 varieties. The Ramblin' K sells from 6,000 to 10,000 bunches of lilacs to Los Angeles florists yearly. The entire Antelope Valley supplies about 40,000 bunches. When Easter falls around the first of April, growers cannot supply the demand for lilacs!

Seven years ago, Mrs. Craig Wilson, a Palmdale resident, began a practice of digging up rootings from the bushes in town and giving them to residents who had no lilacs. The Palmdale Garden Club has continued this project. This year to date, 1,500 plants have been distributed to new residents. To further promote the planting of lilacs, Mrs. Wilson initiated a yearly "Plant Lilacs Now" poster contest in the elementary schools. Besides earning prizes and ribbons for the contest participants, the posters, placed in community store windows, encourage nursery sales of lilacs. (A rather unique relationship with community nursery business. Ed.).

The popularity of the lilac won for it the title of the Official Flower of Palmdale in 1957. Today, there are over 100 varieties growing in the area. A few of the favorites are: Vestale, Ami Schott, Oliver DeSerres, President Grevy, Decaisne, Pres. Fallieres, Montaigne, Katherine Havemeyer, Marceau, Chas. Joly, Ludwig Spaeth, Volcan, Charles X and Edith Cavell.

Visitors often ask, "Why do lilacs thrive in Palmdale on the desert?" Part of the answer probably is the fact that Palmdale has several weeks of cold weather, at times the temperature drops to 10 deg. F. and there is an occasional snow storm. Although this is a short winter in terms of the eastern United States home of lilacs, conditions here are quite satisfactory to produce beautiful blooms year after year.

Lilacs require very little care. Since the flower buds start to form for the next year's bloom right after flowering, the

dead blooms should be cut off immediately after they lose their color. This pruning keeps them from going to seed and gives the energy to new growth. Cut back the top only as necessary to control the shape. Remove the stems that made few flowers, and cut off spindly stems for they only produce small flowers. Well rotted cow or steer manure is recommended for a mulch; sawdust is not advisable. Commercial fertilizers have not proved to be of benefit; the bushes produce a more abundant foliage and stems increase in size, but the blooms are much less in quality and quantity.

The old fashioned lilacs bloom about the same time each year; the French hybrids are a little later. By planting several varieties of hybrids, the blooming season can be prolonged for several weeks. Unless lilacs are grown under glass, as they are in Holland, the blooming time cannot be controlled.

In the matter of home town shows, Palmdale is not found wanting. Eleven years ago, the Palmdale Lilac Show was started with a few bouquets and a dozen specimens on display in a market. In 1957 with a Lilac Queen and all the trimmings, the show occupied a large auditorium and five classrooms of a local school. Besides commercial displays, specimen lilacs and flower arrangements, a show of oil paintings by local artists and a gem and mineral display were included. There is no admission charge to the show. The desert at show time is generally covered with wild flowers, and the Joshua trees are in bloom, as are the wild white and blue lilacs on the hills of the Angeles Crest Highway.

The community of Palmdale, and especially the Palmdale Garden Club, extend a cordial invitation to all to come and enjoy the 1958 Lilac Show, April 18, 19, 20.

President, Palmdale Garden Club

THE HISTORY OF OUR TREES— THE TASMANIAN BLUE GUM

RICHARD M. STRAW

FEW TREES seem so much a part of our southern California landscape as the Eucalyptus, and of these, none is more common than the Tasmanian Blue Gum, known properly as *Eucalyptus globulus*. So familiar are these towering, sickle-leaved giants that the uninitiated might be led to think of them as natives, though in fact they come to us from Australia. So great is their size that even those who know of their origin may have difficulty in realizing that Eucalyptus trees have been planted in California barely one hundred years. And so accustomed are we to their presence that fewer still see in their massive trunks and lofty branches living monuments to the gallant men who sailed the Pacific in wooden ships over a century and a half ago, charting and exploring and collecting: those were the men who first discovered the Blue Gum and its relatives for the western world.

The history of the Tasmanian Blue Gum must begin with the intrepid English Captain, James Cook, who led three expeditions to the Pacific Ocean, and who died in the Hawaiian Islands in a battle with the natives. Cook himself in all probability did not see the Blue Gum, nor is it sure that any of his men did, although the surgeon on one of his vessels of the second expedition brought back the seed from which the first species of Eucalyptus known to science were described. It was Cook's brilliant discoveries in the Pacific, however, that led the French Government to write the second chapter in this history by outfitting an expedition to verify and extend the Englishman's observations.

Two ships, equipped for surveying and

scientific observations, left France in 1785 bound on a complete trip around the world. Their commander was John Francis Galaup de la Perouse, a hero of the Seven Years' War with England who had proved his endurance and skill in 1782 by bringing a naval fleet into Hudson's Bay and capturing the British installations there. La Perouse and his party rounded Cape Horn and explored widely in the Pacific for three years—the California coast, the Philippines, Japan, Hawaii, the Aleutians, Samoa and finally Australia. His last dispatches, up to January, 1788, were sent home from Botany Bay, the site of Sidney that had been named by Cook's explorers for its luxurient vegetation.

After three years without word from la Perouse, the Parisian Society of Natural History proposed to the Constituent Assembly that another expedition be sent out to try to find him—and, of course, to gather more scientific information at the same time. The urge to explore was great. As a consequence, two more ships, named "Recherche" (Research) and "Esperance" (Hope) to symbolize the aspirations of the expedition, were readied. The armed vessels and their complement of 219 men were placed under the command of General Bruny d'Entrecasteaux, but for the story of the Blue Gum the important personage was the chief naturalist, one Jacques Julien Houte de Labillardiere.

Labillardiere was thirty-six years old when the expedition left Brest in 1791. He had, by his own account, studied natural history since his early years, and had just returned from two years exploring and collecting plants in Asia Minor when the new adventure presented itself. He considered himself well prepared for the journey, and proved himself right.

As the ships of la Perouse had been intended to circumnavigate the globe, d'Entrecasteaux set out to intercept their track by the shortest route, and after a stop in the Canary Islands, the Recherche and Esperance made port at Capetown, where for some time they sought word of the missing explorer among the returning seamen. With only a vague rumor that natives had been seen wearing uniforms of the French Marines in the East Indian area as their reward, the search party set sail eastward from the Cape of Good Hope, and in April, 1792, sighted the hills of Van Dieman's Land, now known as Tasmania. Through an error of the navigator, which the captain, being confined to his cabin by illness, was unable to correct, the ships entered Tempest Bay—named for its violent winds—instead of Adventure Bay, on which the city of Hobart now stands, but found shelter by towing into a small cove, where they dropped anchor. From this base the exploring parties—surveyors and naturalists—set out to discover the features of the land.

On April 23, 1792, Labillardiere recorded in his journal, "In the afternoon I went on shore, accompanied by the gardener and two others of our ships' company, in order to make an excursion into the country towards the N. E. We were filled with admiration at the sight of these ancient forests, in which the sound of the axe had never been heard. The eye was astonished in contemplating the prodigious size of these trees. . . . The finest trees in this country are the different species of *eucalyptus*. Their ordinary thickness is about eighteen feet; I have measured some that were twenty-five feet in circumference".

On May 6th, after continued exploration in the forests of Tasmania, the naturalist wrote, "I had not as yet been able to procure any of the flowers of a new species of the *eucalyptus*, remarkable by its fruit, which very much resembled a coat-button in shape. This tree, which is one of the tallest in nature, as it grows sometimes to the height of 150 feet, blossoms only near its summit. [It is said that he required a telescope to assure himself that it was in flower.] . . . We were obliged to cut down one of these trees in order to obtain its blossoms. Being already in a slanting position, it was easily felled".

And thus, the tree now known as the Tasmanian Blue Gum, called *Eucalyptus globulus* because its fruits looked like globular coat buttons to a French naturalist

in 1792, became known to science.

The explorations continued for two more years, which saw the deaths of 99 of the 219 who had left Brest, including Captain d'Entrecasteaux and several of his officers. When the ships reached Surabaya, they found themselves in an enemy port, for the Dutch were then at war with France. The exhausted crews gave themselves into parole, were sent to Batavia and later exchanged, reaching the Isle de France in the Indian Ocean in 1796. It was with some difficulty that Labillardiere kept his collections together through all of this. Even his own officers had not been too sympathetic with his work, and he had to fight for storage space and even for a fair share of the fresh rations. But through the vicissitudes of travel and war and search—the party had passed within sight of the islands where la Perouse's ships lay bleaching in the sand, but failed to fulfill the purported main purpose of their mission—Labillardiere finally reached France and his boxes of specimens, England. Even though England and France were again at war, the British government placed the interests of science above those of the combat. The naturalist's boxes and notes were delivered to France on a ship of war flying a white flag! By 1799, Labillardiere had his notes prepared and published his account of the "Voyage in search of la Perouse" along with the description and picture that introduced the Blue Gum to the rest of the world.

As seed became available, eucalyptus trees became immediate favorites in all parts of the world whose climate were fit for them, and the Blue Gum went quickly to the top of the list. Although specimen trees and small plantings were grown much earlier, serious plantings began in France in 1854, due in large part to the earnest efforts of the Baron Ferdinand von Mueller, government botanist in Australia, and a French amateur, M. Ramel, who enthusiastically promoted their culture. These plantings were quickly followed by others in Italy, Spain and North Africa, and in 1856 the first trees of this large genus were planted in California, imported by a Mr. C. L. Reimer of San Francisco. Because of its phenomenally fast growth the Tasmanian Blue Gum was the most popular of all, and the efforts of many persons in behalf of these majestic trees gave the countryside a wholly new aspect.

And so it is that the grandest trees of our area came to the Western world—monuments to the valor of "men of iron, in wooden ships."

Assistant Professor of Botany
Los Angeles State College

THE PALM SOCIETY

LUCITA H. WAIT

IN 1657 RICHARD LIGON, GENT., wrote "A True and Exact History of the Iland of Barbadoes", telling Europeans about the then little-known New World. In it he says this about the Royal Palm:

> "I believe there is not a more Royall or Magnificent tree growing on the earth, for beauty and largeness, not to be parall'd; and excels, so abundantly in those two properties and perfections, all the rest, as if you had ever seen her, you could not chuse but fall in love with her."

Throughout the ages, palms have had religious significance, have symbolized victory. Millions of persons owe their livelihood, even their lives, to the palms. The economy of northern Africa is geared to the date, which sustains not only the population but the livestock in those arid regions, while the income from exporting dates brings needed revenue. Polynesians use the coconut for housing, food, utensils, tools, medicine and many other needs, while copra shipped to Europe and America provides cash.

Linnaeus called them Principes, the princes of the plant world. If we look around our own homes we find that palms play quite a large part in our daily lives, also. Scrub-brushes and street sweepers, coco doormats, wax for floors and automobiles, soaps, "cane" and rattan furniture, as well as food products, are commonplace. However, in Europe and the Americas, palms are thought of mostly as ornamentals.

Within the past century a few men have loved and studied the palms. The great Martius went to South America, discovered and named several hundred new species. Baron von Humboldt, Darwin, Spruce, Bates and other great botanists wrote about them. In our lifetime, there have been Beccari, Dahlgren, Merrill, Burret, Bailey, Fairchild and others. But on the whole, palms have not received the attention that has been lavished upon many other plant groups.

Why this neglect?

Several factors are involved. One is the great size of most palm species, which makes difficult, if not impossible, the preparation of herbarium specimens from which taxonomists do most of their study. A leaf thirty feet long, an inflorescence weighing several hundred pounds, fruit which would fill a shoe-box, are not easy to bring from the wilds and place between blotting papers. Then, palm literature is scarce, out of print, hard to find. Incorrect identifications have been made so that a name gets into the trade and is almost impossible to change when proper identification has been made, as in the confusion of the Alexandra *(Archontophoenix Alexandrae)* and the Solitaire *(Ptychosperma elegans)* palms, and the Areca-Chrysalidocarpus mix-up. A similar situation exists in the *Cocos plumosa-Arecastrum Romanzoffianum.*

Interest in palms has lain dormant in many a plant-lover's mind, and at last there is a thriving Palm Society, dedicated to learning about the palms and sharing that knowledge as rapidly as it becomes available. The Palm Society is the brain child of Dent Smith, of Daytona Beach, Florida—a palm amateur in the best sense of the word. As he built his collection of palms he felt keenly the lack of adequate information, and began gathering together a group of individuals who shared his enthusiasm. The Society was formally created in April, 1956 and will celebrate its second anniversary when members gather in Miami for the biennial meeting April 17th, 1958.

Already there are almost 400 members, scattered over 24 states and U. S. possessions, as well as in 25 foreign countries. Members share their knowledge through the Society's quarterly journal, PRINCIPES, and through correspondence among themselves. A seed bank has been established for the dissemination of seeds not obtainable through commercial outlets.

Officers at present are: President, Dr. Walter H. Hodge, Longwood Gardens, Kennett Square, Pa.; Vice President, Dr. R. Bruce Ledin, Sub-Tropical Experiment Station, Homestead, Fla.; Secretary, Mrs. David Fairchild, The Kampong, Miami, Fla.; Treasurer, Mr. Nat J. De Leon, South Miami, Fla.; Executive Secretary, Mrs. L. H. Wait, South Miami, Fla.; Editor of Principes, Dr. H. E. Moore, Jr., Cornell University, Ithica, N. Y.

No dues have been established. Membership is by voluntary contribution. Anyone who is interested in palms, "the royalty of the plant world", is welcomed. Please write the Executive Secretary, at 7220 S. W. 54th Ave., Miami 43, Florida.

Executive Secretary
The Palm Society

GROWING NOTES

GEORGE H. SPALDING

RECENTLY, this author received a letter from Mr. Ralph Field of Australia, commenting on our Note concerning *Clianthus speciosus* (Sturt's Desert Pea) in the Spring, '56 issue of Lasca Leaves. The Arboretum has had quite spectatcular success growing the Desert Pea in the past two years, and it seemed that Mr. Field's letter was most appropriate at this time. A portion of his letter is reprinted, with his permission, in the following article:

"A little on *Clianthus speciosus*—the following may be of help to you in growing this gem of our inland 'deserts'. As I glance out of the window right now a feast of color meets the eye. It has been in bloom for nearly two months and will remain so until September-October when it will, with rising temperatures, go into retreat. Although a biennial, we treat it as an annual here, because it does not respond well to cutting back.

"Our plants are growing in a rockery built up to height of two feet, the soil almost pure sand. They will not grow in the natural heavy loam of our garden. This winter we struck an intense low on the 2nd of July, a 23 degrees Farenheit, perhaps just an hour or so of it, but enough to do a lot of damage in the garden. Prior to this we had had an Indian summer and many plants have been inspired to make further growth. Many of the 'hardy' plants in our small Arboretum were badly hit. Strut's Pea caught it but only the flowers and advanced buds suffered. The foliage was untouched and a fortnight later, flowering was resumed.

"Now as to time of planting, treatment of seed, etc. My method of handling the seed is as follows: Half fill a cup or bowl with sand, scatter seed on cloth, cover it with another piece of cloth and add one inch of sand over this. Pour hot water (180°F) or thereabouts on the sand, enough to dampen the whole contents, any excess to be poured off. This can be done in the evening and next morning examine seed and plant any that have swollen. Treat again with hot water, and again if needed Evidently there is hard and soft seed. Now as to time of planting. As per directions, I waited until danger of frosts was over. Grew the plants and enjoyed them in bloom but was always puzzled why they objected to our heat, which is around 90° to 100°F. in the shade I knew the plants would have to endure as much and more but could see they did not enjoy our heat. They would look very sick when a 'scorcher' of 110° and more came along at odd times. Towards autumn and fall they looked much happier. Because of this I resolved to try a late summer sowing and this proved to be the 'secret'. The plants never 'turned a hair' with the frosts, in fact, seemed to relish them and flowers did not object either. Our normal winter minimum night temperatures run down to 28°F. on the ground. Another grand feature of the late summer planting is that flowering in winter, the blooms last so much longer.

"I think the plant demands a free sandy soil and is intolerant of bad drainage. Pots, unless of great depth, would be too small for development of even a single plant Before I built the rockery on which we now grow the Desert Pea, we grew them in 44 gallon drums cut in half, giving a container of about 2 feet high, 2 feet in diameter, with holes punched in the bottom of these. Three inches or so of crocks, then filled with sandy loam—plastering sand we have used with success. The sand should then be given a thorough soaking, enough to wet and settle whole of contents, and as the seed swells it is planted about one half inch deep. Three or four plants per container are ample. A piece of sacking can with advantage cover the surface, to be removed as the plants come through soil surface. Growth here is slow for the first few weeks, rapid as the plants commence to run. The aim should be to get the plants well established and in bud before winter".

We have found at the Arboretum that rubbing the seed between two sheets of medium to coarse sandpaper, thus scarifying them, is the best pre-treatment. This past year, we have had success using a light sandy loam seedbed and getting the plants

into the ground as soon as possible. All of our plants bloomed very heavily and have been a beautiful sight even through January and February, 1958.

BOOK REVIEW

"African Violets, Gloxinias, and Their Relatives." A Guide to the Cultivated Gesneriads by Harold E. Moore, Jr. New York, Macmillan Company, 1957. $10.00

"Walk with me along a forest trail in the valley through which Costa Rica's Sarapiqui River flows", Dr. Moore, on the first page of this friendly book, takes us into his confidence and proceeds to tell us all about the beautiful and interesting Gesneriad family of plants.

This is a popular yet scientific approach to the culture and botanical descriptions of these commonly known household and hobby greenhouse plants. Dr. Moore, with first hand experience in the observation of these plants in their native habitat, has given us an insight into the hows and whys of certain cultural practices necessary for success with African Violets and their relatives.

An orderly book from the first chapter on "Gesneriads at Home" (native habitat), and then to cultural requirements learned from this theme including propagation, pests (and what to do about them), diseases and how recognized and cured.

Dr. Moore has presented the Gesneriad family as a whole, then broken it down into subfamilies and tribes. Of these tribes the Genera are listed, then segregated into separate chapters noting Gesneriads with tubers, Gesneriads with scaly rhizomes, Gesneriads with two stamens, Gesneriads with glands, European and Asiatic Gesneriads without visible stems, and finally, some miscellaneous Gesneriads that do not fit into the above category. The species, hybrids and cultivars are then explained fully, then all generously illustrated with line drawings by Marion Ruff Sheehan. Her excellent botanical representation, due to evident feeling for the subject, compliments the descriptive material of Dr. Moore.

The appendices, which is a very important part of this book, is divided into five parts. First, a profound listing of genera and species, their authorities and places of publication. Second, complete pronounciation and meaning of names concerned with the Gesneriad family. Third, for the hybridist or advanced hobbyist, a listing of many members of Gesneriaceae and their chromosome numbers. Fourth, selected references and fifth, a glossary.

GLENN HIATT

"Flowers and Their Histories" by Alice M. Coats. New York, Pitman Publishing Corporation, 1956. 347 pp. $7.95.

This work is possibly of more interest to the layman than either botanist or gardener. It is ideal for reading in reverse order—first one reads the foreword, then Part III which gives short biographies of some eminent horticulturists, then one looks at the main part of the text thinking to read of one's favorite flowers, but all have such fascinating histories that in the end one reads the whole book.

In her foreword Miss Coats says history is the most neglected of the arts and sciences connected with gardening. She gives a brief introduction to the history of British horticulture and explains her frequent references to Gerard's *Herbal* and Parkinson's *Paradisi in Sole. Paradisus Terrestris* and his *Theatrum Botanicum*. These two gentlemen did their work in Tudor times when plants were first used for ornamental purposes; prior to then gardens were strictly practical for medicine and food. Part I contains histories of border flowers; (greenhouse flowers, shrubs, climbers, including roses, and alpine plants have been omitted). Part II covers a few of the decorative aromatic herbs. She "has attempted only to present the more familiar of our flowers in their historical and human relationships". Part III contains short biographies arranged chronologically from Theophrastus in Classical Antiquity to Reginald Farrar in the Twentieth Century. The section includes 29 authors who wrote of gardening, with a short history of gardening in each era: Antiquity, Dark Ages, Renaissance, Evolution of the Flower Garden—Seventeenth Century, Nineteenth Century Development, and the Twentieth Century. The book concludes with a comprehensive bibliography segregated as to general works, notable monographs, and serials, periodicals and works of reference. There is an "Index of English names differing from the Latin", that serves as an index to the text which is arranged alphabetically by scientific name.

Upon reading the plant histories, one realizes that Miss Coats has used all her references thoroughly and has given an astounding amount of information about each plant. The three pages devoted to Pelargoniums and Geraniums cover almost as much ground, omitting cultural aspects, as a book on the subject. Eight and a half pages are given the Primula, most beloved of British flowers.

The type of information given for each flower comprises technical name, history of origin and native habitat, early history and uses, garden varieties mentioned in old herbals, and interesting anecdotes about the plants.

Old names for the Primula were *Arthritica* and *Herba paralysis*, because the plants were held to be "profitable both for Palsie and pains in the joynts". In the six pages on the Anemone are discussed *A. hepatica*, *A. japonica*, *A. trifolia*, *A. elegans* and *A. pulsatilla*. However the scope of information given by the author is too great to be indicated in a brief review. In addition are 16 lovely illustrations reproduced from the classics, 8 in color.

A beautiful copy of Parkinson's *Paradisi in Sole. Paradisus Terrestris*, London, 1629, may be seen at the UCLA Library, Department of Special Collections.

DORA M. GERARD

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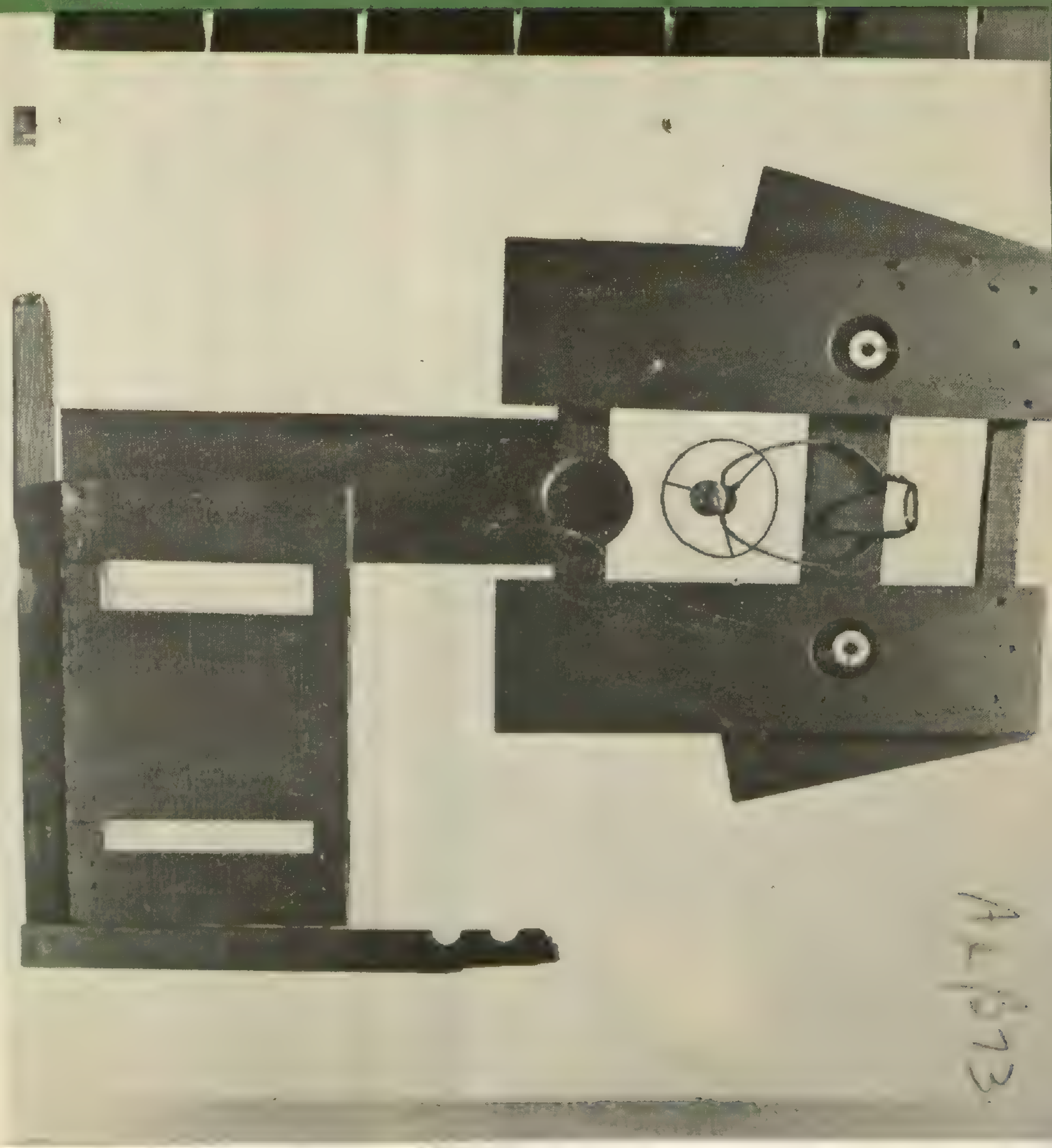

SUMMER 1958

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HORTICULTURAL TECHNICAL TRAINING TOWARD THE FUTURE

J. E. REPTON, Esq., F. Inst. P.A. (S.A.)
Deputy Director of Parks and Recreation
Pretoria, Union of South Africa

Mr. Repton's article crossed our desk at a most opportune time. It is quite appropriate for this issue in which we attempt to summarize the Arboretum's educational program; however, it is even of more interest as the Arboretum assumes responsibility of the Descanso Gardens and contemplates the beginnings of a Professional School for Gardeners.—Ed.

ONCE MORE we have reached a milestone and it is fitting for us to pause for a moment and look back on the road traversed and ponder on what is to be the future of horticulture in this country.

In other professions such as Medicine, Engineering, Law, we have long respected the evidence of their learning, and throughout most walks of life those callings which have come to be regarded as professions, base their standards on qualifications obtained by examinations only after close application to the study of their work. Without qualifications indeed, practice in most professions is not permitted.

The effect of this is profound, upon the standard of attainment, upon the prestige of the profession, upon the services rendered and upon the remuneration commended.

There is therefore, merit in a system which produces such results and it is worth while observing that this system has a very long history and is established practice.

The necessity of obtaining the best equipped personnel for the purpose of Parks horticulture is a problem needing our urgent attention.

That the necessary facilities to employing authorities to encourage their staffs to qualify by taking appropriate professional, technical and administrative examinations are available. Recruits to local government, public works and other public bodies should be given to understand that those facilities are or will be made available and they should be given every opportunity of rendering themselves eligible to progress in course of time to the higher posts.

It is necessary to ensure that the standard of local government service and particularly Parks departments will at all times be commenserate with the duties which that service is called upon to perform.

By these means the Institute and its members will be assisted in their educational endeavours and become fully recognised for what they stand, a body of men trained to undertake the responsibilities of all public horticultural works, in the fields of the practice of horticulture, the design and construction of public Parks and open spaces, and their administration.

This leads to the question "Are qualifications worth while?" Who heard of a town Engineer, Town Clerk, Medical Officer of Health being appointed to a position who did not hold a professional qualification? But how often do we hear of Superintendents and other senior officers of a Parks Department being appointed who hold no recognised qualifications. More frequently, I am afraid, than those who do. And what is the result? A lower status.

I do not want to go into details and pro's and con's of examinations and diplomas, but I am going to say emphatically that it is the only system in any profession by which a man can be judged by laymen as to his knowledge of the work. . . .

. . . Directors and other qualified men of the Public Parks profession should let their voices be heard and not accept an unsatisfactory situation which would not be tolerated in any other profession. They have earned their right to attack by long hours of study and expenditure of finance in gaining their coveted qualifications, which should be made

really worth while; and so that eventually men may be appointed solely by virtue of their standard of attainment.

I say this because I genuinely feel that it is time adequate recognition should be given to the qualified Parks officer and the status of the Public Parks profession be raised and acknowledged. . . .

Efficiency in the occupational world does not depend only on intelligence, or physical stamina, or qualifications; it depends also on a person's ability to adapt himself to existing conditions, and moreover to changing conditions. It depends on his ability to associate with other people, to apply new ideas and innovations.

The well known philosopher Kahlil Gibran once said "Your greatness lies in the struggle not in the prize." And so the will to work, to reach to an ideal has carried him over the obstacles and disappointments.

Mr. A. J. Mellor, said recently at a management school, "Managing a department or business is more difficult today than it has ever been. It has never been necessary, as it is now, for the mind of the director or superintendent to be able to encompass such a wide and involved range of factors in making his decisions. If ever the task of management called for men of outstanding ability, that is the case today, and it is a fair assumption that it will do so even more in the years ahead.

What of those directors of the future?

One of the consequences of a shortage of a trained personnel in an expanding national economy is that an organisation is obliged to lower its standards of employment in order to fill the many positions falling vacant and therefore to appoint people to positions for which they are not really suited or qualified. The result is that people so appointed are grossly overpaid in terms of their real worth, and the continued employment of unqualified personnel in jobs leads to disaster for any undertaking. . . .

We must make the best use of the existing local material, and that means we must accept our social responsibilities as directors and horticulturists and spend money on the selection, education and training of employees. We must do so not in a spirit of charity but because it is a first-class investment to develop our human resources.

This leads to the question of the lack of adequately trained personnel. Whenever horticulturists gather they have at least one thing in common, a grouse on the scarcity of the true exponents of the craft, and public Parks probably suffer more than most in this scarcity.

The difficulty of obtaining the right type of boy to be trained is firstly due to the lack of knowledge of what horticulture implies and the opportunities that are available for advancement in this sphere, secondly an inherent love for gardening and nature appears to be lacking in modern youth. Thirdly a basic factor in this shortage of suitable entrants into horticulture and the relatively low recruitment of the better educated youth is due to

(i) the relatively small monetary reward during training,
(ii) the difficulties encountered by the pupil with ability to obtain professional status,
(iii) the attraction of jobs of the "collar and tie" variety which are sometimes regarded as enhancing one's social standing in the community. . . .

It is necessary to recapitulate upon the urgent need for recruiting and training our own men of the right type and the obvious advantages of a pupilship scheme on a national scale, although deploring that a national scheme of training seems as far off as ever. Parks Departments now bear a very heavy obligation to supply necessary trained men for themselves, and a very high minimum standard is essential.

It is of course, only the really large departments capable of employing upwards of half-a-dozen pupils, who are able to adopt a really successful training programme. How many departments can fulfil all the requirements in respect of adequate training facilities. I would venture to say *very few*. . . .

The training provided by many is most inadequate and consequently many good pupils are being deprived of what is their right and will be no ornament to the profes-

sion through this lack of proper training, and not really through any fault of their own. . . .

There can be no efficiency unless there is pride in work well done.

All the preceding leads to one end only, how can this very complicated national problem of training be remedied? How can large and small departments alike support a common standard that the profession can and will honour.

A very deciding factor regarding low work standards and slackness is that if men in authority do not possess the necessary qualifications and sense of obligation to youth, how can they expect to exert their authority in the interests of everyone and everything and particularly in the training of youth.

Other causes of the problem can be traced to:

(i) lack of proper facilities for necessary training thereby causing low standards of work, lack of or poor tools, foremen in charge who have not the necessary qualifications thereby causing disinterestedness.
(ii) too severe discipline or lack thereof which can be over done.
(iii) lack of consideration for staffs regarding small but important details, such as working conditions, poor organisation, etc.
(iv) favouritism this can be a very big factor in causing discontent and lack of interest.

To put is strongly, many of those in authority think on these lines, "I am allright, why worry about others."

Now the whole problem of the existing conditions for the training of young horticulturists can hardly be described as satisfactory. The reasons for this are so important and perhaps so little understood by many of as to demand *the attention* of all those who have the interests of horticulture at heart.

Horticulture as a profession lacks unity. The various branches such as Public Parks, Public Works, S.A.R. & H., Commercial gardening and nurseries, Div. of horticulture, Training Colleges, Forestry, work in watertight compartments and have few contacts with one another.

Thus Public Parks tend more and more to be concerned with their own affairs, commercial growers as a whole have little interest in the training of gardeners, despite the fact that the prosperity of commercial horticulture is bound up with the proficiency of its workers : Div. of Horticulture staffs normally are little in touch with Public Parks, and from an educational point of view, they are mainly concerned with the dissemination of new scientific knowledge and research and not with the training of horticulturists.

In view of this disunity it is not surprising to find that there is no general policy in regard to training and that such facilities as do exist are scrappy and inadequate.

The existance in horticulture of highly specialised branches is natural and desirable. It should be recognised, however, that specialist establishments cannot provide the *broad initial experience* which is the best foundation for a horticultural career.

The composite nature of horticulture is one of the important factors which bear on this question of training. The other is the rise of scientific horticulture. The lack of certain training facilities may be a consequence of the great progress made in horticultural science in the last two decades.

Scientific methodes are, very properly, displacing rule of the thumb, and at the same time a host of new methods, new materials and new machines is replacing earlier simplicity. One may ask whether these complexities will result in better plants and better gardeners. The answer is that whether they will do so will depend on *training*. This is where the rub comes.

Most young horticulturists have little hope of acquiring the new knowledge unless an adequate training scheme can be evolved. . . .

There is reason to hope that a determined effort could and will be made to organise horticultural education on a scale and with a method that will ensure a steady flow of *well* trained horticulturists into public as well as commercial horticulture.

Only by co-ordinating and extending training facilities throughout the country will progress be maintained and the status of horticulture be improved.

I again stress that in co-operation, and co-ordinating our efforts throughout the country lies success.

I am pleased to report that considerable progress has been made during the past year in the existing N.T.C. courses. We have been most successful in finalising the establishment of a new Diploma Course in Parks Horticulture and Administration, which I hope will be a success commensurate with the amount of work put into it by the sub-committee. I sincerely trust that sufficient students will be forthcoming to enable the course to be run this year.

Much remains to be done to further the cause of horticulture in this country. I am convinced that nothing but the establishment of adequate training throughout the parks departments capable of doing so, secondly the establishment of a national horticulutral pupilship scheme, thirdly the establishment of suitable correspondence courses in both N.T.C. and the Dip. Horticulture and Parks Administration, and fourthly the urgent necessity for the establishment of a National Training Centre or College in Horticulture for a two years course can solve this problem and make good the deficiency, and give pupils the opportunity of obtaining scientific training in this country.

The problem of the establishment of a training centre in Horticulture is one that calls for urgent attention. With the establishment of the Horticultural Research Station at Roodewal, Pretoria by the division of Horticulture on a scale which will make it one of the biggest research stations in the southern hemisphere in the near future, and the excellent progress made with Botanical Gardens at Silverton, Pretoria by the Division of Botany, this problem seems to me to be nearer solution. . . .

On analysis it is obvious there is little hope that any Parks department can wish for an immediate capital gain by assisting in the training of a pupil other than the obvious gain of having the labour of a keen eager man as he is training.

Raising the current standards and providing all-round training must raise the average future abilities of horticulturists and administrative horticulturists so that all will gain in the long run and small authorities will have a fair share in place of gleanings because it will be experience and training and not reputations and influence which will determine progress.

Finally, there is the wider aspect of the subject which should not be overlooked. The training of gardeners or horticulturists is a far bigger thing than ensuring a supply of craftsmen for a particular trade or profession. The land does not merely supply food for our bodies, it is an indispensible instrument of education in the broadest sense. The destiny of our nation and the welfare of our people are both dependent on a wide appreciation of this fact. If we are to profit by our experience we must see to it that horticulture, is equipped to meet the needs of the future and that when a job has to be done the trained man is there to do it. . . .

In conclusion may I mention the message given by Michael Faraday (1853) to the youth of all times.

"Study science with earnestness—search into nature—ellicit the truth—reason on it and reject all which will not stand the closest investigation: Keep your imagination within bounds, taking heed lest it run away with your judgement. Above all let me warn you young ones of the danger of being led away by the superstitions which as this day of boasted progress are a disgrace to the age, and which afford astonishing proofs of the vast floods of ignorance overflowing and desolating the highest places."

CALIFORNIA ARBORETUM FOUNDATION, INC.

As the California Arboretum Foundation looks forward to a new fiscal year, our membership may be interested to learn of the achievements of their organization over the past twelve months.

The following paragraphs summarize the highlights of a most interesting and profitable period in the history of the Foundation.

The new officers elected to lead the Foundation activities are: President, Robert Casamajor; First Vice-Pres., Ralph Cornell; Second Vice-Pres., Mrs. John R. Mage; Treasurer, Howard A. Miller; Secretary, George H. Spalding.

Dr. Mildred Mathias, Mrs. Valley Knudson, Roger Jessup, Howard Bodger and Dr. Elmer Belt were chosen as new members of the Board of Trustees.

The total Foundation membership is now 620, including 159 new members this year.

Sales of items sponsored by the Foundation proved to be very successful:

Queen Anne Brochures	$457.26
Post cards	838.45
Slides	332.92
Peacock feathers	239.09
"Your First Orchids and How to Grow Them"	76.70
Herb Charts and Herb Recipe Books	986.87
Tarzan post cards	50.00
Viewers of Queen Anne, Lagoon and Peacock	44.00

Non-monetary gifts to the Foundation by private individuals included: books, pamphlets, bulletins, prints, plants, trees,

Dr. Frits W. Went admires a cypripedium orchid plant given as a bonus plant to California Arboretum Foundation members at the Annual Membership Meeting, May 20, 1958. In line for their orchids are, (left to right): Mr. Milbank McFie, Mr. Thomas E. Gibbon, Mrs. Rudolph J. Richards and Mrs. Howard Cunningham.

numerous natural and polished specimens of petrified wood, power sprayer and other miscellaneous items. The total value of such gifts was $4,243.85. In addition, donations of orchid plants were received, with an estimated value of $37,262.50.

A total of 97,185 persons accounted for 1,767 "Jeep Train" tours of the Arboretum. Income from the donation boxes on the trains amounted to $4,143.05. This money is used to purchase the trains and pay for their upkeep.

The use of the Arboretum grounds for motion picture and TV locations for such productions as: "The Hoods Take Over", "Navy Log", "Border Patrol" and "Prehistoric World" added $1,450.00 to the treasury.

The Foundation set up a restricted fund of $500.00 to purchase rare books for the Arboretum Library.

This year saw the establishment of the Dewey Nelson Memorial Fund, to be used for continued restoration and improvement of the Queen Anne Cottage. Additional donations to this fund will be most welcome.

The following is a list of the many restricted funds now being administered by the Foundation:

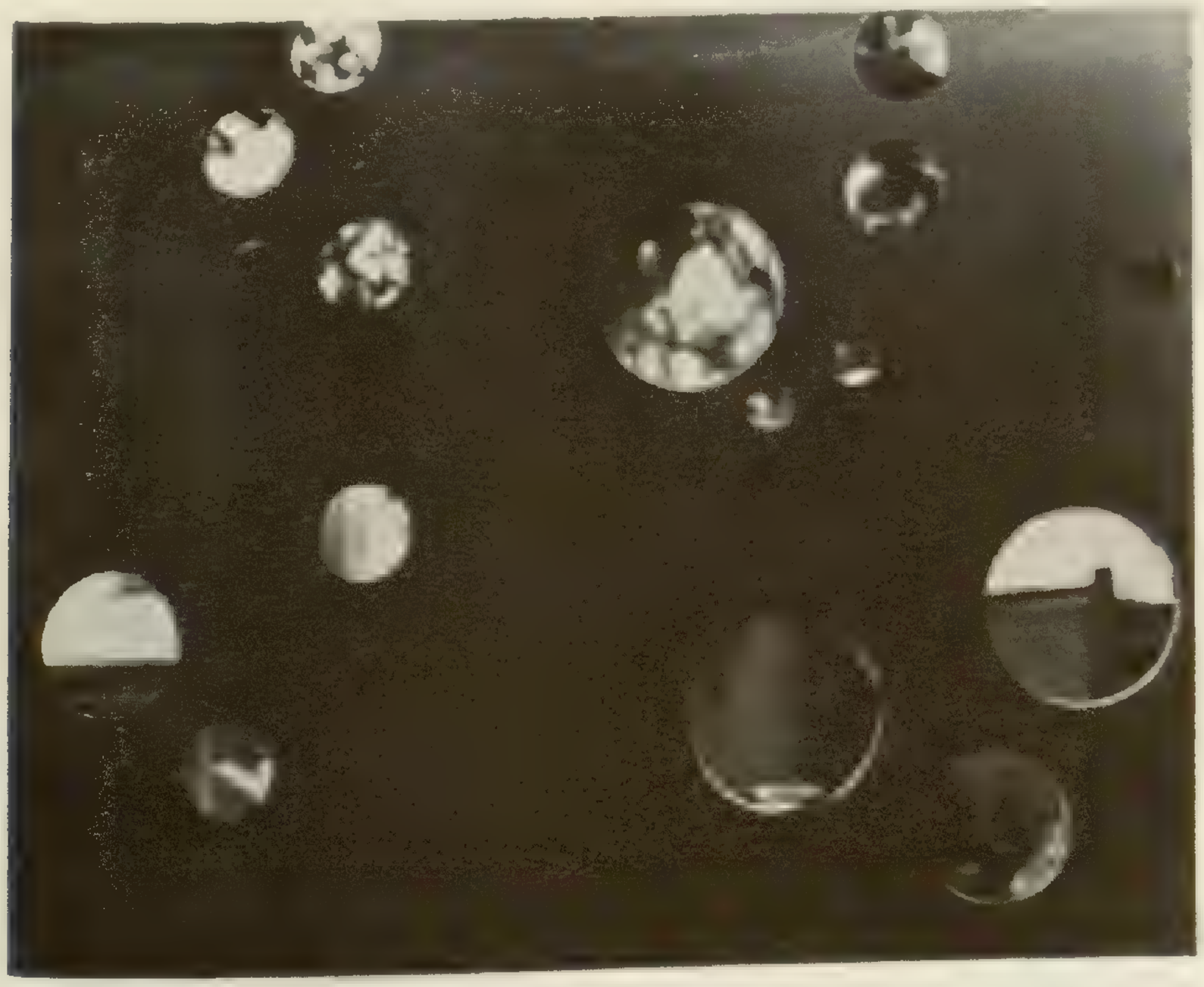
Trees
Research
Herb Garden
Longwood Foundation
Publication
Palmdale Test Plot
Dewey Nelson Memorial
Library
Garden Court — Los Angeles Chamber of Commerce
Historical Committee
Richfield Oil Fund
Endowment Fund
Douglas Memorial
Demonstration Home Gardens
Phenix Greenhouse
Garden Tour Fund
Hugo Reid

The total monetary value of these various funds amounts to $15,954.62.

District 12 of the California Garden Clubs, Inc. donated a continuous playing tape recorder to be used in the Fragrance Garden.

The Pasadena Garden Club has voted to sponsor the landscaping around the Hugo Reid Adobe when the restoration is completed.

And finally, probably one of the most spectacular events of the year was the opening of the new Demonstration Home Gardens to the north of the Administration Building. The California Arboretum Foundation, Inc. co-sponsored this project



A. Swiss cheese maybe?

with Sunset Magazine. More than 9,000 visitors toured these gardens during the first three days.

OBJECTIVES IN THE COMING YEAR:

1. An orchid display greenhouse.
2. A tropical water pool.
3. Support for fellowship research on plants.
4. Contributions for the Library.

MRS. LEE WRAY TURNER
Executive Secretary

A DIFFERENT LOOK AT EUROPEAN HORTICULTURE

PHILIP A. CHANDLER

ONE COULD REMINISCE on such spectacles as visits to Chelsea Show, a must in any tour of Europe. The fortnightly flower shows of the Royal Horticultural Society, where this writer was fortunate to see the fine exhibit of *Rhodendendron sinogrande* from S. W. Scotland at the Rhododendron Show. Then one can never forget the masses of rhododendrons towering to 40 feet height in full flower at Killerton House in the West of England. The extensive collections of rhododendrons and magnolias at Caerhays Castle in Cornwall, where many of the original plants collected by George Forrest in China are now to be seen in their full glory. The miles of rhododendrons at Exbury, a name long associated with this genus. The blue of *Meconopsis* × *Sheldonii* at Bodnant, North Wales, and the scarlet of *Embothrium coccineum* at Penryn Castle in the same area.

Then who could forget the time spent at the Keukenhof, Holland, the show place of the Dutch bulb growers, especially when one was fortunate to visit this fine garden when the daffodils, early tulips, hyacinths and other early spring bulbs were at the peak of perfection together. These are only some of the highlights of a trip taken in the spring of 1956, the best time of the year to visit the gardens of Europe.

Then like the majority of tourists who are interested in horticulture, visits to Kew and Wisley and other well known gardens were on the list of places visited.

This writer is very familiar with many of these places, especially Kew, having been a student there at one time, also one's birthplace. It is, however, a discussion of other types of horticultural establishments, where it appeared that new ideas along with a dynamic approach to problems of horticulture that were being developed and put into practice that is of interest at this time.

Having had the opportunity to meet with a number of prominent English growers who have visited this country the last few years on Kellogg Foundation Scholarships it was interesting to see their own establishments. Among these the visit to Frampton's Nurseries in Sussex stands out, again meeting Mr. Jack Matthews, director, who was in this country in 1953. Apparently Mr. Matthews returned from his trip to this country with such a positive attitude in the approach to problems of the day, that this organization has gone ahead with the latest of ideas.

This firm has been one of the leaders in the development of the mobile greenhouse. This idea of moving greenhouses from one crop to another growing alongside may have in the minds of many appeared in the realm of fantasy a few years ago. But in England and other countries of Europe it is a practical approach to a problem of utilizing greenhouse facilities to the fullest. For example, the mobile greenhouse can be moved from a crop of tomatoes finished in August to a crop of early flowering chrysanthemums, later, when these are finished, to a late crop of chrysanthemums, still later back to cover a crop of freesias in boxes where the tomatoes were originally. Moving of the house is carried out with the use of runners on tracks and a winch. This firm has also been one of the pioneers in England of the all year round production of chrysan-

themums, an American idea that is now spreading in Europe. Old time growers indicated that there would be no market for chrysanthemums the year round in England. How wrong this thought was is slowly being realized by others. But it is pioneers of new ideas and practices who realize the profits.

Plantsmen do not have to restrict their interest to those plants with chlorophyll. For those that like mushrooms, and who do not, the production of them by modern methods should be of interest. This is even of more interest when a crop of 9 million pounds a year is produced by one organization, Linfield's, Thakeham, Sussex. On this 1000 acre farm, the cycle begins with the growing of cereals and fodder crops which provide food for the annual output of 5000 bacon pigs and straw for littering down. The litter along with other materials is composted for the growing of the mushrooms. The compost yard, despite the smell, being a model of efficiency, with two large machines each capable of turning over 250 yards of compost a day. When ready the compost is placed in wooden trays, the only hand operation in the whole scheme, then they are cured by steaming, spawned and covered with sterilized soil, transported by fork-lift tractors right into the houses where they are grown. Five to seven crops a year are taken out of each house. Finally, the spent compost is used on the land, also in the greenhouses for roses and orchids.

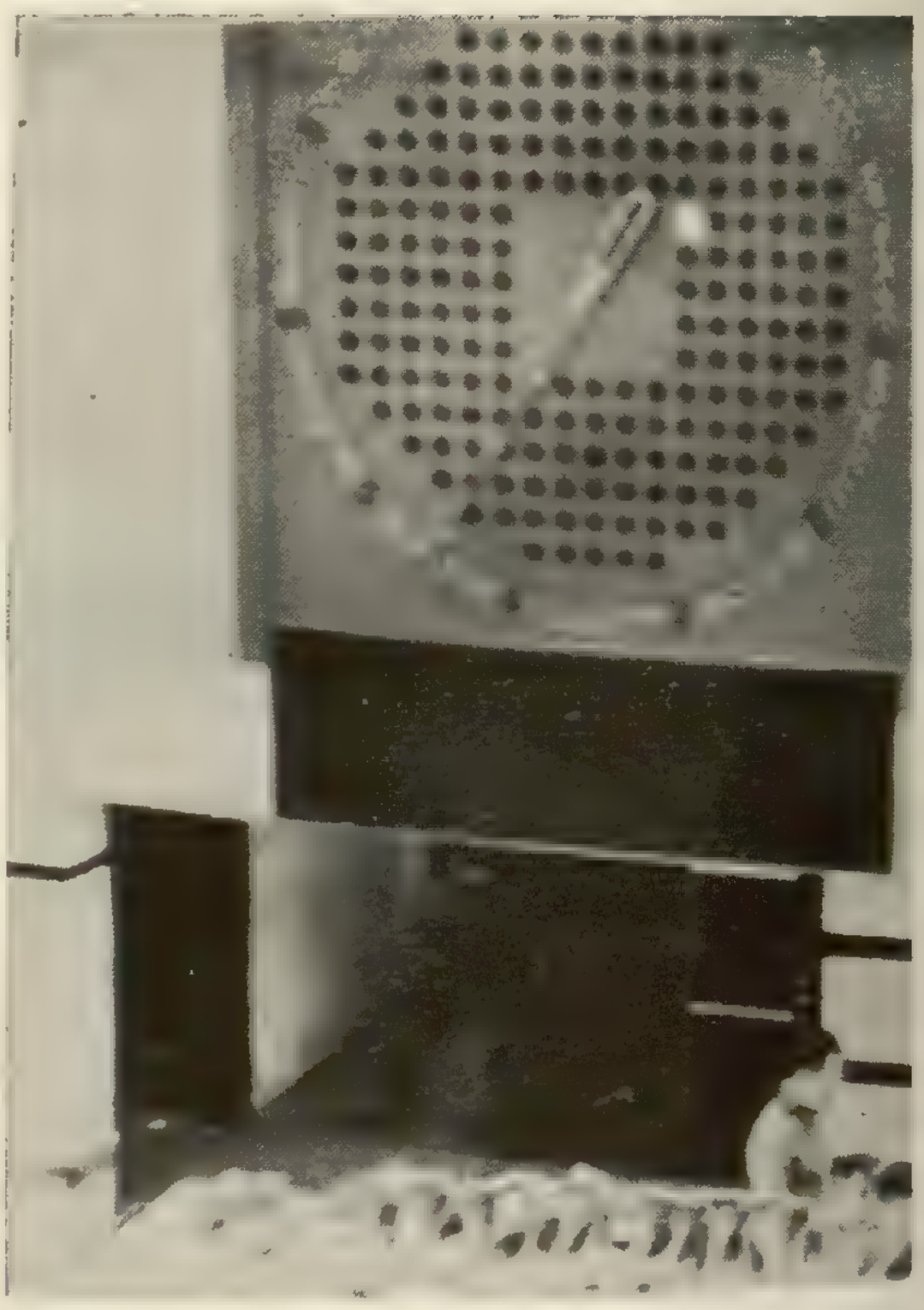
In talking with a number of commercial growers in England it was evident that any visit to Europe would not be in any way complete without seeing the horticultural enterprises around Odense, Denmark and some of the commercial growers in Copenhagen, notably K. Stormly-Hansen.

Mr. Stormly-Hansen, or "Stormly" as he is soon known to any one who meets this dynamic personality is one of Europe's largest growers of carnation cuttings. Readers may question what is unique about this fact, the quantity produced, surely not, for quantity alone in anything should not be a criterion. In this case although the quantity cuttings produced yearly is very large, the quality and the methods by which this production is achieved and the business acumen behind the whole effort are something to remember. This firm is unique in that it produces no flowers for the market, the only plants that are allowed to flower are clones of varieties for further selection of better types and a very limited quantity of each variety so that customers can see the new varieties. The production is carried out along the well founded scientific methods developed both in Europe and this country, with the use of mother-block plants all grown from cultural cuttings. These plants are tested and indexed for disease by culturing basal sections of each cutting on agar for fungus diseases such as *Fusarium* and other sections on broth for bacterial wilts. Dr. Hellmers of the Royal Agriculture College, Copenhagen and Dr. Bob Holley of Colorado have been of great help in this program. Strangely enough, carnations are one crop where American varieties predominate in Europe. This modern approach to the production of pathogen free selected stock is carried out in the latest designed greenhouse, which are cooled in the summer, for year round production. One would think cooling is hardly necessary in Denmark, where days of temperature over 80°F. are very few, but with this establishment everything is being done to improve production. Hence, these facts, along with proper cool storage of rooted cuttings, can provide plants at all times for the European market which includes Finland in the north to Italy and Spain in the south. Here again, certain small points in the over-all operation bring out the excellent thoughts that go into this management. The smocks that the girls wear in the production houses are of a different color from those worn by the staff in the propagation range. No mixing of the crews being permitted, an essential practice in a program of producing disease free stock.

The uniqueness and dynamic approach to business does not stop with the production of cuttings for the market, for this grower also helps popularize the use of carnations to the fullest. How is this done? One of the ways in which Mr.

Hansen accomplishes this, is quite novel. During July and August, the main tourist season in Copenhagen, also the time when gluts of carnation flowers occur, he arranges with the other growers for the surplus flowers to be used in the public rooms of all the boats that cross to Malmo, Sweden. Also for a small bouquet in the taxis that ply the streets of the city. A small unobtrusive tag is attached to each flower with the name K. Stormly-Hansen. Many readers, I can visualize, will have ideas where similar methods can be used to brighten our lives, especially in California.

Odense, the birthplace of Hans Christian Andersen, is also the center of the agriculture production of the Isle of Funen, Denmark. Crops range from cereals, fruits and vegetables to a complete selection of greenhouse products. Denmark is the home of modern ideas in the use of decorative foliage plants. However, it is the co-operative market that impressed the writer, even more so than the one at Aalsmeer, Holland. Even a rainy, dull day could not hide the efficiency and cleanliness of this wholesale market, with adequate parking, well organized offices and cafes. Similar to other markets in Europe, the produce is sold by the use of the electrical auction clock. First, the buyers can view the produce that is for sale whether it be vegetables, fruits or flowers in well lighted warehouse areas. The actual selling takes place in a theatre like room with each qualified buyer having his own seat with an electrical button with which to stop the clock. The auctioneer sitting in a projection-like booth operates the clock and the flow of produce on electric carts to the auction floor. Unlike most auctions in this country the price on the clock starts at a higher figure than the expected item is likely to bring and then moves downwards at a constant speed until one of the buyers presses his button to stop the clock and so make a purchase. This buyer then has the right to purchase the whole consignment or part. Immediately when the transaction is completed, the clock returns to the higher figure and starts downwards again. Speed of operation is outstanding.



The auction clock in operation. Note light is on in one of the positions, indicating a bid. Below the clock, is a tray of plant material on which the bid is probably being made. Picture reproduced from a kodachrome slide made by the author.

So much so, that almost before the buyer can leave his seat, his account is made up ready to settle. Further, it is a question of limited credit, for if the account is not settled by the next day or within 3 days by commission men, the buyer's button is disconnected so he cannot bid. This gentle reminder is enough. No wonder this co-operative market can run efficiently with only 5 to 8% for marketing costs.

I suppose most visitors to Holland think of the bulb fields and rightly so. At any period of the year, a brilliant floral display can be seen even closer to Amsterdam, at Aalsmeer, the center of flower production under glass. The flower auction markets here are similar to those described for Odense, except they are exclusively for flower and pot plants raised in the greenhouses in this district, where over 300 acres are under glass. A unique feature of this market is that a large portion of the stock sold arrives by small barges, with the canal leading right into the auction hall.

Of special interest is the production of

the lilac as a major cut flower. It is shipped all over Europe and even to the Eastern markets of this country. The forcing season lasts from November to June. Established plants are forced in alternate years, resting one year outside to build up strength, being pruned or pollarded back to short stubby plants each year. Breaking the dormancy to produce the earliest crops is a problem. This is mainly accomplished by subjecting the plants to extremely high temperatures, often over 100°F. for the first few days of the forcing period. Although flowers and pot plants are the prime industry of Aalsmeer, the specialty production of flower seeds of greenhouse plants is also a feature. Row after row of pot cyclamen with large, fully mature seed pods were just as interesting to see in many ways as the flowers themselves. Also, houses of freesias for seed production at the firm of Van Staveren, with bee skips in the rafters to aid in pollination, looked very attractive in full flower.

The ideas expressed in this article may be of limited value to the readers of this magazine who, no doubt, are first plantsmen and secondly the type that likes to read about plants. However, if one is a true plantsman and has a wide interest in the growing of plants we should be cognizant of all the latest ideas that are being developed in the horticultural world. The progress being made in the production of disease free plants and in the use of better types of plants in the home and landscape was the type of progress that was most interesting in this all too short trip.

Let us not only look for the so called rare or uncommon plant and landscape gardens of fame, coming back with colored slides to show others, describing them with all the glowing adjectives that we can command. But let us think of the challange the present is to us to improve our own knowledge, so we can improve our own gardens and surroundings.

B. Space rocket with long tail?

FERNS CULTIVATED IN CALIFORNIA

BARBARA JOE

WOODWARDIA

The Chain-fern or *Woodwardia* is a large, rather coarse-cut fern which is well adapted to garden culture. The common name, Chain-fern, is derived from the chain-like arrangment of the sori (fruit dots) on the back of a segment. This small genus, distributed mainly in the north-temperate zone, is represented in our ornamental flora by two species.

The Giant chain-fern, *Woodwardia fimbriata,* is a California native commonly found in the nursery trade. It is hardy and easily cultivated; once established it will withstand considerable neglect. The fronds remain green through the winter months in southern gardens and numerous new fronds appear in early spring. Moisture and shade are the main requirements of this fern. It will grow in a wide range of soils. Spore-grown plants comprise most of the trade stock; however, some plants are started from root-clump divisions.

The European chain-fern, *W. radicans,* is also of easy culture. It is not as common in the trade as the Giant chain-fern. The large, gracefully arching fronds make this species an excellent fern for display in elevated places. When temperatures begin to cool, the fronds of this hardy plant take on a purplish hue. On the midrib of the frond are scaly buds which often take root while still attached to the mother fern. Propagation is achieved by rooting these buds, by dividing the roots clumps, or by spores.

Plants of the genus *Woodwardia* have a stout rhizome which is densely covered with rusty-brown scales. The fronds, arranged in a crown, are large, typically pinnate-pinnatifid, and firm in texture. The veins are netted next to the midvein into one or more rows of areoles (meshes) and are then free to the margin. The sori are sunken into the frond in chain-like rows on each side of the midrib of the segment. The indusium is flap-like, shaped like the areole, and convex. It opens toward the midvein, and is attached to a vein of the areole.

The following key is limited to the species which are presently grown in California culture.

Fronds erect, never with buds on the midrib	*W. fimbriata*
Fronds greatly arching, often with scaly buds on the midrib	*W. radicans*

Woodwardia fimbriata Smith (*W. Chamissoi, W. radicans* var. *americana*). Giant chain-fern. Fronds erect, 3 to 9 ft. long; blades linear-oblong to oblong-ovate, narrowed at the base, pinnate-pinnatifid, without buds; pinnae very deeply pinnatifid, the tips short-acuminate. Veins with a regular row of areoles next to the midvein, beyond this first row the veins casually joining into another row of areoles or free. British Columbia to California. Hardy; of easy culture. Mostly 3 to 5 ft. tall in cultivation.

Woodwardia radicans Smith. European chain-fern. Fronds laxly arching, 4 to 6 ft. long; stipes short and erect; blades oblong, hardly narrowed at the base, pinnate-pinnatifid; scaly buds present along midrib of the blade; pinnae very deeply pinnatifid, the tips long-acuminate as well as the segments of the basal pinnae. Veins with two rows of areoles next to the midrib, beyond these rows the veins casually joining into another row of areoles or free. Europe and Asia. Hardy; of easy culture; propagates readily by buds. To 3 ft.

Other species reported to be cultivated in the United States are: *W. areolata* Moore, *W. orientalis* Swartz, *W. spinulosa* Mart. & Gal. and *W. virginica* Smith.

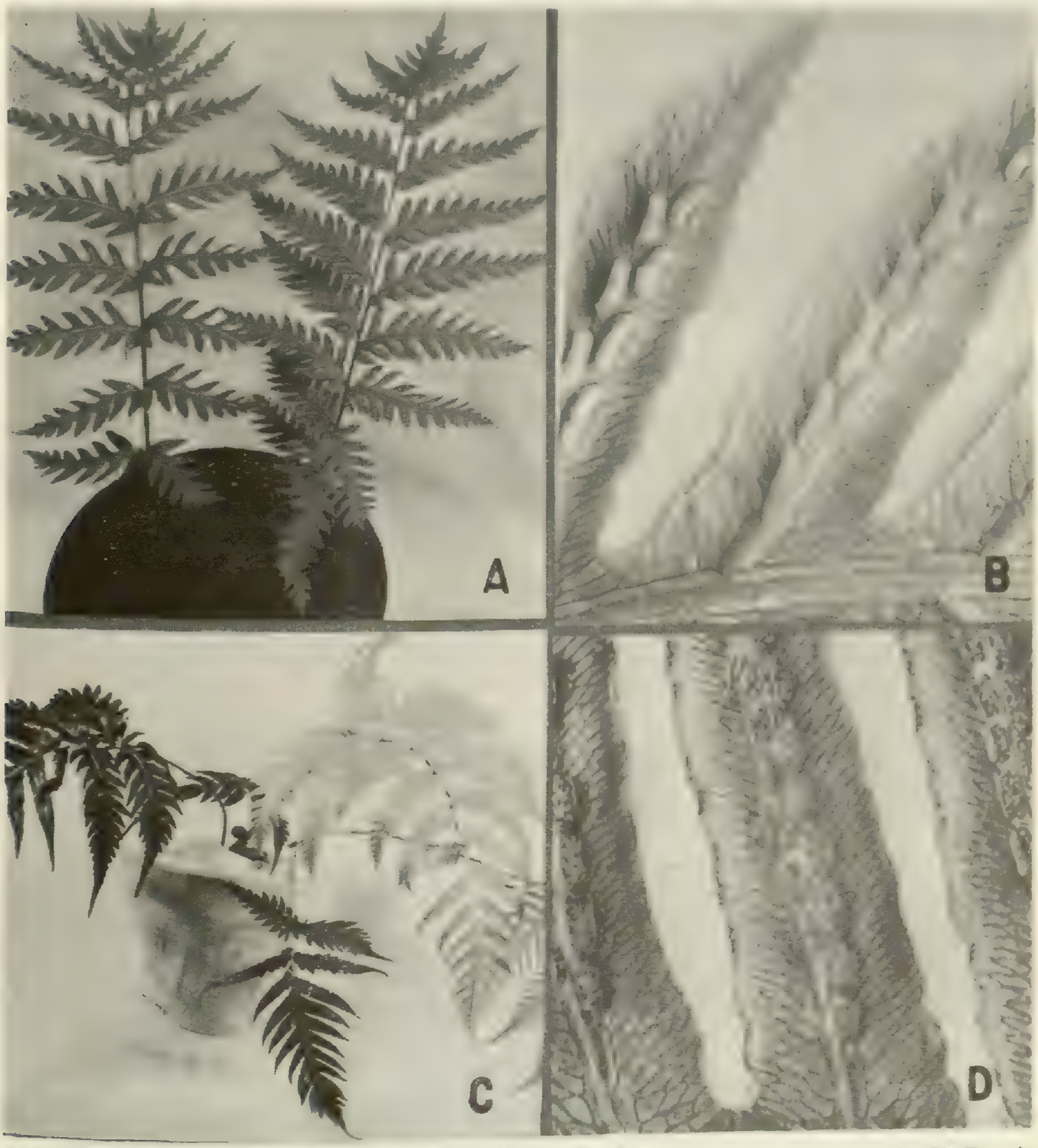
AGLAOMORPHA

Many fine specimens of large epiphytic ferns are cultivated in California. Perhaps the staghorn ferns are the most familiar epiphytes, but even more striking are the

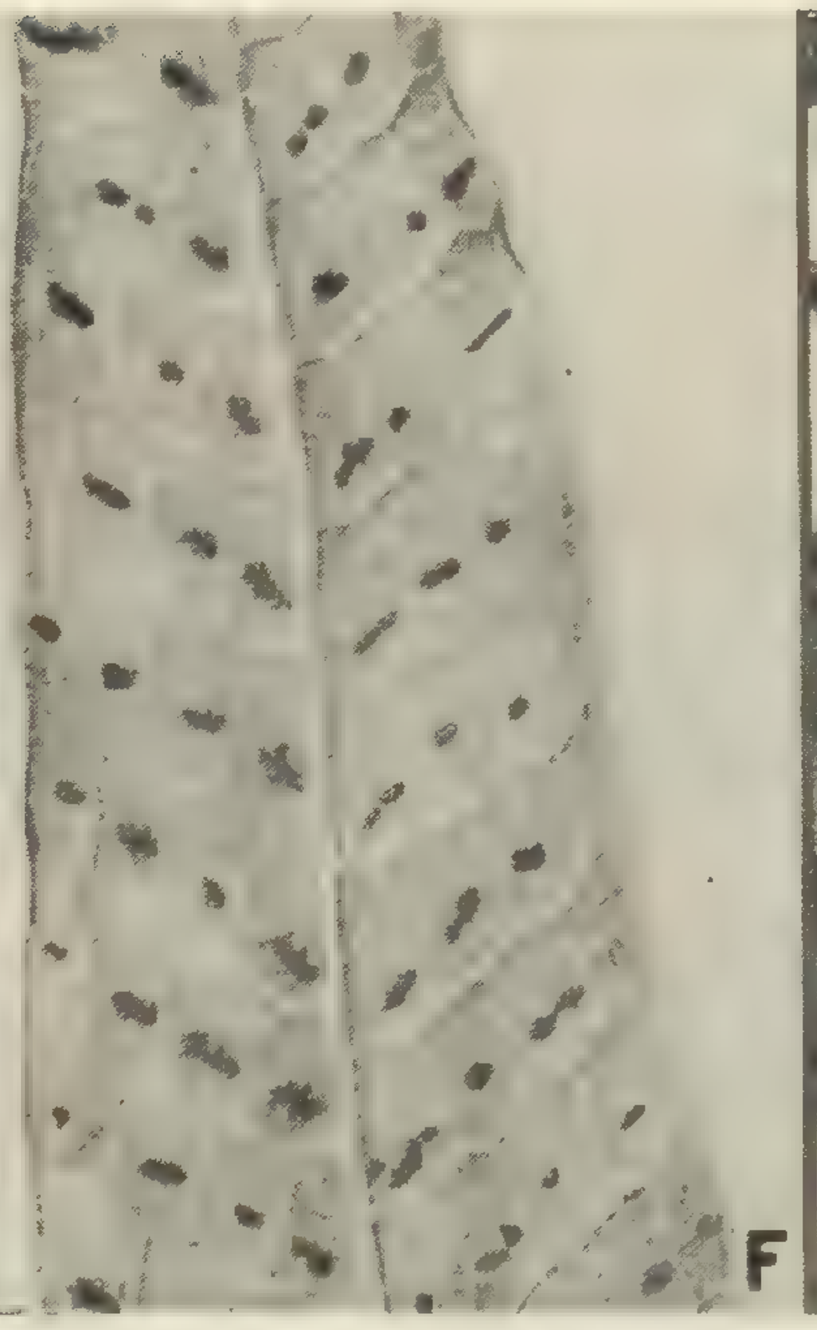
Aglaomorpha species, which are known in the nursery trade under the name *Drynaria*. These handsome ferns may form a stately spreading crown several feet in width.

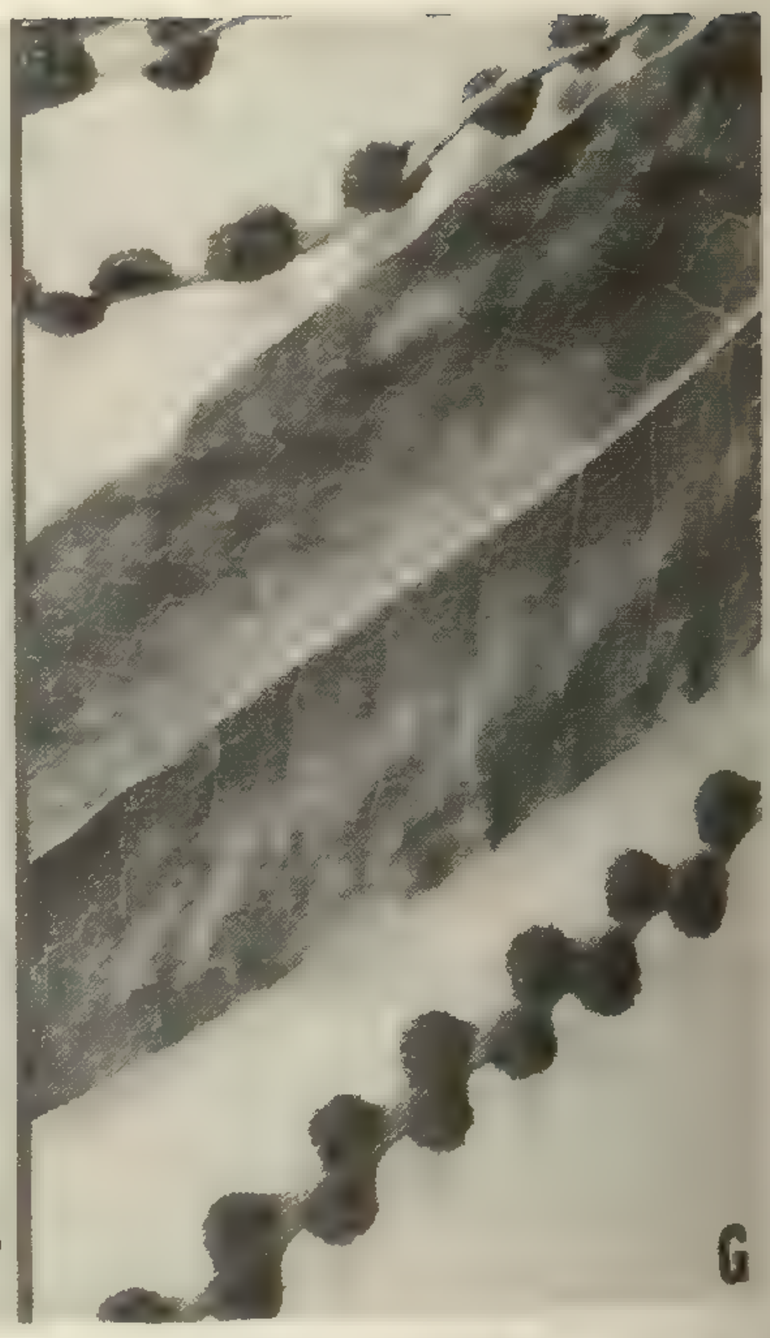
These ferns are from tropical Asia. They usually grow in trees or on rocks where bits of leaves or other debris may fall into their crowns. This debris is caught and held by the specialized bases of the fronds where it is eventually converted into humus and nutrients. The base of the frond appears brown and dead, yet above this harsh, dry area, the blade is green and foliaceous. The thick fleshy roots, which are capable of storing water, are further specializations which enable the plant to live without direct contact with the soil.

Aglaomorpha species are tender plants. Though they are seen outdoors in southern gardens, their peak of appearance and growth is reached in greenhouses or other warm shelters, where minimum tempera-



A) Fronds of *Woodwardia fimbriata*. B) Frond segment of *W. fimbriata* showing sori. C) Fronds of *Woodwardia radicans*. D) Frond segment of *W. radicans* showing sori. Compare the veination of frond segments of the two *Woodwardia* species. Photos by author.





E) Growth habit of *Aglaomorpha coronans*. Note basal portion of frond segment. F) Frond segment of *A. coronans* showing sori. G) Frond segment of *Aglaomorpha meyeniana* showing fertile segments above and below central sterile segment. Photo by author.

tures are above 55°F. Like other cultivated epiphytes, these ferns are planted in baskets or frames. However, containers hung against a wall often hinder the formation of a full crown. These ferns do equally well when they are planted in the ground, and here, they usually have more unrestricted room to form complete crowns. The surrounding soil should have good drainage and about 50 percent organic matter. Fertile fronds are occasionally produced in cultivation. Because the plants are slow growers, they are not frequently found in the trade. Propagation is by divisions or spores.

The genus *Aglaomorpha* is composed of large epiphytes. The rhizome is fleshy and covered with scales. The frond is sessile; the basal portion is shallowly lobed, and functions as a humus-collecting leaf, being dry, harsh, and brown. The upper portion of the frond is green, deeply pinnatifid into broad, lanceolate, entire or undulate segments. The surfaces are smooth; the texture is leathery. The veins are netted, usually forming rectangular meshes with included veinlets. The sori are round, elongate, or in patches, and have no indusia.

This genus is readily distinguished from all other cultivated genera by having the basal part of the frond humus-collecting and the remaining part foliaceous. Some botanists have recently proposed to divide this genus into several more genera. Formerly, the *Aglaomorpha* species were placed in the genera *Polypodium* or *Drynaria*.

Two species are represented in our ornamental flora. They may be separated by the following key:

Fertile segments like the sterile segments, not contracted	*A. coronans*
Fertile segments contracted almost to the midrib	*A. meyeniana*

Aglaomorpha coronans Copel. *(Polypodium coronans, Pseudodrynaria coronans)*. Fronds 2 to 4 ft. long, sessile; base brown and harsh. narrowing above; green portion wider than base. deeply pinnately lobed; segments linear-oblong. Sori oblong, often merging, in a single row between the main veins. Subtropical Asia. Tender. To 4 ft. Most cultivated Aglaomorphas are this species. It was long confused with *A. heracleum* which apparently is not cultivated in California. *A. heracleum (Drynaria heracleum)* has fronds 3 to

6 ft. long, the sori round, in 2 to 3 rows between the main veins.

Aglaomorpha meyeniana Schott. *(Polypodium meyeniana).* Fronds 2 to 3 ft. Like *A. coronans.* but with fertile segments contracted almost to the midrib except for small lobes which are covered by round sori. Philippine Islands. Tender. To 3 ft. Rarely cultivated.

PITYROGRAMMA

The Gold and Silver ferns are among the many attractive ferns cultivated in California. The backs of these ferns are densely covered with a yellow or white

H) Growth habit of *Pityrogramma hybrida.* I) Frond habit of *Pityrogramma chrysophylla.* J) Growth habit of *Pityrogramma triangularis.* Height of plant above soil surface is four inches. K) Frond habit of *Pityrogramma hybrida.* Photo by author.

colored powder, making them interesting garden subjects. These ferns, now placed in the genus *Pityrogramma,* have in the past been known under the names *Ceropteris, Gymnogramma* or *Acrostichum.* They are found mainly in the tropics; however, California has a native species of this genus, the California Gold fern, *P. triangularis.*

Represented in our ornamental flora are two species and one hybrid. They are the Gold fern, *P. chrysophylla,* the California Gold fern, *P. triangularis,* and the hybrid between the Silver and Gold fern *P.* × *hybrida.*

The cultural requirements of the *Pityrogramma* species are the usual ones required for ferns. The Gold fern may be grown outdoors in well-protected places or in greenhouses; even in the southern part of the state it prefers a warm location with minimum temperatures above 55°F. Because the hybrid is more luxuriant in habit and capable of withstanding lower minimum temperatures (near 40°F.), it is more frequently cultivated than the Gold fern. The hybrid grows very well outdoors through the average southern California winter. Both ferns will remain green during the cool winter months in southern gardens, but will look their best in the spring and summer months. They are quick to establish themselves after transplanting and are known to produce many volunteers from their spores.

The hardy California Gold fern which ordinarily curtails its growth during the dry months in its native habitat, will stay green throughout the year under garden conditions. It may tolerate strong indirect sunlight, and does not require as much humidity and water as the other two ferns. Relatively common in the nursery trade, the ferns are received as dormant clumps, which are subsequently planted into containers. The difficulties encountered in keeping the nursery stock in presentable condition may most frequently be traced to over-watering or poor drainage. Not only will aeration be impaired, but the development of various molds and rots will be encouraged by the resulting cool, moist conditions associated with dead or injured vegetation attached to the clump.

The genus *Pityrogramma* is terrestrial, natively growing in rocky woods or on banks. The ferns are small to medium in size. The rhizome is scaly, and erect or short-branched. The stipes are stiff, dark and polished. The fronds are crowded, one to three time pinnate, ovate to deltoid-pentagonal in outline with abundant white or yellow powder on the lower surfaces, herbaceous to subleathery in texture; the veins are free and forked. The sporangia (fruiting bodies) are borne along all the veins, and are not covered by indusia.

Because *Pityrogramma* species hybridize readily both in nature and under cultivation, the exact species determination may be somewhat difficult. The only white-backed *Pityrogramma* presently known in California culture is a variation of the California Gold fern. The following is a key to the cultivated species in California:

Fronds deltoid-pentagonal in outline, mostly 8 in. or less long	*P. triangularis*
Fronds ovate-lanceolate to narrow-triangular in outline, 1-2 ft. long	
Margins of the segments mostly double serrate-dentate, hardly revolute	*P.* × *hybrida*
Margins of the segments entire or obscurely dentate-crenate, usually greatly revolute	*P. chrysophylla*

Pityrogramma chrysophylla Kaulf *(P. calomelanos* var. *aureo-flava).* Gold fern. Fronds recurved; stipes as long as the blades; blades narrow-triangular, bipinnate-pinnatifid, long-acuminate at the tips; margins entire or obscurely dentate-crenate, revolute. Tropical America and tropical Africa. Tender. To 2 ft. Rarely cultivated.

Pityrogramma × *hybrida* Domin *(P. calomelanos* × *chrysophylla).* Much like *P. chrysophylla* except the blades longer and wider, segments fuller, margins

mostly double serrate-dentate and hardly revolute. Semi-hardy. To 2 ft.

Pityrogramma triangularis Maxon. California Gold fern, Gold-back fern. Fronds erect, deltoid-pentagonal, pinnate to bipinnate; lowest pair of pinnae unequal, bearing longer pinnatifid segments on the basal side. California to Alaska. Hardy; tolerant of strong light. To 8 in. The relatively small, broad-triangular fronds with the yellow or sometimes white powder on the underside separates this species from all others in local cultivation.

Other species reported to be cultivated elsewhere are: *P. calomelanos* Link, *P. Laucheana* Koch., *P. sulphurea* Maxon and *P. tartarea* Maxon.

CYPRIPEDIUM ORCHID CULTURE

GLENN HIATT

This outline was prepared for distribution to the California Arboretum Foundation, Inc. members receiving a cypripedium orchid plant at the Annual Membership meeting, May 20, 1958.

HABITAT: Native to Tropical Asia, Malaya and nearby islands. There are two types; 1) solid green leaves found at high altitudes, and 2) mottled green leaves found at lower altitudes. All are subject to abundant rainfall and reasonably cool temperatures. All grow on an accumulation of decaying vegetation on ledges or in crevices of rocks, partially shaded by overhanging cliffs or trees.

CULTURE: Solid green leaved type.

Location

1. Lath house, under trees on sloping ground or raised beds.
2. Leave plants in pots and sink pots in ground, leaving rim of pot exposed.
3. Place about three inches of pea gravel under pot for drainage.

Light

1. Shade throughout the year, slightly more in summer than winter.
2. Intensity of light should be only about 10%-15% of direct sun light.
3. Foliage should remain dark green color throughout year.
4. Too much light stunts growth and causes yellowing of leaves.
5. Not enough light retards flowering.

Temperature

1. Optimal growing conditions at 54°F. minimum night temperature and 70° F. maximum day temperature.
2. Plants will tolerate as low as 35°F. without detrimental effect.
3. Too low night temperature slows growth—plants turn yellowish-green.
4. Move plants into garage or home at night if temperature drops below 35°F.

Humidity

1. Spray overhead three to four times daily during warm weather if possible.
2. Alternative to daily spraying—keep plants near ground level and away from dry breeze. Place among ferns, begonias, fuchsias, etc.

Watering

1. Growth is continuous, so potting medium should never dry out.
2. During bright weather, water about twice each week.
3. Leach compost with copious watering.

Feeding

1. Food in compost will maintain proper growth if all other factors are watched.
2. Weak liquid fertilizer may be added once per month to healthy, vigorous plants.

Potting

1. Pot soon after flowering if compost has decomposed or if plant is crowding pot.
2. Compost should be loose and well drained, such as leaf mold, palco wool, german peat moss, fine sand,

and sphagnum moss, mixed in equal proportions.
3. Divide to not less than three growths. Larger plants flower better.
4. Do not over-pot. Leave space for about two new growths to edge of pot.

Pests

1. Slugs and snails should be controlled with bait.

Flowering

1. Plants will flower during winter, so may be taken indoors to bloom and also protect from cold. Do not leave indoors during entire year.
2. Flowers should last from four to eight weeks indoors and up to three months outdoors if protected.

Arboretum Orchid Specialist

WHAT'S THE COMMON NAME?

CATHERINA WENT

The vernacular names recall inestimable memories.
The Latin name may recall the plant—
but not its dearest associations.—JOHN EARLE.

THIS QUESTION, more than any other, interrupted the Home Landscaping Class when the students were introduced to plant materials. That not all plants had a common name and others had many, was not much help. As the eager members of the class discovered more and more plants which would fill their specific needs, the frustration brought about by their unfamiliarity with Latin names and the resulting reluctance to use them, mounted. Spelling was a problem too, but handing out mimeographed lists of the plants to be discussed largely took care of this aspect. The introduction of scientific botanical nomenclature was one that required more thought and work.

Among other "Pros", the class was told that; strawberry geranium was neither a strawberry nor a geranium, poison oak not an oak, Cape chestnut no chestnut, and the African violet not a violet. Their only guarantee to obtain what they wanted was in the correct Latin name on the plant obtainable in the nursery.

An attempt was made to show the class members that the names on plant labels more often than not, is the key to discovery of interesting bits of information, of lore, adventure, explorers, plant breeders, scientists, etc.

From the first class in the spring of 1957 through the sixth class this spring, a portion of each class meeting was devoted to a phase of botanical nomenclature and classification. The discussions were planned to accomplish the following: A—provide a botanical background and workable vocabulary, B—to arouse the student's interest for scientific names through the history and lore of plant name development, C—to convince the student that nomenclature and classification systems suffered a long formative period and that real people, from many walks of life, contributed freely to the task, and D—by example of plant materials and worksheets, guide the student into using the proper terminology in his everyday meetings with plants.

A quiz was used to introduce the discussion series. For example, the class was asked to identify an annual, common to many yards, by its common name (8). Thus: "Bunny-mouth", "Rabbit's-mouth", "Toad's-mouth", "Cow's-mouth", "Dog's-mouth", "Lion's snap"—the last name might bring a twinkle of recognition, but generally the list had to be finished—"Snaplion", and "Snapdragon"—before anyone answered. From this point, books (see list), living plants and the worksheets (Figs. 1 to 4) were employed to carry on the lesson.

* * * *

A sampling of some of the 50 odd books used for background and display material for the classes to familiarize student's with the more critical tools of nomenclature and classification:

1. Bailey, L. H., *Hortus Second*
2. Bailey, L. H., *Standard Cyclopedia of Horticulture*
3. De Candolle, *Prodromus Systematis Naturalis*
4. Greene, E. L. and Albert Kellogg, *West American Oaks*
5. Hertrick, Wm., *Camellias in the Huntington Gardens*
6. Lanjouw, *International Code of Botanical Nomenclature*, rev.
7. Linnaeus, *System of Nature*. Vols. 1 and 2
8. Percival, Olive, *Our Old-Fashioned Flowers*
9. Royal Horticultural Society, *Dictionary of Gardening*
10. Woodward, Marcus, *Gerard's Herball*

FIG. 1 AN EXAMPLE OF BACKGROUND MATERIAL FROM THE FIRST WORKSHEET ON "BOTANICAL NOMENCLATURE AND CLASSIFICATION."

Many books have been published to help us identify plants. By looking in their glossaries, we discover that no knowledge of Latin is necessary to use these books. It can be a great thrill when one begins to understand the taxonomic vocabulary. The meaningless names on the labels begin to make sense and many interesting facts are discovered.

At the present time, we are still in the process of increasing our knowledge about plants and consequently at times revise some details of the presently used plant classification systems. All available evidence is used and not only hereditary relationships but many other factors are considered. Other sciences enter into this work, such as plant geography and paleobotany. A classification system is a man-made convenience, it makes the knowledge gained from all parts of the world, available to all.

HERBARIA: A TOOL OF CLASSIFICATION

An "herbarium" is a collection of plant specimens that usually have been dried and pressed. These are arranged in the sequence of an accepted classification and are available for reference or other scientific study. So called "type" specimens are the most treasured possessions of an herbarium. They are the original plant on which the description and name of a particular plant were based.

FIG. 2 DEFINITIONS OF TERMS FROM THE SECOND WORKSHEET.

NOMENCLATURE

Nomenclature is concerned with the determination of the correct name of a plant according to a nomenclatural system. Once the plant has been identified it becomes necessary that it have a scientific name. The naming of plants is a subject of international importance. It is a function of taxonomy that is regulated by what are known as the International Rules of Botanical Nomenclature. These rules direct the procedures to be followed for the determination of the name of a plant, or to be followed in situations requiring the selection of a name for a new plant.

SCIENTIFIC TERMS

Scientific terms originate in three ways:

1. Adaptation directly from the Greek, Latin and other languages with appropriate modifications in spelling.
2. Composition and compounding an affixation, and
3. Outright or arbitrary creation, without use of evident antecedent, root, or stem material.

In biology we use the so called binomial nomenclature. Each plant or animal has two names.

FIG. 3 EXAMPLE OF MATERIAL FROM WORKSHEET TITLED "A GLIMPSE AT THE HISTORY OF CLASSIFICATION"

PERIOD 1.

Classification based on habit—300 B.C. till the middle ages.

During this period the dogma of special creation was accepted. It was believed that nature was created by Divine power according to a perfect plan and that man could discover this to a degree. A natural, as then understood, system was one in accord with nature. Numerous systems were devised, considered to represent natural affinities.

Theophrastus (370-285 B.C.) reflected the Aristotelian philosophy and classified all plants on the basis of form and texture: trees, shrubs, undershrubs and herbs. He also distinguished between annual, biennial and perennial duration, and recognized some characteristics which are used today.

Herbalists:

Otto Brunfels (1464-1534) was one of the first of a group of renowned herbalists who described and to some degree illustrated the plants of the world then known. He was first a monk, then a school teacher and ultimately a physician, and produced the first illustrated book about plants, a so-called herbal. He used material largely from the Greek manuscripts; was the *first to recognize the presence or absence of flowers.*

As a group, the herbalists are important, many genera commemorate their names: *Brunfelsia* for Brunfels; *Fuchsia* for the Bavarian physician Leonard Fuchs (1501-1566); *Lobelia* for the Dutch herbalist Mathias de L'Obel (1538-1616); *Gerardia* for the English barber, surgeon and botanist John Gerard (1545-1612); and *Clusia* for the Flemish botanist Charles L'Ecluse (1526-1609).

FIG. 4 A PORTION OF ONE OF THE FOUR PLANT FAMILY WORKSHEETS USED TO ILLUSTRATE THE COMMON NAME, THE USE OF THE SCIENTIFIC DESIGNATION AND DEFINITION OF TERMS.

THEACEAE — TEA FAMILY

COMMON NAME	LATIN NAME		INFORMATION
	GENUS	SPECIES	
Tea plant	Thea	sinensis	Tea plant: *Thea sinensis* and its varieties provide us with our commercial tea. Whether the end product is green or black has nothing to do with the botanical variety. There are several other plants in the world whose leaves are brewed in the same manner as those of the tea. They belong to other families, however.
*Australian tea tree or Broom tree (Myrtaceae)	Leptospermum	laevigatum	Australian tea: Name dates back to Captain Cook who treated his crew for scurvy with a brew made from Leptospermum leaves.
*Tea berry or Canada tea (Ericaceae)	Gaultheria	procumbens	Tea berry: So called wintergreen or partridge-berry.
*Oswego tea (Labiatae)	Monarda	didyma	Oswego tea: Belongs to the Mint family. A landscape plant.
Franklinia	Franklinia	alatamaha	Franklinia: William Bartram, our first U.S. botanist of international fame, described this tree and named it in honor of Benjamin Franklin. Native to S. Carolina and Georgia. It is a rare tree, one specimen growing at Descanso Gardens.

At the end of each class, we expressed the hope that the members would be the Arboretum's ambassadors in promoting the use of Latin names.

It was a great satisfaction when in the advanced landscaping class, an oldtimer explained to a newcomer why we try to use no "common names".

BOOK REVIEW

"The Directory of American Horticulture for 1958". Published by the American Horticultural Council. Price $1.50 postpaid.

This new 80 page Directory, edited by Miss Carol Woodward of the Macmillan Company of New York, was published by the American Horticultural Council as a result of the cooperative work of many people and horticultural organizations in every state. The Directory contains the names and addresses of 418 national, regional and state horticultural organizations in the United States together with the name and

address of the President, the Secretary and each organization's publications.

Also included are the names and addresses of the 103 botanical gardens and arboretums in this country, together with sixty-one non-commercial garden centers. Two hundred and ninety-four universities, colleges and junior colleges teaching horticulture or its related subjects are also listed. All the major horticultural periodicals of the country are listed together with the names of their respective editors.

This valuable horticultural publication was made possible by a special grant to the American Horticultural Council from the Longwood Foundation, and is now available from the office of the Secretary of the American Horticultural Council, c/o Arnold Arboretum, Jamaica Plain 30, Mass.

ARBORETUM YOUTH EDUCATION

M. GERTRUDE WOODS

The Youth Education Program is off to an auspicious beginning. During the past eight months there have been 11 courses of instruction serving 170 children, grades two through eight. Total time for various courses ranged from eight to twenty hours.

Two fall classes on Junior Bird Study created great interest and served to fill badge requirements for several Girl Scouts. During the Christmas vacation period, 18 eighth graders from Arcadia Schools attended an Arboretum Exploration course. Many of the Arboretum staff contributed to this class within their own divisions. The work and facilities of this fast growing horticultural center were reviewed from greenhouse to garden to Administration offices. The response to this experience indicated that such a course might well become a regular part of our youth program in the field of vocational guidance.

A course in Conservation was requested in January, by a teacher of the Los Nietos School District for his student Science Club. After six productive Saturday mornings with them at the Arboretum, the course was climaxed by a field trip to the Lux Arboretum, Monrovia, Calif., where these children could test their new knowledge in observation of a natural watershed area. This course was especially appreciated as preparation for their school-sponsored Outdoor Education week in the San Jacinto Mountains, at Idyllwild, the following week. This class made a fine exhibit for one of the pavilion display cases, emphasizing plants as the controlling factor in soil and water conservation.

Two classes of Weather had great fun making instruments of milk cartons, paper cups, paper clips, medicine droppers, etc. Anemometers, hygrometers, wind vanes, barometers, and current indicators taught much of the elements of weather forecasting and actually worked well enough to show changing conditions. We learned that even the most costly hygrometers depend on one blond hair, preferably Scandinavian! The weather itself was most cooperative during this period. We experienced all kinds of sky cover, thunderstorms, rain and hail.

In February, Anokia School for Girls sent a General Science class of 14 students with their teacher for our Conservation course. They requested a continuation after the eight sessions and did creditable work on Exploring the Plant World. This subject began in April, continued through May for a class of 20 boys and girls. eighth graders, from Arcadia Schools. They were a most interested group. Such meeting titles as Anatomy of Plants, How Plants Do Work, Plants of Past Ages, Plants of the Future, Line, Form and Color in Plants and simple plant experiments kept interest high.

Nature Study for younger children has explored life in the soil and in the water. They took a census of living things around part of the Upper Lagoon. They came up with 819 different living things of 73 species, and learned much of the interdependence of soil, water, plant and animal life.

More than 700 hours of specialized instruction and observation have been given. Many classes have provided displays for the Pavilion. The children's section of the

Library is growing, and books are made available to children currently enrolled in classes.

The response to the first news release on Summer classes has been overwhelming. Additional classes have been opened to the very limit of facilities. Life in the Lagoon, Art in Nature and Plants are Alive will run duplicate sessions. Interested and able volunteer helpers, and a most cooperative staff open the way to a real productive summer for the Youth Education Department.

WEATHER RECORD—1957

Los Angeles State and County Arboretum, Arcadia, California

	TEMPERATURES					RAINFALL	EVAPORATION
	AVERAGE		PEAKS			INCHES	INCHES
MONTH	MIN.	MAX.	MIN.	MAX.	MEAN	MONTH	MONTH
January	42.9	68.6	31.0	79.0	55.75	5.56	1.650
February	49.4	71.4	35.0	93.0	60.40	3.15	1.455
March	48.3	73.7	41.0	88.0	61.00	3.35	2.775
April	50.2	73.5	40.0	88.0	66.85	1.89	3.715
May	53.9	76.9	45.0	92.0	65.40	1.24	4.175
June	60.5	88.9	53.0	107.0	74.70	.24	5.985
July	62.0	97.0	56.0	109.0	79.50	Trace	8.110
August	62.0	94.2	55.0	100.0	78.10	....	7.655
September	58.3	90.2	54.0	100.0	74.25	....	5.665
October	54.4	78.9	47.0	90.0	66.50	....	3.415
November	43.1	73.7	38.0	88.0	58.40	.59	2.460
December	45.2	74.2	40.0	86.0	59.70	4.17	2.190
					Total inches	20.19	49.250

GENERAL OBSERVATIONS

The lowest temperature, 31°F., was recorded on January 28. The highest temperature, 109°F., was recorded on July 4. During the year there were 22 mornings of 40°F. or less. A temperature of 90°F. or more was recorded for 99 days; 15 of these the thermometer registered 100°F. or more.

Rainfall was recorded on 45 days for a total of 20.19 inches. This was 3.45 inches more than the previous calendar year. The greatest precipitation fell during the storm of January 13 when the rain-guage recorded 2.76 inches.

A total of 49.25 inches of water loss through evaporation was recorded for the year. This total was 6.49 inches less than the previous calendar year.

Summary: A good distribution of precipitation during the rain-months and no extreme low temperatures during the winter-months made the year 1957 favorable for plant growth.

J. T. McGah
Weather Observer

WEATHER RECORD—1957

University of California, Los Angeles, Subtropical Horticulture Area

TEMPERATURE

PRECIPITATION

	AVERAGE		PEAKS		TOTAL
MONTH	MIN.	MAX.	MIN.	MAX.	MONTH
January	42.6	60.2	32	74	6.67
February	49.5	65.9	38	83	3.20
March	47.8	68.7	40	82	1.57
April	48.7	67.2	42	81	1.85
May	53.2	69.7	47	76	0.70
June	59.8	77.7	54	100	0.14
July	60.1	81.0	55	94	0.00
August	59.8	81.5	56	88	0.00
September	55.8	80.0	50	88	0.00
October	54.5	75.3	48	90	1.47
November	46.1	71.8	39	85	.56
December	46.6	74.2	40	92	3.76
				Total inches	19.92

NAMES, NOTES AND NEWS

Dr. Frits W. Went, for the past three years, President of the California Arboretum Foundation Inc., and the Department of Arboreta and Botanic Gardens of Los Angeles County, has been appointed Director of the Missouri Botanical Gardens of St. Louis. Dr. Went was one of the group who founded the California Arboretum Foundation Inc.

The Board of Trustees of the Missouri Botanical Gardens, popularly known as "Shaw's Gardens", is to be congratulated in securing a Director of Dr. Went's international reputation in the whole field of plant science and their gain is a great loss to the Foundation as well as the Los Angeles State and County Arboretum. Dr. Went goes with the very best wishes of the Staff and membership of the Foundation and deep appreciation for the splendid service that he has given in the development of the Arboretum.

All botanists and horticulturists wishing to see Dr. Mildred Mathias between June 19 and August 10, will have to make the trip to Gothic, Colorado. Mildred will be teaching Field Botany at the Rocky Mountain Biological Laboratory at stated address and time. This "vacation" should be good for one evening's lecture next fall at Hort. Institute. (Program Chairman make a note.)

The California Arboretum Foundation will lose another member of its organization after July of this year. Mrs. Dolores Hubbell plans to retire from her position of secretary after two and a half years as Mrs. Turner's right hand lady. We will all miss her cheery smile and friendliness, as well as her willing and efficient service for the Foundation.

BIRD NOTES

We have added two species—the Wilson snipe and the Buffle-head duck—to our check list, making a total of 165 species and subspecies.

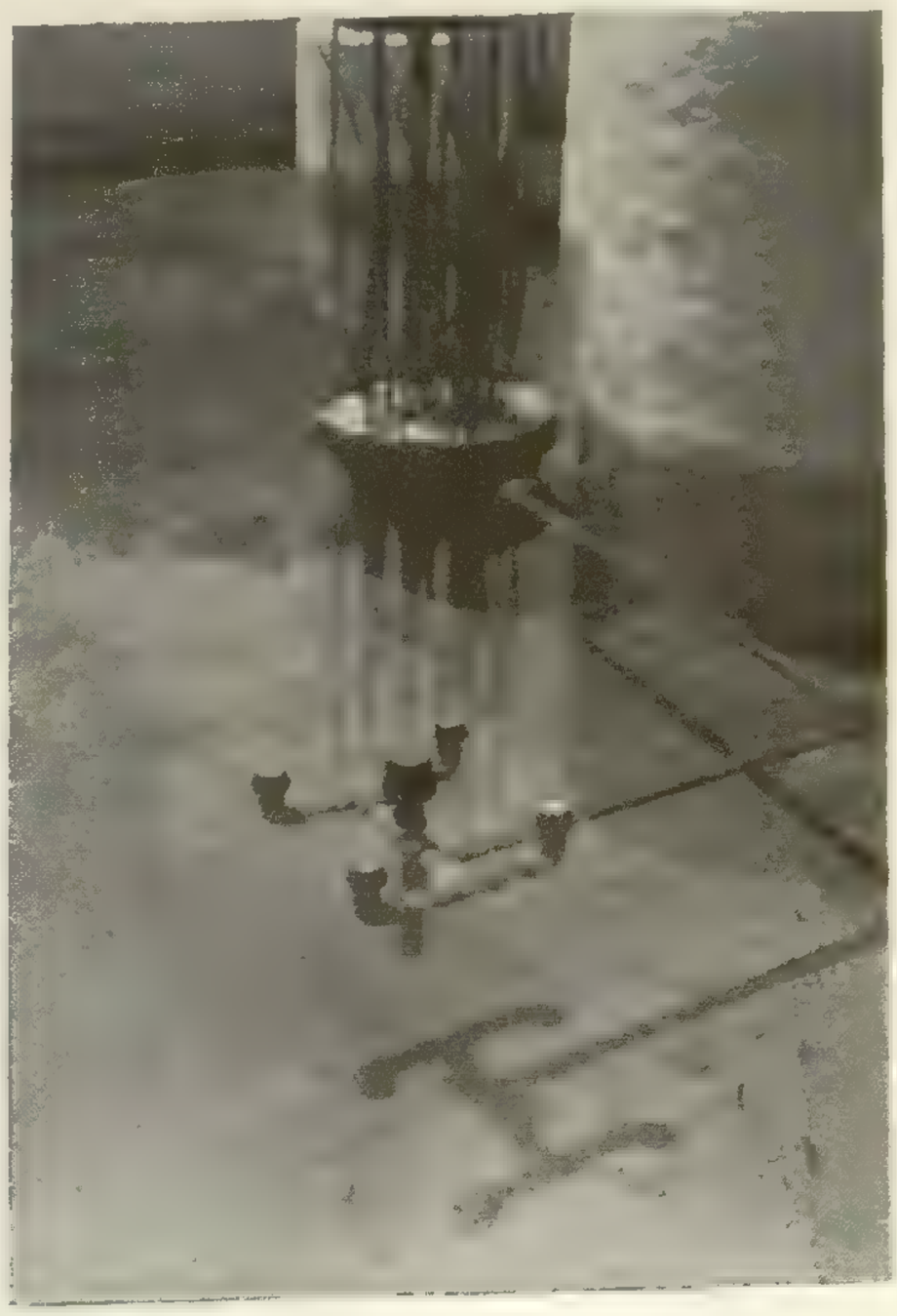
As to our check list, Dr. W. S. Stewart, our Director, along with his other interests in the Arboretum, has a keen interest in its bird life. Let me quote from the front page of our check list: "The Arboretum is a 'Garden of Trees', and a Bird Sanctuary. So, we welcome the Birds and the 'Birders' ". Signed W. S. Stewart, Director. And the number of birds and Birders that have come to the Arboretum the past winter and spring indicate, I think, that they know they are welcome.

There were, in addition to the usual residents, some unusual visitors: the Florida gallinule, White-fronted goose, Virgina rail, Sora rail, Black rail, Eared grebe, Cinnamon teal, Am. merganser, Tri-colored redwing, Horned owl and Pine siskin. There were also the usual winter residents: Canvas-back, Baldpate, Ruddy duck, Green heron, Hermit thrush, Robin, Cedar waxwing, Ruby-crowned kinglet, Purple finch and Gambel sparrow.

May 15, Mr. Fawcett showed me a Black-chinned(?) Hummingbird sitting on its nest, which is in a very *unusual* place,—the southerly porch of the Queen Anne Cottage. On this porch there is a small rotunda some 50 feet away from a shrub or tree. The hummingbird had built its nest on a loop of electric wiring at the apex of the rotunda. She continued to sit on her nest even though several of us were walking and talking not far below the nest. I'm still wondering how she ever *found* this isolated place.

The high-lights of the season were a pair(?) of Gallinules, three Rails at one time, some 1000 to 1500 Robins late every afternoon for a week or more, two Horned owls which perched in different high trees and talked with each other ("hooted") frequently during the *day*. and the unusual place of the Hummingbird's nest.

W. DAN QUATTLEBAUM



C. Water doesn't stop this fire!

BOOK REVIEW

"A Guide List to the Plants in Strybing Arboretum" by Eric Walther and Elizabeth McClintock. A Guide List to the Plants in the Strybing Arboretum was published by the Strybing Arboretum Society. The Guide List contains:

1. An alphabetical list of all plants by genus and species, the name of the family of each, and its location in the Arboretum according to the section in which it occurs.
2. A map of the Arboretum showing its sections.
3. A map of the eastern half of Golden Gate Park showing the location of the Arboretum in relation to other sections of the park.
4. Index of common names.

The Guide List is of value in listing the plants of the Strybing Arboretum but since most of these plants are grown in gardens and parks in coastal central California it is also an indication of the plant materials to be found in this area.

The Guide List was compiled from the original accessions to the Arboretum. In many cases these did not carry the correct names and corrections were made. Nomenclature for the most part follows Bailey's *Hortus, Second. Manual of Cultivated Plants* and *The Standard Cyclopedia of Horticulture;* Rehder's Manual of *Cultivated Trees and Shrubs;* and the Royal Horticultural Society's *Dictionary of Gardening.*

Copies are obtainable from the Publication Committee, Strybing Arboretum Society, c/o California Academy of Sciences, San Francisco 18, California. Paper back copies $1.00. Bound copies $3.50. Please add 10¢ for shipping.

* * *

"The Tropics", by Edgar Aubert de la Rüe, Francois Bourlière, and Jean-Paul Harroy. New York, Alfred Knopf, 1957. 208 p. Indexed. $12.50

The *Tropics*, one of the most remarkable books published in 1957, gives us a panorama covering the geography, climate, vegetation, animal life and population of tropical areas throughout the world. In scope it has a similarity to Schimper's classic *Plant Geography.* however the text of these three authors is up-to-date, authoritative, fascinating reading. The most notable feature of the book is its wealth of beautiful photographs—80 photogravure, 16 colored plates, 34 colored photographs and numerous text illustrations. The photographs are from varied sources, many taken by Aubert de la Rüe himself. Composition is superb, the black-and-white as striking as the colored plates. There are three distribution maps of the main types of vegetation in the tropics.

Senior author Edgar Aubert de la Rüe is Research Head of the National Center for Scientific Research in Paris.

The book is in three parts: the first two chapters by Aubert de la Rüe cover the tropical climates, soils, and plant landscapes; the third chapter by Francois Bourlière covers animal life in the tropics; and the last chapter by Jean-Paul Harroy covers man and the tropical environment.

In the first part Aubert de la Rüe has tried to "record pictorially certain of the more typical and striking aspects of the infinity of graceful, quaint and monstrous forms which the plant kingdom has assembled in the tropics." The photographs of tree ferns in the mountains of Eromango, New Hebrides and Melanesia, Areca Palms near Ankgor, Cambodia, morning mists 11,500 feet in the Andes of Ecuador, adventitious roots in a rain forest, flowers of the African savannahs, etc. are evidence of his success. He makes the interesting observation that: "The tropical forests are not the inexhaustible sources of raw materials that they were formerly considered to be. During their exploitation it has become obvious that their economic possibilities had become greatly exaggerated. . . . As Ravenau has rightly observed, the botanical richness of the equatorial forest is prejudicial to its commercial value." He describes the "secondary forest" which grows up on the ridge of the forest after cultivation and is often mistaken for a virgin forest.

In the second part Francois Bourlière, Professor of Medical Biology at the University of Paris, indicates briefly the better known environments existing in the inter-tropical regions of the different continents, dwelling on ecological peculiarities and characteristics of animal species that live in them—largely mammals, arboreal fauna, giant insects, epiphytic plants, to name a few.

The exploitation of the tropics is discussed in detail in the last chapter by Jean-Paul Harroy, Secretary of the Union for the Protection of Nature.

A large book, about 9" x 11", the *Tropics* combines a beautiful format with a stimulating and well-written text.

DORA M. GERARD

The Cover and Elsewhere

Not the "Doggie in the Window", but on a fence panel. A patio decoration from the artistic mind of Rombout Van Riemsdyk. This and the three other "what's it" shots were taken in the new Home Demonstration Gardens (Sponsored by the California Arboretum Foundation and Sunset Magazine) to the north of the Administration Building. Every home owner should run, not walk, to see the new and provocatively creative use of plants, building materials, patio furniture and color in this unique and compact garden display. The other pictures: A) Patio panelling with varying size cut-out circles. B) Gas burning Luau Torch. C) Gas burners for night fire light effect in small pool below a raised patio deck.

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INDIAN ARTIFACTS FROM THE HUGO REID ADOBE

WILLIAM J. WALLACE AND EDITH TAYLOR WALLACE

FOR THE PAST year and a half, archaeologists from the University of Southern California have been carrying on an investigation of the Hugo Reid Adobe. This historical structure, one of southern California's oldest surviving buildings, is located within the grounds of the Los Angeles State and County Arboretum, Arcadia, California. The house stands on a low rise along the shore of a spring-fed lake. Its builder, Hugo Reid, was a Scot who settled in California and became a Mexican citizen (Dakin, 1939). In 1839 he applied for title to Santa Anita Rancho, formerly a San Gabriel Mission property. Reid received provisional ownership to the three square leagues of the rancho in 1841. This was renewed in 1843 and confirmed in 1845. Here he sowed wheat, grazed his cattle and erected an adobe house. Although Reid and his mission-trained Gabrielino Indian wife, Victoria, maintained a more pretentious residence at San Gabriel and another at their vineyard two miles from the mission, they and their children occasionally lived at Santa Anita. Hugo Reid played a prominent role in local affairs and politics and was one of the delegates to California's first Constitutional Convention.

Straitened circumstances resulting from several unprofitable business ventures forced Reid to dispose of the rancho in 1847. In the years that followed, it was sold and resold, the property passing through many hands. The adobe house was altered, enlarged and modernized by its various owners. Since 1947, it and a small portion of the once vast Santa Anita Rancho have been under the administration of the Los Angeles State and County Arboretum.

Plans were formulated for restoring the historic building and its surroundings, as nearly as possible, to their original appearance. Funds were allocated for this purpose by the California State Division of Beaches and Parks in 1956. Prior to any rebuilding, an archaeological exploration was undertaken by the University of Southern California's Department of Anthropology. This first phase of the work began on November 10, 1956 and was continued until September 15, 1957. Excavations were made within the house and around its outside perimeter (Plate 1).

Architectural features revealed by the digging have been described elsewhere (Wallace, Desautels, and Kritzman, 1958). In addition to providing data on the former appearance of the house, the excavation yielded hundreds of objects, lost or discarded by various tenants. The great bulk of the collection is made up of commercially manufactured items—rusted nails, bits of porcelain, broken glass and the like. These objects, when thoroughly studied, will throw some light upon the tastes, habits and domestic life of former occupants of the adobe. Included also are artifacts of Indian manufacture. The latter are of interest not only because of their association with the historic adobe but also because there is little specific information on the archaeology of the locality.

INDIAN ARTIFACTS

Aboriginal objects were found within the house and in the outside trenches. Represented are only those items made from durable, decay-resistant substances as the soil from which they came is damp and not favorable for the preservation of perishable materials. Included are stone objects, potsherds, one bone artifact and a handful of shell beads. There are also two specimens made from bottle glass.

Three more or less complete and two fragmentary projectile points were found. All are of a size which suggests that they were used to tip arrows. Several forms are represented.

1. The first specimen, made from green bottle glass, is a small, stemless point shaped like an isoceles triangle (Pl. 2a). It has a slightly concave base. The point is thin

PLATE 1. Exploratory trench along outside south wall of wing of adobe house. The wing was not of Hugo Reid period but was built at a later date. Photo: Edith Wallace

and excellently finished by fine pressure flaking.

Dimensions: Length: 2.2 cm.
Width: (at base) 1.1 cm.
Thickness: 2 mm.

This is an authentic Indian artifact made in the same form and fashioned by the same flaking technique used in manufacturing stone arrow points.

2. The second projectile point is made from tan chert. It is also basically triangular in outline with a thinned concave base (Pl. 2b). This specimen is larger and heavier and the workmanship is less skillful than the glass example.

Dimensions: Length: 3.3 cm.
Width: 2.6 cm.
Thickness: 2-4 mm.

3. A stubby specimen has a stem that contracts toward its base which is broken away (Pl. 2c). The shoulder area is rounded and not too well defined. Its blade is short and broad with convex edges. Although the chalcedony from which it is made is of good quality, well suited for controlled flaking, the specimen is asymmetrical, giving it a rather crude appearance.

Dimensions: Length: (projected) 3.0 cm.
Width: 2.8 cm.
Thickness: 3-5 mm.

4. The incompleteness of this projectile point makes it somewhat difficult to characterize. It appears to have had wide, though shallow, side notches just above its base

(Pl. 2d). Its stem was expanding; the butt end is missing. Blade edges are convex. The specimen is not sufficiently intact to measure accurately.

Dimensions: Length: (estimated) 3.2 cm.
Width: 2.3 cm.
Thickness: 3.5 mm.

5. The tip of a well-made, straight-sided point of reddish chert was found (Pl. 2e). This specimen originally may have corresponded in shape and proportions to the glass one. Its former length and width cannot be estimated with any accuracy. The piece is 2.3 cm. thick.

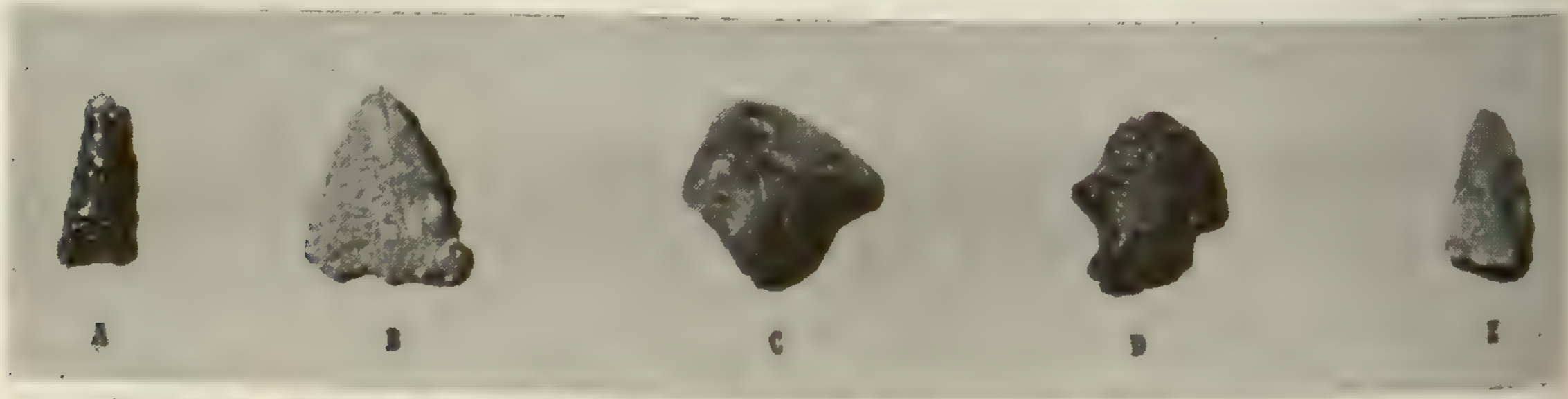

PLATE 2. Arrow points. (A) Green bottle glass, (B) Tan chert, (C) Chalcedony, (D) See text, (E) Reddish chert. Photo: Edith Wallace

There are two bilaterally flaked sections of blades in the collection. Presumably both were used as knives. Neither is complete enough to ascertain its shape or over-all size.

1. A small piece from the edge of an obsidian blade was obtained. It is carefully flaked over both surfaces and sharpened by delicate retouching along its border. The only measurement obtainable is thickness which is 9 mm.
2. The rounded base of a poorly chipped blade of reddish chert was recovered. This is possibly an unfinished artifact, broken during its making and then discarded. It has large flake scars on both surfaces and its edges are pressure-flaked.

Dimensions: Length: indeterminate
Width: 3.0 cm.
Thickness: 3-6 mm.

A single chipped stone drill was found. This tool is fashioned from a thin slightly curving flake of obsidian. One end has been flaked to form a straight-sided shaft; the other expands to provide a finger hold. The broken end of the shaft was retouched, presumably for use as a scraper or graver.

Dimensions: Length: 4.7 cm.
Width: 3.5 cm.
Thickness: 2.6 mm.

The simplest tools in the collection are flake scrapers. There are 5 of these easily-made artifacts; four are whole and one is fragmentary.

1. Of particular interest is the largest specimen fashioned from a thick piece of green bottle glass (Pl. 3). It is more or less oval in form, sharpened around its entire lower curved border by secondary flaking. A large flake scar near its upper edge provides a convenient finger grip.

Dimensions: Length: 4.7 cm.
Width: 3.5 cm.
Thickness: 2-6 mm.

2. The remaining scrapers show no particular group characteristic. They are simple unshaped stone flakes with unilateral pressure flaking along one long border to produce a cutting or scraping edge. The flake scars are very tiny. Two are chert flakes; one is of brownish jasper; the other is chalcedony.

Dimensions: Length: range 1.2-2 cm.; average 1.6 cm.
Width: range 0.8-1.7 cm.; average 1.2 cm.
Thickness: range 1-2 mm.; average 1.5 mm.

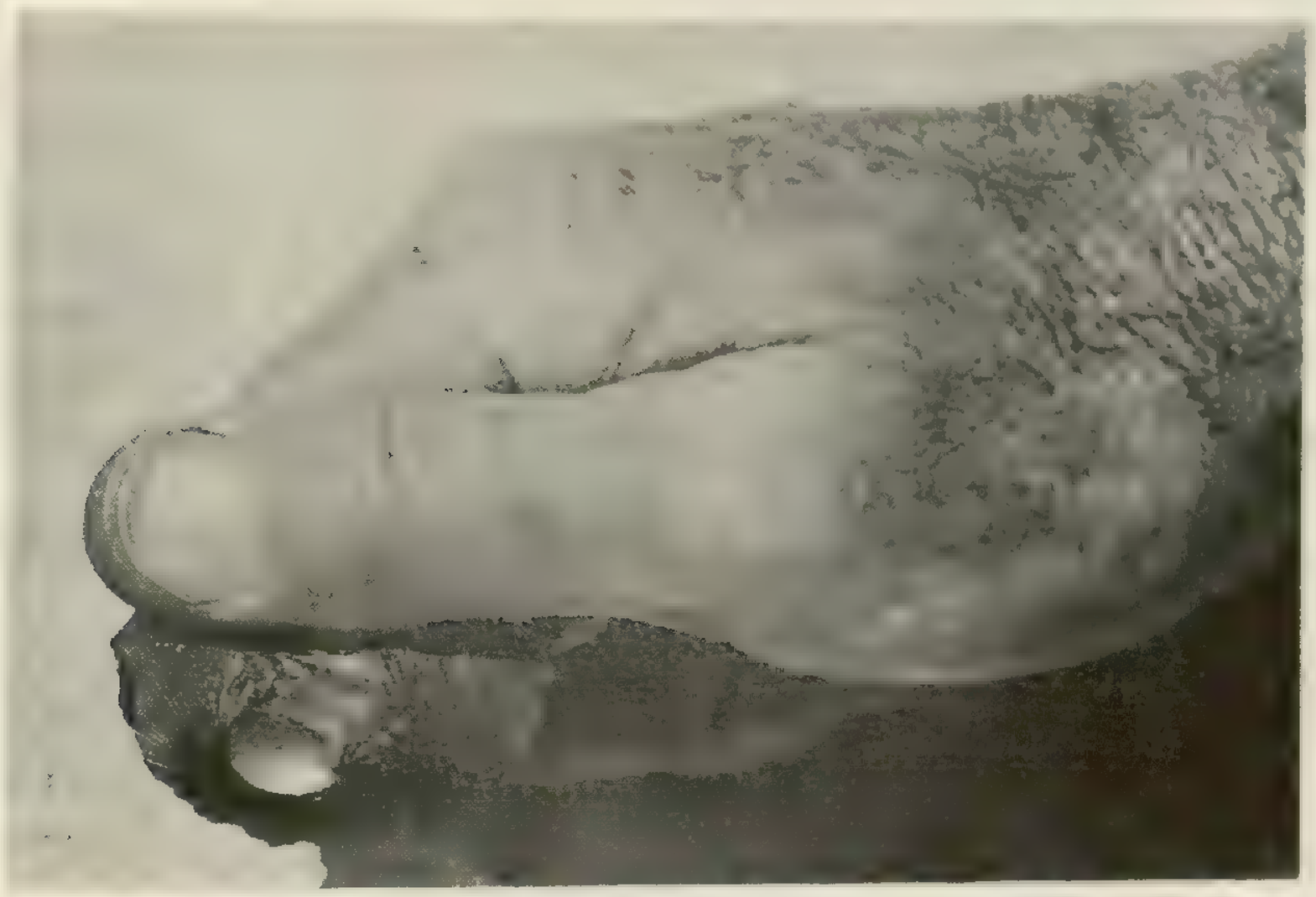

PLATE 3. Glass scraper. Green bottle glass. Photo: Edith Wallace

All workshop material resulting from the manufacture of chipped stone tools was saved. There apparently was no immediate supply of suitable stone as there was not a great amount of waste material in the deposit. Twenty stone flakes and a portion of a "quarry blank" were collected. The latter is a central section from a core of reddish chert, roughly flaked over both surfaces. Of the flakes, 12 are chalcedony, 10 are chert, 5 are quartz and 1 is Grimes Canyon fused shale. No doubt some of these after being struck off during the fashioning of points and blades were picked up and used briefly as scrapers.

Most abundant of the stone implements are handstones (mãnos), 20 whole and fragmentary examples of which were unearthed. They have all been used for grinding on both surfaces. The majority also exhibit well-worn edges. There is some variation in outline: the large handstones tend to be straight-sided with rounded corners (Pl. 4 top row); the smaller ones are somewhat more oval in form (Pl. 4 bottom row). The materials are: scist (7 examples), sandstone (7 examples), granite (4 examples) and quartzite (2 examples).

Dimensions: Length: range 9.6-16.2 cm.; average 12.5 cm.
Width: range 8.6-9.2 cm.; average 8.7 cm.
Thickness: range 4.2-5.0 cm.; average 4.4 cm.

Milling stones (metates), only 2 small pieces of which were found, were made from fairly thin, flat slabs. They have worn, well-defined depressions on one side resulting from the use of a handstone. Both are schist. No pestles or mortars were recovered.

There was a surprising scarcity of hammerstones with only 4 examples collected. Two are broken quartzite pebbles battered on one end.

Dimensions: Length: 8.1 cm. (1 specimen only)
Width: 6.2 cm. (1 specimen only)
Thickness: 3.6-4.5 cm.

The remaining hammers are percussion-flaked cores with large flakes struck off to form rough edges which are battered from use.

Dimensions: Length: 6.1-7.3 cm.
Width: 5.0-5.8 cm.
Thickness: 4.2-4.4 cm.

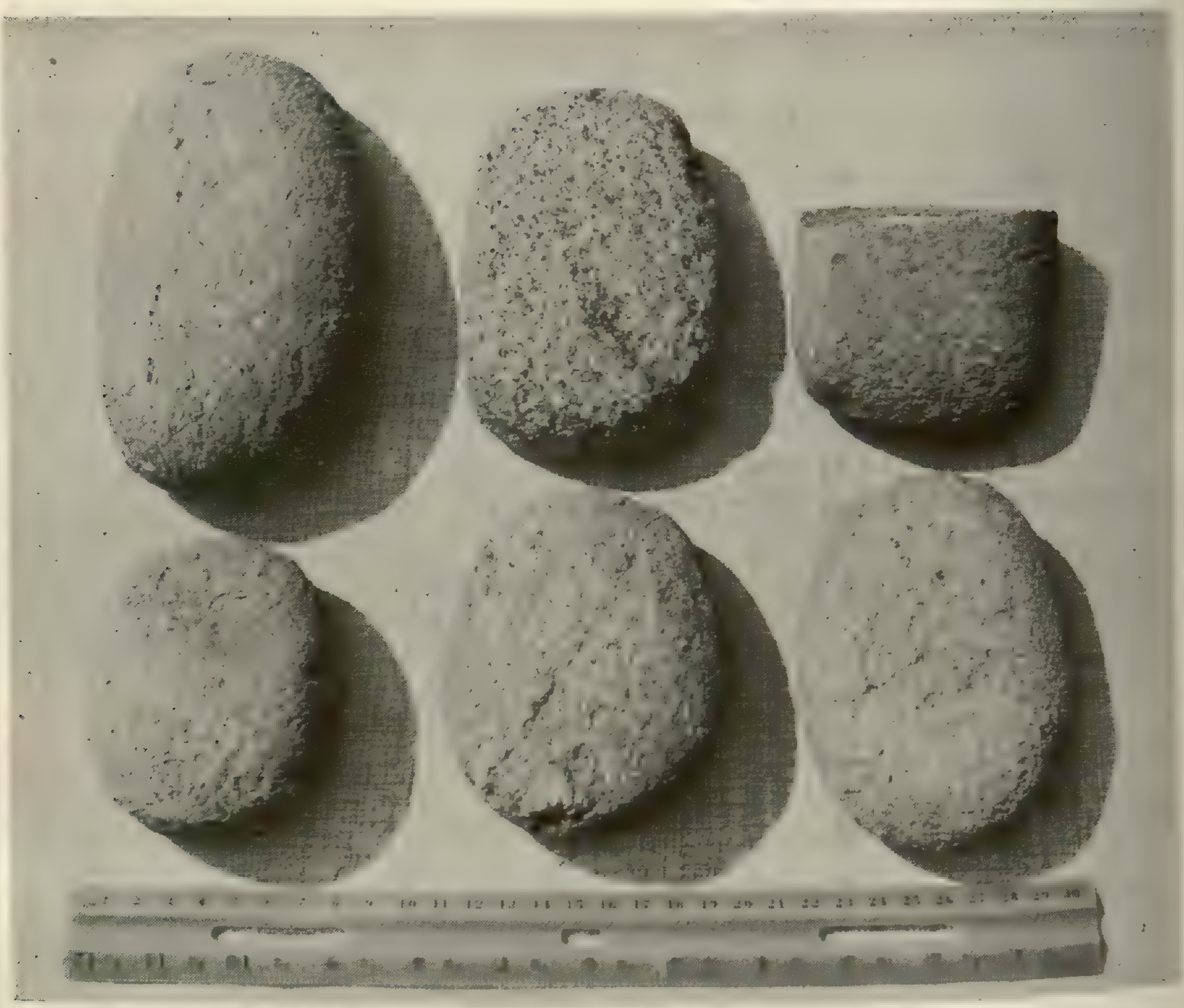

PLATE 4. Handstones (Manos). Photo: Edith Wallace

Several handstones have signs of pounding on their ends, making it appear as though they also may have been used as hammers.

A gray slate pebble is smoothed and worn on one surface. One long edge also shows some wear. The pebble is thin, rectangular in outline with rounded corners.

Dimensions: Length: 4.3 cm.
Width: 1.5 cm.
Thickness: 5 mm.

It apparently was employed in smoothing wooden or bone implements, or pottery vessels.

A single fragmentary bone artifact was found. It is a broken awl or perforator. This fragile specimen, made from the limb bone of a small mammal, was tapered by cutting and thinning along the lower shaft to what must have been a pointed tip. Both ends are missing. The specimen shows little or no use polish.

Dimensions: Length: (estimated) 7.0 cm.
Width: 1.7 cm.
Thickness: 1.3 mm.

Seventeen *Olivella* shell beads (Pl. 5) came from the deposit. They are made from parts of the body wall of the shell and are basically oval in outline though somewhat irregular. Each has a perforation drilled from one surface. The hole for stringing is regularly at or near the center of the bead, though on one specimen it is close to one end. The range in size is not great and presumably the beads all came from a single necklace.

Dimensions: Length: range 6-9 mm.; average 8
Width: range 6-8 mm.; average 7
Diameter of perforation: 1 mm

PLATE 5. Shell beads. *Olivella* shell. Photo: Edith Wallace

Sherds of Indian pottery were found in several trenches but in no large quantity. There are four varieties represented.

1. The majority of the sherds (18) are of a plain, well-made, brown ware of a fairly fine paste, tempered with sand containing a good deal of mica and some small quartz particles. The sherds are polished on the outer surface which is darker in color than the interior. There are no rim sections and nothing could be learned of vessel form or size. The sherds vary in thickness from 5 to 8 mm.
2. Also well fired is a reddish ware represented by 12 sherds. Its paste contains a moderate amount of sand, mica and quartz particles. The sherds exhibit a smoothed and polished exterior; their inner surfaces are less well finished. Fire clouds are noticeable on several pieces. Two rim sections are plain with flat borders and exterior thickening. Curving wall fragments indicate that at least some of the sherds are from a wide-mouthed jar. There is no clue to overall vessel size. Body sherds vary from 6 to 8 mm. in thickness.
3. A single thick (1.2-1.3 cm.) sherd, apparently a basal fragment, is of coarse paste tempered with sand containing a high percentage of angular quartz particles. It is rough on both surfaces and is not polished.
4. Another fragment has a black exterior and is reddish-orange inside. The paste is liberally mixed with sand and bits of angular quartz. The piece, a body sherd, is 4 mm. thick and like the above specimen, it has rough surfaces.

It is perhaps of interest that Hugo Reid, who left an important chronicle of Indian life in Los Angeles county, in his letters serialized in the Los Angeles Star in 1852 (Hoffman 1885, Ellis 1926, Dakin 1939), states that the Indians manufactured no pottery prior to their missionization. Sherds are not found abundantly in archaeological sites in the coastal district of Los Angeles and the number of pieces reported to date is exceedingly few. The local Indians either were acquainted with the potter's art but made little use of it, or occasionally obtained vessels in trade from peoples living farther inland.

There was a total absence of trade articles obtained from Caucasians. The lack of glass beads is somewhat surprising and these were the most popular of items which reached the Indians directly or indirectly through the agency of Whites. Certainly some of the Indians who lived in and around the house had some sort of contact with White civilization. This is demonstrated by the bottle glass scraper and arrow point.

SUMMARY AND CONCLUSIONS

From the archaeological evidence in hand it can be inferred that Indian occupation of the Hugo Reid Adobe site represents two occupational phases, one perhaps is fairly lengthy, the other brief and transient. That the locality was inhabited by Indians before the house was constructed is demonstrated by the finding of aboriginal artifacts at some depth in the exploratory trenches outside of the structure and in test pits carried below

a hard-packed earthen floor, presumed to date from Reid's time, within its walls. The deposit here consisted of a rather sandy, yellowish clay differing in no noticeable way from the regular subsoil. Indian objects were recovered from it to a depth of 36-42 inches below the present ground surface.

Artifacts from beneath the floor or from a corresponding level (below 12 inches) in the outside trenches include:

1. Blade fragment (obsidian)
2. Drill (obsidian)
3. Flake scraper
4. Milling stone fragments
5. Handstones
6. Flaked-core hammerstones

It cannot be demonstrated, as yet, when this earliest Indian occupation began or when it ended as the tools ascribable to it are varieties which have no known value as time-markers. The only certainty is that the spot was lived upon in pre-Hugo Reid times and that the ranch house was erected upon the site of a former native village.

It is not surprising that Indians selected this spot, as it was a favorable one for a hunting-gathering people. There was a plentiful supply of food. Game, particularly migratory waterfowl which visited the lake (originally apparently more of a *cienega* or swamp than a lake) and nested in the marshy ground around it, was abundant; there may have been fish in its waters. Groves of oaks on nearby hills offered a supply of acorns; other native vegetation provided edible seeds. Water, wood for firewood, house-building and artifact manufacture as well as stone suitable for making some implements were readily available.

Hugo Reid lists a single Gabrielino village, Aleupkigna, on Rancho Santa Anita (Dakin 1939, p. 221). Its exact location is unknown though it presumably was somewhere near the ranch-house (Johnston 1957, p. 164). There are three other archaeological sites in the immediate vicinity: one is on Tallac Knoll, just south and west of the adobe; another, now almost totally destroyed, is located around the Arboretum greenhouses; a third was nearly obliterated during the construction of a parking lot at Santa Anita Park. Any one of these could be Aleupkigna. Of the three, the parking lot, which lies a short distance to the east of the house, is the most likely candidate. It is doubtful, judging from the artifacts recovered, that the adobe house site was inhabited when Reid took over the rancho. This occupation appears to fall entirely within the prehistoric period, well before the coming of the first Europeans to the region.

Indians also visited or lived in the locality after the building of the house. This is shown by the recovery of native artifacts within the structure and above Hugo Reid's earthen floor. These objects were found scattered through a deposit of loose black soil and rubbish, 18-24 inches thick, overlying the floor and in the outside trenches to a depth of about 12 inches. The specimens are of considerable interest as a sampling of the kinds of objects produced and used by southern California Indians during the middle decades of the 19th Century. Little is known regarding native material culture during this transitional period. Artifacts here consisted of:

1. Projectile points (stone, glass)
2. Blade fragment (chert)
3. Flake scrapers (stone, glass)
4. Handstones
5. Pebble hammerstones
6. Smoothing pebble
7. Bone artifact
8. Shell beads
9. Potsherds

The only items occurring in both levels were: flake scrapers (more numerous above floor); handstones (more abundant below floor, including largest and best-made specimens) and blades (1 above and 1 below floor).

These later materials could have been discarded or lost by neophyte laborers or cowherds hired by Reid or some later owner or by roving bands of Indians. The latter explanation seems more plausible as it is doubtful that mission-trained Indians were still

chipping stone arrowheads and modeling native pottery in the 1840's. These handicrafts fell into disuse very soon after missionization.

It is likely that the above-floor artifacts were left behind by marauding Indian bands from the interior who occasionally camped in the adobe. Neither Reid nor Henry Dalton, to whom he sold the rancho in 1847, lived in the house continuously so that Indians could have used it for shelter now and then. It was the habit of roving Indians from the Mojave Desert and beyond to cross the mountains and raid the ranchos (Caughey 1952, p. XX). They generally killed a few head of cattle, but primarily they were after horses, which were easier to drive and preferred as food. The finding of ashes and charcoal and the remains of a horse, apparently butchered and eaten, with the artifacts in the house adds support to the assumption that Indians camped in it.

It would be premature to attempt a systematic comparison of the Hugo Reid Adobe artifacts with those from other archaeological sites in southern California. The collection is too small and there is little published data on materials from sites in the immediate area. Further information will be forthcoming from the Hugo Reid Adobe locality as excavation has been resumed in the patio west of the house. It can be anticipated that more Indian articles will be unearthed. Also this digging should shed additional light on the extent and depth of the older archaeological deposit, information necessary for a proper interpretation of the site.

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SAN GABRIEL VALLEY FLOWER SHOW

The Los Angeles State and County Arboretum is dedicated to the acquisition, growing, testing and displaying of plants from all parts of the world. Soil and water requirements, temperature tolerances, light intensities, size, shape and dependability for home gardens are observed by experienced gardener-horticulturists who are responsible for the care of these plants.

Home owners can benefit from this plant research and experimental program by viewing the new Demonstration Home Gardens on the Arboretum grounds. This comprises one acre, designed by landscape architects and devoted to the display of many paving treatments, fence ideas, modern greenhouse, patios, decks, pools and other structures which can be duplicated in almost any home garden.

The San Gabriel Valley Fall Flower and Garden Show will be held in and around the Demonstration Home Gardens, October 31 through November 2, 1958. This "natural" setting will afford every opportunity to include potted chrysanthemums, orchids, begonias and cacti; cut flowers of chrysanthemums, roses, dahlias, carnations, marigolds and zinnias; flower arrangements; special groups for juniors; garden club, landscape and nursery displays; and commercial booths striving to show how to best use products.

The Pasadena Independent-Star News is cosponsoring this flower and garden spectacle and will, with others, donate trophies to be awarded for 77 competitive classes listed in the schedule.

Those who remember the enthusiasm and beauty characteristic of the many wonderful flower shows held at the Fannie Morrison Horticultural Center in Pasadena, will welcome this ambitious effort to again have a representative flower show in the San Gabriel Valley.

GLENN HIATT

"RICE, BAMBOO, KYOTO"

PEGGY SULLIVAN

IT IS FREQUENTLY said about the Philippines, particularly by those who visit by ship with one day per country, that Manila is filthy, war scarred and a city to miss. This is true. Yet during this past spring the writer and her Mother spent several extremely interesting days on Luzon. The secret lies in leaving Manila behind and travelling by car to the interior. Although even while on the outskirts of the city, a horticultural eye views many thrilling scenes. Wild Bird Nest Ferns, five feet high with fronds rolled together into cylinders, are hawked like newspapers on Dewey Boulevard. Gigantic clumps of Dendrobiums, captured from the mountains while in their peak of bloom, hang from a bamboo pole over the shoulder of a man as he leans against a gigantic *Ficus religiosa.* With these inhabitants of the Philippine jungle, have come into civilization seeds of the unbelievable Jade Vine, now pendulant with heavy chains of green pea flowers in many Manila gardens. Along Manila Bay instead of staring at war "momentos" rusting in the shallow water, it is far more enlightening to peer into small carts holding a pot collection of Bougainvillea, Achillea, pine trees, jasmine and roses. An odd assortment but always reinforced by a tangled mass of Phalaenopsis and Paphiopedilum tossed into the corners.

Plant-wise, the only residential district of interest is Forbes Park. Here the homes are magnificent. But the gardens fall short, due to unimaginative designing, low water pressure and a sub-soil hardly worth the effort of penetrating. Individual plant clumps such as the Traveller's Palm and species of the Fishtail Palms were impressive but without design they resemble a Botanical Garden!

Beyond Manila one finds the villages and authentic Philippine countryside. The countless rice paddies, banana plantations, coconut groves are interesting, especially in the evening when bordered by wallowing carabao. But fabulous are the "gardens"—actually wild orchids, ferns and begonias—all in clay pots fastened to the bamboo butts on stilts high above the ground and chickens.

What should be mecca for all plantsmen is the gorge at Pagsanjan. Very narrow, dark and deep, it is beloved by the Manilans for its gentle rapids taken in a hollowed-out log. But to one who has ridden the Colorado River these rapids were only quaint! Actually, the overwhelming awe felt in the gorge is derived from the display of native plants clinging by their root tips to the vertical cliffs. Here are the wild Bird Nest Ferns and Polypodiums. Anthuriums, palms, orchids, begonias, tree ferns, Ficus, all in their splendor, with monkeys for companions.

We left Manila with regret, not knowing that the next three days would be spent flying each day back and forth from Manila to Hong Kong, never being quite able to pierce the Hong Kong weather.

Everyone knows Hong Kong is fascinating. It is, but mainly for junks, rickshas and new suits made over night. The Tiger Balm Garden is atrocious. A great deal of the native vegetation on the hillsides has been replaced by shacks of the refugees from the Communist regime. The Colony is pathetically overcrowded. But the orchid trees (Bauhinias) were in bloom, an occasional Coral tree (Erythrina), and red Ceiba were viewed against the rich green Banyans, with sparse clumps of bamboo, tree ferns and lantana scattered about the hillsides. Rather a dismal horticultural picture, yet a moment of utter delight occurred while in the New Territories. During a stop made near the Red Border, so as to stare at the Communist soldiers, we noted one elderly Chinese woman wearing the customary wide brim hat, the brim edged with four inches of heavy fringe. Within the fringe was discovered a cluster of flowers of the intensely fragrant native *Michelia fuscata.*

While on Macao we were amazed to see bands of small Chinese children rov-

ing about the Buddhist Temple collecting the fallen flowers of the gigantic red Ceiba overhead. First dried and later boiled, the flowers are used as a cure for the summer dysentery.

On a flight from Hong Kong to Tokyo one passes directly over Taiwan (Formosa). Numerous plant names contain "formosanum", so it was with a sense of duty that we dropped down for several days, completely unprepared for the bewildering display of tropical plants. It is truly a tropical China. Under heavy porcelain roofs, the temple altars are jeweled with pots of Clivia and Oncidium, Cymbidium and Dendrobium orchids. Gigantic canes of timber bamboo swayed heavily in the moist air as roosting white pigeons fought to keep balance. Through the mountainous dirt roads, the car brushed against the tree ferns, Alpinia, Philodendron, Begonia, Datura and *Asparagus plumosus*. Enter into the tangled profusion, and one became hopelessly clutched by blooming Passion Vine. Higher up the mountain Rhododendron and Azalea appeared as foreigners to the lush tropical jungle below. Rank green Pandanus lined many streams, just as blue Hydrangeas replaced the rice plants at the paddy edge. All enclosed in veritable cages of giant bamboo.

Oddly, no private gardens are developed in the countryside, all courtyards being enclosed, with ducks inside and carabao outside.

The Botanical Garden at Taipei is casually maintained, rich in palm specimens, and deaf to the English language. The writer toured it in a chilling heavy rain accompanied by a thoroughly soaked and bored interpreter—all handicaps to enthusiasm. But few cities in the world can provide on their trains, as they do, glasses of hot tea followed by scented hot towels, all this while rolling along through masses of red Clerodendron under crimson Ceiba. We left Taiwan while still in shock from receiving so much and expecting so little.

In Tokyo we were suddenly in the numbing cold of the Temperate Zone in early April. But in the five weeks to follow we were continually warmed by the sincerity of the Japanese people. With us they needed much patience, for in travelling throughout Japan watching spring unfold, we lived in the Inns. Our enduring guide during the stay explained not only the ritual of the bath, the bed, the food and the shoes, but also the necessity of being polite. This writer repaid, by mentioning in large and loud adjectives, the countless beauties of Japan. Something he had taken for granted. Before, when riding the Hozu River rapids, he had never really noticed the wild masses of lavender Wisteria on the cliffs with groundcover of violets, underneath a canopy of pink flowering cherry.

During a rain, the mountains are more beautiful than in the glare of a bright sun. Through the mist, the wild Azalea petals become a tender lilac pink, intensified by the deep black-green of the *Pinus Hambergi* overhead. Entire mountainsides often are clothed only in these two plants. Other slopes, as in Beppu, are tapestries of large Japanese Maples and wild Cherries. Possibly the most striking combination is seen in the forest near Nikko, where the yellow-green bamboo canes pierce through the thick black Cryptomerias.

Evidently it is not illegal in Japan to break off branches from native flowering trees. Frequently, youngsters were observed on their way home from school with branches of wild camellias taken from trees twenty feet high. The mountain climbers, after a strenuous weekend on the peaks, would return to their homeward train with ice axe in one hand and *Magnolia kobus* in the other. Firewood trucks coming down from Lake Chuzenji would have tucked on top, limbs of *Rhododendron pentaphyllum* var *Nikoense*, the color an unbelievable pink.

Just as each rice plant in Japan is tended by hand, so also is the fruit tree. Well built terraces contain tangerines, mulched heavily with wheat straw and protected by windbreaks of clipped *Podocarpus macrophyllus*. Somewhat of an improvement over *Eucalyptus globulus*! Even the loquat flower clusters are carefully bagged, giving the tree a striking appearance.

Those of us in southern California

familiar with the Japanese nursery trade would see great similarity between nursery methods and stock there on the Islands and here at home. Only the gallon can is missing! It is replaced by burlap and raffia or newspapers. A startling difference in balling methods is noted. Trees to be transplanted are dug with extremely small balls of earth and moved about the garden by manpower, with the assistance of young lady gardeners.

But it is in the design of the garden that the Japanese show their capacity for detail and philosophical leanings. Their technique has been described long ago and is not to be repeated here. But it may be said that their understanding is great or the writer would not have sat for thirty minutes on the floor of a Kyoto Temple and absorbed the raked sand and fifteen stones arranged as islands on the ocean.

Before visiting Japan one might think that all this is done with the eyes closed, the design ideas coming from within. But, no, the eyes are open and studying the natural landscaping of Japan itself. The Inland Sea and the pine clad little islands of Matsushima are all represented in gardens with quiet dignity and sensitive proportion. While hiking along the trail above Myanoshita a small canyon was observed consisting of boulders, thick moss, and deciduous trees, almost an exact replica of the man-made moss garden at the Saiho-ji Temple at Kyoto. Both gardens, the God-made and the man-made, possessed an almost unearthly restfulness. An emotion not easily copied from the wild.

Actually all of Japan is blessed with great natural beauty .To this is added sake and chopped octopus, poached bird's egg in soup, and seaweed tea. It was difficult to say "Sayonara"!

DESCANSO GARDENS AND ITS ROLE IN THE DEPARTMENT OF ARBORETA AND BOTANIC GARDENS

JOHN L. THRELKELD

Superintendent, Descanso Gardens

ON JULY 1, DESCANSO GARDENS was transferred from the Department of Parks and Recreation to the Department of Arboreta and Botanic Gardens. This shift in administration marks a shift in policy from that of garden display to a policy which emphasizes education and testing in the horticultural and botanical fields.

It is planned that test plots will be installed to determine adaptability of certain plants to local conditions and to demonstrate their proper landscape use and growth requirements. Outstanding in this category will be plant families represented by horticultural societies and test organizations such as the various All-America selection groups. It is planned also to feature a demonstration garden of California native plants to further interest in the choice plants of California and to educate young people in nature appreciation and understanding.

The Gardens will play an important role in the Los Angeles community as a horticultural center where plant societies, garden clubs and professional horticulturalists may assemble, demonstrate to the public their special interests, and receive specialized and professional instruction in the various horticultural and botanical fields.

Descanso Gardens is particularly well-adapted for such use because of existing facilities which can be converted to educational purposes with little or no expenditure. The first facility to be used is the Lakeside Cottage for the Children's Education program. Here special courses for elementary grades will be conducted in various phases of nature study.

It is expected that the former mansion, which has numerous rooms very well-adapted for assembly purposes, will become a center for botanical and horticultural study. The Gardens proper, however, will probably always be the main source

Under the canopy of California Live Oaks, one can enjoy peace and quiet in addition to the beauty of the flowering shrubs.

of learning, where the thousands upon thousands of plants will continue to thrive under nearly ideal garden conditions, showing by direct example how they respond to correct culture.

There are two main features on which the building of Descanso Gardens depends. First, the ideal natural terrain, which is a north slope of the San Rafael Hills. The Descanso property is bound on the east by residences on Encinas Drive, on the south and west by property belonging to the City of Glendale, and on the north by private property and Descanso Drive.

The property is unique in that it extends to the very peak of the San Rafael Hills on the south, west and northwest, literally creating a great bowl of 140 acres. This situation assures against encroachment by industry or residential development which could interfere with the precepts of developing a garden along natural lines. It is also important because of the fact that it is close-in to the heart of one of the world's largest metropolitan areas and can remain an island of nature for the benefit of posterity.

The other feature which is vital to the precept of garden development is the natural vegetation in the area, outstanding of which is a 30 to 35 acre California Live Oak forest. It is one of the rare pure oak forests, being the result of a great fire which burned off the San Rafael Hills in 1883. The acorn crop from the previous oaks had fallen before the fire. Subsequent rains caused the acorns to be scattered and covered by debris. They germinated in the spring of 1884, creating one of the most picturesque oak forests to be seen anywhere.

The canopy provided by the trees provides ideal shade garden conditions. The

The mansion, commanding a sweeping vista of the garden below, will be used for classes and meetings devoted to a variety of horticultural interests.

continual drop of oak leaves for centuries has built rich, black leaf soil in which nearly any plant will thrive with very little care other than irrigation and an occasional feeding to replace used elements. Weeds are no problem because of the shade and leaf mulch.

The plant for which Descanso Gardens has achieved the most fame is the camellia. The background plants throughout the shaded area are primarily *C. japonica,* comprised of approximately 50,000 plants of some 800 different varieties. These are continually being added to and subtracted from to maintain current interest. There is also a collection which features about 25 different species.

Camellias have been planted in Descanso Gardens in every conceivable condition of exposure, soil and terrain. Persons interested in learning more about this outstanding plant can observe it growing in the various situations and are almost certain to be able to find one condition similar to their own.

As there are nearly 3,000 registered varieties of *C. japonica* in this country, the home gardener is sometimes at a loss to decide which varieties he desires to have in his planting. By observing the mature Descanso plants in bloom, he can make selections of varieties and bush forms adaptable to his own likes. The Descanso collection is not intended to include all the known varieties, but rather to feature those known to be outstanding, which will remain high in public esteem for many years.

The Descanso Rose Gardens present an educational opportunity for those interested in both cultural and historical data. The collection contains plants which are representative of times before the Christian era, to the latest popular introductions.

The Rose Gardens displays roses growing in every manner, from the trailing ramblers, hedges, arbor and trellis covers, to shrubs, bushes and borders.

A portion of the Rose Gardens. Completely labelled, one can enjoy a multitude of bloom and color and learn the history of roses as preserved here.

Many of the old roses are grown by the "arch and peg" method. This system of training allows gardeners to grow the roses, which normally require a great amount of space, in a very limited area. A few canes, up to 12 or 18 in number, are arched and pegged to the ground. All other growth is removed. The arched canes then produce buds over their entire length, producing an abundance of flowers.

The Descanso Rose Gardens may well be called a living museum, for many of the species and varieties represented there are no longer to be found in commercial nurseries. Without their preservation in collections such as in Descanso, these classic varieties would be lost to horticulture.

Greater respect and understanding of modern rose-growing techniques can be obtained upon viewing the Descanso planting, as they show the rose and its development from its most primitive forms. Also, one can see there many characteristics which certain ancient varieties have, which would well benefit modern varieties, such as resistance to drought, insects and disease.

In addition to roses and camellias, such plants as azaleas, rhododendron, fuchsias, begonias, outdoor orchids and other plants are being grown. It is the purpose of Descanso Gardens to show that it is possible to have color and garden interest the year-round in southern California, and to impart to the gardening public the knowledge and skills necessary for them to achieve a like situation in their own gardens.

ANTELOPE VALLEY TEST STATION

A Progress Report

DONALD P. WOOLLEY

THE Los Angeles County Department of Arboreta and Botanic Gardens maintains a small test site in the Antelope Valley near Palmdale, California. This article presents a brief report on a 14 months growing period at the test site.

Maximum summer temperatures during the period reported reached 109°F. Lowest winter temperature was 16°F. Recorded rainfall for 1957 was 10 inches. The plants received weekly maintenance of watering and weeding.

Performance of the plants has been tentatively and empirically rated as follows: 1—Excellent, 2—Good, 3—Fair. A rating such as 1-2 is the average performance of the total number of a particular species. An (*) means the plant is new to the area.

GROUND COVERS	
Clematis heraclaefolia	2
Pyracantha (sport)	1
Rosemary	1
SHRUBS	
**Acacia albida*	3
**Berberis wilsonii*	1-2
**Callistemon lanceolata*	1-2
**Callistemon phoeniceus*	1-2
**Callistemon salignus*	1-2
Ceanothus crassifolius	1
Cercidium torreyanum	1
Cistus spp.	1-2
Cotoneaster serotina	1-2
Deutzia spp.	2
**Eleagnus umbellata*	1-2
**Eucalyptus erythronema*	1-2
**Eucalyptus rodantha*	2-3
**Eucalyptus rugosa*	1-2
**Fontanesia phyllyraeoides*	1-2
Genista spp.	1
**Ilex wilsoni*	1-2
Lagerstroemia indica (dwarf)	1
**Ligustrum ibolium*	2
Maclura pommifera	1
Philadelphus spp.	1-2
**Prunus pumila*	2
Prunus sieboldi	1-2
Pyracantha spp.	1-2
**Salvia grahami*	1
**Sophora davidi*	1
**Syringa pinetorum*	2
Viburnum Opulus sterile	2
Vitex agnus castus	1
TREES	
**Actinostrobus pyramidalis*	1-2
**Albizzia julibrissin rosea*	1-2
Broussonetia papyrifera	1
**Catalpa ovata*	1-2
**Chilopsis linearis*	1
**Cupressus stricta*	1
*Golden Locust "Sunburst"	1
**Liquidambar orientalis*	1
**Maytenus boaria*	1
Parkinsonia aculeatus	2-3
**Pawlonia lilacina*	1-2
Pinus halepensis	1
Pinus pinea	1-2
**Pistacia atlantica*	1-2
**Quercus acutissima*	1
**Quercus variabilis*	1
Washingtonia filifera	1-2

NOTE: *Clianthus speciosus* (Sturt Pea or Desert Pea) has made successful growth during this summer (1958) and is setting seed. *Verbena peruviana* has also been successful.

COVER PICTURE

Typical of the thousands of annual visitors to Descanso Gardens, the young couple enjoy the world famous camellia display while Junior looks for squirrels or ducks. The Garden House (background) often features displays of flowers or other horticultural subjects, and is used as a classroom for the Adult Education Program.

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Lasca Leaves

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THE PRINCIPLES OF LANDSCAPE DESIGN APPLIED TO GARDENS

Presented before the Southern California Horticultural Institute, October 9, 1958

THIS IS A TOPIC which, at first glance, might seem to be very controversial because of the fact that design, and taste in design, can mean something different to each who observes or concerns himself with such matters. Design is what the individual sees and puts into any arrangement of objects or forms or patterns or colors when he undertakes to compose them in a manner he hopes will be pleasing. We do not all see eye to eye. Our backgrounds, experiences, education, all vary. These matters of training, as well as those of individual temperament and potential, affect our attitudes, our likes and our dislikes. Furthermore, both the abilities and the tastes of any individual, however talented he may be, incline to run rather a wide gamut of variation during the period of his lifetime.

So it is, in considering the principles of landscape design, that one must avoid personal likes and dislikes and consider only the basic controls which govern design. The principles are sound and fundamental. All artists, whatever their bent, have the same materials with which to work as do their contemporaries. Only that spark which the individual artist is able to provide can make one design different from another, if a common program and use requirement is established for the problem. From the same stock of ingredients may come products of highly varying quality.

Education has a great deal to do with both tastes and our abilities. Therein lies both a danger and a wonderful well of opportunity because we are inclined to enjoy and appreciate the things to which we have been educated. We usually like that to which we are accustomed and which we have been taught to like.

I recall an incident that occurred during World War II when I was driving the highways for countless miles on war housing work. I stopped to "give a lift" to a Marine with a busy thumb. Usually such beneficiaries of a weak moment immediately filled the car with an eye-smarting haze of thick smoke or fell asleep when they hit the cushions. Not this boy! He was alert and alive to the beauties of the roadside after having spent some months in Guadalcanal. And Guadalcanal he did not like. His first comment was, "My God, it is good to get back where they have billboards. I didn't see a billboard all the time I was in Guadalcanal. I come from Chicago where they have good billboards." What price background, education?

If one were born and raised in a stable, then a stable would be home sweet home to him. Thus it is important that we provide desirable surroundings for our children—and ourselves. And also it is important that we disassociate merely personal likes and dislikes when we consider the principles of design.

It probably is good that to the first title of this talk was added the afterthought,—"Applied to Gardens", since it pins it down a bit and makes it possible to talk of but one phase of the work encompassed by the profession of landscape architecture. *Landscape architecture deals with the planning of space, its use, and the placement of objects upon or within it. It is land or land-use planning.* At the turn of the century it was defined as "The Art of Fitting Land to Human Use and Enjoyment". Please note that it is a recognized art, by that definition and by general acceptance by the other arts. Initiated as a course of instruction in the most advanced schools of our country, late in the nineteenth century, it had an innocent beginning relatively free from complications. Quickly, however, it developed a side-arm of City Planning and other types of specialization, some of which have outgrown their humble beginning until they scarcely admit or recognize

the little red schoolhouse where the profession got its start. Now the well qualified landscape architect may engage in the design of home gardens, public gardens, parks, recreation areas, industrial grounds, schools, institutions, cemeteries, subdivisions and city planning of various sorts.

Although already quite specialized, landscape architecture probably is the youngest of the accepted professions, having been recognized as such, in this country, for little more than half a century. In other eras of culture, back through the centuries, it seemingly was the trend of the times for an artist to operate in many fields, not just in one branch of design. The architect also was the sculptor, the painter, the landscape designer. He produced a total product rather than just one phase of a given undertaking. And it was good, if we can judge from what has been left unto our day. Now the tendency is for collaboration of the many, each a "specialist" in some particular phase of all that it takes to complete a total project.

This comment, however, deals primarily with gardens and the principles of landscape design as applied to them. As landscape architecture probably is the youngest of all professions, so is gardening the oldest of professions,—as old as man, himself. Gardens are as old as the records and date from the Garden of Eden. The first garden was started when one of our ancestors crept from his cave and consciously planted a seed in the accumulation of debris which he had piled about its entrance. From then on our profession was in the running, though a bit embryonic. There are records of gardens that go back as far as 3000 B.C., the temple of Karnak in Egypt perhaps being the oldest one of note. The gardens of the Great Mughals, the Hanging Garden of Babylon, the lovely gardens of the Orient, those of the Renaissance in Europe (without reference to correct chronology) all are part of the garden heritage. In the great Euphrates and Tigris valleys of today's Iraq, are remnants of irrigation canals that are 1500 years old, with indications to suggest that those people knew much about the ways of plant growth in an arid land.

There have been many types and styles of gardening throughout the centuries. For the most part gardens have been designed for pleasure, enjoyment, leisure, peace and tranquility, for protection from the outside world and expansion of family life within their walls. The Roman atrium was a forerunner of the modern patio. The gardens of Babylon and the Moorish gardens of Spain expressed reaction to the harsh environment of their surroundings and made use of the sound and sparkle of water movement. The Italian gardens of the Renaissance reflected the society and environment of their time and stressed seclusion from outside influences. The Grand Style of le Norte (much copied by others) was a reaction to the lavish court life of that era. English gardens ran the gamut, copying many other styles and developing their own idea of the country park,—introducing the romantic and melancholy into some of their parks, by use of dead trees and gloomy objects. Even this country developed highly stylized garden design of considerable merit in the New England, the Southern and the Monterey Colonial eras, much of which still exists in original or copied form. Now comes the contemporary garden in an upsurge of creative design.

A design, of any kind, is neither good nor bad because it is traditional or contemporary. Whether or not one likes it may be purely a matter of taste, perhaps one of education—depending upon which billboard he was exposed to in his youth. However, the basic principles of design remain constant and apply to any style or type garden one may fashion. Regardless of its type, those which have been successful and have remained as satisfying examples of the art of garden design, always have expressed a way of life of a people and have been adapted to the climatic surroundings and environment of their location. Thus, each of those which are mentioned in this talk, was an expression of its day, of the people and their culture and their adjustment to physical environment. Without such adaptations a style does not develop and cannot live as an expression of a culture.

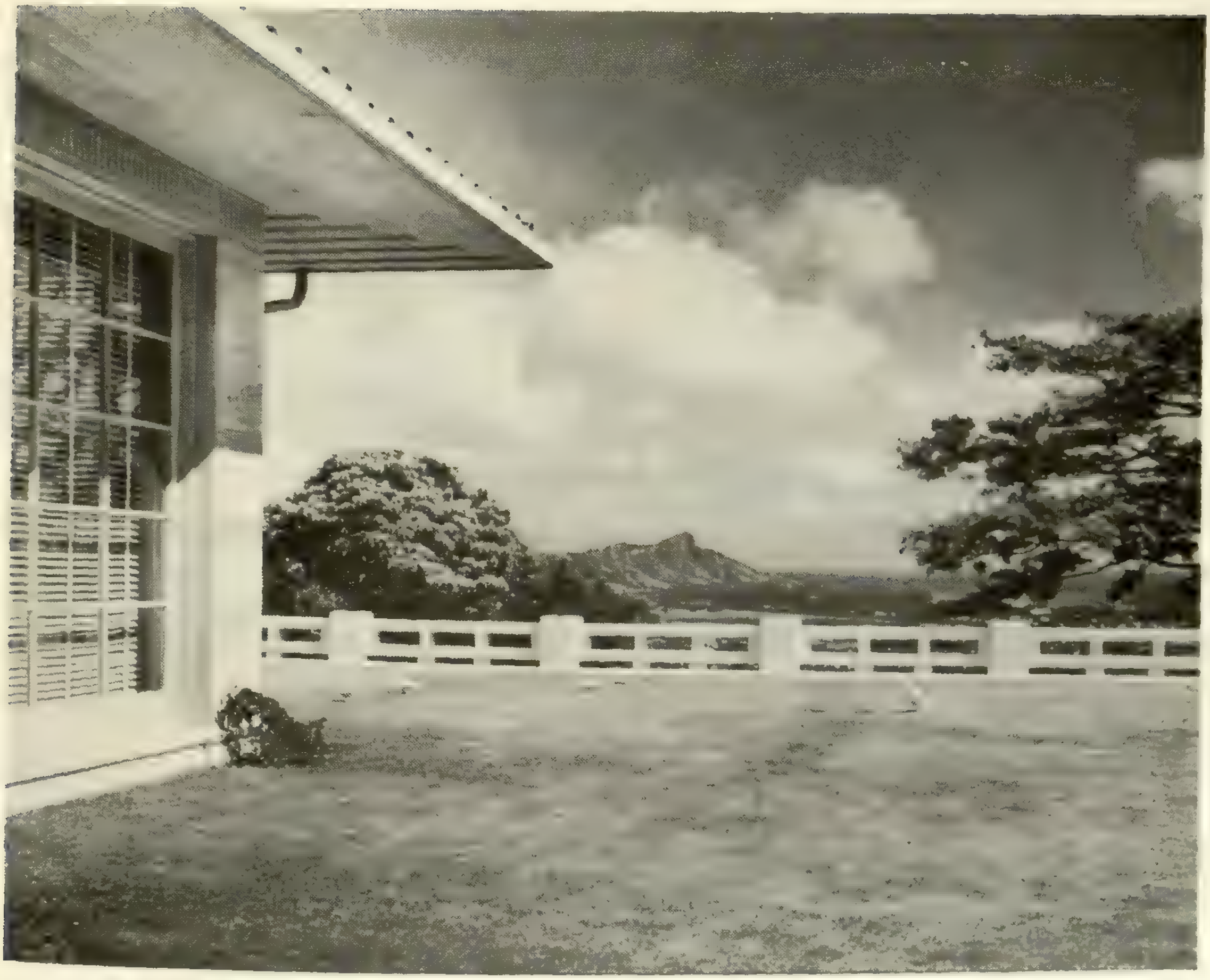
Very few people are endowed with creative genius. Most of us are followers rather than leaders. We try to copy something that another has created with feeling and understanding, but which we perhaps do not comprehend. True art has a meaning and expresses many things in many ways. A mere copying of zigs and zags, an uncomprehending use of tricks and foibles does not constitute good design.

The owner of a garden should have the type of garden that his heart desires, because that is why he builds it. It may not satisfy the tenets of good design but if it satisfies the owner, he (perhaps alone) is happy. Thus it always is important to know, at the outset, why one is building a garden. If the owner interest is dominantly horticultural and he wants only a plant museum, should that not be his privilege? If his garden is for social entertaining, or for personal seclusion, it should abet such uses. And if enough gardens develop along similar lines to express a community, a local or a national way of life,—then is a style developed. But the purpose, the reason, the program for its design must come before the garden is built.

A copy of any style, transplanted into a new land and different society, is a legitimate thing for anyone to possess but it is never more than just a copy of something else. It does not express anything vital within the current life of its new setting. Perhaps it may be a collector's item, justifiable only as such. Only as the designer is able to free himself from the copying of other work or other styles does he, himself, become a creative artist; and to be creative he must design to fit the conditions at hand. Since all designers have the same materials with which to work, it is the way these materials are used and put together that establishes the success of their effort.

Materials from which gardens are designed include space, air, land, sky, trees, forms of many kinds, textures, colors, architectural objects, sculpture—anything that is seen or used. With the purpose of the garden in mind, the designer seeks good space composition in the arrangement of his materials. He must recognize the need, the way of life, the program of plan and design before he starts. Without such understanding he expresses the wrong meaning.

LEFT: Framing a garden view focuses attention to a chosen spot and creates visual unity, a dominant note of interest. Honolulu, Hawaii. RIGHT: A garden for the collection of plants. La Mortola, Ventimiglia, Italy. Main axis to garden, Echimus, lavendula, spiraea, cercis. Cornell photos



Subordination of immediate foreground and enframement of distant view, brings outside landscape features into the garden. Honolulu, Hawaii. Cornell photo.

If a physician were to diagnose a patient's symptoms incorrectly, and prescribed on the basis of his diagnosis, he would be treating the wrong ailment and might not succeed in a cure. Similarly, if one fails to analyze the garden problem and need, it is very possible that he may build a garden without much meaning or use efficiency. He must adjust his pattern and detail to the site, its topography, its size, shape and surroundings as he "applies the principles of design" to his problem.

These design principles are constant for all of the Arts—for music, painting, architecture, sculpture, home decoration, dress design, whatever may be. They seek unity, with interest, and become concerned with balance, rhythm, repetition, sequence, texture, form, accent, contrast, color, dominance and subordination. If one is familiar with any one of the arts he may apply the basic principles that govern that art to any of the other forms of expression.

Although unity is sought in all design, absolute unity may become monotony, just as utter lack of unity does become chaos. In a musical score, complete unity of note and tone may be tiring; and so the composer introduces a bit of contrast in the form of staccato or allegro to give animation to the composition. He adds sparkle by injecting accent, contrast and color, and change of pace. Crescendo and diminuendo contribute variety and the elements of dominance and subordination enter into his composition. From these comments it will be apparent that I am not a musician but I try to make a point. These same values enter into any design and most surely apply to a garden.

First of all, by the simple etymology of the word, a garden is an enclosed space. It does not become a garden until it is enclosed. Enclosure thus provides the first sense and awareness of unity but, alone, may not create interest. So following the program one then

decides what is to be the purpose and dominant motif of the garden, how the subordinated elements are to contribute to that dominance and how interest and variety can be introduced to animate the design without loss of unity and functional efficiency. Faithfulness to idea and purpose is very important, particularly since there seems to be a human tendency to collect things. If all plants and objects within a garden carry individual interest to the point where they attract attention to themselves they become competitive and can very quickly defeat the principles of design by approaching or creating chaos. If a lady designs a dress well, she does so with more concern for the ulitmate effect than for the quantity of lace, ruffles and embroidery she can bestow upon the tout ensemble. So it should be with the garden. Use what you already have of experience, and apply it to the design of the garden. One sometimes observes a tendency to confuse a multitude of details with design. It takes more than a collection of gadgets to create a garden.

And then there is color. Design can be done in color, just as in form, space, line or texture, but the garden designer must consider the complex use of all these factors. His problem is not simple, and color is a medium that carries tremendous impact. In fact the power of color is so great that it, alone, may make or ruin a design. It carries psychological, as well as, visual significance. We all know that we can be "tickled pink" or turn green with envy, purple with rage, white with fear; we feel blue, act yellow and sometimes get a dark brown taste that dissipates but slowly. Such metaphor is not idle chatter but carries a deep connotation which should be heeded well by those who "dabble in color".

Entertainer's Garden, Demonstration Home Garden, Los Angeles State and County Arboretum. Circular colored stepping stones lead to a small mirror pool. From the raised deck patio, one can look out over the entire garden. Structures are of concrete, cement blocks and redwood. Colors are many, pastel in tone, gay and very pleasing. Denis Kucera photo.

Mental hospitals, industrial plants and "practical" business men have learned the significance and value of proper color use in relation to human reactions and efficiencies. When a highly exciting color film is shown in the theater and warm spotlights are used, the air-conditioning units of the theater are taxed to compensate for increased body temperatures of the audience, incited by the color. After such a show has closed, condensation gathers on walls and ceilings to cause plenty of trouble for the technicians.

The same principles apply to the use of color as apply to all other media of design. Color presents excellent opportunity and material for establishing unity, accent, focal interest, rhythm, harmony, contrast, scintillation, and so on. Since it can be dynamite however, it is important that it be used only with skill and intelligence. A little intense color might be very good in a situation where excessive use of color would destroy the composition entirely. Let's say that a suit of clothes has a hundred times as much material in it as has a single necktie. Then, if a red necktie is par excellence as a coup in haberdashery, is a red suit one hundred times as good? Que dicen, amigos?

Now, how do garden design and horticulture relate one to another? Each is dependent upon the other if it is to achieve its highest expression, and yet they are entirely separate professions. Training or skill in either of the two does not insure one's understanding of the principles that govern the other. A good landscape designer may be a poor horticulturist and knowledge within horiticultural fields does not qualify one as a landscape architect—although there seems to be much lack of understanding of such fact. With building construction, a skilled mason or carpenter, who knows his trade well, seldom considers himself to be an architectural designer. So it is in landscape work, a knowledge of plants does not suffice to certificate one as a designer.

With gardening as perhaps the oldest profession of man, it would seem rather logical that the best results in garden building might be achieved by the "wedding" of garden design and good horticultural practice. Each will profit by its consideration for the other. To realize its highest development, each must depend upon the other. The landscape architect and the horticulturist should join hands and work together, rather than as independents who assume responsibilities for which they may not be trained.

It may be helpful quickly to enumerate some of the common pitfalls to which many of us fall heir in building a garden. They would include, but not be limited to, the following:

(1) Lack of a precise program.
(2) Failure to hold to a firm objective.
(3) Overcrowding of things within a design pattern, with too many items of individual interest.
(4) Lack of a dominant feature or motif, in relation to which other details are subordinated.
(5) Confusion tending toward chaos, instead of simplicity and unity.
(6) Failure to provide proper enclosure and to screen from view the neighborhood distractions of many kinds.

Although it is oft misquoted it still is good, and I would like to close these hurried and inadequate remarks with words spoken by Francis Bacon, about three hundred years ago, who said: "God Almighty first planted a garden and, indeed, it is the purest of pleasures. It is the greatest refreshment of the spirit of man, without which buildings and palaces are but gross handiwork: and man shall ever see that when ages grow to civility and elegancy, man shall come to build stately sooner than to garden finely, as if gardening were the greater perfection".

FERNS CULTIVATED IN CALIFORNIA

BARBARA JO

PHYLLITIS

The Hart's-tongue fern, *Phyllitis scolopendrium,* is a familiar garden fern in the northern hemisphere. The tongue-shaped fronds for which this plant is named are oftentimes ruffled, fringed, forked or otherwise different from the normal condition. In the nursery trade, this plant is best known under the older name *Scolopendrium vulgare.*

Evergreen and very hardy, this fern is much to be desired in northern gardens. In warmer southern gardens it also does well, preferring a well-shaded location. The often-heard recommendation to add lime to the soil is based on the frequency in which this fern is found growing wild on limestone rocks. Lime is usually applied as oyster shell or dolomite. Such additions may not be necessary, especially if the soil used in the planting mix contains adequate calcium, or if the water used is hard with a low sodium content. Propagation is by spores.

Members of this genus are small evergreen ferns. The rhizome is erect, bearing the fronds in a cluster. The stipes are coarse and scaly. The frond is simple, entire, and strap-shaped; the tip ends in an acute point, the base is heart-shaped, the texture is thick-leathery. The veins are free, twice-forked, extending from the midrib to a point short of the margin, where the ends of the veins are enlarged or thickened, forming hydathodes. The sori (clusters of fruiting bodies) are linear and in pairs. A sorus is borne on the upper vein branch and one on the lower vein branch. The indusium is shaped like the sorus, and opens toward its partner. This genus has also been known under the names *Asplenium* or *Scolopendrium.*

There are over 500 described cultivars. Some of the more common types found in California are:

cv. 'Crispa'. Edges of the frond ruffled.
cv. 'Cristata'. Ends of the frond tasseled.
cv. 'Fimbriata'. Margins fringed.
cv. 'Muricata'. Fronds erect, long and narrow, the upper surface with a linear ridge or a raised corrugation sometimes bearing the sori.
cv. 'Sagittata'. Eared base extended.
cv. 'Variegata'. Variegated.

DOODIA

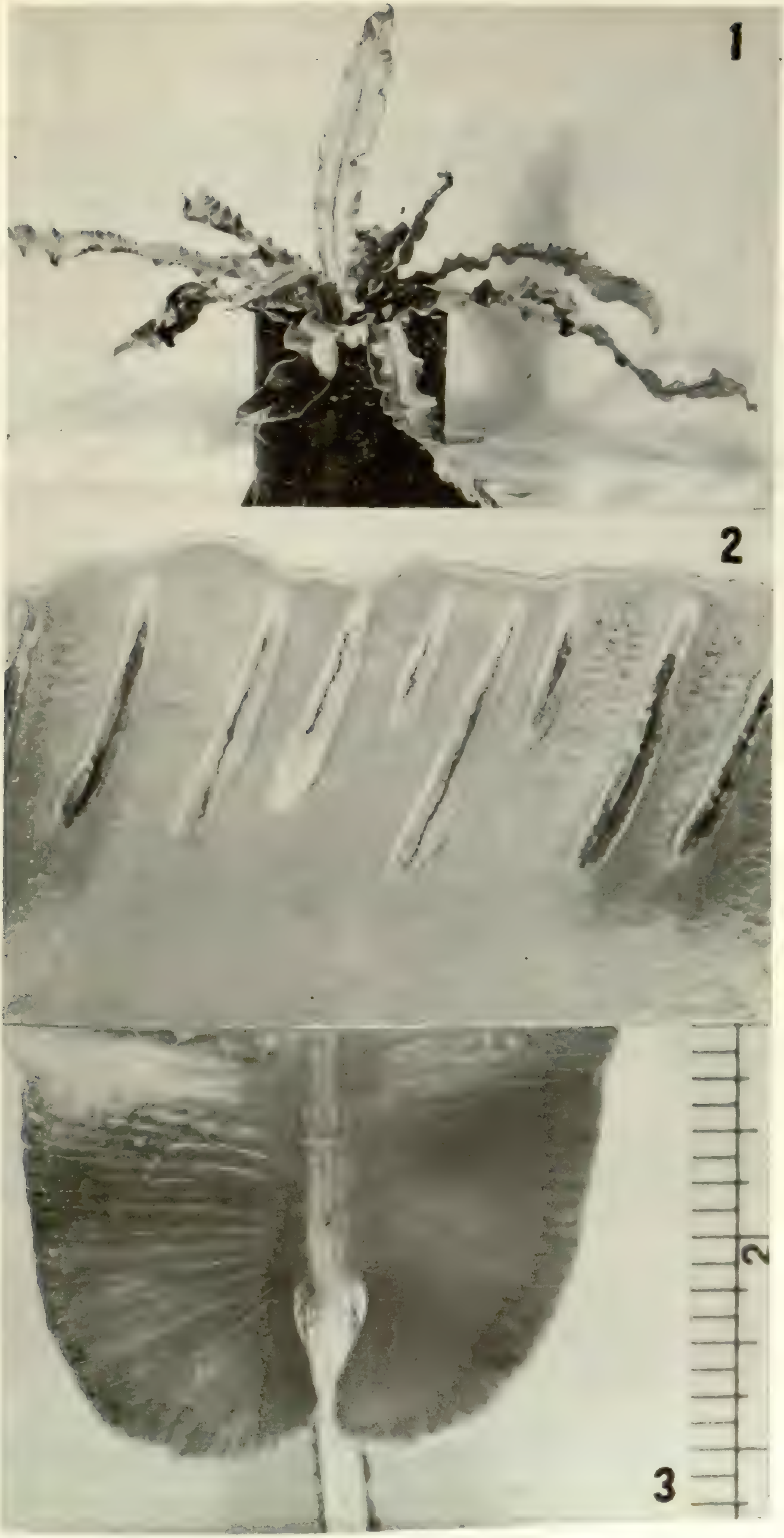
The Hacksaw fern, *Doodia,* is one of a small group of ferns occasionally cultivated in rock gardens or fern beds. Young ferns are sometimes used as table ferns. The fiddlenecks and young fronds of our cultivated species, *D. media,* are much admired for their red color which is gradually replaced by a deep forest green as the fronds mature.

Doodia media is considered hardy to semi-hardy in southern California. Inland and further north this fern may be more sensitive to cool temperatures, and may need to be planted in a protected place or a cool greenhouse. In the southern coastal areas this fern withstands some direct sunlight. The remaining cultural requirements of this species are the usual ones required by ferns. Propagation is by spores or occasionally by divisions.

The genus *Doodia* contains about ten species. They are native to Polynesia, Australia, and Ceylon. The ferns are small; the ascending harsh-scaly rhizome bears the rigid fronds in a cluster. The stipe is dark and scaly at the base, the blade is pinnate or pinnatifid, narrowed at both ends, and the many pinnae are closely set, sharply toothed, and harsh in texture. The veins are netted to form one or more rows of areoles (meshes) on each side of the midrib; elsewhere, the veins are free and forked. The sori are curved or oblong, in one or two rows on each side of the midribs of the pinnae and parallel to them. The membranous flap-like indusium is shaped like the sorus; it opens toward the midrib, and is attached to a vein of the areole.

Phyllitis scolopendrium:

1. Habit;
2. Close-up of leaf edge showing sori;
3. Base of frond.

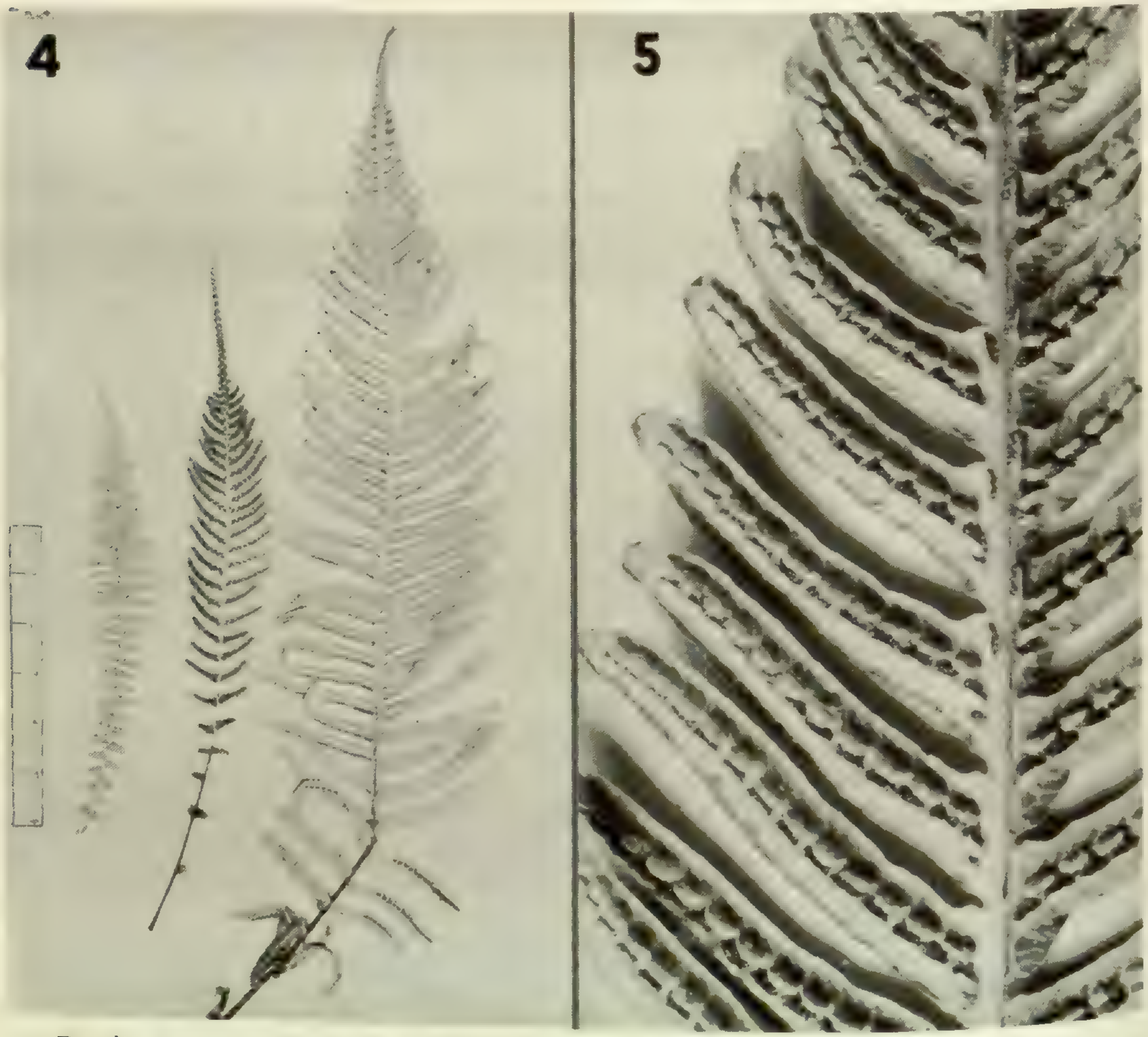


Doodia species are readily distinguished from other cultivated ferns by their small narrow pinnate or pinnatifid fronds with the oblong sori borne parallel to the midrib of the segment. Other species reported to be cultivated in the United States are *D. aspera* R. Br. and *D. caudata* R. Br.

PYRROSIA

Among the forty types of hanging basket ferns cultivated in California gardens, there is one that is distinct because of its felt-like texture. The Japanese felt fern, *Pyrrosia lingua,* as it is called is also known as the Tongue fern, a common name less suitable because of the many other species with tongue-shaped fronds. The fronds of this plant are long-lived. Close examination of the surfaces will reveal a dense covering of star-shaped hairs which help to keep the blade from drying out. The frond itself, however, is very thick and capable of storing some water to carry it over a mild dry period. In the nursery trade this fern is best known under the synonym *Cyclophorus lingua.*

The rhizomes and fronds of mature specimens will often cover the baskets, forming a mass of foliage. In southern California, the baskets are left outdoors through the winter. However, in areas with frost this is not advisable. Northward the fern should be treated as a cool greenhouse subject, at least during the winter months. Though this fern is not a rapid grower, there is nothing difficult about its culture. Once it is established, all it will require is a shaded place and adequate moisture. Portions of the rhizome will take root when secured to a layer of moss and kept moist .



Doodia media: 4. The two smaller fronds nearest ruler are *D. media;* the large frond is *D. media* var. *Brackenridgei;* 5. Frond of *D. media* showing sori.

The hundred or so species belonging to the genus *Pyrrosia* are distributed mainly in the Old World tropics. They are small epiphytes with slender creeping rhizomes. The fronds are usually simple and entire, leathery, and covered with stellate hairs, at least on the under side of the frond. The veins are immersed in the frond and difficult to see; they are finely netted with included veinlets. The sori are borne on the under surface of the frond; they are round, close together, and sometimes confluent. They are not protected by an indusium. Members of this group have been known under the names *Niphobolus* or *Cyclophorus*. *Pyrrosia* is the botanical name used by contemporary botanists.

Several cultivars are apparent among the cultivated material. Some have margins which are wavy or slightly ruffled, another is variegated. Cultivar 'Variegata' has bands of yellow extending from the midrib to the margin. The amount of variegation varies considerably from plant to plant. The slender rhizome, the simple, entire frond with the tapering base, and star-shaped hairs readily separate this fern from other cultivated species.

LLAVEA

The airy light green foliage of *Llavea cordifolia* presents an interesting contrast to the usual darker greens of our other cultivated ferns. Long cultivated in European greenhouses, this fern has not been well known in California. This is indeed surprising since the native home of the fern is in nearby Mexico and Guatemala. Because the fertile parts of the frond are distinctly different from the sterile parts, this has sometimes given rise to the common name Flowering fern, alluding to the narrow fertile pinnules as being flowerlike. However, this common name is also applied to species of *Osmunda*.

In the mild climate of southern California, this fern may be grown outdoors in protected places. In the inland areas or where cooler winter temperatures prevail, the foliage does not maintain its best appearance through the cool months. Should temperatures drop consistently below 40°F. it may be best to keep the plant as a greenhouse subject. The remaining cultural requirements are the usual ones for ferns. Propagation is by spores or occasionally by divisions.

The genus *Llavea* has only one species. The rhizome is scaly, short and stout. The fronds are borne in clusters, erect and then moderately arching. The stipe is covered at the base with large needle-shaped scales, which are lemon-color when young and darken with age. The blade is tripinnate. The sterile segments are ovate, more or less serrate and about 1 to 2 inches long. The fertile segments are linear in shape and always appear toward the top of the blade. The veins are free and repeatedly forked in the sterile segments and once forked in the fertile segments. The sporangia (fruiting bodies) are borne all along the veins, and often spread over the entire under surface of the segment. The margin is reflexed in the fertile segment and partially covers the sporangia.

The Royal fern, *Osmunda regalis*, which is seldom cultivated in California, has contracted fertile pinnules at the top of the frond. However its fronds are bipinnate rather than tripinnate and it does not have yellow scales.

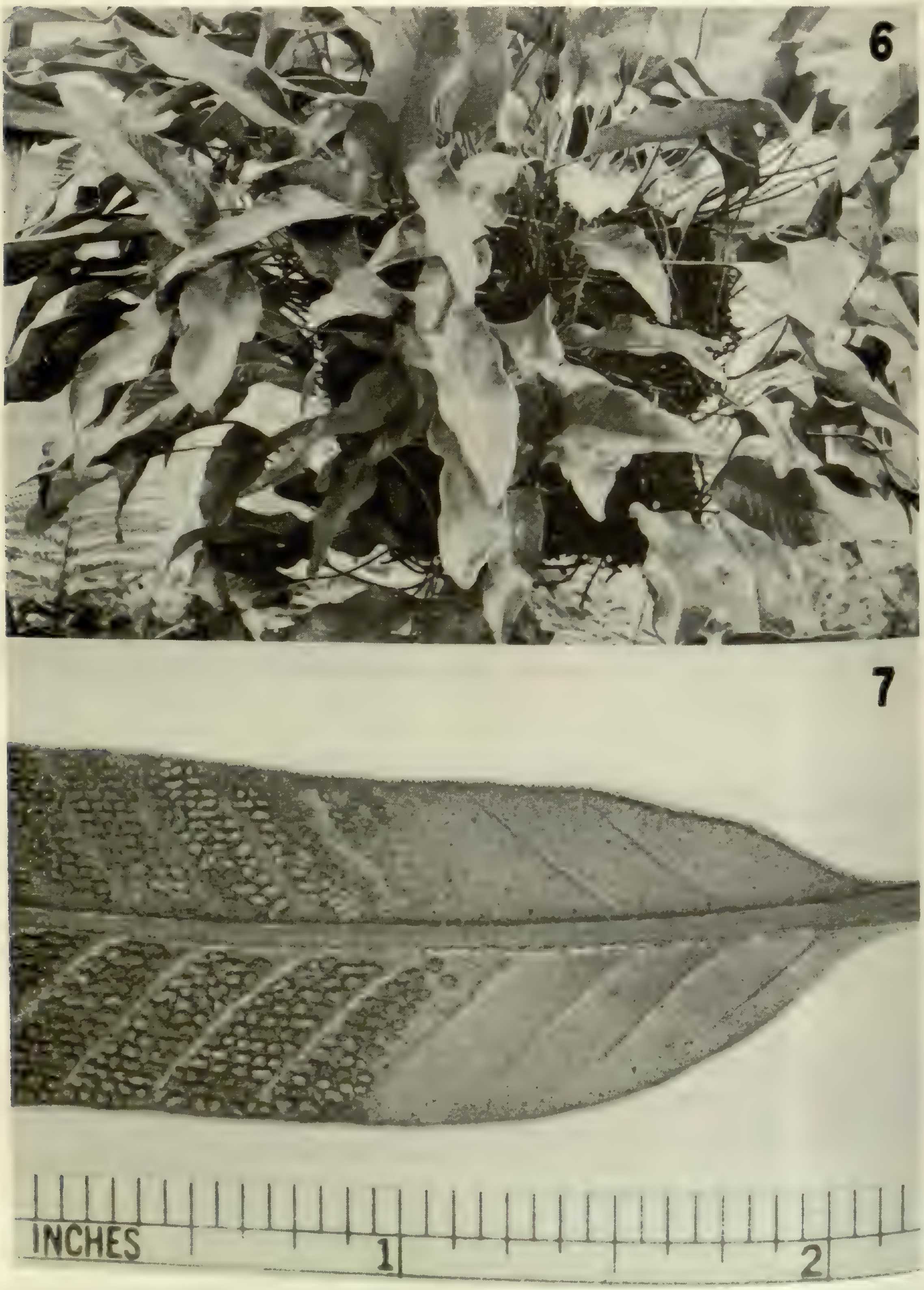
SUMMARY

Phyllitis scolopendrium (L.) Newm. *(Scolopendrium vulgare)*. Only one species is cultivated in California, and most plants seem to be derived from the European species rather than the American variety. Hart's-tongue fern. Evergreen fronds stalked; blade strap-shaped, the base eared, the tip acute, sparsely scaly beneath except along the midrib where the scales are more prominent. Very hardy. To 1½ ft. Shade. Europe and North America. A decorative fern for rock gardens or beds because of its bright, glossy-green fronds and evergreen habit. The normal frond is distinct from all cultivated strap-shaped ferns by its eared base.

Doodia media R. Br. *(D. lunulata)*. There is apparently only one species and a variety cultivated in California. Fronds 6-12 in. long, 2-4 in. wide. Lower half of the frond pinnate, pinnatifid above. Pinnae stalked below, gradually becoming sessile

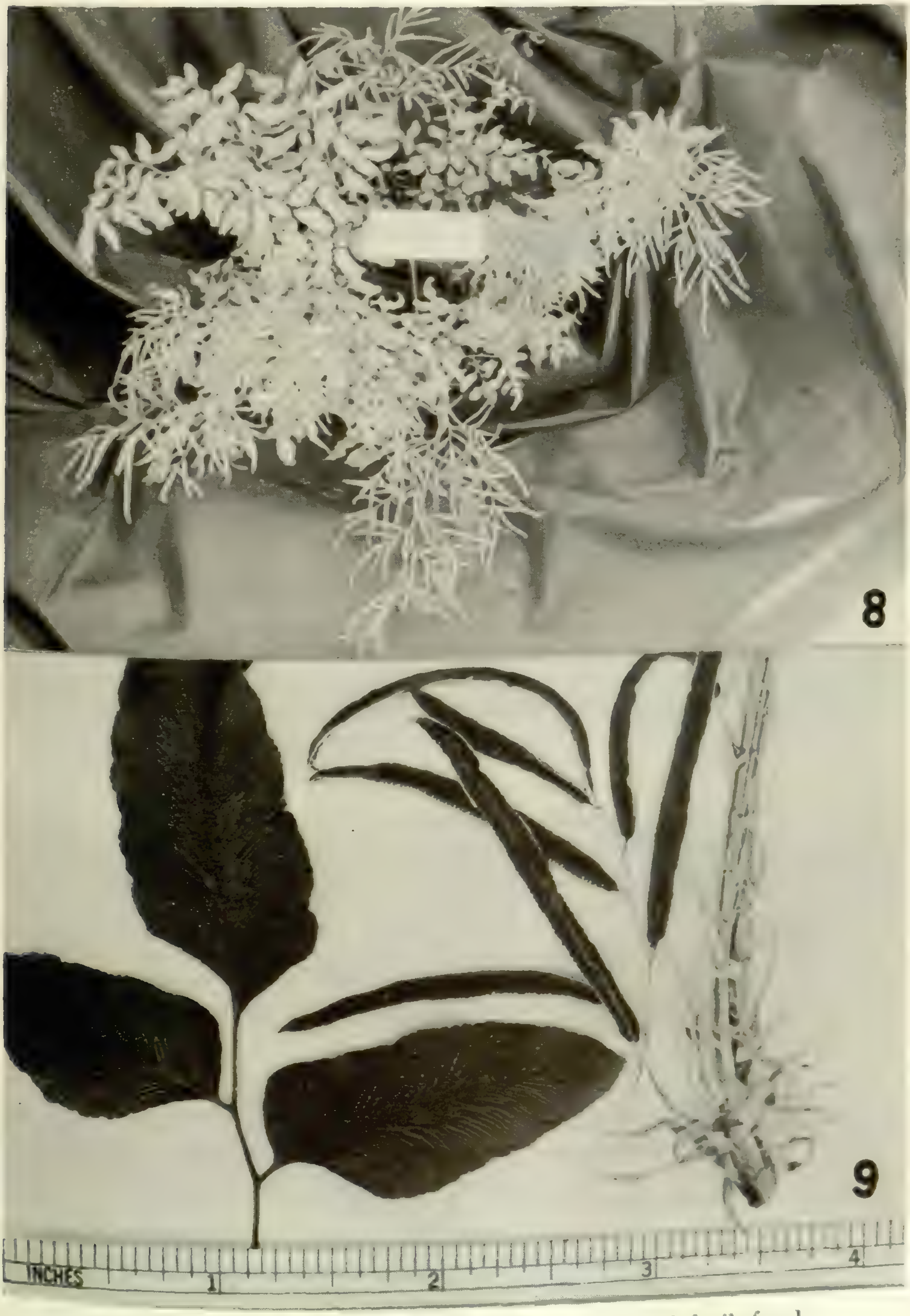
above, free except in upper part of the frond. Pinnae short-linear to oblong, the lower ones cordate, the apex blunt, acute. Sori in one row on each side of midrib. Hardy to semi-hardy. Evergreen. To 1 ft. Tolerant of some sun. Australia, New Zealand, Polynesia.

This species has long been confused



Pyrrosia lingua: 6. Habit; 7. Base of frond and sori.

with *D. aspera,* which is pinnatifid throughout, except sometimes the lowest pinnae may be free. In *D. media* the lower half of the frond is pinnate. Until the many *D. media* variations are critically studied, the following variety is but tenta-



Ilavea cordifolia: 8. Habit; 9. (left to right) Sterile frond, fertile frond and base of stipe showing scales.

tively recognized;

var. *Brackenridgei* Carr. Fronds 12-20 in. long, 2-5 in. wide. Pinnae long linear, apex acute. Sori in 2 irregular rows on each side of midrib. To 1½ ft. Viti. Larger than the species, best planted in fern beds.

Pyrrosia lingua Farwell. *(Cyclophorus lingua, Niphobolus lingua).* Japanese felt fern, Tongue fern. Rhizome slender and creeping. Fronds simple and entire, oblong-lanceolate, covered with stellate hairs which are denser on the under surface. Semi-hardy. To 1 ft. Shade. Evergreen. Japan, China, Tonkin, and Formosa.

Llavea cordifolia Lag. A handsome fern for accent use. Semi-hardy to tender. To 2 ft. Shade. Medium to rapid in growth. Mexico and Guatemala. It is readily recognized by its yellow-green foliage, the canary-yellow scales on the stipes, the ovate sterile and linear fertile segments. The latter are always borne at the top of the frond.

HISTORICAL RESEARCH PERTAINING TO THE ORIGINAL HUGO REID ADOBE HOUSE

WILLIAM J. WALLACE

INTRODUCTION

IN PREPARING TO RESTORE an historical structure, two types of research are regularly undertaken in order to determine as nearly as possible its original appearance. One is archaeological, digging into the soil in a search for buried foundations and other subsurface remains. The other is historical, examining the archives for maps, deeds or other records, descriptions by visitors or travelers and pictures of various sorts relating to the building. These two approaches complement one another; combined they provide the fullest possible evidence.

Both lines of research have been followed in providing data for the restoration of the Hugo Reid Adobe, part of which still stands on the grounds of the Los Angeles State and County Arboretum in Arcadia, California. Archaeological exploration has proven extremely fruitful and considerable knowledge concerning the earliest form of the building has been secured from it.[1*] Historical records have provided less information.

HISTORICAL RESEARCH

An effort was made to bring together all available historical material published and unpublished, relating to the original Hugo Reid ranch house.[2] This involved a considerable tracing and combing of sources in libraries and other institutions of California. Collections in the Huntington, Bancroft, University of Southern California, University of California (Los Angeles), California State, Los Angeles County Museum and Southwest Museum libraries were consulted. Documents at the Santa Barbara Mission and in several Los Angeles county agencies were also checked. Time and facilities were not sufficient to allow for the investigating of all possible items, scattered in various parts of the state and nation.

Of particular value were the documents, maps and testimony of the witnesses gathered together for the land claims case for Rancho Santa Anita upon which the Reid Adobe

*All superscript numbers refer to footnotes or bibliography, which are found at the end of this article.

homesite was located. This hearing was held before the Board of United States Land Commissioners in September and November of 1852.[3] Also useful was Hugo Reid's correspondence, the bulk of which is in the Abel Stearns Collection of the Huntington Library.[4]

As research progressed it became increasingly evident that there were only stray bits of information available. When assembled, however, these provide some information on the Reid residence and allow for the drawing of certain inferences.

THE EARLY HISTORY OF RANCHO SANTA ANITA AND THE HUGO REID ADOBE

Santa Anita Rancho was formerly a San Gabriel Mission property. This landholding of gently sloping, grassy land, oak-covered foothills and narrow canyons was three square leagues in extent.[5] It reached north to the San Gabriel Mountains and was bounded on the east by Rancho Azusa de Duarte and by Rancho Pasqual on the west. During mission days the *rancho* served as a grazing ground for herds of sheep and goats and, presumably, cattle. The land was well suited for this purpose. Native grasses and herbs furnished excellent pasturage, whether green in winter or dry in summer. There were year-round pools of water for thirsty animals to drink from and oaks and other trees under which they could find shade on hot days.

Under mission ownership, the *rancho* was uninhabited except by Indian herdsmen. These retainers probably lived in easily constructed grass- or brush-covered shelters. No satisfactory evidence has been found that an adobe house was built to shelter them or an occasional visiting padre such as were erected at Rancho San Bernardino.[6] No reference to any structure is made in the *Informe on Mission San Gabriel* 1802-1822 which lists mission properties.[7] A similar list compiled in 1827 by Father Sanchez likewise mentions no buildings.[8]

When California came under the flag of Mexico, following the successful revolt from Spain in 1822, a new land policy led to a gradual relinquishing of mission lands by the padres and made possible their granting to individuals. Their disposal was left to civil officials with final disposition in the hands of the governor himself.

The sprawling acres of Santa Anita attracted several petitioners for ownership—Jose Maria Ramirez in 1834; in 1839 Bernardino and Jose Maria Lopez, Jose Antonio Carillo, Vicente de la Ossa, and Jose Antonio Yorba all asked for Santa Anita or parts thereof.[9] It was not a native Californian, however, but a newly arrived foreigner, Hugo Reid, who finally received title to the three-square leagues of Santa Anita. Reid, a well-educated Scot, had settled in California in 1834.[10] Two years after his arrival, he swore allegiance to Mexico and adopted the Catholic faith. Now known as Don Perfecto Hugo Reid, he soon identified himself with the life in the province. Unlike many other foreign settlers in California, he did not seek the hand of a daughter of one of the rich and influential Spanish-Mexican families. Instead, he claimed as his bride a mission-trained Gabrielino Indian woman, Bartolomea Comicrabit, later known as Victoria.

In May 1839 Reid applied to Juan Bandini, Prefect of the District and administrator of San Gabriel, for ownership of the land.[11] His formal petition affirmed his Mexican citizenship, described the desired tract of land.[12] The *Ayuntamiento* or City Council of the Pueblo de los Angeles was asked to look into the matter. Its committee on vacant lands, finding that Don Perfecto had all necessary qualifications and that the land was unoccupied, recommended that he be given the grant. The *Ayuntamiento* passed favorably upon his request. Their proceedings of May 11th, 1839 record the following:

> "... that at present it (Santa Anita) is partly occupied by a small number of sheep and some short crops kept by the Indians, and since the petitioner's claim is strengthened by his family, it recognizes that he has some right in his favor ..."[13]

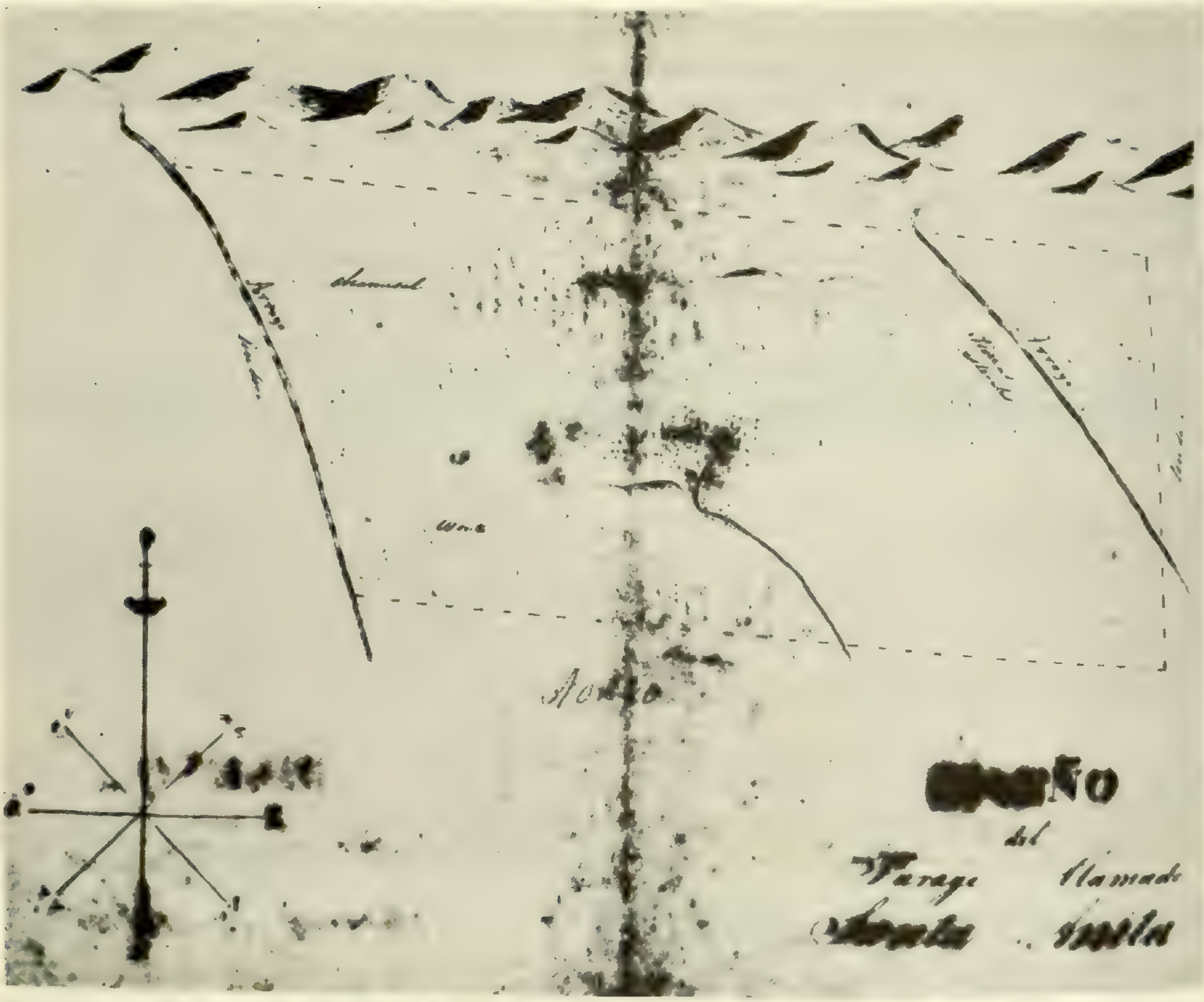


Photo-copy of Hugo Reid's 1839 *diseño* sent to Bandini and then to Juan B. Alvarado, governor of the province. Site of Adobe in center of map.

Reid's 1839 petition was accompanied by the usual *diseño* or map of the desired land-holding which showed its location, area, natural boundaries, landmarks and names of contiguous grants. This earliest *diseño,* prepared by Reid himself, depicts no house or cultivated fields.[14] The petition endorsed by Bandini was sent on to the governor of the province, Juan B. Alvarado. It was next transmitted to the Departmental Assembly at Monterey which passed favorably upon Reid's request. Actual title was slow in coming, however. After nearly two years had elapsed, Reid again filed a claim for possession. He received provisional ownership from Alvarado on April 16, 1841.[15] Not satisfied with this somewhat precarious title, which amounted to nothing more than a right to occupy, he continued to request a firmer one. The provisional grant was renewed by Governor Manuel Micheltorena on July 5, 1843. At this time Fray Thomas Estenaga of San Gabriel Mission strongly supported Reid's claim in a note to the Governor dated June 5, 1843, in which he stated,

> "The title of property in the land which they call Santa Anita can be granted to the interested party because it is unoccupied entirely and for reason of services rendered for the benefit of this Mission by his wife and her late husband Pablo who rendered so much services to the said Mission."[16]

The question of title was left unsettled for another two years. It was not until 1845 that it was finally confirmed by Governor Pio Pico.[17]

Hugo Reid had not waited until full title was received before occupying Santa Anita. Almost immediately after the *Ayuntamiento* had passed favorably upon his first petition, he took possession. Juan Bandini did not object to Reid's taking over the *rancho* even though the grant had not yet been received from the Governor. Don Perfecto brought

cattle and horses to his new landholding, sowed wheat and set out a few fruit trees. All of this was done to fulfill his obligations and to strengthen his claim to the property for Mexican land law required that a grantee, in addition to being a Mexican citizen and a Catholic, should occupy the land, stock it with cattle, build a house on it, and plant some trees.

Hugo Reid did not at once build a permanent house at Santa Anita. Instead he erected a temporary shelter. The dwelling probably had walls of upright poles with branches intertwined and was thatched with straw or grass. In a letter to William Hartnell, pioneer English merchant and trader, on November 12, 1839, he reported that,

> "As the season is far advanced I have merely put a straw *(sic)*[19] habitation on it for the boys. At present they are making *corrales,* sowing wheat and preparing wood to fence a piece for gardening."[20]

Two months later, on January 27, 1840, he again wrote to Hartnell, this time referring to the house as a "*jacal,*" a Mexican Indian term for a dwelling made of poles covered with grass, brush or tules. In it Reid also mentions having built a new house at the mission, "flat roof'd and corridor'd."[21] A little over a year later, in a letter to Governor Juan Alvarado, dated April 12, 1841, he describes having built a "... *casa de pared*" (solid-walled house) "where some person, assigned by me would always stay to look after all that is there ..."[22] This was presumably the adobe house, part of which still stands. It was constructed sometime between January 27, 1840 and April 12, 1841; probably during the summer or fall of 1840.

No contemporary description of this house has been found, perhaps because it was like so many others of its time and did not impress visitors or travelers. The only illus-

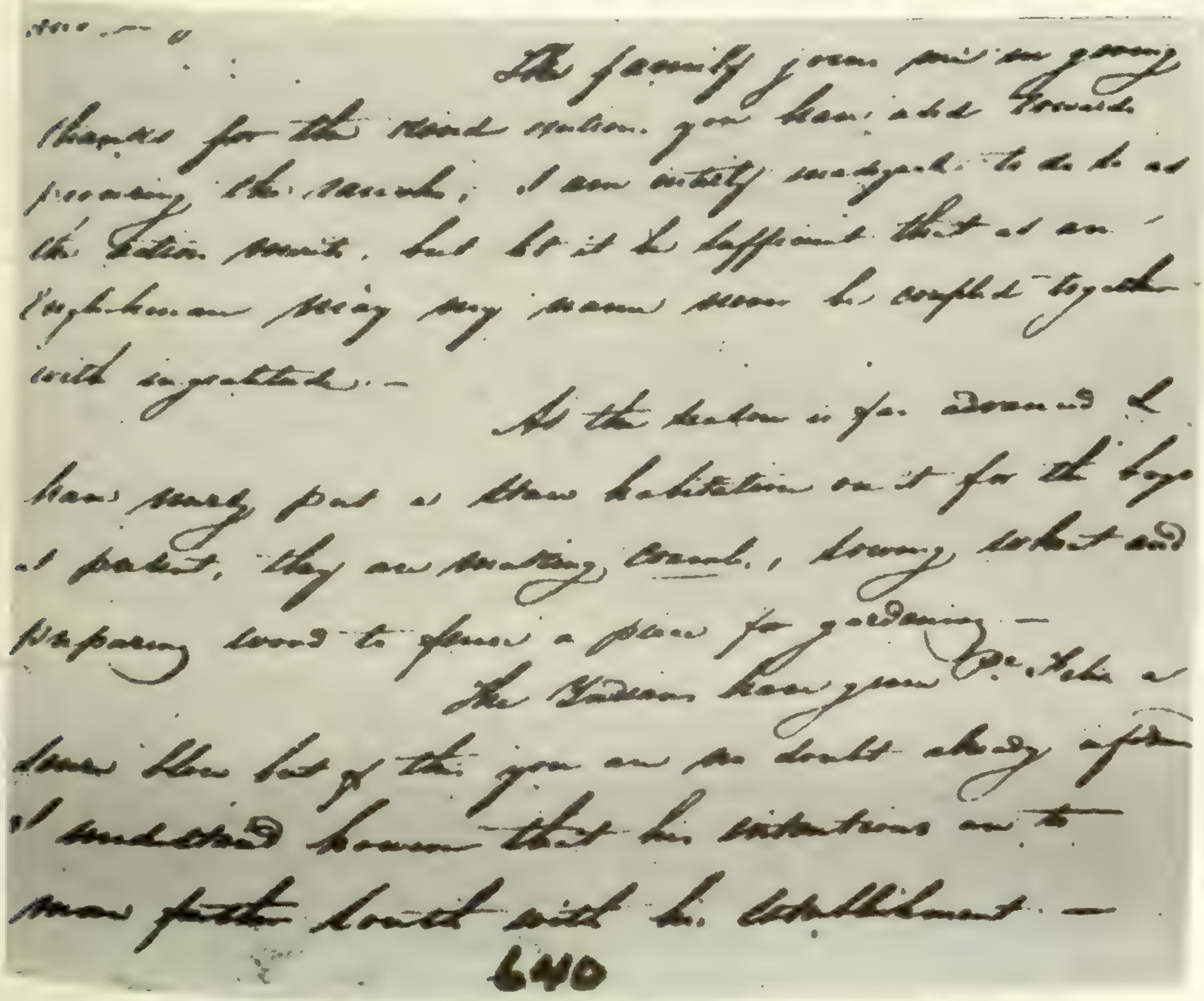


Photo-copy (from Bancroft Library) of a portion of Hugo Reid's 1839 letter to William Hartnell. See text.

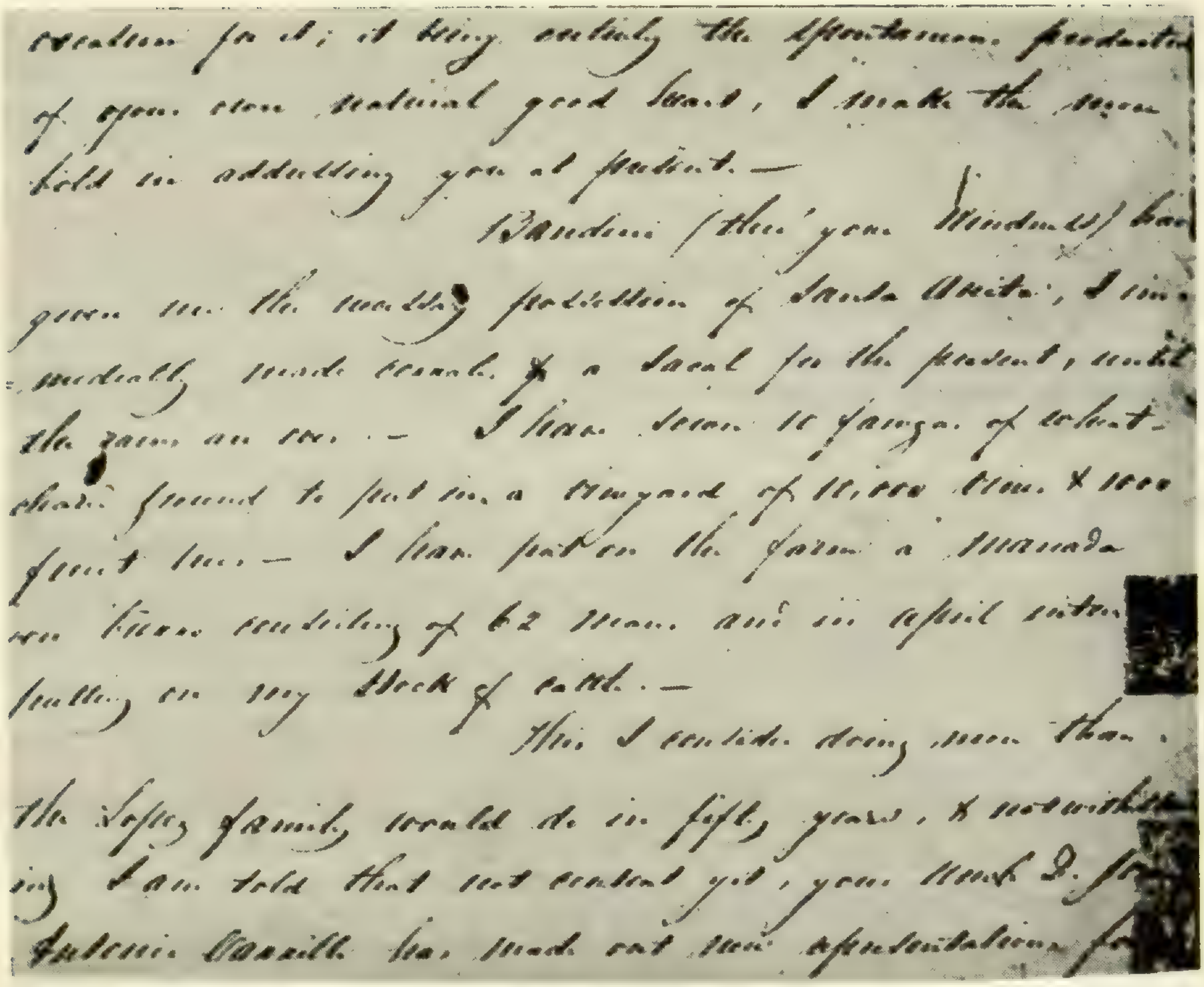


Photo-copy (from Bancroft Library) of a portion of a second letter to Hartnell in January, 1840. See text.

tration is a tiny sketch drawn by Hugo Reid on the *diseño* which accompanied his petition to Governor Pico on March 17th 1845. This shows a modest structure with a single door and window. Other details are open to different interpretations. The sketch may be a stylized representation and not intended as an accurate picture of the building. In any event it is too tiny to give much information on the house's original appearance.

There is little doubt that the earliest adobe dwelling was a rather rude affair. Most outlying ranch houses of this period were small buildings with only two or three rooms. *Rancheros* added to their houses as they prospered and their families increased in size. Archaeological findings indicate that Don Perfecto's house had three rooms, an earthen floor, stamped and pounded until it was hard and firm, and was without fireplace or chimney. Cooking, presumably, was done outside in an open shed or special oven.

The spot selected by Don Perfecto as the site for his ranch house was a small rise of ground on the shore of a shallow spring-fed pond or lake. On the 1845 *diseño* this is designated as a *"cienega"* or swamp rather than as a *"laguna"* or lake. This suggests that it was more of a tule-choked marsh than an open body of water. It is quite possible that there were no plantings close to the house as remote ranch houses of this period were regularly erected on slight elevations of land, clear of trees and shrubbery, so that bands of approaching Indians could easily be observed. Andres Duarte, on neighboring Rancho Azusa de Duarte, placed his house on high, open ground free of trees and other plant growth.[24] William Heath Davis describes this as typical.

> "The houses of the rancheros were usually built upon entirely open ground, devoid of trees, generally elevated, overlooking a wide stretch of the country round, in order that they might look out to a distance on all sides, and see

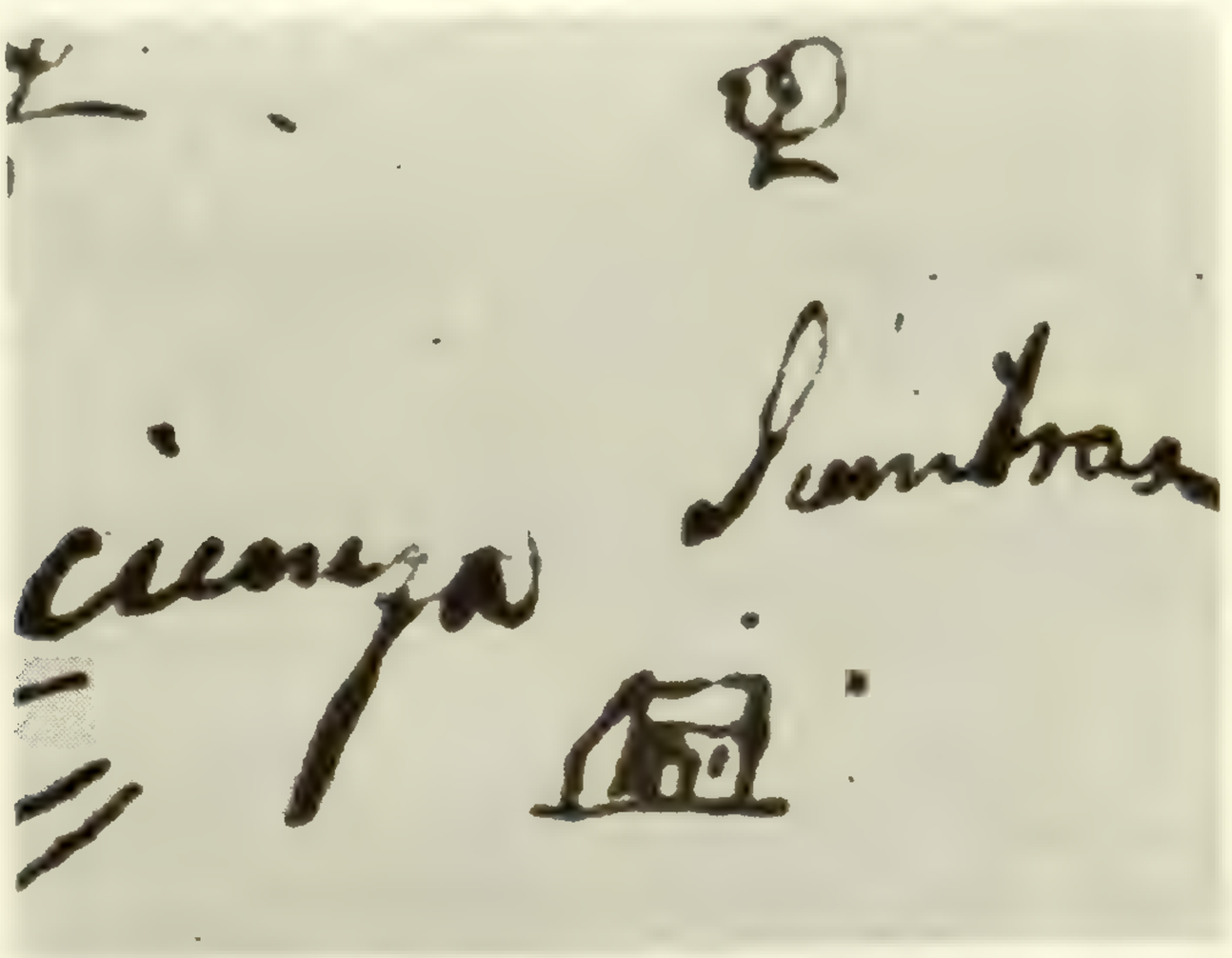


Photo-copy of Hugo Reid's 1845 *diseño*. Enlarged portion of this *diseño* from above middle, and right of center of entire drawing.

what was going on, and notice if any intruders were about the rancho for the purpose of stealing cattle or horses, in which way they were occasionally annoyed by the Indians, or perhaps by some vicious countrymen; and the house was placed where there was a spring or running water. These houses stood out bare and plain, with no adornment of trees, shrubbery or flowers, and there were no structures, except the kitchens, attached to the main buildings. Even in the towns it was a rare thing to see flowers or shrubbery about the houses of the Californians.

"I have often inquired of the rancheros, on seeing a beautiful and shaded spot, why they did not select it for their residence, and they would always answer it was too near the forest—they having in view always security against the Indians."[25]

Although being a *ranchero,* one of the landed gentry, gave Don Perfecto increased standing in the community, the primitive life and hardships of ranch living had little appeal for him. He seems to have spent little time at Santa Anita. None of his letters bear a Santa Anita date line and there are surprisingly few references to the *rancho* in his correspondence. The wording of Abel Stearns' testimony in the 1852 land claims case to the effect that Hugo Reid

> "... had a house there which was inhabited and he cultivated land and had several hundred head of cattle on the land. He continued thus to occupy the land living on it himself a portion of the time until he sold to Dalton ..."[26]

seemingly indicates that someone else besides Reid regularly lived in the adobe ranch house. Don Perfecto's family moved out to the *rancho* during harvest but on at least one occasion, he stayed behind.[27]

Hugo Reid preferred to live in greater comfort at Huerta de Cuati (Uva Espina), about two miles from Mission San Gabriel. This tract, often referred to in his correspondence as the "Vineyard", had been granted to his wife Victoria by Governor Alvarado on October 12, 1838. She had occupied some of the land before her marriage to Reid.[28] This was a well-established place with gardens, a large vineyard, and an extensive fruit orchard enclosed with an adobe wall.[29] He also spent considerable time at his town house at San Gabriel "... 300 yards from the Mission Church,"[30] where he also cultivated vines and fruit trees. It is apparent that Reid favored farming over stock raising.

During his ownership of Santa Anita, Don Perfecto used its three leagues primarily for grazing stock and for growing wheat or other field crops. Apparently a few fruit trees were planted in the vicinity of the house.[31] Although Reid asserts in a letter to Hartnell that he cleared land for a large orchard (1000 fruit trees) and vineyard (10,000 vines)[32] there is no real evidence that he ever planted them. In his petition to Governor Alvarado, April 12, 1841, he states,

> "... I planted a vineyard consisting of a considerable number of vines ..."[33]

But again there is no indication that it was set out. These statements were undoubtedly made to impress Hartnell and the Governor with his industriousness and thus to strengthen his claim to the land. Reid's own 1845 *diseño* shows only some field crops.

Hugo Reid never seems to have had many cattle and horses at Santa Anita. Certainly his herds did not compare with those of some of his neighbors, which numbered in the thousands. He probably did not pasture on the *rancho* many more head of livestock than was required for a land grant. In a letter to Abel Stearns in 1844, he mentions only 400 cattle and Stearns stated that he had only "... several hundred head of cattle on the land."[34] To keep stock away from crops and trees there were wooden fences, and possibly hedges of tuna cactus. No fences were required to enclose the entire *rancho* because roaming livestock could easily be separated from those of neighbors at the annual rodeo, as all animals over a year old were branded. Hugo Reid's branding mark was registered on April 21st, 1840.[35]

The daily management of Santa Anita was left to someone else, apparently to Felipe, Reid's adopted son, a nineteen year old when Don Perfecto first took over Santa Anita. As ranch foreman, Felipe and his family (he married in 1843) would have lived in the adobe house. Indian retainers—farmhands, vaqueros and house servants—undoubtedly dwelt nearby in brush- and grass-covered huts.[36]

Although owner of a *rancho* of vast proportions, as well as of other valuable properties, Don Perfecto was never very prosperous. Almost perpetually in debt, he decided to dispose of land to pay off creditors. He elected to dispose of Santa Anita and on May 29th, 1847 he sold the *rancho* to Henry Dalton, an Englishman who had come to California and became *ranchero,* for $2700. The deed of transfer describes the land as consisting of

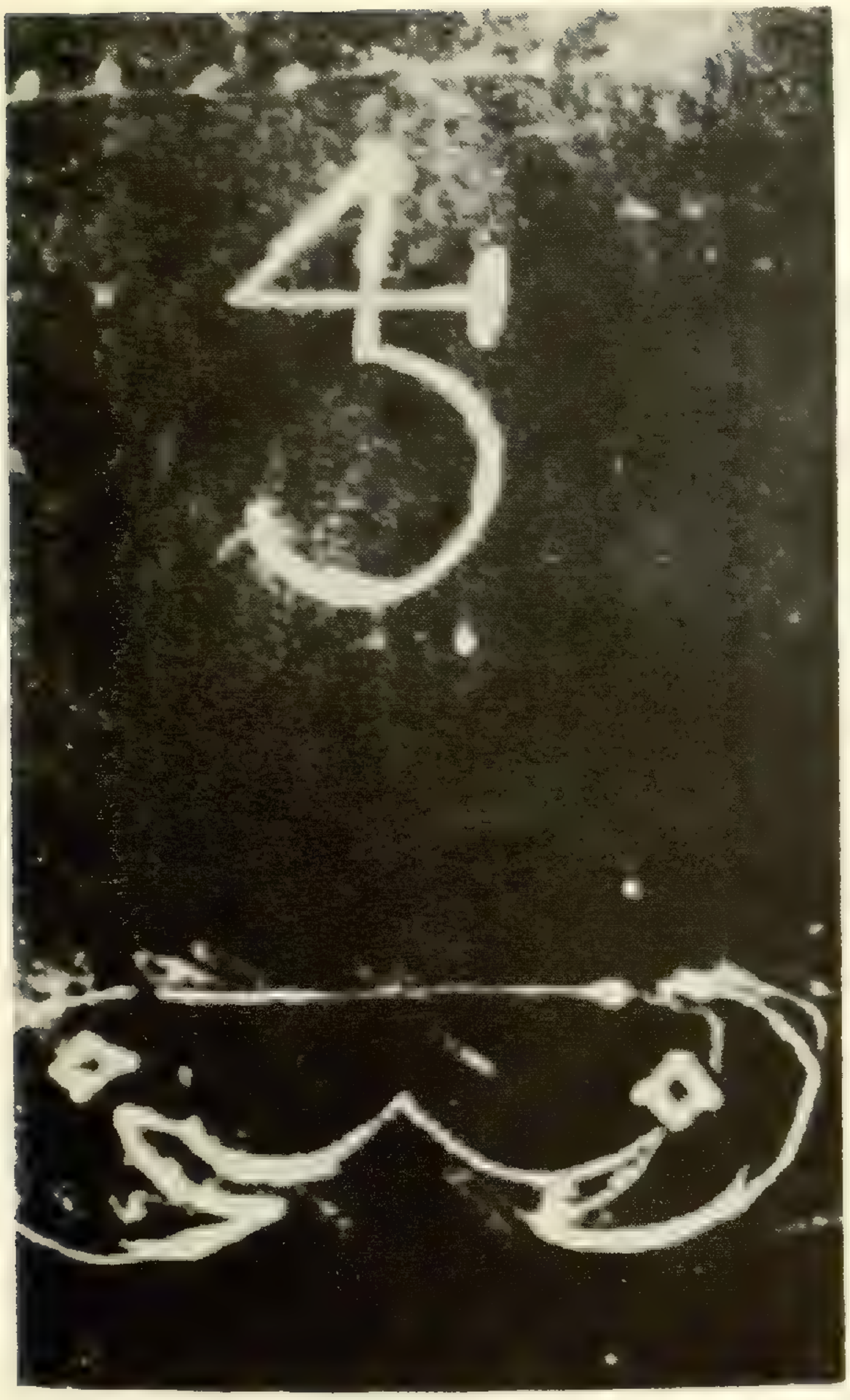


Photo-copy of a portion (enlarged) from Book of Brands, Los Angeles County Recorder's Office, pg. 17. Translated quotation from same source: "21 of April 1840 there was registered and granted the iron and mark in the margin to Don Perfecto Hugo Reid, which is authorized and signed as 1st Justice of the Peace of this city of Los Angeles". Signed, Felipe Lugo.

". . . three square leagues *sitios de ganada mayor* (grazing land) together with the houses, *corrales* and some fruit trees . . ."[37]

Reid was careful to reserve from the sale his beloved Huerta de Cuati, which adjoined Santa Anita and which, apparently, had become more or less identified with it. Thus, in 1847, a few months after the American conquest of California had been completed and peace agreed upon between Californians and their American conquerors, Hugo Reid, in poor health as well as in debt, gave up the *rancho* which he had held for only eight years.

SUMMARY AND CONCLUSIONS

Though less rewarding than the archaeological investigation, the historical study has produced additional facts regarding the original Hugo Reid Adobe. From a compilation of the scanty documentary sources, the following inferences can be drawn:

1. Hugo Reid's adobe house was the earliest permanent structure erected on the site.
2. Although the exact date of the building's construction is still a matter of conjecture, it undoubtedly occurred in the summer or fall of 1840.
3. The original house was a modest affair, a typical southern Californian ranch house of the period.
4. Hugo Reid rarely lived in the house himself.

The historical findings in no way make an alteration of the archaeological interpretations necessary; to a limited extent they tend to confirm or verify them.

The combined archaeological and historical information is sufficient to allow for a fairly accurate restoration. The essential architectural features are known beyond reasonable doubt. There are still unanswered questions regarding certain details of the appear-

ance of the building at the time it passed into the hands of Henry Dalton. Additional research might turn up bits of information on these or other features but major discoveries of new data are not to be expected. Where specific knowledge is lacking or is equivocal, information from adobe buildings in the same area and of approximately the same age can be used judiciously to fill in gaps.

At this writing, plans have been completed for restoration of the century old ranch house and its surroundings. Funds have been allocated for this purpose by the California State Division of Beaches and Parks and actual reconstruction will soon begin under the direction of the California State Division of Architecture. Authentically restored and furnished the Hugo Reid Adobe will stand as an excellent example of a simple ranch house of Spanish-Mexican California.

FOOTNOTES

1. William J. Wallace, Roger J. Desautels, George Kritzman "The House of the Scotch Paisano. Archaeological Investigations at the Hugo Reid Adobe, Arcadia, California" *Lasca Leaves* vol. 8, no. 1 (Winter, 1958) pp. 2-13.
2. The assistance of Glenn Price, formerly with California State Division of Beaches and Parks; Haydee Noya of the Huntington Library staff; W. W. Robinson of the Los Angeles State and County Historical Committee and Father Maynard Geiger, Santa Barbara Mission, in obtaining historical information is gratefully acknowledged.
3. Land Commission Case No. 343, Rancho Santa Anita. A copy of these proceedings is in the Huntington Library.
4. Abel Stearns was a shrewd Yankee merchant who settled in Los Angeles and became the most influential foreigner as well as the largest landholder in southern California. The large collection of letters received by him provides a valuable source of historical data on Spanish-Mexican California. He and Hugo Reid were close friends and associates and kept up a lively correspondence.
5. One Spanish league equals 2.63 English statute miles. The term was used loosely in early California. Santa Anita was later surveyed by Henry Hancock in 1858 and contained 13,319 06/100 acres.
6. Zephyrin Englehardt *San Gabriel Mission and the Beginnings of Los Angeles* (San Gabriel, Calif.: Mission San Gabriel, 1927) page 347.
7. Santa Barbara Mission Document No. 863.
8. Santa Barbara Mission Document No. 1039.
9. *Archives of the Prefecture of Los Angeles* 1834-1850, Vol. 2.
10. Hugo Reid's life in California is described by Susanna Bryant Dakin in *A Scotch Paisano* (Berkeley, University of California Press, 1939).
11. Rancho Santa Anita, Expediente (FHC 257, Map drawer) Huntington Library.
12. Rancho Santa Anita, Expediente.
13. Rancho Santa Anita, Expediente.
14. Rancho Santa Anita, Expediente.
15. Land Commission Case No. 343 (esp. page 19).
16. Land Commission Case No. 343, Dec. 17 and 18, page 18.
17. Land Commission Case No. 343, Docs. 21-26, pages 20-25.
18. Rancho Santa Anita, Expediente.
19. This word is difficult to read and has been interpreted as "straw" with the "r" omitted or as "stone", but Reid's later letter to Hartnell seems to confirm the assumption that it is *straw*; note also the use here of the word "merely".
20. Reid to Hartnell, Nov. 12, 1839, Bancroft Library.
21. This letter is in Bancroft Library. It is reproduced in *A Scotch Paisano*, pages 65-66.
22. Rancho Santa Anita, Expediente.
23. Land Commission Case No. 343, Doc. 22, page 23.
24. Ida May Schrode *The sequent Occupance of the Rancho Azusa de Duarte* Ph.D. thesis, University of Chicago, 1948, page 41.
25. William Heath Davis *Seventy-five years in California* (S.F.: John Howell, 1929) pages 61-62.
26. Land Commission Case No. 343, Doc. 2, page 8. This ambiguous statement differs from Stearns'

testimony in other land cases where he definitely states that the owners regularly lived and worked on their land.

27. Reid to Stearns, June 26, 1841. Stearns Collection, Huntington Library.
28. MS. U.S. District Court, Northern District of California. Land Case No. 171 S.D. Photostatic copy in Huntington Library. Also Transcript of the Proceedings in Case 455, November 5, 1852.
29. A detailed list of plantings at Huerta de Cuati is contained in a letter to Abel Stearns of June 1, 1844. Stearns Collection, Huntington Library. A chance visitor to Huerta de Cuati on March 27, 1848 was John McHenry Hollingsworth, a young United States Army lieutenant and part-time suitor of Dona Maria Ygnacia, Don Perfecto's adopted daughter (John McHenry Hollingsworth *Journal* 1848: 1850, San Francisco: California Historical Society 1923, page 41). It was probably also here that William Heath Davis and James McKinlay were entertained lavishly during November and most of December 1844. (William Heath Davis *Seventy-five Years in California*, page 143).
30. Juan Forster's testimony March 26, 1854 in *Transcript of the Proceedings in Case* No. 574. Julian Workman et al—Claimants vs. The United States—Defendant. For the Place named Mission of San Gabriel. Transcript No. 574, Filed Dec. 6, 1855.
31. Land Commission Case No. 343, Doc. 27, and 28 its translation.
32. Reid to Hartnell, January 27, 1840. Bancroft Library.
33. Rancho Santa Anita, Expediente.
34. Land Commission Case No. 343, Doc. 2, page 8.
35. Los Angeles County Recorder's Office, Cattle Brand Book, page 17.
36. On some *ranchos* Indian workmen lived in clusters of brush huts near the main ranch house; on others they lived away from the house; on a few both arrangements prevailed.
37. Land Commission Case No. 343, Docs. 27 and 28.

Photo credit—Edith Wallace

EDITOR'S COMMENT: *With full confidence that all persons working on and interested in the restoration of the adobe house are sincere, yet we realize that differences of opinion can arise between the most dedicated. We welcome any and all articles for publication in "Lasca Leaves" bearing on this restoration.*

COVER PICTURE

Where but in sunny southern California can children harvest their vegetable gardens on Saturday, Dec. 13, 1958! "Gardening", a 12 week course, is just one of several subjects in our Children's Education Program under the direction of Mrs. Gertrude Woods, Education Assistant. The string incidentally is to keep out the peacocks and peahens!

Kucera photo

BOOK REVIEW

"Pruning Made Easy" by Edwin F. Steffek. Henry Holt and Co. July 22, 1958. $2.95

Due to the unprecedented numbers and variety of plants, shrubs, trees and vines which can be grown in southern California, few writers of pruning instructions have cared to embrace this area. Our local magazines and some west coast authors have written for us and with fair success, but have either just scratched the surface, specialized on certain groups of plants or have been too highly technical. Now comes "Pruning Made Easy", startling like Sunset's Pruning Handbook, but with a better format and ease of reading for the amateur gardener.

The chapters lead logically and simply from a consideration of the theories behind pruning, the physiological effects on plants following pruning, the tools for the various pruning situations, into the plant types and their special pruning needs. Mr. Steffek's section sub-titled "Road map to pruning shrubs—by kinds", is a most useful and interesting treatment of a most reoccurring pruning situation.

Line sketches illustrate "how to" practices and "do's" and "don'ts" of pruning.

Although the book jacket includes the student and professional as possible interest groups in this book, it would appear to be more useful to the week-end and general garden enthusiast. To this group its appeal would stem from the ease of reading and direct to the point language.

Mr. Steffek should already be familiar to many of our readers as the author of "The Plant Buyer's Guide" (5th Edition) and "Wildflowers and How to Grow Them".

DONALD P. WOOLLEY

BOOK REVIEW

What flowering tree is that? A handbook for the tropics, by Edwin A. Menninger. 1958 edition, completely revised and rewritten. Published by the author, Stuart, Florida, 1958. 183 pp. Indexed. $4.00 Cloth, $2.50 Paper.

Those who may have seen or read reviews of the first edition of this book will remember that Mr. Menninger's aim in life has been to introduce gardeners in Florida to the wide-range of unusual and beautiful flowering tropical trees. It would be well to compare the two editions for similarities so that those who have purchased the first, may decide whether they want to get this and succeeding revisions; no doubt there will be other revisions for the author says that "this book can never be complete".

The preface is the same for both editions, except for an additional paragraph in which Mr. Menninger states that "this 1958 edition brings the reader even richer rewards in the wonderland of tropical trees". The original edition contained 110 pages, 4 color plates, 175 black-and-white photographs, and 665 plant descriptions. The revised edition has 183 pages, 6 color plates, 275 black-and-white photographs averaging 2″ x 2½″ of plants described, plus 7 photographs of classic botanical illustrations, and the entire 1000 plant descriptions claimed on the title-page. The descriptions are alphabetical in arrangement by scientific name of the family, with both common and botanical name of each tree. Small type is used to denote trees that have inconspicuous flowers, because the book is mainly concerned with showy blossoms. Descriptions vary from a few lines to a paragraph.

Under the heading "Trees for Special Purposes" listed in back, the "Flowering Tree Calendar" now includes common-name, scientific name, color of the flowers and native country. Other lists cover the same ground in both editions: wind-resistant trees; fruit trees, ornamental and edible; salt-spray-resistant trees; trees for wet ground; fragrant-flowered trees; good shade trees; trees that resist temperatures to 20°; ornamental foliage trees; with the additional category, plants that make good hedges. Many varieties have been added to each category.

The text has indeed been revised and rewritten; facts have been corrected and unnecessary words omitted, while the descriptions remain basically the same in Mr. Menninger's best conversational style, well authenticated by many references and quotations gleaned from research in his extensive library. One feels that he well deserves the citation reproduced in front of the book from the American Horticultural Council for "devoting a great part of your life toward gathering knowledge about ornamental plants for the state of Florida".

Because of the 315 additional trees described and 100 more photographs, it seems that purchase of the 1958 edition would be worthwhile for anyone concerned with plant identification, even though they have the earlier volume. If other revisions are forthcoming, they should be available in the horticultural or herbarium library. The individual gardener could be satisfied with one edition.

DORA M. GERARD

"Symbolism in Flower Arrangement" by Ervin S. Ferry, MacMillan Company, New York, 1958. $4.95

In this book the garden lover, as well as the flower arranger, will find new insight into the true Oriental way of appreciating and enjoying the beauty of flowers and the message that each individual blossom brings. Traditional emphasis is placed on certain selective flowers chosen for their special qualities or beauty or symbolism, an important aspect of the Oriental art.

Japanese flower arrangement has its origin in the floral art of China, but there are distinct as well as subtle differences between the two. The author explains these points clearly. Chinese flower arrangement is governed by a set of basic rules called the Six Canons of Art Design: (1) Rhythmic Vitality (2) Organic Structure (3) Conformity with Nature (4) Appropriate Coloring (5) Placing and Composition (6) Style. The art of Japanese flower arrangement is based on two fundamental principles: (1) natural live effect of plant material (2) the esthetic value of every flower composition. The criterion or standard of excellence in the evaluation of the quality of a Japanese flower arrangement is the degree of adherence of the design with the two fundamental principles. It is interesting to note that at flower exhibitions in Japan there are neither prizes, ribbons, nor judges' decisions. "Athletic contests have prizes; exhibitions of art do not."

Professor Ferry studied toward the Japanese degree of Flower Master in Kyoto and received his Kaiden Certificate from the Saga school, one of Japan's finest flower arrangement schools. For the next twenty years flower arranging was his chief hobby. The author tells of his personal experiences while studying for his degree in Kyoto. He also discusses many different Japanese schools and the individual style of each school.

"Symbolism in Flower Arrangement" is a collection of flower lore from around the world and a text with useful reference lists. Its purpose is to reveal the conditions under which a plant or flower composition may evoke an idea, convey a message, or arouse an emotion in the mind of the viewer.

The book is illustrated with thirty artistic and meaningful arrangements. Three of these were made especially for this book by Mrs. Makoto Kajiwara of New York. The twenty-seven others were designed, composed and photographed by the author.

This delightful approach to the esthetic enjoyment of flowers has been placed in the library of the Los Angeles State and County Arboretum, Arcadia, California. BILLIE MCCASKILL

LASCA LEAVES

The official publication of the Southern California Horticultural Institute and the California Arboretum Foundation, Inc.

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ARBORETA AND BOTANIC GARDENS

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Arcadia, California

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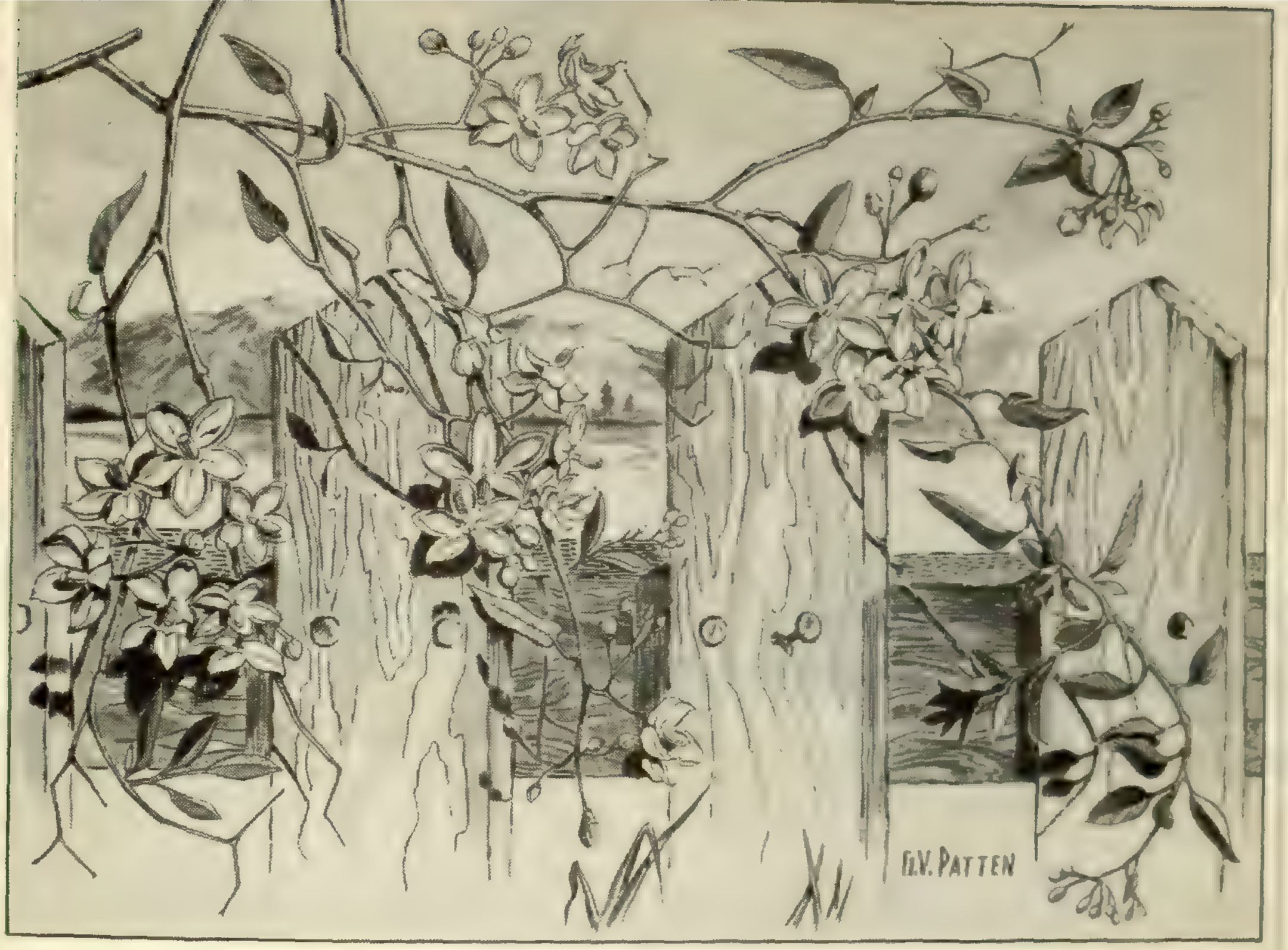

Lasca Leaves

SPRING 1959
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VOL. IX APRIL, 1959 No. 2

HORTICULTURE

VINES FOR SPECIFIC SITUATIONS

MILDRED DAVIS

TODAY, MANY PEOPLE shudder at the mention of the word vine. It is likely to conjure up a picture of a house smothered in ivy or creeping fig, or trees and shrubs enveloped in the toils of a passion vine.

In the past, vines were used to cover poor architectural design. No effort was made to keep them under control. They became untidy messes. They frequently caused untold damage to tile and shingle roofs.

However, vines carefully selected for a given use, with full knowledge of their ultimate growth and kept properly pruned, are an asset in landscape design.

In a brief article, it is impossible to discuss all the potential vine species; therefore, a few of the best have been selected for detailed consideration.

CUT BANK COVERING

One of the most useful functions of rampant vines is for covering a cut bank where there is little possibility of planting on the sheer face. For this situation, vines may be planted at the base of the bank where it is possible to build up sufficient soil for good growth. They may be planted at the top and allowed to drape over. In the latter case, water must be provided by way of a sprinkler system. Single wires or chicken wire may be extended from bottom to top and anchored with steel reinforcing rods. This wire need not cover the entire surface but merely act as a support for the establishment of the vine.

A. Sunny Exposures:

Araujia sericofera—A frost tolerant vine. Medium sized grey-green leaves. Many small white, star-like flowers. Fruit pods like milkweed. 15 to 25 feet.

Ipomea leari—Common Morning Glory. Decidedly rampant and invasive. To be used only where it will not invade a garden. For covering sheer cliffs it is excellent.

Pandorea pandorana—Clean, shiny dark green, divided foliage. Panicles of small white flowers. Fast growing. 20 to 30 feet.

Passiflora mollissima—Typical flowers of the passion vine. Flowers deep pink. Very rampant. 20 to 30 feet.

Phaedranthus buccinatorius (Bignonia cherere)—Trumpet vine. Good foliage, rampant grower once established. Long flame red trumpet flowers over many months. Tender. This can be seen in many places in Santa Barbara.

While these same vines might be used to cover a chain link fence, I do not advise it. Any other plant material used in front of the fence will soon be enveloped by the vine and strangled. Vines on fencing only serve as a display area. They never give complete privacy as their height will only be that of the fence.

B. Shade Exposure on Cliffs:

Cissus hypoglauca—Clean divided foliage. No visible flowers. 20 to 30 feet.

Cobea scandens—Cathedral Bells or Cup and Saucer Vine. Very rampant. Soft foliage. Bell shaped flowers on five inch stems. Tender. To 30 feet.

Clematis armandi—An evergreen clematis. Exceedingly rampant. Glossy, leathery foliage, unlike other clematis. Many clusters of rather small white flowers. Used in San Francisco Bay area. Foliage at end of season has browning in part and then needs pruning. 20 to 30 feet.

Philadelphus mexicanus—Evergreen Syringa. Light green leaves. Many cream white fragrant flowers. Blooms over a long period. Fairly frost tolerant. 15 to 20 feet.

VINES AS GROUND COVERS

Cissus rhombifolium—Grape Ivy. Best in partial shade. Try it instead of the inevitable ivy. Allow at least eight feet between plants.

Lonicera confusa—A much more refined Honeysuckle, too seldom used. Full sun along coast, partial shade inland. Foliage light green. Flowers creamy white and borne in profusion. 6 to 10 feet.

Sollya heterophylla—Australian Bluebell. Full sun, excellent drainage. Small foliage. Many deep blue, bell-shaped flowers. 6 to 8 feet.

Trachelospermum jasminoides—Star Jasmine. Sun or partial shade on coast, partial shade inland. Apt to tip frost. A good ground cover to replace ivy. One plant may cover 8 to 10 feet. The runner can be pegged down or if nipped early, will bush. Glossy dark green leaves (medium). Many pleasingly fragrant small white flowers. Slow to start, but do not plant too closely.

Thunbergia gibsoni—Full sun. Tender. Small grey green leaves. Vivid orange flowers borne solitary on five to six inch stems.

VINES FOR WALLS, BEAMS OR OVERHEAD SUPPORTS

Clytostoma callistegioides (Bignonia speciosa)—One of the most satisfactory all purpose vines. Good foliage, lots of bloom (lavender blue trumpet flowers) in spring and early summer. Sun along coast or partial shade inland. Quite cold tolerant. To 20 feet.

Distictis lactiflora 'Riversi'—Long blooming season. Flowers trumpet like, deep rosy lavender-purple with yellow throat. Tender. To 20 feet.

Gelsemium sempervirens—Carolina Jasmine. Good foliage, rather small, light green. Yellow bell shaped flowers in late winter and early spring. Sun or partial shade. Cold tolerant.

Solanum jasminoides—White Potato Vine. Everblooming clusters of white flowers. Shiny foliage, best in partial shade. Fairly cold tolerant. Can be cut to ground if too rampant, soon blooms again. 25 to 30 feet. See cover illustration.

Pandorea jasminoides—A lovely vine. Glossy divided leaves. Masses of trumpet flowers, white with deep rose throat. To 25 feet.

DAINTY VINES

Antigonon leptopus—Coral Vine. Herbaceous. Best inland, needs heat. Heart shaped leaves. Sprays of watermelon pink flowers. 8 to 10 feet.

Bomarea caldasiana—Fleshy root. Partial shade. Usually herbaceous. Many umbels of tubular flowers, red and yellow. 8 to 10 feet.

Clematis—In variety.

Herdenbergia comptoniana—Australian vine needing good drainage. Small pinnate leaves. Flowers in racemes, pea shaped, white, lavender, blue and sometimes pink. Fairly cold tolerant. Sun to partial shade. 12 to 15 feet.

Sollya—See Ground Cover Vines.

Stigmaphyllon ciliatum—Orchid Vine. Tuberous like roots. Herbaceous. Velvety, heart shaped leaves. Yellow orchid-like flowers in umbels. Partial shade, good soil. 6 to 8 feet.

SPECIALS

Hoya carnosa—Wax Plant. Strong grower. Leathery leaves. Unusual star shaped flower (look like carved from paraffin) pink, in clusters, fragrant. Tub plant in or out of doors.

Oxera pulchcella—Leaves leathery. Flowers in immense clusters in axils of leaves. They are ivory with long exerted stamens. Can be grown as fountain like shrub. 15 to 20 feet.

Passiflora racemosa—One of the best of the passion vines. Medium growth. Foliage

leathery, less susceptible to depradations of caterpillars. Flowers in racemes 12 to 18 inches long, deep rose red. Partial shade.

VINE SUPPORTS

Small six foot trellis are not sufficient to support a vine; either trelliage should be built against a wall as part of the design, or the vines should be attached by other methods. Vine guides are only satisfactory for dainty vines, as they are not apt to pull off the wall with heavy growth. Galvanized wire can be placed from the foundation (attached to a cement nail) and run to screw eyes in the rafters. This allows for taking down when painting is necessary, keeps growth orderly and in any desired pattern.

Landscape Consultant and Instructor.

COVER PICTURE

Whether on a trellis, patio fence or softening the austere laundry line post *Solanum jasminoides* or White Potato vine, adds a bit of daintiness to any scene. Mr. Patten's ink-brush rendition catches this abstract quality.

HISTORY

HUGO REID ADOBE

ORVEL B. JOHNSON

Presented to the Historical Committee meeting of the California Arboretum Foundation, Inc., November 19, 1958

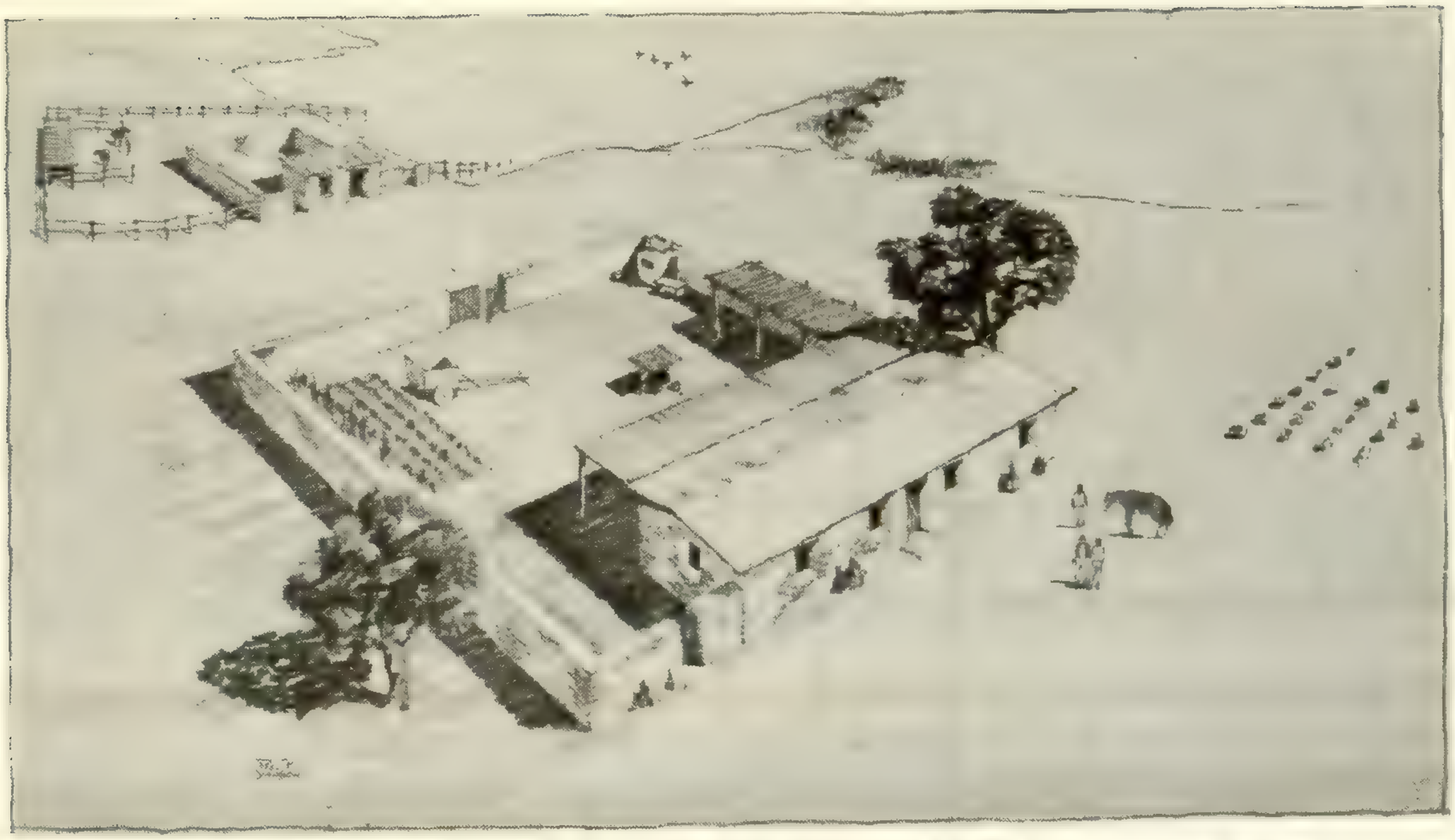
ON OCTOBER 9 and 10 the writer did more investigation at existing structure and adobe foundations at west ell. Findings are as follows:

1. The partition wall between rooms 1 and 2 was removed. This wall was laid up with very dark adobe, with a binder which appears to be tule material. When wall was removed, a cut was made on interior to bottom of adobe foundation at east and west walls. It was found that the yellow hard clay area in room No. 1 continued under this wall. Chunks of material which looked like La Brea tar were also found on top of the clay strata. The yellow material ran to the deep foundation which is directly opposite the partition wall location. The west wall near north end of existing structure has some of the dark adobe blocks in it. We have previously described this area as an area between "cold" vertical joints in west wall.

Unfortunately the north end-wall of structure slipped from its foundation, which made it necessary to remove the adobe. However, due to this it was revealed that the west end of wall had been chopped off, and the wall had at one time extended west.

2. Evidence strongly points to a structure that stood on existing deep foundation comprising three rooms, before the existing three room structure. We have not gone into the history of the area, so will make no attempt to surmise what period this may have been.

The adobe blocks in the foundation are larger than the blocks in the existing structure, and contain very little, if any, straw binder. This could have been a factor in the walls "melting down" when first roof was decayed or destroyed.



Sketch submitted by Mr. Orvel B. Johnson of the proposed final appearance of the restored Hugo Reid Adobe. Upper left: Over-all appearance of restoration, including corral fence to lagoon and a small horse shed.

From the eveidence uncovered at this time, we believe this was the structure with the La Brea roof. This roof could have been destroyed by fire, as all chunks of La Brea found, appear to have been in a fire.

3. We will call this part of report: Building Number Two.

After the first building tumbled, possibly from erosion, another building was erected, using part of the remaining foundation, including the north end and part of west section. This was a structure some thirty six feet long, running east and west. The existing good blocks were used to lay a foundation on the clay strata, and extended some sixteen feet west from existing walls. This could have been a single room structure, with walls approximately twenty inches lower than existing walls.

The remaining foundation running west for sixteen feet, is same type of block as that on interior partition foundation. Chunks of La Brea are also apparent under this area. The west foundation on this west section is different from any of the other walls further west. Also the corners have been keyed in, which indicates a room or building corner. The adobe block in cross walls, and in south wall of this area (Baldwin Annex), show large chunks of burned La Brea. No doubt the clay floor was used in this structure the same as in the first.

4. This deals with the existing structure which was probably built eight to twelve years after structure noted as Number Two. Part of structure Number Two was still standing when existing structure was built. This accounts for the "cold" joints, and blocks having been chopped off.

Some of the adobe taken from the middle partition wall had Indian designs on them. These were not the dark block, but the light colored block similar to the north end wall. The height of existing walls is apparently the original; however, the heads of windows were approximately ten inches lower than existing, and sill was twelve inches above existing adobe cut-out, being in size approximately forty inches wide and fifty inches high, rough opening. The openings had a wood jamb, sill and head, cased inside and out. This would give a finish opening of some three feet in width, and three feet seven

inches in height. Point of evidence on cased openings is wood grain marks on mortar and good corners on adobe block, which indicate moisture did not get to these areas.

Door heads were about four inches lower than existing. These had a wood jamb about seven inches wide, set on inside with doors swinging in. Height of door was about seven feet. Reveal at exterior of doors was adobe, with limewash material. This was, perhaps, reason for erosion at corners, which were later rounded and plastered.

There was one door to exterior on east side, and one to exterior on west side in section running north and south, and perhaps a door to exterior in ell running west. Windows were as indicated on elevations shown group on September 24, 1958.

Apparently the adobe floor in what is called Room Number Three was laid on the yellow clay strata about the time existing structure was built, and the clay was used as the floor for the Number One structure.

From evidence uncovered the interior and exterior on the existing structure was a lime wash material, with perhaps color added, for interior. Flecks of blue have been found in soil.

There is little doubt that the clay and adobe floors were used when this structure was first built. This is evidenced by the plaster extending down to this area. We have found that the walls were washed with the aforementioned lime wash sometime before plaster was applied. No plaster material was found in soil strata encountered at exterior south-east corner of building.

The fill-in wall as before mentioned which is at "cold" joints, is of the same period as existing walls. It appears however, that walls on the ell section were never built up to height of existing walls. This could have had an independent roof structure, or a gable type roof tying into main roof.

We regret to advise that no evidence has been found which indicates that the existing structure had a La Brea roof.

The existing wood plate at top of wall is a one and one-eighth by eight and one-half inch whipsawn board. It has been whitewashed on the outer edge, under the existing plaster. It is red fir material, or at least similar. The existing ceiling joists have been used before being used in the present way. Several have ends cut on a long pitch. Some of these have had a whitewash material applied at one time. They are red fir, and whipsawn. It is apparent that at least the wood plate as before mentioned, and possibly some of the present roof timbers were used in the present structure when it was first built.

It was pointed out to the group on September 29, 1958, that a part of the east and south walls had fallen, and had been re-built on a brick foundation. Some of the adobe block in this wall have the limewash on them inside the wall. This is further evidence of the original finish.

The door opening on east side which had been filled in, was perhaps done after the wall which had fallen and been re-built. A radius corner adobe, with plaster on the radius, was found in this opening. Seemingly the first plaster was applied to building after this wall was re-built. At about this time, the ledge around perimeter was built up with adobe mud, and plastered. This ledge is about twelve inches high, a different material from the foundation and wall blocks, and was placed integral on top of protruding foundation adobe, and against eroded adobe wall. This leaves a straight wall line almost to level of clay strata.

There is little question in our mind at this time in regard to room partitions relative to the existing structure. Protrusion of adobe blocks show original partitions in same location as those removed at start of restoration. The brick partition is accounted for due to the wall failure as before mentioned, where brick foundation was placed under adobe wall. The same type brick were used, and laying was similar. The question could arise: why not an adobe partition? Evidently sufficient adobe was salvaged from the ell

and fallen wall to replace exterior wall, but not the partition.

The "black" adobe partition was re-built still later, perhaps after deterioration of other adobe, which was of the second structure. If it was built at the same time as the brick partition, we are unable to account for adobe in lieu of brick. The fireplace was cut into the adobe after the wall was erected. There was a wall in this location prior to the black adobe. The side wall had been chopped down. A wood door lintel had been cut back for a thinner wall. Behind this wood lintel was a piece of log section which might have formed the lintel for an earlier door, which could have led to the exterior.

On exterior at west side two holes have been found which had rotted wood in them. These, no doubt, were posts to support a porch roof. Inside of posts, and running full length of west side from ell, was rotted wood which appeared to have been a log. This could have been used to retain fill at porch area, due to its location. This was definitely before the Baldwin period. Further investigation will be made later to see if this same condition exists along ell section.

5. Baldwin Annex west of ell.

The north wall (foundation), running west appears to be of the same period as the existing three room section, built, however, of block probably salvaged from first structure. The front or south wall, and cross walls of this are are various sizes, and contain amounts of La Brea which indicate that they were made from soil about the area, after the first structure was down. If this was a building, and all walls were constructed from this type material, it would not have withstood much weather.

6. General

We conclude as follows:

a. The original structure relative to the existing walls still standing, contained four rooms. Three rooms lay north and south, with one room forming an ell at north end from the west wall.

b. The foundation sections on interior, with walls to side of each, were made use of for seats, tables or something of this nature.

c. The west side of building was front of house, having dirt-filled porch floor, small in size, with low roof over.

d. Back of house was on the east side, with a dirt-filled porch floor, small in size, with no roof over.

e. Thresholds at doors were about twelve inches above clay floor level, with flattened log step down to floor.

f. Window openings had wood jambs and sills, and were cased inside and out.

g. Door openings had wood jambs and wood thresholds, cased on inside only, about seven feet in height.

h. Both doors and windows had wood shutters, or windows could have had casement sash, glazed. The articles found by Dr. Wallace's group will be checked by the writer for clues in regard to glass, if used, hinges and other items.

i. Top of walls were about as they are now, with some of the top adobe replaced.

j. Sawn timbers were used in roof construction and window and door material. Hewn lintels were used at window and door heads.

k. Further investigation could change our version regarding the roof structure, but at this time it seems correct.

l. The north wall running west from ell was built at time of existing structure, from salvaged adobe. Cross walls, front wall and west end wall were built later. This was possibly a low wall adobe structure, but due to composition of adobe block, they having been made from spoils of the first structure, did not last long.

m. The items discussed in this report present three periods of adobe construction on the site, plus a remodeling with adobe and brick, and then the Baldwin period. As before

stated, we have not had the time to study site history on this project. Known history may or may not support our findings, but from physical evidence bearing on construction principles as old as time, and in the absence of supporting documents, we believe our findings to be correct. We have refrained from saying the existing structure is the Hugo Reid Adobe. However, it is possibly of a period before 1870, based on other adobes of this period.

Direct Construction Supervisor
California State Department of Architecture

HERBS

HERB GARDENING

MARY D. DARROW

A BEE SKEP! Who today, has seen or even remembers seeing the old fashioned rounded bee hive, made of coils of twisted straw? They really have become a garden antique. Your next trip to the Herb Garden at the Arboretum will give you an opportunity to catch up on this old, yet new addition to the Garden.

For those who are not familiar with the Herb Garden (*Lasca Leaves,* Vol. VI, No. 4, 1956) let us explain. The members of the Southern California Unit of the Herb Society of America have established an attractive, as well as, functional garden of herbs at the foot of Tallac Knoll. Their interest takes the form of both financing and working in the garden. Although it is not completed, it already has been judged the finest garden of its kind in the northern hemisphere.

Established at present are: a Kitchen Garden, an Herbs for Landscaping Section, an Herbs for Fragrance Section, a dipping well, a cascade pool, a rock garden and a small Knot Garden.

During the past year, the following innovations have been accomplished: a new lawn at the entrance; decomposed granite has replaced the gravel walkways, making travel within the garden more pleasant; and a small glass house constructed, courtesy of Dr. Stewart, Arboretum Director. This house is used to propagate the seeds purchased by the Unit for the garden. A full time Gardener, Mr. Tom Parker, has been assigned to maintain and assist the Unit members in planning and planting the Garden.

Building and maintaining the Garden is only one phase of the Unit's endeavors. Making ends meet, financially, has received a large portion of their attention.

First, they harvest herb crops from the Garden. Then they sell both fresh and dried products of this harvest. Basil vinegar, bottled in attractively shaped, green containers bearing hand made labels, sell rapidly. Mrs. Arthur D. Richardson is given credit for the labels and containers.

A second project has been the publish-

ing of a series of Cook Books. A unique feature of this series is the Herb Cookie booklet. All the delicious tasting and fragrant cookies, soups, salads, teas, cakes, pies, breads and beverages are tested recipes from kitchens of the members. Dr. Grace Lawson, dietitian and member of the Unit, acts as editor.

An Herb Chart, suitable for framing or otherwise placing in the kitchen where the 'Lady' of the house keeps her spices, is sold in quantities.

Many sales are made at the Gate House of the Arboretum under the sponsorship of the California Arboretum Foundation, Inc. The Unit gratefully acknowledges the Foundation's cooperation and assistance in this venture.

All proceeds from these various 'commercial' endeavors, go to the continuing support and development of the Herb Garden.

In addition to planting, harvesting and preparing items for sale, the Unit has plunged into the lecture field with enthusiasm and success. Cooperating with the Adult Education Program at the Arboretum, Unit members have given a series of six lectures at least five different seasons. Originally given at the Arboretum, this Fall the series was given at Descanso Gardens, La Canada. Miss Marguerite Dumbauld, Unit Treasurer, arranged each lecture series and was assisted in the presentation by Dr. Louis B. Martin of the Arboretum.

Subjects for the lectures have ranged from: Books on Herbs, Mrs. Darrow; The Culture and Use of Lavenders, Miss Edna Neugebauer; Native Uses of Herbs in the Southwest, Miss Dumbauld; to Cooking with Herbs, Dr. Grace Lawson. Other speakers have been: Mrs. Leslie Stephens (past National President), Mrs. Fred S. (Mirandy) Bauersfeld, Mrs. Henry Wilder, Mrs. Floyd (Kay) E. Betts and Mrs. Maria Wilkes to list only a few.

The Herb Garden as it serves the public as a unique phase of plant work, also serves the Unit in one additional manner. It is a training garden for new Unit members. Here the neophytes can contribute hours of productive work and gain practical and interesting information about the cultivation of herbs.

The Unit extends a most cordial invitation to all to visit and enjoy their handy work—Herb Gardening at the Arboretum.

Chairman, Southern California Unit
Herb Society of America

ECONOMIC BOTANY

MARINE PLANTS—AN AGRICULTURAL CHALLENGE

MICHAEL NEUSHUL

MAN BEGAN AGRICULTURE by learning to control the plants which grew naturally around him on the land. Man is learning now to control the plants which grow in the sea. This natural resource will meet the needs of man through efforts which might properly be called "mariculture".

The thin layer of plant life on the earth could well be considered our most important natural resource. This green layer of plants is spread over nearly the entire earth. Seventy-one percent of the earth's surface is covered by ocean, and a major portion of the primary production of organic material takes place there. The production of organic resources on land compared with that in the ocean yields a surprising figure. Approximately 10/11ths of the food manufacture by plants in the world takes place in the sea. The productive capacity of the sea is very high. The calculated average production is 3.75 tons of carbon fixed into organic material per year for every 2.5 acres, as compared with 1.3 tons on land. The need for the study of this tremendous natural resource has been emphasized recently by Walford in his book, *Living Resources of the Sea.*

The great primary productivity of the sea can be attributed to microscopic phytoplankton. The use of plankton organisms directly has been advocated. However, most of the benefit derived from this form of life reaches us indirectly via the long food chain in the form of fish or other marine animals. Some marine plants can be utilized directly; these are the seaweeds.

The use of marine plants extends to the limit of recorded history, seaweeds having been used in China and Japan for many hundreds of years. The greatest use of algae for food occurs in Japan. The 180,000 miles of coastline provide an abundant supply of marine algae. Some 25 to 30 species are eaten. The Japanese harvested 310,000 tons of seaweed for food in 1955.

The principal marine algae utilized as food in Japan are shown in figure 1. These can be purchased in local markets dealing in Japanese foods. Some other marine algae have uses other than for food. Funori, *Gloiopeltis furcata* is used for glue and sizing material and Makuri, *Digenea simplex* is used as a vermifuge.

Figure 1
SEAWEED UTILIZATION IN JAPAN

Nori	*Porphyra lacinata* *P. vulgaris*	Soups and with many foods
Wakami	*Undaria pinnatifida*	Vegetable, soups
Kombu (Konbu)	*Laminaria japonica* *L. angustata* *L. longissima* *L. fragilis*	As vegetable, a relish, to make tea or candy
	Alaria fistulosa	
Hijiki	*Cystophyllum fusiforme*	Used as vegetable
Aosa	*Ulva lactuca*	Garnish similar to parsley
Tengusa	*Gelidium cartilaginium*	Jellies, soups, saki purification

Many algae are utilized as food in Hawaii. They are called "Limu" and form a considerable portion of the vegetable diet. The algae are, for the most part, eaten raw. Some of the genera used are *Codium, Ahnfeldtia, Sargassum, Haliseria* and *Ulva.*

In contrast with the traditional use of marine plants in the Orient, they have not been utilized as fully in the western world. Roman ladies used a rouge prepared from the rock-weed, *Fucus,* and seaweed extract was used to dye garments; however, in general marine plants were not used.

In more recent times seaweed industries have flourished in Scotland, England, France and the United States. The uses of marine plants in this country are different from those of the Orient. There they are mainly used directly as vegetables, whereas in this country, chemical extracts and industrial treatment of marine plants produce substances which are widely used but infrequently noticed.

Few of us in America realize that algae furnish many familiar and useful products. Irish moss or carrageen, *Chondrus crispus,* grows on our Atlantic coasts from Maine to the Carolinas. It is used in puddings, jellies and similar desserts. In New England towns, dulse, *Rhodymenia,* is eaten as a vegetable. On our west coast alone approximately 6,000 tons of marine plants are harvested annually. The major portion of this amount is the giant kelp, *Macrocystis pyrifera.* From *Macrocystis* a colloidal substance called algin is extracted. There are many uses for algin, (figure 2). *Macrocystis* grows abundantly along the California coasts attached to rocky bottoms by large root-like holdfasts, (fig-

Fig. 2
SOME OF THE MANY PRODUCTS IN WHICH ALGIN, THE NATURAL GUM FROM KELP, IS USED

Pharmaceutical Products
- Aureomycin Tablets
- Terramycin Suspensions
- Triple Sulfa Tablets
- Penicillin Suspensions
- Anti-acid Tablets
- Sulfa Suspensions
- Aspirin Compound Tablets
- Calamine Lotion
- Hemostatic Powders
- Bulking Laxatives
- Dental Impression Compounds
- Toothpaste
- Orthopedic Impression Compounds
- Surgical Jellies
- Suppositories
- Mineral Oil Emulsions
- Rubbing Ointment

Miscellaneous Food Products
- Bakery Icings and Meringues
- Salad Dressings
- Frozen Foods
- Fountain Syrups
- Orange Concentrates
- Candy
- Puddings

Rubber
- Natural and Synthetic Latex Creaming and Thickening
- Finished Articles
  - Automobile Carpeting
  - Electrical Insulation
  - Babies' Rubber Pants
  - Foam Cushions
  - Rubber Coating
  - Tires

Textile Products
- Size Compound for Cotton and Rayon
- Textile Print Pastes
- Plastic Laundry Starch

Dairy Products
- Ice Cream
- Dry Ice Cream Mix
- Sherbet
- Chocolate Milk
- Chocolate Toddy
- Sterilized Cream
- Cheese

Adhesives
- Wall Board
- Paper Bags
- Shipping Containers
- Gummed Tape
- Decals

Paper Products
- Food Packages
- Pharmaceutical Soap and Detergent Packages
- Milk Containers
- Butter Cartons
- Frozen Food Packages
- Insulation Board
- Food Wrappers
- Greaseproof Paper
- Acoustical Tile

Miscellaneous Products
- Paints
- Ceramic Glazes
- Porcelain Ware
- Leather Finishes
- Auto Polishes
- Welding Rod Coatings
- Boiler Compounds
- Battery Plate Separators
- Wallboard Joint Cement
- Beet Sugar Processing
- Wax Emulsions

ure 3). The long fronds float to the surface forming masses which are readily seen on the surface. These areas, or kelp beds as they are called, occupy nearly 100 square miles of our coastal waters.

Seaweeds today are being used in many ways. Even so, man's use of them is regulated by what the sea has to offer: plants exposed by the tides, floating on the surface, or cast upon the shore. No real attempt to "domesticate" marine plants has been made. The closest approach to marine "agriculture" is perhaps in Japan where marine plants are cultivated by increasing the available surface to which the naturally produced spores can attach. This situation might be considered analagous to that which existed more than 7,000 years ago when man's use of land plants was the mere acceptance of what nature offered.

Periodic destruction of naturally occurring areas of kelp along the Pacific Coast of North America greatly limits the supply of raw materials during certain periods of the year. The destruction of marine plants by man-made pollution is a serious threat to the seaweed industry in Japan, and the loss of California kelp beds near polluted areas has suggested that similar problems may be encountered here. At the present time our knowledge of marine plants is not adequate to cope with these problems.

In response to the urgent need for more knowledge of our seaweed resources, recent efforts in the study of California's marine plants are worthy of mention. In connection with the State Department of Fish and Game and the State Water Pollution Control Board, The Institute of Marine Resources of the University of California is conducting investigations concerned with the basic biology of the giant kelp, *Macrocystis*, and with the relation of this plant to pollution.

The State Department of Fish and Game is conducting studies on the possibilities of

increasing substrate for the attachment of marine algae. The preliminary results of this study are very promising. The recently established Beaudette Foundation for Biological Research at Solvang, California is centering its efforts on urgently needed taxonomic studies and investigations of hitherto non-utilized marine plants.

It is often said that man will in time depend on the sea to supply a major portion of his sustenance. When thinking of the sea as a source of food, plants, the primary producers, must be taken into consideration.

In this modern world the future is approaching at an ever-increasing rate. The time when man must depend upon the production of the sea is probably not as distant as one might think.

Fig. 3. A tagged plant of *Macrocystis* growing at a depth of 50 feet showing holdfast and lower blades. (tag length is 1 meter)

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BOOK REVIEW

Camellia Culture, edited by E. C. Tourje. The Macmillan Company, New York, 1958

This publication marks a milestone in the compilation of our knowledge of Camellia culture. Assembled here in a book of 484 pages are the notes, methods, experiences, and opinions of 55 qualified Camellia authorities.

There are chapters on: plantings; care of Camellias; climate; propagation and development; display, shipping, and handling; pests and their control; diseases and methods of treatment; soils, nutrition and moisture; and, breeding and hybridizing. Various chapters are written by one, two or three authors. The authors are all either recognized amateur Camellia fanciers or trained research scientists. In spite of the technical nature of several sections, the use of scientific terms has been held to a minimum so that the chapters are readily understood by the layman.

Even though there are 55 different authors, the editing has been so carefully and skillfully done that one is not conscious of the large number of participants by reason of marked differences in style of writing.

As a compendium of Camellia knowledge, both from the cultural as well as scientific aspect, this publication is without equal. It is well illustrated with abundant line drawings and photographs.

This volume was prepared under the auspices of the Southern California Camellia Society, Inc., the objective of this Society is "to encourage and promote the science and art of Camellia culture". In this regard the Society is to be complimented in achieving this objective through the publication of "Camellia Culture".

This book with its wealth of knowledge on all of the aspects of Camellia growing is a must for anyone who is more than superficially interested in Camellias. "Camellia Culture" sells for $11.50.

WILLIAM S. STEWART

STUDENT EXPERIMENT

MAELIC HYDRAZIDE TREATMENT OF INDOOR FOLIAGE PLANTS

ARTHUR N. BROWN

GROWERS, FLORISTS and home owners have long valued the Dieffenbochia for its colorful foliage and its ability to grow well as an indoor ornamental. However, the tendency for this plant to seldom branch, to soon over-grow its container and in time to become spindly with foliage only at the top, leaves room for general culture improvements. Branching can be induced by pinching back, but this may spoil the appearance of the plant. The grower and retailer cannot profitably hold a plant long enough for it to re-grow new tops; the home owner will not pinch or cut his "beauty" when it should be cut.

The chemical, maelic hydrazide, has been used to retard the growth of certain lawn grasses. It has also been used to induce branching on chrysanthemums. The following reports the results of using maelic hydrazide (also designated as MH) as a foliage spray on several indoor ornamentals.

Materials and Methods.

Six species were used in the experiment: *Dieffenbochia Roehra supenba, Aralia elegantissma, Philodendron dubia, Peperonia fosteniana, Pathos aureus* and *Pellonia fulchra.* Only the effects of MH on *D. Roehra supenba* and *A. elegantissma* will be considered in detail.

The plants were received as 2½" liners and planted in 4" fern pans. After allowing three weeks to establish themselves, they were treated with varying strengths of maelic hydrazide (Diethanolamine salt of 1, 2 - dehydro - 3, 6 pyridazinedion.) To find the most effective concentration, from 500 ppm (parts per million) to 2000 ppm were tried.

The greenhouse temperatures ranged from 70°-80°F. during the days with humidity of 90-100%. Night temperature was 70°, but due to mechanical problems dropped below 60° on several occasions.

The plants were all numbered and measured; the number of stems, nodes, leaves and length of leaves were recorded at the start of the experiment. A similar record was made at the end of the experiment, May 15th, and are shown in the accompanying charts. Fourteen Dieffenbochia plants and three of the Aralia were treated with each concentration.

Spraying was done on November 11, 1957, when air temperature varied from 69° to 81°F. and humidity was 64%. Each plant was sprayed separately until run-off occurred on both top and bottom sides of the leaves. After the leaves dried the plants were returned to the greenhouse. In the case of the Dieffenbochia a second spray was applied March 2nd.

No tests were made to determine how much or how long the material remained on the leaves; however, great care was taken in watering so as not to wash the material from the leaves.

Results:

It will be noted that there is marked reduction in leaf size of Dieffenbochia with increased concentrations of MH which is undesirable. Plants recovered from this condition and produced excellent specimens (see photo) except in the highest concentration. Although further work is needed to determine the exact time of application and concentration, 1000 to 1500 ppm can be recommended to give the best over-all results in these two species.

These results suggest that maelic hydrazide may be of value to greenhouse operators in producing compact, branched plants.

EFFECTS OF MH SPRAY AS RECORDED MAY 15, 1958

Dieffenbochia Roehra supenba

(Average of 14 plants at each concentration)

PPM	Increase in number of leaves	Average length of 2 mature top leaves	Number of Breaks
500	4	9.4 inches	1.36
750	3	8.6	2.43
1000	3.4	7.5	1.90
1250	3.7	8.6	.86
1500	1.9	6.1	3.90
2000	2.0	6.2	4.90
Control	4.4	9.2	.36

Aralia elegantissma

(Average of 3 plants at each concentration)

PPM	No. of branches	Height	No. of nodes	Total length of stems
500	1.7	5.9 in.	37.0	11.25 inches
750	2.0	3.25	33.7	5.4
1000	4.7	3.75	42.3	7.3
1250	3.5	2.6	36.5	6.6
1500	7.0	2.3	62.3	7.0
2000	3.0	2.4	34.0	6.4
Control*	1.0	5.1	20.0	5.1

*9 plants in control group

Aralia elegantissma: Left to right, treatment with MH—2000 ppm, 1500 ppm, 1250 ppm, 1000 ppm, 750 ppm, 500 ppm and control. Photo Sept. 1, '58.

Dieffenbochia: Left, control (untreated) plant. Right, treated with 1500 ppm MH. Photo, Aug. 15, '58, nine months after start of experiment.

Dieffenbochia: Left, control. Center, 1500 ppm MH. Right, 2000 ppm MH. Photo, Aug. 15, '58

Dieffenbochia: Left, 1500 ppm MH. Right, 2000 ppm MH. Severe leaf size reduction and stunting with 2000 ppm. Photo, Aug. 15, '58.

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HORTICULTURE

TREES-IN-COLOR CALENDAR

For Greater Los Angeles

PHILIP E. CHANDLER

THE PLANTS COMPILED by Mr. Chandler are for immediate consideration in answering the perennial question of year around garden color using trees. However, Mr. Chandler and/or Lasca Leaves would appreciate comments about the trees listed, either in the form of new species, culture practices to fit varied locations, flowering time or additional locations where specimen plants can be observed.

JANUARY

Acacia baileyana—Yellow, evergreen, scant summer water, 20 to 30 feet—Common.

Acacia podalyriaefolia—Yellow, evergreen, scant summer water, 15 to 20 feet—Northeast corner Bristol and San Vicente, Brentwood.

Callistemon lanceolatus—Bright red, evergreen, usually grown as shrub, but is good small tree, 8 to 18 feet—Surfrider Inn, 1700 Ocean Avenue, Santa Monica.

Erythrina caffra—Burnt orange, usually deciduous, not hardy, 30 to 40 feet high and 40 feet across—255 South Barrington, Brentwood.

Eucalyptus caesia—Dusty rose flowers with gray-green foliage, evergreen, habit open and pendulous, 10 to 20 feet—Los Angeles State and County Arboretum.

Eucalyptus erythrocorys—Bright red buds, chartreuse flowers, evergreen, best as a multiple trunk, 15 to 20 feet—255 South Barrington.

Eucalyptus megacornuta—Chartreuse, evergreen, 20 to 35 feet—UCLA Botanic Garden.

Eucalyptus orpetii—Rose to red, evergreen, 8 to 15 feet—Dr. Samuel Ayres, Jr., 4665 El Camino Corto, La Canada.

Eucalyptus sideroxylon rosea (pallens)—Rose, evergreen, usually pendulous, very hardy, 30 to 40 feet—UCLA west side of Royce Hall.

Eucalyptus torquata—Rose to red, evergreen, open but narrow, 15 to 20 feet—Dr. Samuel Ayers, Jr.

Eugenia smithii (Acmena)—Orchid fruits, evergreen, slender, 10 to 20 feet.

Magnolia denudata (Yulan)—White, deciduous, 15 to 20 feet—Huntington Botanic Garden, San Marino.

Prunus campanulata (Formosa cherry)—Rosy red, deciduous, narrow, 20 to 25 feet—UCLA campus.

Prunus mume (apricot)—Shell pink. Rosemary Clark: white, fragrant. 15 to 20 feet—Huntington Botanic Garden, San Marino.

Prunus persica (peach)—Early red, deciduous, 20 to 25 feet.

FEBRUARY

Acacia pycnantha—Yellow, evergreen, fast growth and short lived, scant summer water, 20 to 25 feet—City College Campus, Santa Monica.

Callistemon lanceolatus—See January. 602 25th Street, Santa Monica.

Erythrina americana—Red, deciduous, trunk greenish, 15 to 30 feet—West side of Glendale Boulevard, first block north of Los Feliz in Glendale.

Erythrina caffra—See January. Down center of San Vicente Boulevard, West Los Angeles and Santa Monica.

Erythrina lysistemon—Orange, deciduous, somewhat tender, 25 to 35 feet—Mature specimen near northeast corner of Union Oil Building, Beaudry Street, Los Angeles.

Eucalyptus erythronema—Light red, evergreen, slender, 10 to 15 feet.
Eucalyptus magacornuta—See January. Los Angeles State and County Arboretum, Arcadia.
Eucalyptus orpetii—See January.
Eucalyptus sideroxylon rosea (pallens)—See January. Brentwood Country Club near corner of Stanford and Montana, West Los Angeles (fine group showing seedling variations).
Eucalyptus torquata—See January. Dr. Samuel Ayers, Jr.
Eugenia smithii (Acmena)—See January.
Magnolia campbellii—Pink, deciduous, 20 to 30 feet—Mrs. Jack Evans, 14225 Sunset Boulevard, Riviera.
Magnolia dawsoniana—Pink, deciduous, 15 to 25 feet—Mrs. Evans.
Magnolia denudata—See January. Mrs. Evans.
Magnolia veitchii—Pink, deciduous, 12 to 15 feet—Mrs. Evans.
Prunus campanulata—See January.
Prunus cerasifera atropurpurea (pissardi)—Light pink, 20 to 35 feet—Old specimens in Stone Canyon near Copa de Oro, Bel Air.
Prunus cerasifera blireana—Pink double (earliest of *cerasifera*), deciduous—Common.
Prunus mume—Rosemary Clark and white. See January.
Stenocarpus sinuatus—Orange red, evergreen, slow, 20 to 25 feet—Los Angeles State and County Arboretum.
Robinsonella cordata—Blue to lavender, virtually evergreen, rarely blooms here, but spectacular when it does; 25 to 30 feet.

MARCH

Acacia pycnantha—See February.
Callistemon lanceolatus—See January.
Callistemon viminalis—Red, pendulous, 20 to 30 feet. Not as showy as *C. lanceolatus*, needs ample water, food, thinning; long noded, sparse green—Corner Sunset Boulevard, one block west of Highland Avenue, Hollywood.
Cercis canadensis—Rose purple, occasionally white, deciduous—UCLA Botany Garden.
Cercis occidentalis—Rose purple, deciduous—Rancho Santa Ana Botanic Garden, Claremont.
Cercis siliquastrum—Rose purple, rarely white, deciduous.
Erythrina americana—See February.
Erythrina caffra—See January. Motor court on Barrington Avenue, opposite Paul J. Howard's California Flowerland.
Erythrina coralloides—Red, deciduous, 20 to 30 feet—Huntington Botanic Gardens, San Marino.
Eucalyptus erythronema—See February. Los Angeles State and County Arboretum.
Eucalyptus megacornuta—See January.
Eucalyptus sideroxylon rosea (pallens)—See January.
Eucalyptus torquata—See January. Los Angeles State and County Arboretum.
Eugenia smithii (Acmena)—See January.
Magnolia campbellii—See February.
Magnolia dawsoniana—See February.
Magnolia liliflora nigra—Maroon, deciduous, 10 to 18 feet.
Magnolia veitchii—See February. Miss Peggy Sullivan, 2212 Mandeville Canyon, Brentwood. Here it frequently blooms early.
Prunus cerasifera atropurpurea (pissardi)—See February. 16th Street at Arizona, Santa Monica.
Prunus persica Helen Borchers—Double pink, deciduous, 20 to 25 feet—Common.

Prunus subhirtella—Pink, deciduous, best away from coast, 15 to 25 feet—Huntington Botanic Gardens, San Marino.
Stenocarpus sinuatus—See February.

APRIL

Aesculus carnea brioti—Rose red, deciduous, 15 to 20 feet.
Aesculus carnea—Pink, deciduous, 15 to 20 feet.
Bauhinia variegata—Orchid or white, usually deciduous, 20 to 25 feet—150 Barrington Place, Brentwood.
Callistemon lanceolatus—See January.
Callistemon viminalis—See March.—513 7th Street, Santa Monica.
Cercis canadensis—See March.
Cercis occidentalis—See March.
Cercis siliquastrum—See March.
Erythrina coralloides—See March.—Union Oil Building, Bixel Street entrance.
Erythrina falcata—Deep pink, evergreen, to 50 feet—Los Angeles State and County Arboretum.
Erythrina lysistemon—See February.—825 San Vicente, Santa Monica.
Erythrina ovalifolia—Red, *new,* probably tall.
Erythrina umbrosa—Red, evergreen, 30 feet—Entrance to Los Angeles State and County Arboretum.
Eucalyptus erythrocorys—See January.
Eucalyptus ficifolia—Red, orange, pink, peach, apricot, white; 20 to 25 feet—Spectacular specimen northwest corner of Montana Avenue and 18th Street, Santa Monica.
Eucalyptus megacornuta—See January.
Eucalyptus sideroxylon rosea (pallens)—See January.
Eucalyptus torquata—See January.
Magnolia liliflora—See March.
Malus floribunda arnoldiana—Rose to white, deciduous, 8 to 10 feet.
Malus (Hopa) species in question—Pink and white, 15 to 25 feet. Best crabapple, grows best near ocean.
Malus sylvestris eleyi—Deep rose, deciduous, 20 to 25 feet—Common.
Prunus persica Helen Borchers—See March.
Prunus persica Late White—Deciduous, last peach to bloom and possibly showiest, 20 to 25 feet—Northeast corner Fourth and Normandie in old Wilshire district.
Prunus subhirtella—See March.
Robinia idahoensis Monument—Deep pink, deciduous, 20 to 25 feet—Los Angeles State and County Arboretum.

MAY

Acacia pruinosa—Pale yellow flowers and copper new leaves, evergreen, 25 to 35 feet—345 25th Street, Santa Monica.
Aesculus carnea brioti—See April.
Aesculus carnea—See April.
Aesculus hippocastanum—White, deciduous, 20 to 40 feet—Opposite Beverly Hills Hotel on Sunset Boulevard (southwest corner).
Bauhinia corniculata—White, claw-like petals, stamens colored, 10 to 25 feet—UCLA Botanic Garden.
Bauhinia fordicata—Cream, semi-deciduous, 10 to 15 feet.
Bauhinia variegata—See April. West side of Normandie between 3rd and 4th, old Wilshire district.
Callistemon lanceolatus—See January.
Callistemon viminalis—See January.—2216 23rd Street, Santa Monica.

Erythrina falcata—See April.
Erythrina ovalifolia—See April.
Erythrina umbrosa—See April.—Southeast corner Chamber of Commerce Bldg., Bixel Street, Los Angeles.
Eucalyptus erythrocorys—See January.
Eucalyptus ficifolia—See April.
Eucalyptus megacornuta—See January.
Eucalyptus torquata—See January.
Feijoa sellowiana—White-red, not showy, evergreen to backed grey, resents soggy conditions, very hardy, 15 to 20 feet and across.
Hymenosporum flavum—Light yellow, fragrant, semi-deciduous, 20 to 40 feet—528 Alta Street, Santa Monica.
Jacaranda acutifolia—Blue or rarely pink, deciduous, 30 to 50 feet—Pink at Los Angeles State and County Arboretum.
Koelreuteria paniculata—Yellow, deciduous, 20 to 25 feet.
Magnolia grandiflora (Forms of *M. exoniensis* and *M.* St. Mary's)—White, fragrant, evergreen; the former 40 to 75 feet, the latter two 20 to 25 feet.
Malus ioensis Bechtel—Light pink double, deciduous, 15 to 20 feet—Common.
Metrosideros tomentosa—Red, evergreen, slow; especially for coastal areas and immediate ocean front; 20 to 30 feet—Palisades Park at foot of Broadway, Santa Monica.
Stenocarpus sinuatus—See February.

JUNE

Acacia pruinosa—See May.
Bauhinia corniculata—See May.
Bauhinia forficata—See May.
Callistemon lanceolatus—See January.
Callistemon viminalis—See March.
Calodendron capense—Orchid, semi-deciduous, best coastal, 20 to 40 feet—Two specimens in parkway on Ohio just east of Federal, West Los Angeles.
Clethra arborea—White, fragrant; evergreen; fastigiate; needs thinning, partial shade, some acidity, best in cool gardens; 15 to 25 feet—353 19th Street, Santa Monica.
Dais cotinifolia—Pink; semi-deciduous; slow and temperamental; needs good drainage and moisture; 10 to 20 feet—Glenn Peebles, 12179 Leven Lane, West Los Angeles.
Daubentonia tripetti—Orange, deciduous, 10 to 15 feet—Common in San Fernando Valley.
Erythrina crista-galli—Bronze red, deciduous, 15 to 20 feet—255 South Barrington Avenue, Brentwood.
Eucalptus caesia—See January.
Eucalyptus erythrocorys—See January.
Eucalyptus ficifolia—See April.
Eucalyptus megacornuta—See January.
Eucalyptus orpetii—See January.
Feijoa sellowiana—See May.
Hibiscus Rosa-sinensis (Hybrid tree-form)—White, pink, red, yellow; evergreen, tender, eventually to 20 feet.
Hymenosporum flavum—See May.—393 19th Street, Santa Monica.
Jacaranda acutifolia—See May.
Koelreuteria paniculata—See May.
Liquidambar orientalis—Red purple foliage, deciduous, height undetermined—Los Angeles State and County Arboretum.
Magnolia grandiflora and more dwarf forms—See May.

Metrosideros tomentosa—See May. Fourth Street from Montana to San Vicente, Santa Monica.
Nerium oleander—White, pale yellow, pink, rose, red, salmon; evergreen, 10 to 25 feet—Common.
Stenocarpus sinuatis—See February.
Thevetia thevetioides—Yellow, evergreen, showy, open, somewhat tender, 10 to 25 feet—14229 Sunset Boulevard, Riviera.
Tipuana tipu—Deep yellow, deciduous, 25 to 50 feet—685 Elkins off Rosemont, Brentwood.

Horticultural consultant, instructor and writer

(To be continued)

NAMES, NOTES AND NEWS

The Southwest Branch of the International Geranium Society will present a flower show on Saturday, May 16 and Sunday, May 17. Site of the show will be Plummer Park, 7377 Santa Monica Blvd., Los Angeles. Time, Saturday—1:00 P.M. to 9:00 P.M.; Sunday—10:00 A.M. to 5:00 P.M. There is no admission charge.

BOOK REVIEW

Principles of Horticulture, by Erwin L. Denisen. New York, The Macmillan Company, 1958. 509 pp. Indexed. $7.50

There are so many books on horticulture and propagation that it is hard to say one is better than another or to choose the one most useful to the gardener. All seem to deal with elementary horticulture, since more complicated phases of the subject lead one into the pure science of plant physiology. Dr. Denisen's book, although designed for the college student, has been slanted toward the home gardener who is interested in just growing things. He has included a chapter on "Hobbies in Horticulture" which is timely in this era of hobbies. People have engaged in gardening through the ages, but like reading, it has not been considered a hobby with all the attributes of such—the power to sooth, console, amuse, challenge or inspire. He suggests Bonsai, terrariums, flower arranging, plant breeding and other usual aspects of horticulture, but also includes painting, music, literature, photography and other activities that one does not associate directly with the art of growing plants.

The book is in three parts giving the traditional treatment of the subject. Part I discusses the fundamentals of horticulture: fruit, vegetables and ornamental plants, landscaping, nursery production, seed production, plant anatomy, photosynthesis, stages of growth and environment. Part II covers the skills and practices of modern horticulture. These principles apply for the commercial grower, the processor, the retailer, the salesman, the home owner or the hobbyist. There are chapters on propagation, grafting, pruning, soils, etc. This part ends with a discussion of harvesting, storing and marketing which is essential to the commercial grower. Part III relates the principles of horticulture to the home grounds, with chapters on landscaping, lawn care, ornamental plants, vegetable gardens, fruit and hobbies.

The book is noteworthy for the author's efficient method of reducing complex theories to the understanding of the layman and for its emphasis on practical horticulture. The three chapters on propagation are particularly well illustrated and explicit. He has succeeded in his objective: "to enlighten the reader in the far-reaching aspects of horticulture and to show how it enters his daily life." There are many fine photographs by the author, line drawings by Virginia Yelland, and a glossary of value to the amateur.

DORA M. GERARD

"The Art of Flower and Foliage Arrangement" by Anna Hong Rutt, MacMillan Company, New York, 1958. $5.95

Here is a fresh approach, a wealth of inspiration for every arranger—novice or prize-winner. Here is a real treasure house of photographs with a text covering all the principles and elements in flower arranging. This book will be read with keen interest by the Flower Show Judges as well as all others interested in the fascinating art of flower arranging, for it is now an art of outstanding importance. Beginners will find the fundamentals fully explained with lucid instructions covering the choosing and handling of all kinds of materials, choices of containers and accessories and the placing of compositions. School children will be encouraged and delighted by Mrs. Rutt's chapter on Arrangements for Juniors. Advanced practitioners in this art will find words of wisdom that will enlarge their understanding. To quote the author: "The basic idea in this book is that flower arrangement is an art and can be analyzed and understood as any of the other visual arts. The principles of art are the basis for our analysis of a flower arrangement—for example, we study it to see if it has good proportion, satisfactory balance, moving rhythm, and positive emphasis—we apply all these principles to the elements of color, line, form, pattern and texture in our flower arrangement."

The book is beautifully illustrated by 96 photographs by Elemore Morgan. They were taken especially for this book and are said to be the finest to appear in any book on flower arrangements. All the arrangements were made by the author alone. You will find them well designed, clear cut, neat and expressive.

The book has been placed in the library of the Los Angeles State and County Arboretum, Arcadia, California.

BILLIE MCCASKILL

"The Amaryllis Manual", by Hamilton P. Traub. New York, The Macmillan Company, 1958. 338 p. Indexed. $7.50

It is an event for a librarian to find a modern flower book written as a scientific publication and not over popularized for the home gardener. Dr. Traub has written a comprehensive, technical treatise on the genus *Amaryllis* which covers every detail of the subject and is interesting and clear to the non-scientist as well as the scientist. It is an extremely well-documented work in the exact style familiar to readers of *Herbertia*. In fact, it was the many requests for such a manual which he receives as editor of *Herbertia* that inspired Dr. Traub to write the book. His lifetime study of the Amaryllis makes him the best qualified person for the work. The bulk of the text covers Amaryllis history, botany, breeding, propagation, culture and marketing. The Appendices contain valuable information on chromosome numbers, nomenclature, a generic and subgeneric diagnosis of Amaryllis with a key to the known species and their complete descriptions, Amaryllis nurseries, organizations and dealers, commercial sources, a glossary of terms, a 9 page bibliography and a complete index. There are 31 black and white illustrations, 1 colored plate.

The author starts with a well illustrated botanical description of the Amaryllis, including pollination and fertilization. He then describes the nine divisions of cultivated species and hybrids. There is an interesting historical account of introductions and breeding from 1689 to the present. All the noted hybridizers are mentioned from Garroway and Company, Bristol, England to Luther Burbank in California. Details of the breeding industry all over the world are given.

Propagation and culture are treated in the same thorough manner. As a UCLA staff member, this reviewer would like to see the *UC System for Producing Healthy Container Grown Plants*, ed. by K. F. Baker, supersede other soil mixtures with which it is listed! In the chapter on culture there is a fine diagram of the cross-sections of an Amaryllis bulb which would be hard to find elsewhere. Slightly different methods of field culture have been developed in the varying climates of Florida and California; outdoor culture is only for tropical and subtropical climates.

From the chapter on marketing, the reader can learn much about the flower industry as a whole. The author gives commercial standards, market outlets, and shipping methods. The last two chapters on Amaryllis shows and the Amaryllis as a cultural asset are of popular interest. They are followed by the technical appendices mentioned above.

A well written horticultural book with literary style, this volume stands a fitting monument of scholarship to Dr. Traub's half-century of devotion to these beautiful plants, and is the most valuable contribution to the literature on the genus Amaryllis to date.

DORA M. GERARD

"Maples Cultivated in the United States and Canada" by Brian O. Mulligan. Published by The American Association of Botanical Gardens and Arboretums 56 pp. August 1958 $2.00 per copy, with discount for 10 or more copies.

The American Association of Botanical Gardens and Arboretums has for several years sponsored the publication of papers of interest to horticulturists, particularly in the United States and Canada. The latest publication in the cultivated maple is one of this series and is an important edition to our horticultural literature.

The pamphlet begins with a brief discussion of the geographical distribution of the genus and its botanical classification. The genus *Acer* in the 1902 revision in Das Pflanzenreich com-

prised 110 species which were subdivided into 13 sections. The genus is widespread in its distribution and horticultural material comes from a number of areas. The cultivated species are arranged in their sections and series according to Rehder and the species and hybrids cultivated in the United States and Canada are listed, indicating the number of places where they are known to be cultivated. A valuable list, in addition, is that of the maples at the U. S. Plant Introduction Station at Glenn Dale, Maryland, with their Plant Introduction numbers. The cultivars are identified as to their associated species. A brief discussion is given of hybrids and of what is known of the chromosome cytology of the genus. The pamphlet is replete with such lists, including one on maples classified as to size and use, either as large shade trees or small ornamentals and those valuable for fall color. Mr. Roger G. Coggeshall has prepared the section on propagation, with a bibliography on the subject. In addition to the alphabetical list of the cultivated maples, there is a further alphabetical listing which indicates the botanical gardens in which they are known to be growing, their native habitat, the information available on their introduction into cultivation, and what is known about their discovery. This is greatly abbreviated but brings together in one place much useful knowledge. Under each of the botanical species the cultivars are described and their origin given. A number of excellent black and white photographs show the form of the whole tree, variations in leaf structure, and variations in the habit of growth.

Few genera are as widely cultivated as the maple. A publication such as this, which brings together in one leaflet information on introduction, cultivars and their origin, propagation, and brief notes of interest to the horticulturist on the geographical distribution, chromosome number, etc., is a valuable addition to horticultural literature. It is a compilation of facts from a number of sources and provides a time-saving reference source for all growers of maples. It is to be regretted, however, that this publication does not include a vegetative key, at least to the species of maple common in cultivation. We hope that the American Association of Botanical Gardens and Arboretums will find it possible to continue the publication of such informative pamphlets on other genera.

MILDRED E. MATHIAS

"Wild Flowers of the Santa Barbara Region", text by Katherine K. Muller, photographs by Campbell Grant. Santa Barbara Botanic Garden Inc. 1958. $1.00 plus 4% tax.

A botanic garden publication of such merit as to bring out the 'green' eye of any similar horticultural institution.

Wild flowers of California are everyone's interest, and becoming familiar with those about Santa Barbara will be a pleasure, using this latest guide. Most striking to the layman will be the color plates. All the pictures are reproductions of colored photographs, all depict the flowers in close, sharp focus. A goodly portion against natural settings. Color true, even to the difficult to photograph blues, purples and greens. The layout of three pictures to a page has been given close consideration, leading the eye from picture to picture, yet emphasizing each.

The text, opposite each picture, identifies each of the 48 species by common and scientific name and the Plant Family to which it belongs. The detailed description of each specimen gives the essentials for identification, plus the type of natural location in which the plant is likely to be found. The writing style reads easily, interestingly and quickly!

An attractive and serviceable cover binds this flower guide. Made of a stiff, high gloss stock, the front cover is a photograph of a California poppy bordered walk within the Garden. The back cover carries a close-up photograph of this same flower. Binding is the new spiral plastic.

Indeed, a handsome and useful addition to the study and enjoyment of California wild flowers.

Buy one!

Gardening indoors under lights, by Frederick H. and Jacqueline L. Kranz, New York, Viking Press, 1957. 241 p. Indexed. $4.95.

This book is of exceptional interest to anyone in the vicinity of UCLA aware of the experiments on exposing plants to light carried on in the greenhouses of the Department of Floriculture and Ornamental Horticulture, because it offers the opportunity for a novice to try similar techniques at home.

Some interesting facts about light in relation to plants are given. For instance, "by combining fluorescent tubes and incandescent bulbs to the ratio of three to one, plants can be grown to maturity without benefit of daylight. Scientists refer to this combination as 'balanced lighting'". Each of the colored rays affects the growth of plants, but two are vital—the red and the blue. The blue light promotes foliage growth, the red encourages flowering. Fluorescent tubes emit the rays of the blue part of the spectrum, and the incandescent tungsten-filament bulbs supply the needed rays in the red end of the spectrum. When only one type of lamp is being used, balanced lighting can be obtained by placing the lamp by a window—a boon to the amateur who may not want to invest in complicated lighting arrangements. The natural light from the window will supply both the blue and the red rays, and whichever artificial light is used will give a greater light intensity, so that plants will grow more rapidly.

The above, to the reviewer, was a most interesting part of the book. Every facet of the subject is discussed by the Kranz in an informative and helpful manner. Temperature, light intensities and photoperiodism, construction of indoor

greenhouses, experiments with soil, leaf mold, plant food, watering, transplanting, pests, propagation, a chapter on Saint-Paulias, outstanding flowering plants to grow by lamplight, and a selected group of foliage plants. There is a recipe for a fool-proof soil mixture and a fertilizer recipe, both inviting the reader to try this system of house gardening.

The authors give explicit instructions on how to go about this type of horticulture. It is considered all right to water from the top as long as care is used. Diseased and pest ridden plants should be discarded completely as a danger to the whole collection. The Appendix contains germination records of year-old and fresh vegetable seeds, a list of annuals to raise from seedlings, a record of cuttings of shrubs, and the lighting needs of a select group of plants.

One feature not mentioned, is the cost of fluorescent lighting equipment for one not able to construct his own. An endearing quality of this author family is that they cannot bear to leave their large collection of plants in the summer while they operate a summer camp. So they take all their plants along with the children to the woods!

DORA M. GERARD

ADULT EDUCATION PROGRAM IN HORTICULTURE

Late Spring Session in horticultural and botanical subjects are being offered at both the Arboretum, Arcadia and Descanso Gardens, La Canada. Courses to begin April 20, 1959.

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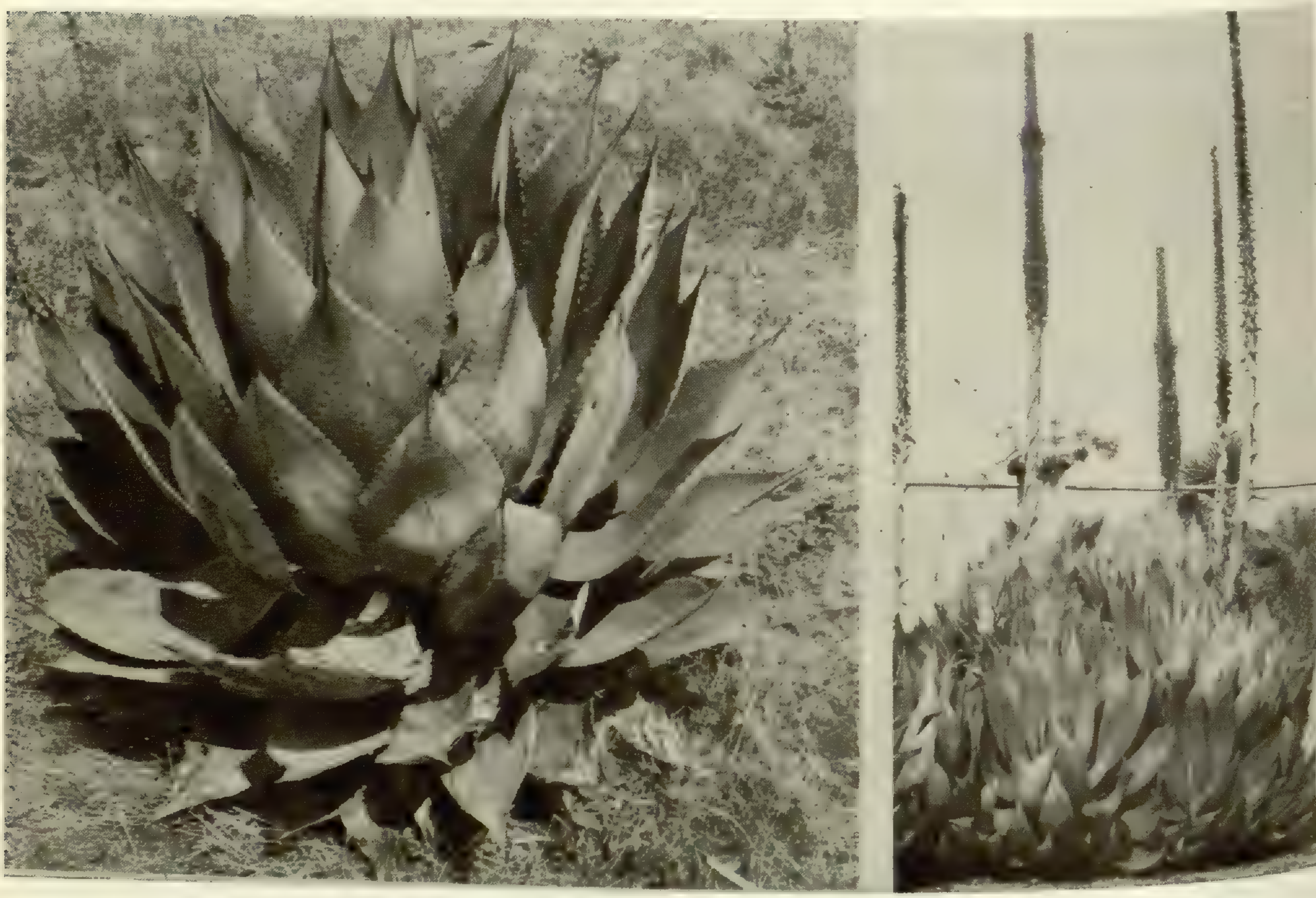

Agave macrantha grown in the Huntington Botanical Garden, San Marino, California.
Photo by August J. Breitung in *Cactus and Succulent Journal.*

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Lasca Leaves

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VOL. IX JULY 1, 1959 NO. 3

HORTICULTURE

TREES-IN-COLOR CALENDAR

For Greater Los Angeles

PHILIP E. CHANDLER

THE PLANTS COMPILED by Mr. Chandler are for immediate consideration in answering the perennial question of year around garden color using trees. However, Mr. Chandler and/or Lasca Leaves would appreciate comments about the trees listed, either in the form of new species, culture practices to fit varied locations, flowering time or additional locations where specimen plants can be observed. The Calendar for the months of January through June appeared in Lasca Leaves, Vol. IX, No. 2, Spring 1959.

CONCLUSION

JULY

Albizzia julibrissin—Light pink, deciduous, 20 to 50 feet and across—Several young blooming trees at Occupational Therapy Garden, Brentwood Hospital, West Los Angeles.

Albizzia julibrissin rosea—Deep pink, deciduous, 20 to 25 feet—Los Angeles State and County Arboretum.

Brachychiton discolor—Rose, erratic bloomer, semi-deciduous, 30 to 80 feet—Best inland.

Callistemon lanceolatus—See January.

Calodendron capense—See June.—Sunset Boulevard through Riviera.

Castanospermum australe—Yellow and red, evergreen, apparently blooms best inland, 15 to 30 feet—Huntington Botanic Gardens, San Marino.

Chiranthodendron platanoides—Dark red with yellow, evergreen, fast, slightly tender, 30 to 60 feet—14229 Sunset Boulevard, Riviera.

Clethra arborea—See June. Common, but usually badly grown.

Daubentonia tripetti—See June.

Eucalyptus caesia—See January. Dryish conditions only.

Eucalyptus ficifolia—See April.

Eucalyptus torquata—See January.

Feijoa sellowiana—See May.

Hibiscus Rosa-sinensis—See June.

Jacaranda acutifolia—See May.—Along several streets east end of Santa Monica Canyon.

Lagerstroemia indica—White, pink, orchid, rose, red; deciduous, mildew near sea but fine inland, 10 to 30 feet.

Liquidambar orientalis—See June. Good specimen in UCLA Botanic Garden.

Magnolia grandiflora and forms—See May.

Nerium oleander—See June.

Pittosporum rhombifolium—White, flowers showy, evergreen, 15 to 35 feet—Hollywood High School campus, Sunset and Highland Avenue, Hollywood.

Sophora japonica—Cream, deciduous, 30 to 70 feet.

Thevetia thevetioides—See June. Fine specimen on north side of Chaparral, half block west of North Barrington Avenue (1 block north of Sunset).

Tipuana tipu—See June. See entire 2500 block of Colby Avenue, West Los Angeles.

AUGUST

Albizzia julibrissin—See July.

Albizzia julibrissin rosea—See July.

Bauhinia grandiflora—(possibly incorrect species name, but this is nomenclature in trade) Large white, virtually evergreen, 15 to 25 feet.
One of very best orchid trees and virtually lost to market.
Callistemon viminalis—See March.
Castanospermum australe—See July.—255 South Barrington, Brentwood.
Chiranthodendron platanoides—See July.—Parking lot across South Barrington from Paul J. Howard's California Flowerland.
Chorisia speciosa—Light pink to deep purplish rose, semi-deciduous, 30 to 60 feet. Outstanding, Los Angeles State and County Arboretum.
Daubentonia tripetti—See June.
Erythrina crista-galli—See June. Cut back flowering branches hard immediately after each blooming to hasten next performance.
Erythrina humeana—Orange red, deciduous, slightly tender, 20 to 30 feet. Possibly oldest specimen at Morgan Evans, 14229 Sunset Boulevard, Riviera.
Eucalyptus erythrocorys—See January. (Usually blooms a month and rests a month).
Eucalyptus megacornuta—See January.
Hibiscus Rosa-sinensis—See June.
Lagerstroemia indica—See July.
Liquidambar orientalis—See June.
Magnolia grandiflora and forms—See May.—310 San Vicente, Santa Monica (exoniensis).
Nerium oleander—See June. Most effective planted in groups of one color!
Sophora japonica—See July.
Stenocarpus sinuatus—See February.
Thevetia thevetioides—See June.
Tipuana tipu—See June. Fine old specimen at Los Angeles Country Club, Wilshire Boulevard between Beverly Hills and Westwood; also St. John's Hospital, Santa Monica.

SEPTEMBER

Bauhinia grandiflora—See August.
Callistemon lanceolatus—See January.
Callistemon viminalis—See March.
Cassia mulijuga—Yellow, evergreen, very showy, 15 to 25 feet—Los Angeles State and County Arboretum.
Chiranthodendron platanoides—See July.—Brentwood Hospital Therapy Garden, Veterans' Administration, West Los Angeles.
Chorisia speciosa—See August. Fine specimen south east corner Bel Air Hotel.
Erythrina humeana—See August. Usually reaches climax in September. Fne young specimen at 1st and Los Angeles streets. The best coral for Los Angeles for fall.
Eucalyptus erythrocorys—See January.
Eucalyptus ficifolia—See April. Usually at best early fall.
Eucalyptus megacornuta—See January.
Hibiscus Rosa-sinensis—See June. Usually reach climax in September.
Lagerstroemia indica—See July.
Liquidambar orientalis—See June.
Magnolia grandiflora and forms.—See April. 346 19th Street, Santa Monica (exoniensis).
Nerium oleander—See June.
Pittosporum rhombifolium—Orange yellow fruit. See July.—Cherokee from Sunset to Hawthorn, Hollywood.
Stenocarpus sinuatus—See February.

Thevetia thevetioides—See June. Frequently best in September.

OCTOBER

Arbutus unedo—Small white flowers, red and yellow fruit; evergreen, hardy; charming but not showy, multiple trunk; 12 to 25 feet.
Callistemon lanceolatus—See January.
Callistemon viminalis—See March.
Cassia carnaval—Yellow, showy, evergreen, 15 to 20 feet—Los Angeles State and County Arboretum.
Cassia multifuga—See September.
Cassia splendida—Large bright yellow, evergreen, 15 to 20 feet—Arboretum. (Species per Arboretum nomenclature, not old *splendida* of trade.)
Chiranthodendron platanoides—See July.
Chorisia speciosa—See August.—Sunset Boulevard center strip through Beverly Hills (specimens still very young).
Erythrina crista-galli—See June.—521 16th Street, Santa Monica.
Erythrina humeana—See August.
Erythrina lysistemon—See February.—436 20th Street, Santa Monica.
Eucalyptus caesia—See January.—353 19th Street, Santa Monica, Mrs. M. Davis.
Eucalyptus erythrocorys—See January.
Eucalyptus ficifolia—See April.—Along Mountain Drive, Glendale.
Eucalyptus megacornuta—See January.
Eucalyptus orpetii—See January.
Eucalyptus sideroxylon rosea (pallens)—See January.—Along Embury Street, Pacific Palisades.
Eucalyptus torquata—See January.
Hibiscus Rosa-sinensis (tree form)—See June.
Koelreuteria formosana—Yellow flowers, salmon seed pods, deciduous, 25 to 35 feet—Benedict Canyon just north of Sunset Boulevard.
Liquidambar styraciflua—Red, yellow, purple foliage; deciduous, 40 to 75 feet—Parkway along Chevy Chase in Glendale.
Liquidambar orientalis—See June.
Magnolia soulangeana—See January. Fine specimen, 800 block Lincoln Boulevard, Santa Monica. Usually blooms fully at this time.
Nerium oleander—See June. Centinela Avenue north from Wilshire, Santa Monica.
Pittosporum rhombifolium—See September.—Georgina Avenue, 17th to 19th Streets, Santa Monica.

NOVEMBER

Arbustus unedo—See October. Common as large shrub, less common at best as a multiple-trunk tree.
Callistemon lanceolatus—See January.
Callistemon viminalis—See March.
Cassia carnaval—See October.
Cassia splendida—See October.
Chorisia speciosa—See January. One of the showiest ornamentals at this time.
Eucalyptus caesia—See January.
Eucalyptus erythrocorys—See January.
Eucalyptus ficifolia—See April. Lining streets near ocean edge of Huntington Palisades. Magnificent avenue in Corona del Mar.
Eucalyptus megacornuta—See January.
Eucalyptus orpetii—See January.
Eucalyptus sideroxylon rosea (pallens)—See January.

Jacaranda acutifolia—See May. Often re-blooms in November.
Koelreuteria formosana—See October. Fine specimen near street on La Mesa Place just off 26th Street, Santa Monica.
Liquidambar formosana—Red, purple foliage, deciduous, 35 to 65 feet.
Liquidambar orientalis—See June.
Liquidambar styraciflua—See October. See parkways 4200 block of Wilkinson Avenue, Studio City.
Magnolia soulangeana—See January.
Pistachia chinensis—Flame foliage, deciduous, 20 to 50 feet.
Pittosporum rhombifolium—See September.
Stenocarpus sinuatus—See February.

DECEMBER

Arbutus unedo—See October.
Acacia podalyriaefolia—See January. Blooms later if no December rain.
Callistemon lanceolatus—See January. One of showiest December trees especially in dry years.
Callistemon viminalis—See March.
Chorisia speciosa—See August. Fine specimen in parking lot of Southern California Auto Club, West Adams and Figueroa.
Erythrina lysistemon—See February.
Eucalyptus caesia—See January.
Eucalyptus erythrocorys—See January.
Eucalyptus megacornuta—See January.
Eucalyptus sideroxylon rosea (pallens)—See January.
Eucalyptus torquata—See January. Flowers do not open if cold and wet.
Eugenia smithii (Acmena)—See January.
Liquidambar formosana—See October.
Magnolia soulangeana—See January. Often rests now between fall and later bloom.
Stenocarpus sinuatus—See February.

BEG YOUR PARDON

The Editor begs Mr. Chandler's pardon for the following slips in the January through June Trees-In-Color Calendar, Vol. IX, No. 2, pages 41-45:

Page 42. *Callistemon viminalis*—Red, pendulous, 20 to 30 feet. Not *so* showy as *C. lanceolatus.* (Rather than, "Not as showy as".)

Page 43. *Erythrina falcata—Red* (rather than, "deep pink".) Also *Malus* (Hopa) species in question—Pink and white, 15 to 25 feet. *One of few crabs good near ocean.* (Rather than, "Best crab-apple, grows best near ocean".)

Page 44. *Erythrina falcata* rather than *Erythrina umbrosa* is planted at the southeast corner Chamber of Commerce Building, Bixel Street, Los Angeles.

Add to May:
Brachychiton acerifolium—orange-red, semi-deciduous, erratic bloomer especially near coast.

Add to June:
Brachychiton acerifolium—See May. Fast in youth, slow in maturity, slow to bloom, best inland.

PROPAGATION

A "T" bud graft of *Chorisia speciosa.* Top of stock has been removed and scion bud shows healthy, vigorous growth.
Photo by Denis Kucera, Arboretum staff.

GRAFT OF CHORISIA SPECIOSA SUCCESSFUL

GEORGE H. LEWIS

A growing interest has been shown in the winter flowering tree, *Chorisia speciosa,* commonly called 'Floss-silk tree'. It is a native of Brazil.

The principal type of propagation to this time has been by seed. Of the plants which have flowered at the Arboretum, color variation of the blooms has been observed. A method of propagating outstanding seedlings seemed desirable. This article reports our first successful grafting of one of these selected seedlings.

A "T" bud graft was made on February 13, 1959, on a seedling plant approximately 14" high and with a stem circumference of ¾ inch. The stock seedling was growing in a gallon can, having been planted on December 5, 1958. The scion bud was selected from a tree which produced deep rose colored flowers. When the "T" incision was made, the stock plant exuded copious quantities of a very gummy, clear substance which jelled readily.

Ten days after making the graft the bud and stock had made union. After six weeks, the top was removed from the stock plant. The "T" incision scar had almost become invisible by this date. The newly grafted bud was forced to break and start growth, (see photograph).

This trial showed that *Chorisia speciosa* can be propagated by grafting. Uniform plantings of clonal material, therefore, become a possibility. *Arboretum Nurseryman*

HISTORICAL

ARCHAEOLOGICAL EXCAVATIONS IN THE "PATIO" OF THE HUGO REID ADOBE

WILLIAM J. WALLACE AND EDITH TAYLOR WALLACE

INTRODUCTION

BETWEEN March 1st and May 24th, 1958, a limited archaeological excavation was made in the "patio" west of the Hugo Reid Adobe on the grounds of the Los Angeles State and County Arboretum in Arcadia, California. It was exploratory in nature and its aims were fourfold. The main task was to determine if there had ever been a garden wall along the south side of the area. A second purpose was to ascertain original ground level and to learn something of the nature of the soil beneath. A minor objective was to obtain further information on a prehistoric Indian village site believed to underlie the home-site. And, finally, on the basis of the findings, to judge whether a major archaeological exploration covering the entire courtyard would be profitable.

The investigation was part of a program of archaeological and historical research designed to provide the California State Division of Beaches and Parks with information necessary for an authentic restoration of the old adobe house which was erected in 1840 by Don Perfecto Hugo Reid, an early settler in southern California.[1] Earlier excavations had provided data on original floor plan and had revealed something of the complicated constructional history of the house.[2] An examination of the documentary sources had added a few shreds of evidence concerning the structure's earliest appearance.[3]

The "patio" is a level-surfaced, rectangular section falling within limits of an L-shaped adobe house revealed by previous digging. It measures, roughly, 45 feet in a north-south direction and 65 feet east to west. The area is grass covered with a few shrubs and other plants growing close to the house. The only trees are a small palm and an incense cedar. There are several larger trees nearby whose roots extend far into the patio.

THE EXCAVATION

The first step in the patio exploration was selection of a suitable spot for digging. A plan of the courtyard as it was during the ownership of Elias J. "Lucky" Baldwin, the home's last occupant, showed that much of it had been covered with garden, paths, drains, a fountain and the like (Figure 1). All of these had been razed some years ago. It was decided that the most profitable digging would be in a section some distance from the southwest corner of the house. There had been no extensive disturbance here and it seemed a spot likely to provide maximum information.

The datum point was established at the southwest corner of the adobe and from this a grid of 5 x 5 foot squares was laid out with a transit, each square being assigned a letter designation for its north-south position and a number for its east-west location. The first trench, beginning at a point 20 feet west of the datum and including 8 pits, was staked out so as to be astride of the remains of a garden wall if one had existed along the south side of the patio. A second, shorter trench, actually an extension of the first, was laid out at right angles. Figure 2 shows the layout of the grid system and position of excavated units.

The exploration was carried on by a class in archaeological field methods from the Department of Anthropology, University of Southern California. Its members were: Gary Coon, James Heard, Arbie Keown and William Schmidt. Volunteer workers were Diane Alexander, John Crone and George Kritzman. The diggers met at the site on Saturdays and worked a six-hour day. Excavation began on March 1st and was continued intermittently until May 24th. Seven Saturdays and a few additional weekdays were spent in digging.

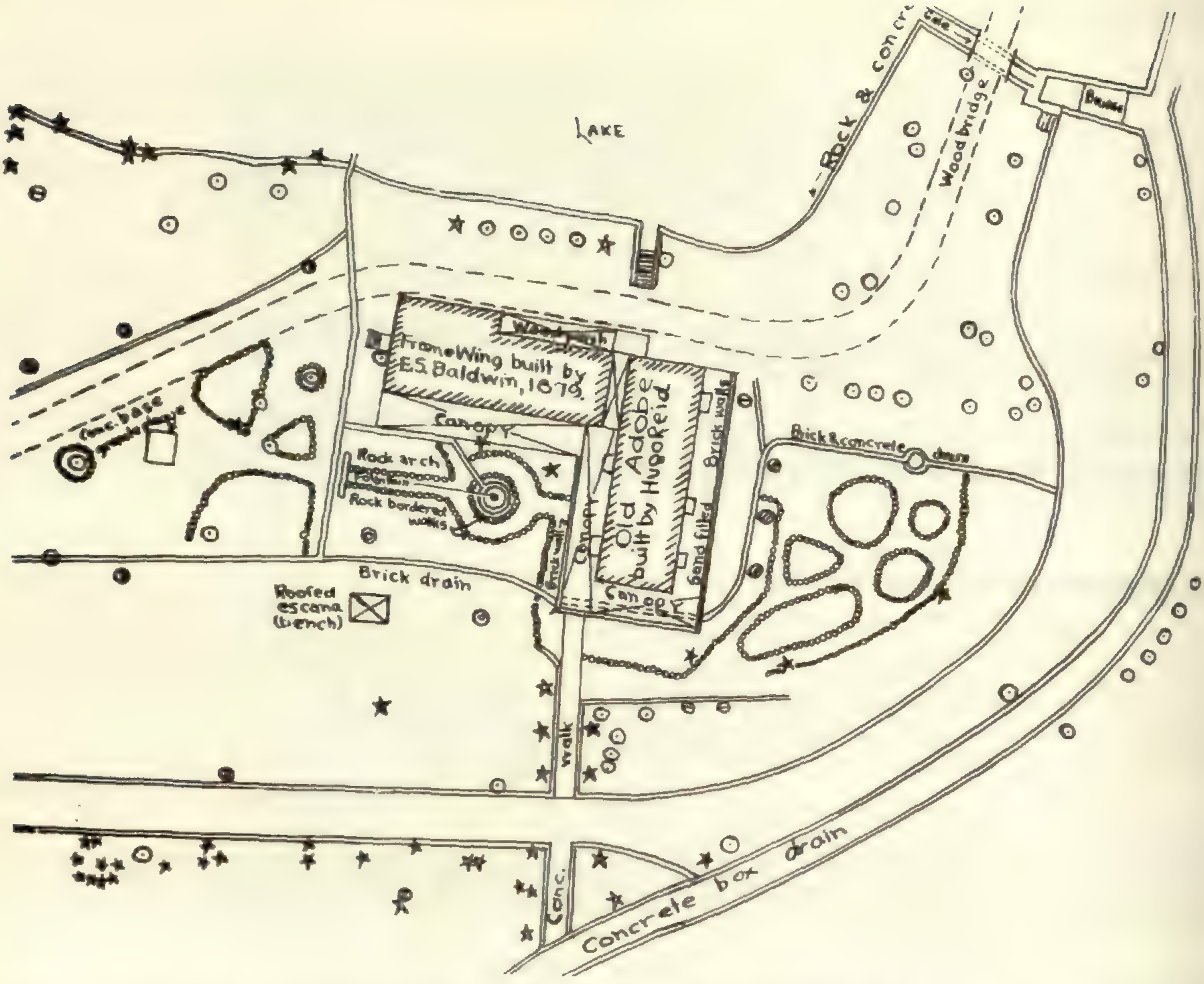


Fig. 1. Patio area indicating position of various features introduced by E. J. "Lucky" Baldwin. From tracing of County Surveyor's Map (B-2131, Revised 1950).

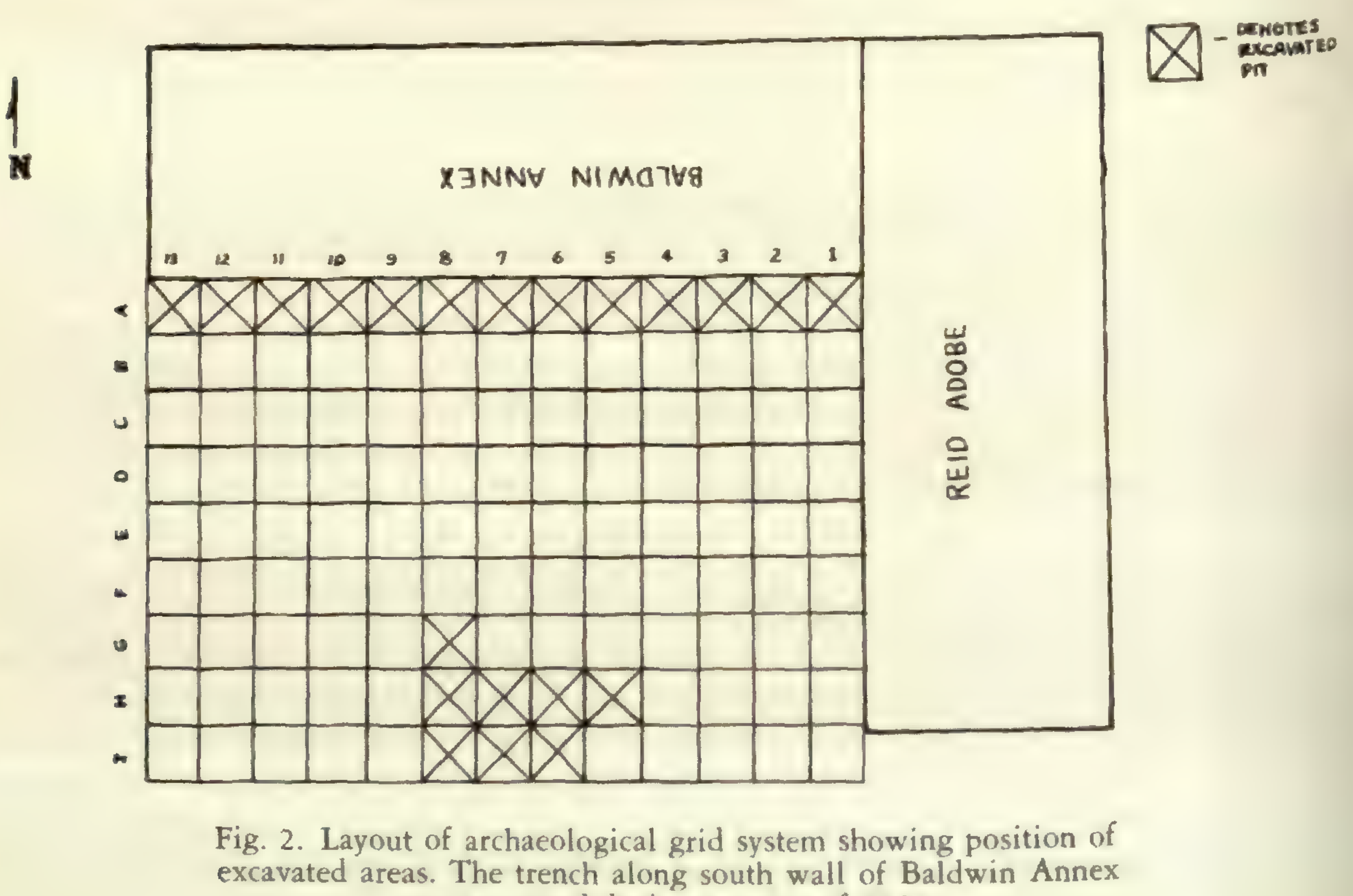


Fig. 2. Layout of archaeological grid system showing position of excavated areas. The trench along south wall of Baldwin Annex was excavated during summer of 1957.

Excavating was done as far as possible with trowels. In many spots, however, the soil was so hard that mattocks were needed to loosen it. All earth was carefully scrutinized for artifacts before being shoveled out. Its nature precluded screening.

The deposit was removed in 6-inch levels. Although the soil was sterile of artifacts below 18-24 inches, digging was continued to a depth of 36 inches below present ground surface in all pits. This was done to avoid missing any possibly deeply-buried architectural remains and to learn more about the underlying soil. Core borings were made into the subsoil for an additional five feet in several pits.

Records were kept of the soil's appearance in each 6-inch level and changes in color, texture and so on were noted. Sketches were prepared of the strata when the excavation was completed. Two distinct soil layers with a zone of intergradation between them were revealed (Figure 3). The uppermost 8-12 inches consisted of a dark gray soil, basically clay, containing much decomposed organic material. Below this was a yellowish-brown sandy clay. The latter contained many granite cobbles, some ranging up to 2 feet in diameter. The darker topsoil had been badly disturbed by cultivation and digging into it for other purposes; the earth beneath was relatively untouched.

Core borings showed that the yellowish-brown clay continued downward for an additional 2-3 feet to where a 6-8 inch layer of fine-textured, yellow clay was encountered. This thin band appears to have been water-deposited, perhaps during a minor flood. Beneath the clay lens the sandier soil resumed. The earth was quite moist below the 3-foot level.

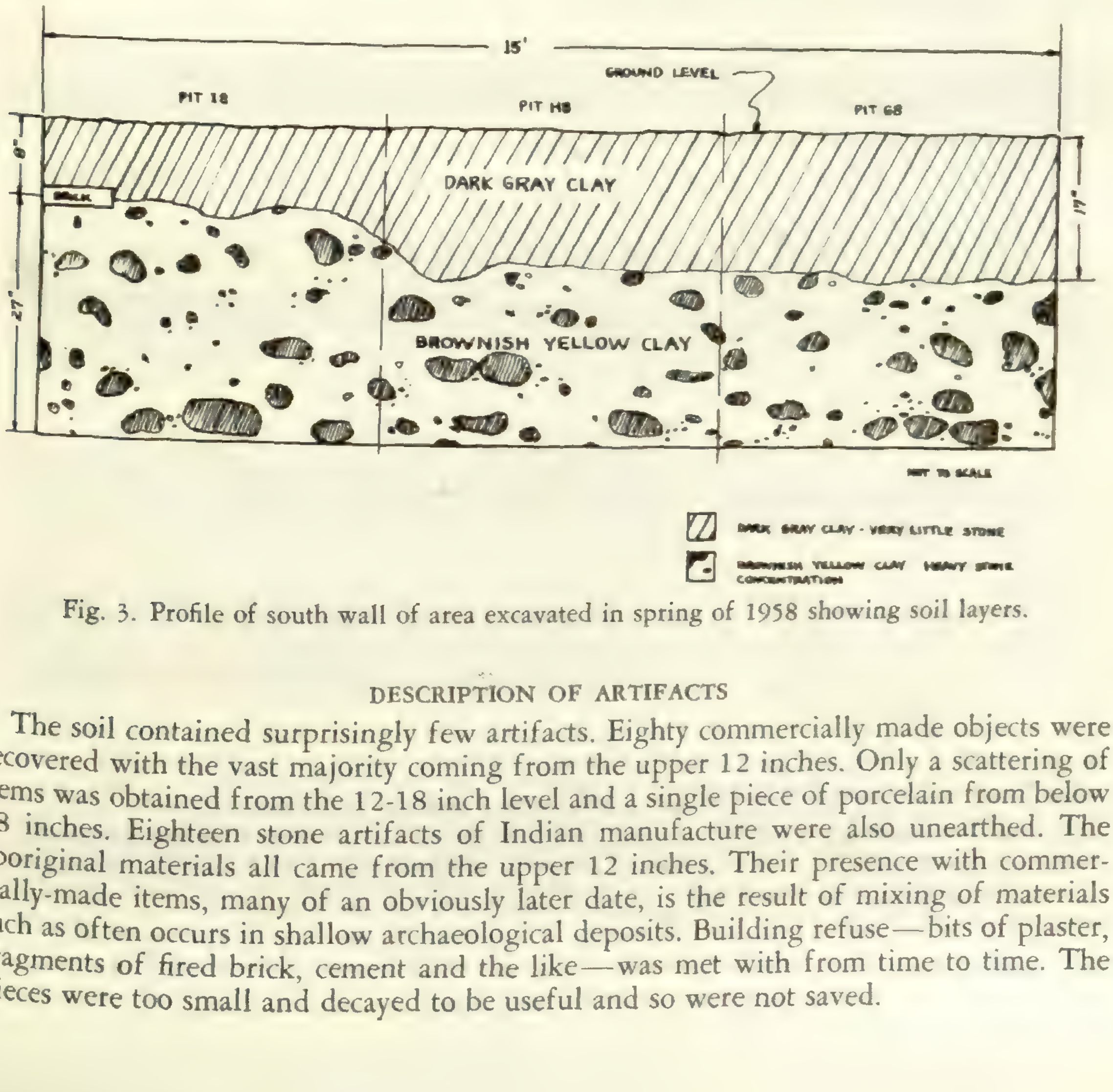


Fig. 3. Profile of south wall of area excavated in spring of 1958 showing soil layers.

DESCRIPTION OF ARTIFACTS

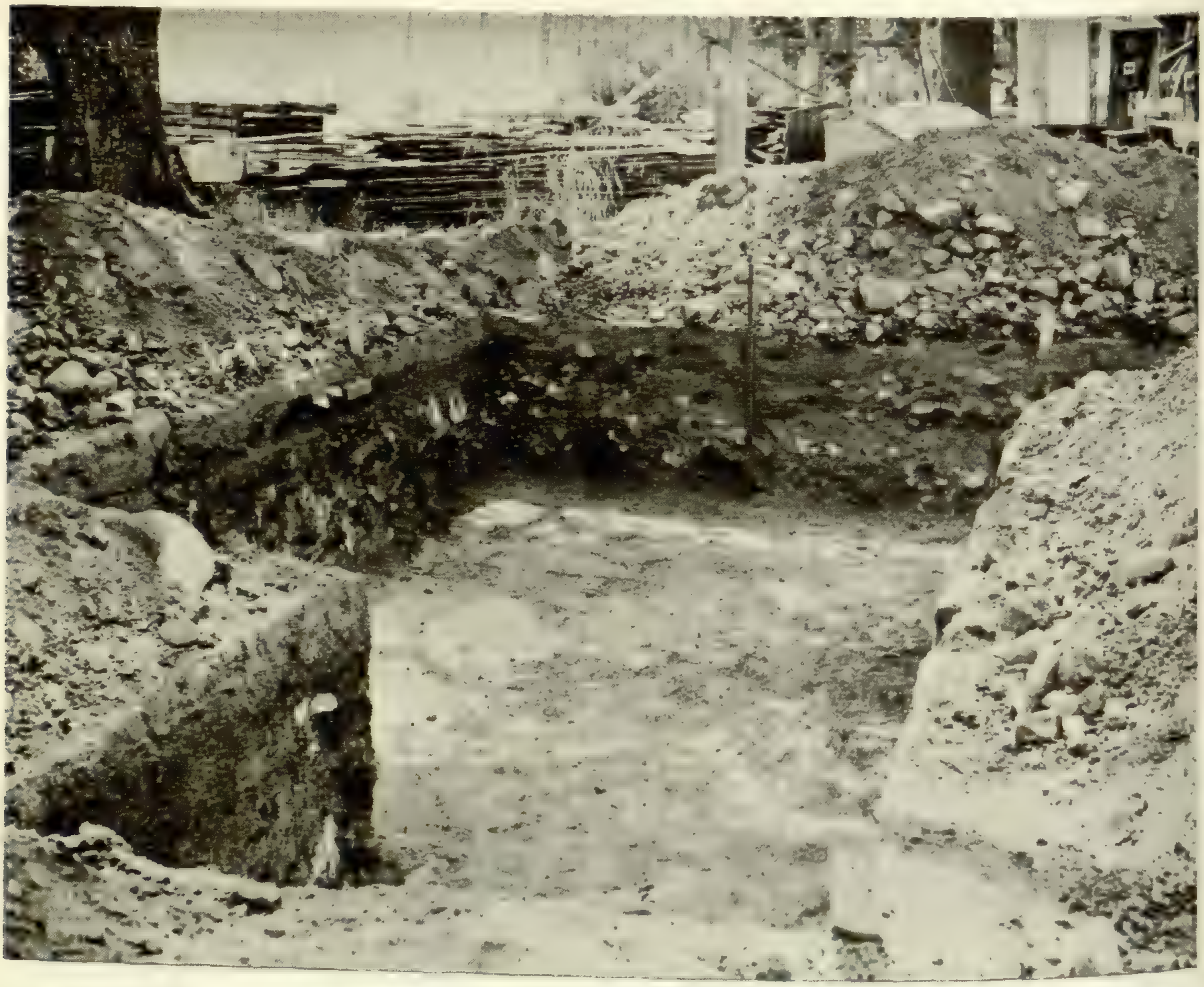
The soil contained surprisingly few artifacts. Eighty commercially made objects were recovered with the vast majority coming from the upper 12 inches. Only a scattering of items was obtained from the 12-18 inch level and a single piece of porcelain from below 18 inches. Eighteen stone artifacts of Indian manufacture were also unearthed. The aboriginal materials all came from the upper 12 inches. Their presence with commercially-made items, many of an obviously later date, is the result of mixing of materials such as often occurs in shallow archaeological deposits. Building refuse—bits of plaster, fragments of fired brick, cement and the like—was met with from time to time. The pieces were too small and decayed to be useful and so were not saved.

Metal: Thirty-eight iron objects, all heavily rust-encrusted but which could be identified as to probable form and use, were unearthed. Most numerous were nails, 28 of which were found. Twenty-six are of the old square variety and average 6.5 cm. in length. There are also 2 modern wire nails in the collection. Seven pieces of spikes or bolts, 1.2-1.5 cm. in diameter, were also recovered.

A flat piece of iron has the appearance of being part of the blade of an ordinary kitchen knife. It has a hole near one end, undoubtedly for the attachment of a handle. Its handle was probably of wood because one of bone or ivory would not have deteriorated beyond recognition. Another part of a kitchen utensil, perhaps a large serving fork has a flattened end with two minute holes. Its shaft is diamond-shaped in cross-section. It also must once have had a wooden handle.

The only other identifiable iron object is a threaded pipe connection with an inside diameter of 2.5 cm. There are two pieces of iron, one thin and the other thick, which are too fragmentary and rusted to give a clue as to original shape. The number of metal objects other than iron was not great. There are 6 brass cartridge cases, 5 of .38 caliber and 1 of .22 caliber, a narrow strip of zinc with two nail holes near one end, a scrap of the same material and a bit of twisted copper wire.

Glass: Glass fragments were fairly plentiful with 21 specimens recovered. Five—2 dark green, 2 light green, and 1 brown—are from large bottles assumed to have contained spiritous liquors. A thinner light green piece seems to be part of the base of a small medicine bottle. The remainder are clear glass. Included are the neck of a medicine bottle, a portion of the rim of a large bottle or jar, and 4 curved fragments. Four thinner



Excavation pits bounded by quadrats numbered H-5, G-8, I-8 and I-6 (see Fig. 2). West-facing view. Edith Wallace photo

pieces may be parts of a kerosene lamp chimney. There are also 5 bits of window pane. Some glass surfaces are scaly and iridescent from exposure to fire or from the action of time and earth.

Procelain: Five pieces of porcelain were collected. Four are plain white. Two thin specimens are edges of a small but deep saucer or dish; the other two are from a coarser, thicker ware. Of special interest is a tiny fragment with blue designs painted on a white background. None of the bits of porcelain bears a manufacturer's trademark.

Tile: Two pieces of curved roofing tile were found. Both are of fairly good quality. The first has a reddish hue, inside and out; the other has an orange exterior and a yellowish-buff interior. Surfaces of the latter are striated and it is possible that it is a portion of an earthenware jar, rather than a piece of tile.

Wood: The soil was quite damp so that perishable materials were not to be expected in quantity. There were only two pieces of wood. One is a thin (7 mm.) sawn section with traces of white paint along one edge. The other is a knot.

Stone: The 18 stone Indian artifacts include 10 handstones, 7 hammerstones, and a polishing stone. There are no chipped stone projectile points or knife blades or parts thereof. The only indication of stone-flaking is a tiny bit of chalcedony. It is apparently just a waste flake struck off from a nodule. Its sharp edges give no indication of use as a scraper.

Of the 10 handstones, 2 are complete and 8 are broken. The most nicely finished one is oval in form and has two flat, well-worn grinding surfaces. Its edges have also been used for grinding. The specimen is of granite and measures 13.9 cm. in length, 9.5 cm. in width and is 4.0 cm. thick. Three handstones, 1 complete and 2 fragmentary, have a single flat grinding surface with the other surface rounded and unutilized. The whole uniface example is irregular in outline; the others appear to have been oval. Two are made from sandstone cobbles; the other is schist. Dimensions of the complete handstone are: length 14.6 cm.; width 11.1 cm.; thickness 6.4 cm. The balance of the specimens, 3 schist, 2 sandstone, 1 granite, are small fragments.

There are two varieties of hammerstones. Four, (2 quartzite, 1 quartz and 1 sandstone), are ordinary pebbles with battered ends. Two are angular; the third is rounded. They are of average size with dimensions as follows: length 7.3-8.3 cm., average 7.7 cm.; width 5.8-6.3 cm., average 6.1 cm.; thickness 4.7-5.4 cm., average 4.9 cm. The other group of 3 hammerstones, all broken, have flakes removed from their surfaces. They are all of quartzite.

A small, irregular sandstone pebble has one worn edge, probably resulting from use as a smoothing stone. It is 5.3 cm. long, 3.3 cm. wide and 2.8 cm. thick.

FOOD REMAINS

Relatively little food refuse was found in the trenches. Thirty mammal bones, the majority cut and sawed, were obtained. They all appear to be from domestic animals—cattle, sheep, and pigs. Five broken bird bones were also recovered. The only other food remains are a complete Black Walnut and half of another.

ARCHAEOLOGICAL FEATURES

No remains of a garden wall were unearthed. The only structural feature encountered was a disturbed row of fired bricks along the south edge of the main trench. This presumably is a section of the brick drain shown in Figure 1.

Remnants of a fairly large palm tree, evidenced by a darkened area and by decayed roots, was discovered 12 inches below the surface. No trash pits or other areas of concentrated debris were encountered.

SUMMARY AND CONCLUSIONS

Although the archaeological exploration was limited in scope, it achieved its objectives. The chief result was the establishment of the fact that there was no garden wall along the south side of the patio. The area was never an enclosed courtyard. It was also determined that ground level in the past was about the same as it is today. Original topsoil was presumably a yellowish-brown clay similar or identical to that encountered 8-12 inches down in the trenches. Its present darkness developed subsequent to the building of the first ranch house in 1840. Although there has been considerable filling in the vicinity of the adobe house, no evidence of extensive addition of earth was detected in the excavated area. It is, of course, possible that a few inches of garden soil was introduced.

The scarcity of cultural materials and refuse of any kind is surprising in view of the almost 100-year occupation of the adobe. A greater accumulation of household debris was to be expected. Trash must have been disposed of elsewhere, perhaps in the nearby lake or in specially dug pits. Or, daily work and living may have gone on outside of the area examined so that rubbish collected elsewhere.

No unusual artifacts turned up during the courtyard dig. The commercially-made items are like those recovered in previous excavations and are of types which cannot be precisely dated. No object contemporary with the first building has been identified in the collection. It is possible that some items do date from Hugo Reid's time but they cannot be recognized with certainty.

The finding of Indian artifacts confirmed the existence of a prehistoric village site, presumably abandoned long before Hugo Reid built his house on the spot.[4] Knowledge of the nature of this site was extended. It was learned that the deposit becames shallower to the south, away from the lake. Whereas aboriginal objects had been found previously to a depth of 36-42 inches in trenches farther north, none was found below 12 inches during the recent digging.

The archaeological findings indicate that a full-scale excavation of the patio probably would not be worthwhile. If further excavating is to be done, it should be concentrated on the east and south sides of the house. There may exist in one of these localities trash pits or buried remains of an oven or outbuilding for cooking. The problem of the original surroundings of the Hugo Reid Adobe has not yet been solved.

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COVER PICTURE

Common forms of *Cyrtomium falcatum*. Left to right: *C. falcatum; C. falcatum* cv. 'Butterfieldii' ; *C. falcatum* cv. 'Mayi' ; *C. falcatum* cv. 'Rochfordianum'. Approximately 1/10 natural size.

HORTICULTURE

FERNS CULTIVATED IN CALIFORNIA

BARBARA JOE

CYRTOMIUM

The handsome Holly fern, *Cyrtomium falcatum,* is one of the most popular garden ferns. The glossy foliage is tolerant of dry atmospheres, making this fern suitable for house culture as well. It is of easy culture and is said to be capable of withstanding the winter temperatures of the eastern states with some protection. The foliage is evergreen in coastal California; tip burn results at temperatures near 20 deg. F.; lower temperatures may cause the foliage to be deciduous. Shade, good drainage, moisture at the roots and some organic matter in the soil are the main requirements of this fern. The addition of a suitable commercial fertilizer at about half the usual recommended dosage improves the color and growth. Propagation is by spores. Generally, scale and mealybug are the only serious pests of this fern. Malathion spray or dithio smoke are the most effective controls. The latter, being very toxic to humans, is available for use only by commercial growers. The well known story of the lady who laboriously scrapped off all the scale from the back of fern frond, only to find that the "bugs" were the fruiting bodies of the fern, prompts the author to provide a picture for the benefit of those who may not be familiar with the appearance of sori and scale. The large dots are the scale, and of course the small dots, restricted to the back of the frond are the sori.

Species of the genus *Cyrtomium* are all terrestrial, medium in size and have their fronds arranged in a circle. The rhizome is ascending to erect, and densely covered with broad scales. The firm and generally leathery fronds are simply pinnate. The often falcate, eared pinnae taper to a point. The margins are entire, sub-entire or with sharp teeth. Fine hairs are present on the under surface of the frond. The veins are concealed in the tissue; they are usually netted with a free vein included in each mesh. The sori are large, round and scattered over the pinnae. The indusium is round with a depressed center; it is shaped like a mushroom and is attached to the frond by its stalk.

Species of *Cyrtomium* have been known under the names: *Aspidium, Polystichum* or *Phanerophlebia.* There are twenty species distributed in the Old and New World, and the Hawaiian Islands. Only three species are widely cultivated in the United States and all are represented in our California gardens. They may be identified by the following key:

A. Pinnae 3-6 pairs, to 6 in. long, the terminal pinna as large or larger than the lateral pinnae. . . . . *C. caryotideum*

AA. Pinnae 10 pairs or more, seldom more than 5 in. long, the terminal pinna smaller than the lateral pinnae.

B. Pinnae bright green, glossy, the apex entire, or in some forms crested or coarsely incised. . . . . *C. falcatum*

BB. Pinnae dull green, not glossy, the apex with minute but sharply pointed teeth. . . . . *C. Fortunei*

C. caryotideum Presl. Pinnae 3-6 pairs, large, to 6 in. long and to 2 in. wide, the terminal pinna as large or larger than the lateral ones, the margins finely serrate-dentate. India, China, Hawaiian Islands. Semi-hardy. To 2 ft. Slow growing. Seldom cultivated. May be confused with forms of *C. falcatum* except for the margins which are finely serrate-dentate to the very tip of the pinnae.

C. falcatum (L.f.) Presl. Holly fern. Pinnae 10 pairs or more, glossy green, mostly ovate-

falcate, thick-leathery, the margins thick and entire or variously lobed or incised, but not finely and regularly serrate. Japan, China, India. Hardy. To 3 ft. Moderate to rapid growth rate. Of easy culture. Many forms common in cultivation, some not as distinct as others, and often blending into one another:

cv. 'Butterfieldii'. Margins deeply serrate.
cv. 'Mayi'. Tips of pinnae crested, tip of frond often forked and crested.
cv. 'Rochfordianum'. Margins coarsely fringed. Most widely sold Holly fern.

C. Fortunei J. Sm. Similar in general appearance to *C. falcatum* but pinnae dull green, mostly lanceolate-falcate, not so leathery, the apex with minute but sharply pointed teeth. Separated from *C. caryotideum* by fewer, smaller pinnae which are to 3 in. long and to 1 in. wide, and by the smaller terminal pinna. Japan. Hardy. To 2 ft. Moderate growth rate.

The species *C. juglandifolium* (Humb. & Bonpl.) Moore has been introduced into cultivation in the past but did not prove to be successful.

Cyrtomium falcatum cv. 'Rochfordianum'. Scale insects along rachis and mid-vein of pinnae. Sori appear as smaller bodies scattered over under surface of pinnae.

Close-up of frond of *Cyrtomium caryotideum*, showing characteristic terminal pinna.

Left: margin of *C. Fortunei* showing minute serration.

Right: *C. falcatum* showing smooth or entire margin.

Habit of *Cyrtomium caryotideum*.

Habit of *Cyrtomium falcatum* cv. 'Rochfordianum'.

ONYCHIUM

The light airy texture of the Japaneses claw fern, *Onychium japonicum*, is so reminiscent of the foliage of carrots that it has been named the Carrot fern in the nursery trade. The word "claw" refers to the segments which are narrowed and pointed.

Evergreen, but really at its best in the spring and summer months, this medium-small fern forms a compact mass of delicately cut foliage. The fern slowly enlarges its clump by means of short-creeping rhizomes. In gardens, this fern is planted along the border of flower beds, in among rocks or any place where the finely-cut foliage makes a pleasing combination with the other plantings. A moderate amount of shade produces the best foliage. It is semi-hardy to hardy. Propagation is by spores or by divisions.

The species belonging to this genus are characterized by a creeping, or short and com-

pact, scaly rhizome. The fronds are medium-small in size, usually broad at the base, 3-4 times pinnate, and finely divided. The segments are small, narrow, pointed, and smooth; the fertile segments are somewhat contracted. The veins are free; those in the sterile segments are forked with the ends club-shaped; those in the fertile segments are simple and short. The linear sori are marginally situated, one on each side of the segment. The flap-like indusium is a reflexed leaf margin. The indusium of one side of the segment meets the indusium of the opposite side, both opening from the center of the segment.

The six species which comprise this genus are native to Asia and Africa. Only one species is known to be presently cultivated in California:

Onychium japonicum (Thunbg.) Kunze. Japanese claw fern. Carrot fern. Fronds lax, triangular, finely divided into slender, sharp-tipped segments; texture firm-herbaceous. Semi-hardy to hardy. To 2 ft. Moderate growth rate. East Asia and Himalayas to Java.

This fern is distinguished from other cultivated ferns by its finely divided foliage and by the two flap-like indusia which occupy most of the small sharp-pointed segment. Sometimes confused with *Asplenium bulbiferum,* the Mother-fern, which has segments with rounded tips and a single flap-like indusium attached to the midrib of the segment.

Onychium japonicum. Note indusia.

STENOCHLAENA

A climbing fern occasionally seen in California gardens is *Stenochlaena tenuifolia.* (Identified by C. V. Morton). This wide-creeping fern with its bold leaf pattern scrambles over the ground and may climb trees in its tropical home. In gardens, it is rarely given this wide freedom and is ordinarily confined in a hanging basket. Basket specimens several feet across produce a magnificent display of gracefully arching fronds radiating from all sides of the basket and completely hiding in the foliage. The bright yellow-green color of the fronds often blends into a bronzy-green and may take on a metallic sheen.

The pinnate fronds are borne on slender rhizomes which are loosely climbing. The growing ends of the rhizomes may often hang down from the basket. To maintain a feathery basket, these loose ends are trained back into the basket or clipped. Pieces of rhizome take root readily. As fertile fronds are not frequently produced in cultivation,

Habit of *Stenochlaena tenuifolia*. Contracted fertile frond left of center.

rooting the rhizomes is the commonest means of propagation. Some spore grown plants have recently appeared in the trade as potted plants. The pots are provided with a moss covered pole on which the fern climbs.

Unfortunately, this plant is sensitive to cool temperatures, and frequently turns yellow or drops its foliage unless it is situated in a well protected place. With the advent of cool temperatures consistently near 45°F., baskets are usually moved to warmer localities. The growth rate is slow to moderate with fastest and most luxuriant growth when plenty of water, warmth, and humidity are provided. Oftentimes, ferns which are in baskets suffer from inadequate water or insufficient nutrients. From baskets left on the ground rhizomes readily take root and spread away from the basket to produce some very fine foliage.

Stenochlaena is a small genus distributed from tropical Africa to the Pacific Islands. It is characterized by its long climbing rhizome which is green and scaleless when mature. Young rhizomes bear deciduous scales near the growing ends. The fronds are borne several inches apart on the rhizome. The leaf stalk is similar to the rhizome. The sterile

fronds are once pinnate; the pinnae are narrowly elliptical with sharply toothed transparent margins. The texture is firm and smooth. The fertile fronds are contracted into narrow linear parts. They are usually pinnate, but are bipinnate in *S. tenuifolia*. The veins form a single series of long narrow areoles (meshes) next to the midrib. These areoles are most conspicuous near the tip of the sterile pinnae. Elsewhere the veins are free. The sporangia cover almost the entire underside of the contracted frond. An indusium is absent.

This genus is readily distinguished from all other cultivated genera by the long creeping rhizome and the pinnate fronds bearing the characteristic areoles. If present, the contracted fertile frond, covered beneath with sporangia, is also distinctive. Only one species is known to be cultivated in California:

Stenochlaena tenuifolia (Desv.) Moore. Rhizome wide creeping or loosely climbing. Fronds 2 ft. long, the sterile ones pinnate, the fertile ones contracted and bipinnate. Tropical Africa, Australia and adjacent islands. Shade. Tender. Growth rate slow to moderate. Interesting planted in baskets or pots. Suitable in the ground if rampant growth is not objectionable. Often confused with other cultivated *Stenochlaenas* from which it differs by having bipinnate fertile fronds. *S. palustris* (Burm.) Bedd., has been reported in cultivation outside of California. The much more divided foliage of the Japanese climbing fern, *Lygodium japonicum,* readily separates it from *S. tenuifolia.*

Fertile frond of *Stenochlaena tenuifolia.*

All photos by author

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HERBS

HELLEBORE IN OUR CHANGING TIMES

KAY BETTS

WHEN MOST flowering plants are content to settle down for a long winter's rest, *Helleborus niger* chooses the holiday season for its dramatic show. In fact, Gerard's *Generall Historie of Plantes* of 1636 states that this herb was called the Christmas Rose "because it floureth about the birth of our Lord Jesus Christ."

Even a light blanket of snow is no deterrent to our beautiful perennial which actually seems to thrive best when the temperature drops to near freezing.

In southland gardens, however, a more popular species known as *H. orientalis,* which enjoys a warmer climate and often delays its blooming until later in the spring, is commonly identified as the Lenten Rose. *Orientalis* lends itself particularly well to hybridizing, and we are pleased to acknowledge the work of Chelsea Bellona who has successfully produced a number of spectacular horticultural varieties.

Having spent some ten years on this project, Mr. and Mrs. Bellona now display about twenty-five unusual variants. When visiting the Bellona gardens in late spring, we found the colorings quite breathtaking: some of the delicate pinks softly irridescent, chaste white blooms polka-dotted with deep purple, others delicately dashed with lavender or crimson. Possible combinations seemed unlimited!

Considering the number of his favorites, we can understand why Mr. Bellona has not as yet dubbed each of them with an appropriate name, although he hopes to present many of them on the market—perhaps in another year. Two of his choice specimens may be seen at the Arboretum.

Although most of the Bellona collection are growing in large pots and tubs, there is a low evergreen border of hellebore encircling the front lawn which illustrates nicely one of its versatile uses. When provided partial shade, rich loamy soil, good drainage and frequent watering, clumps of hellebore have been known to thrive for fifty years or more—dropping their own seed for satisfactory propagation. The roots may be carefully divided during August and September, but plants are not amenable to being moved after once established. A liberal amount of compost is

Helleborus niger. From the 1636 edition of Gerard's *Generall Historie of Plantes.*
Courtesy of the Huntington Library, San Marino, California

helpful when planting. Liquid fertilizer, in light proportions, may be sprayed on the leaves weekly during the blooming period as a "luxury feeding" to promote healthy but not too luxuriant growth.

Single stems of *H. niger* and *orientalis* supporting shiny dark green leaves average 1½ to 2 feet in height. Five petal-like sepals, about 2½ inches across, resemble the wild rose or a glorified buttercup in shape.

Another exotic beauty is *H. corsicus* with tall single stems—sometimes rising 3 feet—with clusters of smaller blossoms in a lovely chartreuse. And *corsicus* also enjoys living in a tub to provide charming and mobile accent in garden decor.

For centuries Helleborus has graced our gardens, not only as a rare gem but to our early ancestors beloved as a symbol of family protection to ward off all evil. In fact, an ancient gardener eyed his hellebore with varying degrees of utility. Its "talents" or "wondrous vertues" were rife and ranged from being employed as poison for predators to a euphoric purge for the relief of melancholy. Although the latter smacks of empiric brews, Gould's Medical Dictionary (20th century) notes that "the root of *H. niger* has been used as a drastic purge in insanity."

A most fascinating psychological treatise on the frailties of the human mind and reputedly the most elaborate treatise on love was published in 1628 by Robert Burton called *The Anatomy of Melancholy*. Rated as herbs extraordinary are borage and *H. niger*—both of which appear in illustrations on the frontispiece of his book. Concerning the "vertues" of our Christmas Rose, Burton writes:

"Black Hellebore, that most renowned plant, and famous purger of melancholy, which all antiquity so much used and admired, was first found out by Melampus, a Shepherd, (as Pliny records) who seeing it to purge his Goats when they raved, practiced it upon King Proetus' daughters, that ruled in Arcadia, and restored them to their former health. In Hippocrates' time it was in only request, insomuch that he writ a book of it, a fragment of which remains yet. Paracelsus above all the rest is the greatest admirer of the plant, and especially the extract; he calls it another Treacle, a Terrestrial Balm."

Despite the ominous implication of its name, Black Hellebore was apparently so called because, as Gerard explains, "the roots are many, with long blacke strings coming from one head." Its root has consistently been employed medicinally, especially in veterinary practice, the constituents which include Helleborin having powerful narcotic effects. In defense of such violent drugs, Burton points out, "that the fault is not in the Physicke, but in the rude and indiscreet handling of it."

In a recent publication by Louise Beebe Wilder, entitled *The Fragrant Path,* there is mention of *Helleborus odorus,* which she describes as "a sweetly scented species that bears its greenish blossoms throughout winter in mild climates. It is found wild over the wooded regions of eastern Central Europe on limestone formation." Unfortunately our nurseries are not familiar with this attractive species, and to date we have not found it listed in any catalogue.

Science may produce more glamorized versions of the venerated old hellebore but the legend of our Christmas Rose remains unadorned and comes to life each Christmas as fresh as holiday spirit. For long, long ago there was a small child who stood apart from the throngs wending their way to visit the Christ child, all bearing gifts. No one noticed the unhappy little girl nor heard her sobbing because she had nothing to present the holy infant. Thoroughly dejected, she sank to the ground. Suddenly, all about her were lovely flowers, and wherever a tear fell there would spring another blossom—delicately tinted. Her sadness changed to unbounded joy as she recognized that here was the beautiful gift that she had so wanted. Hers would be most precious, for this flower—beautiful as a wild rose—would bloom each year in honor of this holy day and would be known as the Christmas Rose.

455 South Hobson Mesa, Arizona

PLANT PATHOLOGY

DISEASES OF ORNAMENTALS AND LAWNS

RALPH W. AMES

INTRODUCTION

A PLANT DISEASE must be prevented in order to obtain really satisfactory control. Once the disease is established, it is difficult, if not impossible, to cure the plant. For that reason, our attention should be directed toward growing healthy plants. This includes making the right choice of plants for the type of soil, water, temperature, etc. with which we are concerned. The easiest and most obvious way to control a plant disease is to use resistant plants, providing they are available and horticulturally desirable. However, often such plants are not available and then the home property pest control operator is called upon to make correct diagnoses of plant ailments and to follow up with measures designed to control the trouble. Such action must be forthright and honest if the confidence of the public is to be maintained.

DISEASES OF ORNAMENTALS

No attempt will be made to cover all of the disease problems encountered. Only a few of the more prevalent diseases will be discussed.

Powdery mildews: These diseases are common and destructive on a rather wide range of host plants. They are caused by fungi which are quite restricted in their host range, i.e., the fungus which causes the disease on one plant species will not be able to attack another species. The fungus which couses the disease is largely found on the surface of the leaves and twigs. This means that it is sometimes possible to cure a plant after the first symptoms are seen. However, the fungus over-winters in the twigs or other perennial parts of the plant and is lurking for susceptible plants the following season. Thus, in order to get satisfactory control one should have adequate spray programs at least two years in succession.

Powdery mildew of rose is very common here and can be rather readily controlled by applications of Actidione PM (following the directions on the package). Actidione at double the concentration is effective on crape myrtle, and it is possible that still higher concentrations will control powdery mildew of oaks. Also a double strength Karathane, now being formulated, may prove effective on oaks. Sulphur is still used to some extent. Extreme caution is indicated when the temperatures approach 90 F. when using sulphur or Karathane. Phaltan (2 lbs/100 gallons), iscothan and other chemicals are effective in controlling various powdery mildews, with phaltan reported as being especially good for controlling mildew on roses. When chemicals are used during bad mildew years it is desirable to spray often enough so that the plants will be protected, i.e., every 7 or 10 days. It is necessary to use a good wetting and sticking agent so that thorough coverage will be obtained when spraying. One of the best means of preventing witch's broom of oak, is to treat the trees so that the minimum amount of succulent growth (highly susceptible to infection) is produced, i.e., do not overprune, overfertilize with nitrogen, etc.

Anthracnose of Sycamore: This disease appears first in the spring when the leaves and growing tips of twigs may turn brown and die as they emerge from the bud. Usually the disease develops later, first as spots along the main leaf veins, which rapidly enlarge into large dead areas. These areas gradually coalesce, finally killing the entire leaf. During moist weather, small cream colored dots, about the size of pin heads, or short threads of spores appear on the lower leaf surface along the veins. These spores may infect additional areas. Killed leaves soon drop and severely affected trees remain bare until a second crop of leaves is produced later in the year. Cankers may be formed on the twigs and may girdle the twigs. Often water sprouts develop below the cankers. In the spring

the spore producing bodies break through on the surface of the cankered areas and initiate new infections. To control the disease it is desirable to destroy the fallen leaves and to prune off and destroy all infected twigs and branches. Puratized Agricultural Spray or Bordeaux have been reported as giving satisfactory control when applied several times as the leaves are expanding (first after the buds have opened but before the leaves are half grown, etc.). Puratized Agricultural Spray has caused some damage to underplantings, so care must be exercised in its use.

Oak Root Rot: Although this disease is called oak root rot, the fungus involved attacks a wide range of host plants. The fungus is present in many canyon areas, in washes, stream beds and adjacent flood plains. Prolonged wet soil conditions during summer months favor the development and extension of the disease. This is why it is so often seen in destructive proportions in home plantings. Often, water loving plants, such as azaleas, camellias, ferns, etc., are planted under oaks and when water adequate to their needs is supplied, the oak root rot fungus thrives and the susceptible plants succumb more readily.

Above ground indications of the disease include a gradual decline of the plant or its sudden death, not unlike those due to other causes. However, the presence of the fungus can be rather easily detected. Diseased plants have a white or cream-colored, flat, fan-like mat of fungus material between the bark and affected root or crown tissues. Such diseased tissues have a strong mushroom odor. Brown to black "shoe-strings" which cling to the surface of the root and grow into the soil are also useful in identification, but they are not always present. Clusters of tan-colored mushrooms often appear at the base of diseased trees or from shallow roots in the surrounding area in late fall or winter. These are the reproductive stage of the fungus which causes the disease.

Since the disease develops most readily in moist warm soil, it is desirable that during the summer months, only the water needed for the growth of the oak trees be supplied. Thus, it is unwise to underplant with species needing a lot of water. One of the best ways to handle a planting under oak trees is to use flagstones and then plant in pots which can be watered individually. If a diseased tree is discovered in time, its life span can be extended considerably. Surgical removal of the diseased tissue in the root crown area and painting the exposed wounded area is often effective in slowing down the advance of the fungus. The life of the trees may be extended by removing the soil from the trunk and root crown, since exposure to air and drying is effective in retarding the advance of the fungus. In general, it is not feasible to control oak root rot by trenching or the installation of permanent barriers around diseased areas. However, plants which can tolerate a limited root area have been grown successfully in clean soil in concrete containers with adequate drainage. Carbon disulfied injection into the soil often is not practicable, because of the difficulty of getting adequate and uniform penetration under many situations. However, it may be useful under certain conditions.

Fireblight: This bacterial disease is common on flowering pear, apple, pyrocantha, cotoneaster, etc. It appears rather suddenly as a browning of blossoms, sepals, leaves and twigs. Dieback may extend down the twigs and give the appearance of having been scorched. Also dead leaves hang on and give the appearance of having been scorched, hence the name. During warm humid weather, recently infected areas may exude amber colored droplets made up of bacteria and plant juices. During dry weather this dries down to a thin glistening sheet. When the twig blight extends into the limb, trunk or root, localized or diffuse cankers develop which vary in size and shape. As these cankers dry out, they may be separated from the healthy tissues by small cracks.

The bacteria which cause this disease overwinter in the cankers, so it is well to remove them. When pruning out cankers, the cut should be made far enough below the canker so that all the diseased area is removed. This means that the cut should be made several inches below the visible canker. Also the pruning implement should be sterilized between

cuts. Spraying with fixed coppers or with antibiotics (Agrimycin 100, etc.) during the blossom period gives some control. No really desirable resistant varieties are currently available, so the best cultural practice to prevent fireblight is to avoid measures which favor the production of rapid tender growth, i.e., do not prune heavily, do not over-fertilize with readily available nitrogen, etc.

Water molds: These are fungus diseases which usually start at the tips of main or lateral roots, but which may rapidly involve all below grounds parts. They develop under conditions where the soil moisture level is high. Two kinds of symptoms may develop: 1) a sudden wilting and death of all of the above ground parts due to death of the roots or, 2) a more gradual death of the plant by a branch at a time being affected and dying from the tip down. About the only recommended treatment is to cut down on watering. The use of captan, thiram, etc. as a soil treatment in established plantings has been used with varying degrees of success.

DISEASES OF LAWNS AND GROUND COVERS

Brown patch: This is a hot weather disease which appears rapidly from June through September during periods of high relative humidity when the day temperatures of 80-95 drop to night temperatures of 60-70. Dew, fog or irrigation late in the day favor the development of this disease. Also, overstimulation with nitrogen favors the development of the trouble. Wettable Thiram or ferrated Actidione give rather effective control when used as directed. Many golf greens apply fungicides every 2 or 3 weeks, but in home plantings Actidione may be used mainly as a preventative, by applying as soon as symptoms appear and about one week later or as indicated by conditions.

Dollar Spot: This is a cool weather disease (fall and spring inland and all year coastal). High humidity also favors this disease so it is unwise to water in the afternoon or early evening. The disease may be recognized by the irregular, roughly circular, brown patches which vary in size from an inch to three feet or larger. Usually, the grass is not completely killed within the spot. Recovery often starts at the center of the spot and spreads outward, while the margin may still be enlarging. Actidione (ferrated), Puraturf 177, Calocure, Calochlor and Kromad when used as directed have given satisfactory control.

Damping-off: This is especially bad on rye and is difficult if not impossible to control if the weather conditions favor the development of the disease. However, ferrated Actidione has proved effective in some areas and a mixture of captan and fermate has been recommended.

Melting out: This disease caused by a species of *Helminthosporium*, is apparently becoming more prevalent in the spring on golf courses. Early symptoms of this disease are an indefinite gradual yellowing of the plant. The most obvious symptoms consist of a bright yellow leaf blade or distinct yellowish-brown spots with darker borders. Dead spots may be found on leaf sheaths, stems and roots. Actidione and Kromad have been used with sporadic and somewhat unsatisfactory results.

Bacterial leaf-spot of Ivy: This disease is very common in the spring and can cause considerable damage. Cutting down and destroying the old foliage will reduce the disease somewhat in that the amount of inoculum is reduced. Following this, it is easier to protect the remaining leaves with fungicides. Bordeaux has been used satisfactorily except that the discoloration produced is objectionable in some areas. Agrimycin 100 and possibly Agrimycin 500 should be effective in controlling this leaf spot. Actispray is reported to control this disease effectively.

Various root rots of strawberry, ajuga, ivy, etc.: Several fungi, including Fusarium, Rhizoctonia, Verticillium, Pythium, Phytophthora, etc. are involved in causing root rots of a wide range of plants. In general, it is best to plant in clean, well drained soil, use good plants, etc. The use of various chemicals is effective depending upon the fungus involved.

Arboretum Plant Pathologist

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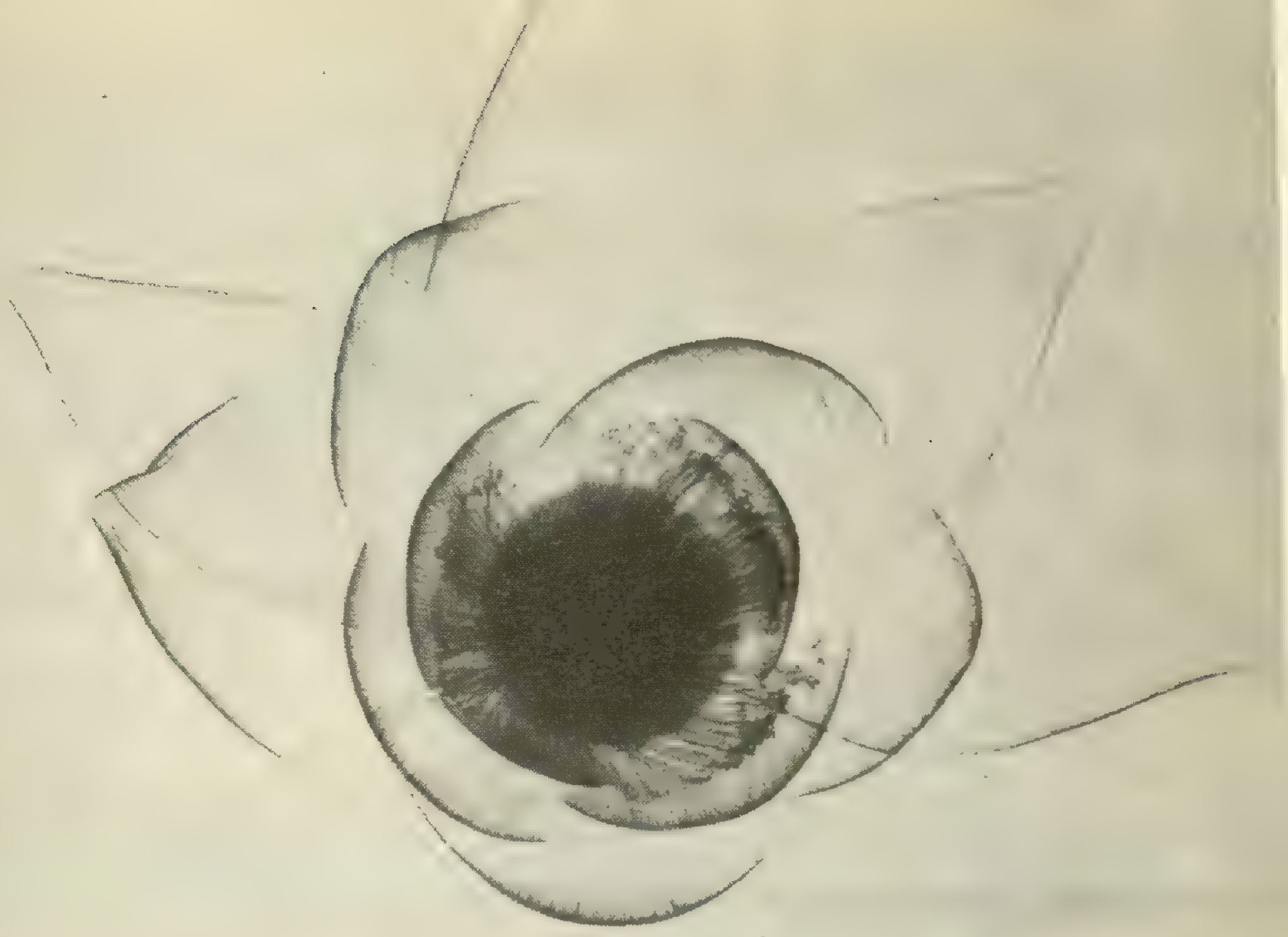

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HORTICULTURE

Ferns Cultivated in California

BARBARA JOE

HYPOLEPIS

Hypolepis punctata is a large fern which has been cultivated in California for some time without the botanical name ever being determined for it. (Identified by C. V. Morton.) It resembles the common Bracken in habit, but is softer and finer in texture. The rather closely placed fronds produce a mass effect of foliage about 3 to 4 ft. high.

This vigorous fern requires little care. An established bed may need to be occasionally contained by cutting back the rhizomes. Unlike the Bracken, the rhizomes of *H. punctata* remain on or near the surface of the soil and are easily removed should they creep out of bounds. Specimens may also be planted in pots or tubs where the rhizome may be confined. In coastal areas the foliage remains in excellent condition with full sun. It seems to be able to endure temperatures near 26°F. and thrives on the usual winter temperatures of Southern California. Its growth rate is moderate to rapid. A short rest period takes place in late fall and new growth appears in very early spring. Unless the winter is cooler than usual, the old fronds remain green through the winter. Readily propagated by rhizome divisions, it may also be propagated by spores. Though present in many gardens, this fern is rarely found in the nursery trade.

Members of the genus *Hypolepis* are distributed mainly in the tropics where they frequently form thickets. All are characterized by being large brake-like ferns with long creeping rhizomes covered with hairs. The fronds are two to four times pinnate. The veins are free. The round sori are placed close to the margin and are usually covered by a small, thin reflexed tooth. Of the 45 species known, only one is presently cultivated in California:

Hypolepis punctata showing hairy nature and marginal sori covered by reflexed teeth. 4x natural size. Photo by author.

Hypolepis punctata (Thunbg.) Mett. Large triangular-shaped fronds, deeply quadripinnatifid with short crisp hairs on midrib and branches. Sori sometimes exposed, though usually partly or all covered. Japan and tropics. Semi-hardy. To 3 ft. Sun or shade.

Hypolepis repens (L.) Presl. formerly cultivated in California, differs from *H. punctata* in having a prickly stipe and small needle-like spines along the midribs. *H. tenuifolia* (Forst.) Bernh. is reported to be cultivated in the United States. *Hypolepis* may be distinguished from the Bracken by its more finely divided fronds and the round rather than linear sori of the latter. From the closely allied *Dennstaedtia*, it is distinguished by the absence of a cup-like indusium. *Microlepia* differs by having the sori set back from the margin and covered by a scale-like indusium.

RESEARCH

Slow Burning Plant Research Project

A PROGRESS REPORT

F. T. CHING

SINCE JANUARY 1958, an expanded research program has been in progress at the Los Angeles State and County Arboretum to determine the possibilities of obtaining plants that are slow burning or somewhat more resistant to burning by brush fires than the existing native plants in the mountainous foothill regions of Southern California. Prior to 1958 there was limited research on this problem and the results have been published (13,16).

As reported in these publications, various species of *Cistus* (Rock Rose) have been found to be slow burning, consequently species of Cistus have received the emphasis of subsequent studies.

In many areas of Los Angeles and San Bernardino Counties, plots have been established to determine the ability of Cistus seeds to germinate and grow when sown directly on the ground (1,11). To date, the results have been gratifying as there has been natural germination and the seedlings are actively competing with the native vegetation. In many localities the growth of Cistus appears to be very slow, but likewise the growth of the native vegetation is slow. In some localities no germination was noted the first year following seed sowing; however, germination was obtained the second year, as many as 50 seedlings per 25 sq. ft. having been observed.

Despite some verbal reports that Cistus is not able to grow well, if at all, in Southern California the Angeles National Forest has been using Cistus for erosion control for many years, planting it both on road slopes and on the faces of flood control dams. These plants have grown vigorously and have produced an abundance of seed (12,13).

In cooperation with the United States Forest Service, Cistus plots have been established in the Cajon Pass area of the San Bernardino National Forest, and, as in the Angeles National Forest, Cistus is growing very well despite the adverse conditions encountered, i.e., low rainfall, extremes of temperatures and a very sandy, porous soil.

Within the past two years, native and introduced plants other than Cistus have been receiving an equal amount of study. *Eriodictyon trichocalyx* and *Atriplex halimus* appear to possess at least equal slow burning qualities as Cistus. In some field pots it appears that *Atriplex halimus* will produce a faster and heavier foliage growth than Cistus, while *Eriodictyon trichocalyx* spreads over a large area quickly by means of root suckers (2).

Currently, the research program at the Los Angeles State and County Arboretum centers around six major projects with all work being done in cooperation with State, County and U.S. Forest Service Departments. These projects are:

1. SEARCH FOR SLOW BURNING PLANTS

Since the Arboretum serves as a plant introduction center, seed and plant cuttings, which are reported to be slow burning or incapable of supporting a fire have been obtained from many parts of the world. It is desirable that selected species, in addition to being slow burning, possess the following qualities: 1) Immunity to insect and disease damage; 2) Ability to compete with native plants; 3) Ability to grow under drought conditions; 4) Ability to re-seed itself; 5) Ability to stump sprout following a fire.

A basic procedure has been developed to determine the burning characteristics of selected species. Initially, the seeds are germinated not only to obtain plants but also to study the germination response. The seedlings are then grown in the greenhouse and then transplanted to the field nursery for observing their general growth habits.

After a seedling has been planted out in the nursery and has established itself, leaf samples are collected for the burning test. Fresh and dried leaf samples are weighed to determine the moisture content; they are then burned in a muffle furnace at 1100° F. The time required for ignition is noted; special care being taken to observe whether the leaf sample bursts into flame or merely glows and blackens. These observations become the basis for selecting plants for further use. Table I shows the results of one such test burn.

Table I. TEST BURN OF LEAVES IN THE ELECTRIC MUFFLE FURNACE
(Results expressed as averages based on 10 leaf replicates)

	Eucalyptus pyrifomis var. aurea	Cistus albidus	Atriplex halimus
FRESH LEAF TEST			
Fresh wt. (gm.)	.56	.09	.27
Burn time (sec.)	14.5 (F)*	8.8	19.4
DRIED LEAF TEST			
Fresh wt. (gm.)	.51	.09	.25
Dry wt. (gm.)	.24	.05	.06
% Moisture	53.0	46.0	78.0
Burn time (sec.)	5.0 (F)	3.8	3.7 (F)

*"F" denotes a burst of flame, otherwise, just a gradual charring occurred.

Fresh and dry leaf samples of *Cistus albidus* did not flame when subjected to the furnace, while both the fresh and dry leaves of *Eucalyptus pyrifomis* did burst into flame. In the case of *Atriplex halimus*, fresh leaves did not flame, while the dry leaves did. Note the differences in burning times and also the moisture content of the plants.

II. IMPROVED CULTURAL METHODS FOR FIELD PLANTING

Production of plants on a large scale basis for field plantings was initially a serious problem. Tar paper containers, 10" deep, used by the U.S. Forest Service are suitable for plant growth; however, the cost of eight cents per container is prohibitive. Seedlings grown in 3" clay pots become rootbound in a very short time, and the necessary frequent watering causes a lush, tender type of growth unsuitable for field planting. Plants grown in one gallon cans are capable of producing a more suitable root system but these containers are too cumbersome to carry into the field.

Following thorough testing, it was found that one pint, unprinted cardboard milk cartons (2"x2"x6½") allow 49 plants to be grown and carried in a standard flat are sufficiently deep to allow for the development of a good root system. Also, these cartons (2"x2"x6½" allow 49 plants to be grown and carried in a standard flat (18"x18"), whereas only 25—3" clay pots, 30 tar paper containers or 7 one gallon cans may be fitted into a flat. The cardboard cartons deteriorate in the greenhouse within 9 months, but this is not a liability as plants should be planted in the field before this time elapses (3). In planting, the cartons need not be removed.

III. INCREASING GERMINATION IN DIRECT FIELD SEEDING

Under both natural and laboratory conditions it has been observed that germination of seeds of *Eriodictyon* sp. is negligible. Since it has been generally observed that a brush fire in the foothills will either stop or slow down where a large establishment of these plants exist, an investigation was initiated to determine a practical method of seed treatment to increase germination.

It has been reported that if a small hole is drilled through the seed coat, germination is increased, but this operation is impractical due to the small size of the seed (4). It has also been reported that heat will enhance germination, and although laboratory tests have confirmed this report, the process has been considered unsuitable as the amount of germination was still very low (1.14%) and seed must be sown immediately following treatment (4,10,15).

Experiments at the Arboretum have shown that as much as 40% germination was obtained when Eriodictyon seeds were treated with giberellic acid and germinated in petri dishes (5). When seeds were soaked in solutions of gibberellic acid for 24 hours and then sown in a mixture of 50% sponge rock and 50% Georgia peat, germination as high as 20% was attained (6). Seeds treated with gibberellic acid dust formulation and sown in the same potting mixture did not germinate well. After this same treatment, the seeds did not germinate at all when sown directly in the field (7). Field tests this winter should determine the suitability of increasing germination by soaking Eriodictyon seeds in a gibberellic acid solution prior to sowing.

IV. DEVELOPMENT OF A PORTABLE FIRE TUNNEL

Design and construction of a portable fire tunnel has been completed. Such a tunnel, of sturdy but light construction, is to be used in the field for replicated burning tests of mature stands of native or exotic plant materials.

The first tunnel was built entirely of aluminum. Although it was light and flexible for field use, it was not sufficiently sturdy to withstand the temperature of 1400° F., obtained, in the field, when mature stands of *Adenostema fasiculatum* were used as test material (9).

The second fire tunnel has just been completed, constructed of reinforcing steel and galvanized metal. The tunnel is in five sections and, in operation, has the approximate dimensions of 20′ x 5′ x 4′.

A standard burner has been constructed for igniting fires using a propane gas container. A pressure regulator makes it possible to ignite fires of the same degree with consistent regularity.

Figure 1. Second fire tunnel constructed of reinforcing steel and galvanized metal. Operational dimensions, 20′ x 5′ x 4′. Electric fan on extreme left.

Figure 2. Fire tunnel with 50" electric fan in operational position. Portable generator and propane gas burner not shown.

To simulate the wind often encountered in an actual forest fire in our foothills, a 50" electric fan placed at one end of the tunnel, forces air through the tunnel at approximately 10 to 12 mph. A portable gasoline generator furnishes the electricity for operating the fan. See Figures 1 and 2.

V. DEVELOPMENT OF SMALL SIZED FIELD PLOTS

The primary purpose of these plots is to test the ability of various plants to withstand a burn under simulated forest fire conditions with the use of the fire tunnel.

Accordingly, replicated field plots 4' x 16' have been established in the following areas:

Topanga Canyon	Los Angeles County	Saddle Peak
Descanso Gardens	Los Angeles County	La Canada
Lux Arboretum	Los Angeles County	Monrovia
Clear Creek	Los Angeles County	Angeles National Forest
Cajon Pass	San Bernardino County	San Bernardino National Forest

The following species have been planted in the plots:

Cistus hirsutus	*Eriodictyon trichocalyx*
Cistus albidus	*Helianthemum mutabile*
Cistus purpureus	*Bacharis pilularis* var. *typica*
Cistus ladaniferus	*Calycotome villosa*
Cistus laurifolius	*Rosmarinus officinalis* var. *prostratus*
	Atriplex halimus

A second purpose of these plots is to observe the ability of the various species to grow under different climatic conditions from the seacoast, to the mountains and desert regions. And finally, to observe their ability to compete with the native vegetation. Thus, in the Topanga Canyon plots it has been found that most plants are producing vigorous growth, with *Atriplex halimus* growing as much as six feet high in the first three months following planting (Fig. 3). *Eriodictyon trichocalyx* has been spreading by sending up root suckers (8) (Fig. 4). In the San Bernardino area, with less than 7" of rainfall, the growth of plants is much less vigorous, although when compared to the growth of native plants, growth is considered satisfactory.

VI. ESTABLISHMENT OF FIELD PLOTS FOR OPEN BURNS

The ultimate goal of studies with plants, selected for their slow burning qualities, will be the establishment of field plots of several acres in size. These will be subjected to fire under favorable forest fire conditions. If the selected plants can pass this test, it is expected that they would be planted around homes, along road shoulders, fire breaks and highways in the mountain areas as effective controls against the start or spread of forest fires.

Figure 3. *Atriplex halimus,* when planted in the field one year ago was similar in size to plant in one gallon can seen in the foreground. After one year's growth, measurements of the single plant in the background are approximately 7′ x 8′ x 5′. This plant has not received any irrigation other than rain, since September, 1958.

Figure 4. *Eriodictyon trichocalyx,* when planted one year ago was the size of the plant in the one gallon can. The original plant (behind and to left of gallon can) has spread itself in this nursery by means of root suckers. As many as 50 new plants have been counted surrounding the parent. Neither the parent plant or the suckers have received irrigation, other than rain, since September, 1958.

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Arboretum Research Assistant

HERBS

Perfumes, Yesterday and Today

MARJORIE WARVELLE BEAR

PERFUMES ARE THE ESSENCE of the past, so deeply and sweetly do they transport us to ancient Egypt, Greece and Rome, then to medieval Europe and finally to modern, chemical America.

Perfumes, the souls of flowers, have always mystified and delighted man's inner spirit, and, even more than great music or painting, have brought the most nostalgic or happiest of memories.

The earliest records associate the use of these precious scents with the worship of the gods and to those of royalty and wealth—always the ingredients of these sensuous and dream provoking mixtures have been costly, even as they are today. The alchemists who knew the secret of these mysteries were held in great esteem by the royal courts.

Richard Le Gallienne once wrote that although the history of mankind may be written in blood and tears, it also is written, and perhaps more completely, in perfumes. This revealing statement is strengthened by the unearthings from the tombs of the ancient civilizations. Here are to be found, lying beside instruments of war and jars of food, exquisitely beautiful oil and unguent vases, iridescent glass perfume bottles and incense lamps.

Starting with the Renaissance and continuing into the nineteenth century, the art of perfume making became known to the monasteries with their cloistered herb gardens, to the peasants and to the great ladies with their still rooms.

The still room was a most fascinating place. Lavender, rosemary, rose geranium, lemon verbena, roses, violets and orange blossoms were distilled in simple, wood-fired condensers with the water flowing in from a nearby creek. Here, also, in the fragrant stillness, herbs such as mints, sages, and artemisias were hung to dry. Some were used for culinary purposes, others for strewing. Strewing herbs were used as a freshener or deodorant, as they were swept across the floors of the much lived in rooms, which lacked plumbing and ventilation.

Likewise, the fragrant herbs, unguents and floral waters have been used for bathing, deodorizing and healing as well as for the sensuous enjoyment of their exhilarating or soothing odors.

Also, in the still room such flowers as muguet, narcissus and other lily forms were pressed or macerated on sheets of beeswax. After many applications the wax absorbed the precious concentrated oil of the flowers; it was then washed or dissolved in spirits, as alcohols were then called.

This process continues today in a highly complicated form of vacuum removal. The once simple alembic still has, also, become intricate steam and vacuum operated machinery, using tanks holding tons of fresh flower petals.

A few centuries ago, the queen's apothecary blended in a mortar, in lavish proportions, such ingredients as musk tonquin, ambergris, otto of rose, orris root and labdunum, producing one of the most lasting of perfumes. Today, the rooms of Napoleon's Josephine still recall that potent fragrance.

Entering the twentieth century, perfume making became a highly technical and chemical process. Alchemists and still rooms became interesting folklore reading; large factories took over the many small home industries of southern France and Bulgaria. The flower growers pooled their produce just as citrus, sugar beet or bean growers do in the United States. Certain precious components of perfume-making, such as musk,

became a rarity with the little musk deer becoming almost extinct from the age-old traffic in this particular animal native to India and China.

The science of organic chemistry suddenly bloomed into a fragrant bouquet of flower-like odors and flavors. The synthetic odors rivalled the actual extracted essential oils of plants, in that the chemical isolates were duplicates of the natural odors, more lasting and cheaper to create.

The petroleum age, with its ever expanding benzine ring aided by the simplest of organic and basic elements, such as milk, yeast, sugar, and the mother of vinegar, gave us wondrous floral bouquets with their acids, aldehydes, esters, alcohols, ethers and ketones.

The brilliant colors of the spectrum found in the new chemical dyes, the amazing development of plastics and synthetic rubber, not to mention the new wonder drugs and some older drugs like aspirin—all of these are the miraculous discoveries of the petroleum age and the chemists' continued interposing of the atoms in the benzine ring—just plain coal tar, the ABC of organic chemistry.

Having established certain synthetic controls, the perfume chemists continually are analyzing the natural essential oils of widely separated families of plants that have common trace elements or chemical components. Even the nose of the botanist was suspecting such relationship years ago. Nature in her lavish ways puts for example, lemon, a most desirable perfume and food flavor, in a citrus fruit, verbena bush, grass, thyme, geranium, basil, mint and a eucalyptus tree, just to mention a few botanicals. One can do the same for the odors of rose, camphor, peppermint, pineapple, apricot, strawberry, clover, mushroom or nut.

Just so, in organic chemistry these constituents can be isolated or imitated with many fine shadings or nuances of the particular odor or flavor required.

What then is modern perfume? Is it all chemical as would be inferred with all these resemblances of odor ranging from pleasant to most repulsive? Chemically, there are such odors as fatty, sweaty, putrid, fecal, ammoniacal, musty, rose-like, violet-like, lilac-like, camphor-like, resinous, spicy, woody, nutty, fruity, moss-like and medicinal or bitter.

Where is the soul of the flower? Modern perfumes of top grade are not composed entirely of synthetic substances. It has been proven over a period of fifty years that those precious oils as jasmine, muguet, otto of rose, neroli, orris and violet and such animal fixatives as ambergris, civet and musk as well as such plant fixatives as labdanum and benzoin are still needed for a mellowed, lasting and pleasing perfume.

However, modern perfumery, even the most expensive, may contain only about ten percent of natural oils and fixatives. The secret of the diversity and lilt of many popular present day perfumes is due to that surprising result of many atoms of many chemicals embracing the nature oils of many plants. The new creation which emerges from the perfumer's vial is equally a surprise to him. It may be a masterpiece or a dud. How true of the painter and the composer too! Even our Creator makes a few malforms. No art is ever perfect—it is "the indefatigable pursuit of an unattainable perfection." And yet, as Shakespeare wrote: "A strange invisible perfume hits the sense."

The author of the foregoing article is a member of the Southern California Unit of the Herb Society of America and engaged in perfume research and manufacture at her studios, RIVIERA ATELIERS in Santa Barbara.

Using, heretofore, untried western flora, she is distilling essential oils of such common wayside plants as: *Artemisia tridenta,* Sagebrush; *A. vulgaris.* Old Man; and, the Sages: *Salvia mellifera,* Black Sage; *S. apiana,* White sage; *S. clevelandi,* Cleveland sage; *S. leucophylla,* Purple sage; and *Stachys bullata,* Wood mint.

To the casual nose, some of these oils might be unpleasant, but when blended with the hundred or more other components, the result is a new and most pleasing odor.

ARBORICULTURE

Care of Our Native Oaks

HAROLD P. MARTINEZ

THE NATIVE OAK, including *Quercus agrifolia, Q. engelmanni, Q. lobata,* are a part of the heritage and history of this wonderful state. They are of extreme value, both for beauty and utility, in our public gardens and home grounds. Their life span is long, given the proper care.

Beginning in the recent past, and ignoring the reduction in the amount of annual rainfall, the rush of home site developments and often ill-advised landscaping plans have made the survival of our oaks a question of the "luckiest" rather than of the fittest". In the following paragraphs, the home owner may find some helpful suggestions to aid him in preserving his favorite garden tree.

PRUNING—Pruning of our oaks should be done during the months from July through August, the hottest part of the summer. Reason—it prevents oak mildew (witches' broom) from attacking new growth. All pruning wounds should be properly painted with an antiseptic asphalt mixture paint. Sealing the wounds prevents development of heart rot. Only dead wood and dangerous limbs should be pruned, since the rule for pruning a tree is concerned with the health and safety of the tree, rather than just making the tree more attractive.

TREE SURGERY—Cavity repair, cabeling and bracing may be done at any time and should be done as soon as the need is discovered. Cavity work and bark tracing will be most quickly healed at their edges by the healing callus, if this work is done in the spring or early summer.

TREE BASE PLANTINGS—Do not grow moisture loving plants at or near the base of our oak trees. Such plants as azaleas, camellias, rhododendrons, begonias, ferns and many others often require daily watering, and most of this watering can be considered 'out of season' for the oaks. This treatment invites trouble from the oak root fungus. *Armillaria mellea.*

TREATMENT OF TREE BASE—The soil around the base of the tree should be scraped away and a natural drainage away from the tree provided. It is very important to keep the area immediately around the tree base free of plants, and to divert water from sprinklers away from the base. Placing rocks or gravel next to the trunk is better than allowing soil to reach the bark. A brick or stone walled dry well around the base of a tree is a common practice for keeping the area of the trunks—soil line—root crown dry.

WINTER WATERING FOR NATIVE OAKS—Under natural growing conditions, our oaks usually receive the majority of their moisture during the winter months. The oaks should receive supplemental water, in the winter, when Nature fails; summer watering, as stated before, invites oak root fungus infection. For deep irrigations from December to April, watering can be accomplished by digging holes, using a post-hole earth auger, around the outer edge of the drip line of the tree. A soil soaker or sprinkler can be used to supply water to these holes for a period of eight to ten hours, each month. Another method is to use sub-irrigation attachments which can be pushed into the soil around the tree and allowed to run for six to eight hours once a month. Such a method should be repeated in four or five positions around the drip line.

FERTILIZERS—The best time of year for applying fertilizer is early spring, except in the case of *Quercus agrifolia.* This species should be fertilized in late summer or early fall. However, a tree that shows symptoms of the lack of proper nutrients should

be fed, if practical, whenever this condition is discovered, regardless of the season.

Organic fertilizers may be applied preferably in holes if the soil is badly compacted, as already suggested in connection with winter watering. The fertilizer may consist of cottonseed meal, blood meal, bone meal, and manufactured sludge in about equal proportions. It may be mixed with sand. Large oak trees may need as much as 100 pounds of fertilizer each year. One formula used to estimate the number of pounds of 10(N)-8(P)-6(K) fertilizer to apply to each tree is to add the height in feet + the crown spread in feet + the circumference of the trunk one foot above the ground in inches. For example, a tree 40 feet high + 30 feet in crown spread + 30 inches in trunk diameter will need 100 lbs. of fertilizer. For large trees, it is best to apply the fertilizer in holes spaced 2 feet apart in concentric circles around the tree—at intervals of 2-2½ ft., as far out as the spread of the branches. If any fertilizer remains after the holes have been filled, it may be scattered over the soil surface around the tree. Sprinkled down immediately to dissolve the soluable part of the fertilizer, thus making it quickly available to the feeding roots.

INSECT CONTROL

OAK MOTH—This is the most common and the most serious insect contributing to the decline of our oak trees. It can defoliate an entire tree, leaving only a network of veins. It can consume the entire leaf or portions of it. The larvae that do the chewing are about an inch long and olive green with a prominent black and yellow stripe on the side and back. Two broods usually develop one in the spring and one in the summer. The adult moths appear and lay eggs in Oct. and Nov. The eggs hatch during the later winter and spring months. Then the spring hatched larvae become mature moths and lay another crop of eggs, which in turn hatch and become leaf-eating larvae for the second time during the year. To get effective control of both the adults and larvae on large trees it is best to hire a commercial spray company to thoroughly spray with a power sprayer. Control of oak moth is obtained by using 50% wettable D.D.T. powder at the rate of 2 lbs. per 100 gal. water or 75% wettable D.D.T. powder at the rate of 1 lb. per 100 gal. water, plus 25% wettable malathion powder at the rate of 2 lbs. per 100 gal. water. This is an ideal combination spray to control any of the over wintering pest. The spray should be applied when leaf damage is noted, from the middle of March through April or May, and then possibly again when the moths are flying in June, July or August. In gardens where fish pools are located under oak trees, use Cryolit (it doesn't kill fish) or cover the pool with a tarp or with a sheet of polyethylene film during the spraying.

OAK TWIG GIRDLER—This is one of the most damaging insect of oak trees. The leaves dies because their source of water and nutrients has been cut off by this insect's twig girdling. The twig girdler's burrow may be found by peeling the bark from dead twig. The only way to control its activity is to destroy it when it emerges in May and June. Since the life cycle occupies two years, there is only about one month in 24 in which the insect is outside the twig and can be contacted with a spray. Presently D.D.T. in the same formula used on oak moth is used as a control spray. Cryolite is not effective. Best control is obtained when this spraying program is continued over a period of at least 3 to 4 years. Where there is heavy infestation, 2 yearly sprayings are recommended. The first of these should be applied during the latter part of May or the first part of June, and the second during the latter half of June and the first half of July.

PIT SCALE, LECANIUM SCALE, APHIDS, RED-SPIDERS—The pit scales are capable of causing serious damage to both live oaks and deciduous oaks. A severe infestation on young growth will cause the tips to die back. The pitting effect is most noticeable on the bark of the younger growth and is less conspicuous on the older bark. The recommendation for control of the pit scale and lecanium scale is to spray some

time during the early half of May with toxaphone, a chlorinated texepene hydrocarbon that comes in a 60% emulsion. The spray should consist of 1½ pounds of actual toxaphene (or 1 quart of 60% toxaphene) plus 2 gal. of light medium oil in 100 gal. water. If this spray is applied during the first half of May, it will also control the oak caterpillars, pit and lecanium scale, aphids, white fly, and red-spiders present.

Arboretum Arborist

COVER PICTURE

We hope our readers are as intrigued with this photograph, and the others printed herein, as we were when we came across them recently. A little sleuthing produced a Mr. Clarence Klug and a very nice gift to the California Arboretum Foundation, Inc. The flower on the cover is a water lotus.

From left to right, the flowers are: tulips, Bird of Paradise and Philodendron.

THREE DIMENSIONAL RADIATION PHOTOGRAPHS

What was once a hobby for Mr. Clarence Klug and Dr. Dain L. Tasker, came to our attention just before this issue went to press.

The following brief information was supplied by Mr. Klug:

"Philodendron is very difficult to radiograph. It remains open for only two hours at a time and the base is so much more fleshy than the tip that no type of exposure can render both satisfactorily.

"Negatives for the Tulips were produced by fine-focus X-ray tubes made by General Electric Company.

"Lotus is quite difficult to X-ray as it shows considerable motion and opening only in the forenoon. The settings for this photograph were: Rheostat 10, auto-transformer 31, MA. 10, distance 30 inches. Exposure 120 seconds or 1200 milliampere seconds."

Mr. Klug's gift to the foundation of 1000 sets (four 9½" x 12½" photographs in an envelope) has made it possible for many to share the hobby of these two gentlemen. The members of both the Foundation and the Southern California Horticultural Institute are being given the first opportunity to obtain a set of prints, before they are placed on sale at the Arboretum Gatehouse.

Suitable for framing, a set may be purchased for $1.15, which includes Federal sales tax and postage. Address orders to: California Arboretum Foundation, Inc., P.O. Box 688, Arcadia, California.

We feel that Mr. Klug's generosity is deserving of your consideration. Please be among the first to order your set of photographs!

BOOK REVIEW

Hawaiian Flowers and Flowering Trees, by Loraine E. Kuck and Richard C. Tongg. Rutland, Vermont, Charles E. Tuttle Company, 1958. Indexed. $7.50.

The unmistakable stamp of Japanese artistry characterizes this book with its attractive two-tone binding of persimmon and brown, and unusual page-layouts with their beautiful flower paintings. It is an item for the bookman or artist, rather than the botanist. The three artists who

worked on the paintings—Y. Odo, C. Taketa, and M. Kuwata—have reproduced the plants in an accurate and original manner. This little volume will be of value to Southern Californians for plant identification because so many of the flowers described grow profusely in this area.

The present volume is far superior to that produced by the same authors in 1943, in which there was more text, but only small photographs of flowers on the few plates. In the present work, there are five chapters which divide the flora of Hawaii into flowers, blossoming trees, flowering vines, tropical shrubs and tropicalia (greenhouse varieties). The first chapter gies an interesting history of early plant introductions to the islands by ship and natural seed dispersal. The authors say that there are over 1,792 species in the Hawaiian Islands, 94.4 per cent of which are indigenous to Hawaii. Many of the native species grow only in isolated areas, which makes wandering over the mountainous regions of the islands fascinating to botanists. For each of the 122 species illustrated, the authors give a full-page, with common-name, scientific name, family, place of origin, annd short non-technical description arranged above, below or to the side of the picture. There are some typographical errors in the spelling of proper names. It is with real pleasure that one turns to the lovely paintings of Hibiscus, Bougainvillea, Shrimp Plant, Plumbago, Bottle Brush, Thungergia, and many other plants familiar to our own landscape.

DORA M. GERARD, UCLA

The Orchids, A Scientific Survey, by Carl L. Withner, Editor. Ronald Press, New York, 1959. $14.00.

Dr. Carl L. Withner is Associate Professor of Biology, Brooklyn College and Resident Investigator of Orchids, Brooklyn Botanic Garden. He has brought together sixteen of the most informed people who work with and study the many facets of interest of this most complicated and vast group of plants, the Orchids.

The profound knowledge and careful interpretation of each of these investigators has given us a scientific accounting of the history and development, aspects of variation; cytology, hybridization and inheritance, and the physiology of orchids. The mycorrhiza of orchids, photoperiodic and temperature responses, plus a complete list of orchid pests and diseases and their control suggests the book's use as a handbook. An up to date key to the orchids resolves their classification into a more understandable form.

The bibliography at the end of each subject discussed is so complete that most of the pubilshed information on orchids is thoroughly covered.

This survey will be most interesting to the casual reader and valuable to the hobbyist and professional orchid grower alike. It is the first book with a scientific approach yet compiled on orchids, and will be accepted with gratification by all persons interested in this special field of horticulture.

GLENN H. HIATT

Enjoying America's Gardens, by Joan Perry Dutton. New York, Reynal & Company, 1958. 311 p. $5.00.

It is an accepted fact that the English excel as writers and gardeners, so for one who is neither a gardener nor a botanist, but a reader, the British books about gardening are the most enjoyable because they are very often good literature too. Mrs. Dutton is true to form in her gift for writing and her twenty-seven drawings of garden scenes, appropriate to each chapter, are beautiful. The book covers a wider range than indicated by the title, for she is a knowledgeable botanist, well acquainted with the literature. She spent three years touring what she refers to as the "perimeter of the continent", during which she moved from the gardens of the East Coast and deep South to the mountains of the West. She started by working for Robert Pyle, the eminent rose grower, then editorial work on plant explorers for Colonial Williamsburg, later secretarial work in Seattle. She describes famous gardeners and their gardens: Du Pont's fabulous Longwood, now directed by Dr. Russell Seibert, formerly of our California State and County Arboretum; gardens of John Bartram and Mrs. Mrs. J. Norman Henry near Philadelphia; Jefferson's Monticello; South Carolina's Magnolia Garden and Middleton, New Orleans. In Texas she was reminded of the patio gardens of Spain with their emphasis on greenery and fountains for coolness, a forgotten art in the Southwest where lawns are the thing. Here she visited the garden of Douglas Chandor, the artist who painted Mrs. Roosevelt.

Mrs. Dutton draws an enthusiastic and stimulating picture of the West, starting with the native flora and spectacular landscape of Colorado, where she found ferns under nine feet of ice and gardens in "stupendous natural settings". In Southern California she was impressed by the Santa Ana Botanic Garden, Santa Barbara Botanic Garden and the Mojave Desert. But she singles out the Ojai Valley for the "glorious Matilija poppy". Our Eucalypts, profusion of geraniums, avocados and citrus characterize Southern California to her. At Carmel she met Mrs. Lester Rowntree and draws a warm portrait of this author and botanist "among the few plant collectors with the ability and determination to set down for gardeners generally the knowledge she has so hardly acquired". In reading about Mrs. Dutton's trips in the Pacific Northwest one feels that one who has not explored the primitive mountain areas of the Olympic Peninsula and Cascade Mountain has not lived. Mount Tamalpais, Muir Woods, Drake's Bay, Yosemite, Redwood highway, Seattle, Portland are a few of the places that made a great impression on

her. She eventually returned to make her permanent home in Northern California.

In closing here are some interesting comparative figures. At Kew Gardens there are one-hundred-and-fifty men employed on some three hundred acres, while at Arnold Arboretum only thirteen men on slightly less acreage; there are more rock and formal gardens at Kew which require detailed work, more machines used at Harvard. In America there are five million gardeners to one-hundred-and-sixty million population; in England ten million to a population of forty-two million. England has more home gardeners than any other country, but America is fast catching up.

There is not an index, but the Appendix covers the lack with annotated lists of Botanical Gardens and Arboretums, Public Gardens and Show Places, and Natural Wild Preserves.

DORA M. GERARD

WEATHER RECORD — 1958

Los Angeles State and County Arboretum, Arcadia, California

	TEMPERATURES				RAINFALL	EVAPORATION
	AVERAGE		PEAKS			
MONTH	MIN.	MAX.	MIN.	MAX.	MEAN	INCHES MONTH	INCHES MONTH
January	48.1	72.1	37.0	83.0	57.6	2.51	2.285
February	48.0	71.1	42.0	84.0	59.6	9.12	1.535
March	44.3	67.2	36.0	75.0	55.7	6.53	2.340
April	50.7	77.3	41.0	100.0	64.0	5.05	3.915
May	54.7	82.5	47.0	93.0	68.6	.04	5.115
June	57.3	80.3	52.0	91.0	68.8	.....	6.590
July	59.5	87.9	54.0	100.0	73.7	.....	7.335
August	64.0	89.8	60.0	97.0	76.9	.50	6.855
September	61.1	92.5	58.0	104.0	76.8	.13	6.635
October	59.0	87.4	52.0	108.0	73.2	1.33	4.990
November	48.0	75.3	31.0	88.0	61.6	.21	3.080
December	45.4	76.2	38.0	95.0	60.8	.....	2.680
					Total inches	25.42	49.250

GENERAL OBSERVATIONS

The lowest temperature, 31 deg. F., was recorded on November 17th. The highest temperature, 108 deg. F., was recorded on October 16th. During the year there were 25 mornings of 40 deg. F. or less. A temperature of 90 deg. F. or more was recorded for 80 days; 13 of these days the instruments registered 100 deg. F. or more.

Rainfall was measured on 40 days for a total of 25.42 inches. This was 5.23 inches more than the previous calendar year. The greatest precipitation for any twenty-four hour period was on February 19th when the rain-gage recorded 4.15 inches.

A total of 53.305 inches of water loss through evaporation was measured during the year. This total was 4.055 inches more than the previous calendar year.

A good distribution of rain during the rain-months and no prolonged cold weather during the winter months made the year 1958 favorable for plant growth. J. T. McGAH Weather Observer

WEATHER RECORD — 1958

University of California, Los Angeles, Subtropical Horticulture Area

	TEMPERATURE				PRECIPITATION
	AVERAGE		PEAKS		
MONTH	MIN.	MAX.	MIN.	MAX.	TOTAL MONTH
January	43.6	71.2	36	84	3.22
February	48.5	68.2	43	79	8.94
March	45.2	65.6	36	75	6.35
April	51.0	75.2	42	91	3.01
May	55.0	76.3	50	83	0.00
June	56.9	78.9	53	85	0.00
July	60.1	80.4	54	90	0.00
August	64.5	84.1	60	91	0.03
September	59.8	87.5	52	98	0.06
October	57.3	84.3	49	106	0.02
November	45.6	72.7	35	82	0.08
December	43.5	71.8	35	91	0.02
				Total inches	21.73

INTERNATIONAL

Floriade

INTERNATIONAL HORTICULTURAL EXHIBITION

Rotterdam, Netherlands, March 25-September 25, 1960

Holland, the world's leading exporter of horticultural products, will be host at a world's fair of gardening in which more than a dozen countries are to display their skills and accomplishments in the field of horticulture.

The year 1960 is a fitting one for Holland to stage the Floriade (a word that is a combination of Flora and Olympiade, signifying an Olympics of horticulture). This is the year that the Dutch celebrate the 400th anniversary of the arrival of the tulip in Holland, and the 100th anniversary of the Royal General Dutch Bulb-Growers Society.

The Floriade will occupy more than 125 acres in the center of Rotterdam. In addition to setting aside the park area, the City of Rotterdam has contributed more than $2 million to the development of the Floriade. More than 5 million visitors are expected during the spring and summer of next year. The event will run for six months, from the end of March through the end of September, 1960.

The subject of the Floriade is horticulture in its broadest sense: everything from the newest in roses, to the latest methods of freezing vegetables for shipment and storage. The theme of this international horticultural exhibition is "from seed to force."

There will be specifically national displays, in an area to be known as the Gardens of the Nations. Here, individual nations will stage displays of indigenous plant materials, landscape design practices, or emphasize special or unique interests and activities.

Countries expected to participate in the Floriade are the United Kingdom, Ireland, the United States, Belgium, the Netherlands, Luxembourg, Germany, Denmark, Sweden, France, Switzerland, Italy, Hungary, Spain and Israel.

A 350-foot tower named the Euromast, has been built on the exhibit grounds. Symbol of the Floriade, its circular "crow's nest" terrace, high in the air, commands a view of half of Holland. A restaurant is located at the top for the convenience of Floriade visitors.

Unlike other world's fairs characterized by exhibits only on a nation-by-nation basis, the Floriade will, in addition to the national exhibits, be organized into sections devoted to different phases of horticulture. For example, roses from each country will be grouped in the Rosarium, where visitors will view a garden of all roses of the world!

Also in outdoor exhibits, life-size market gardens and florists' greenhouses will show the techniques used by professional growers in raising fruits and vegetables, as well as flowers and plants for commercial markets.

Visitors will be treated to a constantly changing series of indoor flower shows during the six months of Floriade. More than 161,000 square feet of indoor display area have been set aside for the purpose.

Opening March 25, the Floriade will be given over for six weeks to one of the most splendid displays of tulips ever created in the land that has become synonymous with the spring flower.

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Dr. R. J. Seibert heads the committee established by the American Horticultural Council to coordinate exhibits and participation by America's industries, professional and non-professional groups.

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LASCA LEAVES

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ARBORETA AND BOTANIC GARDENS

Box 688

Arcadia, California

Arboretum Office—HIllcrest 6-8251

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Index Vol. IX. 1959

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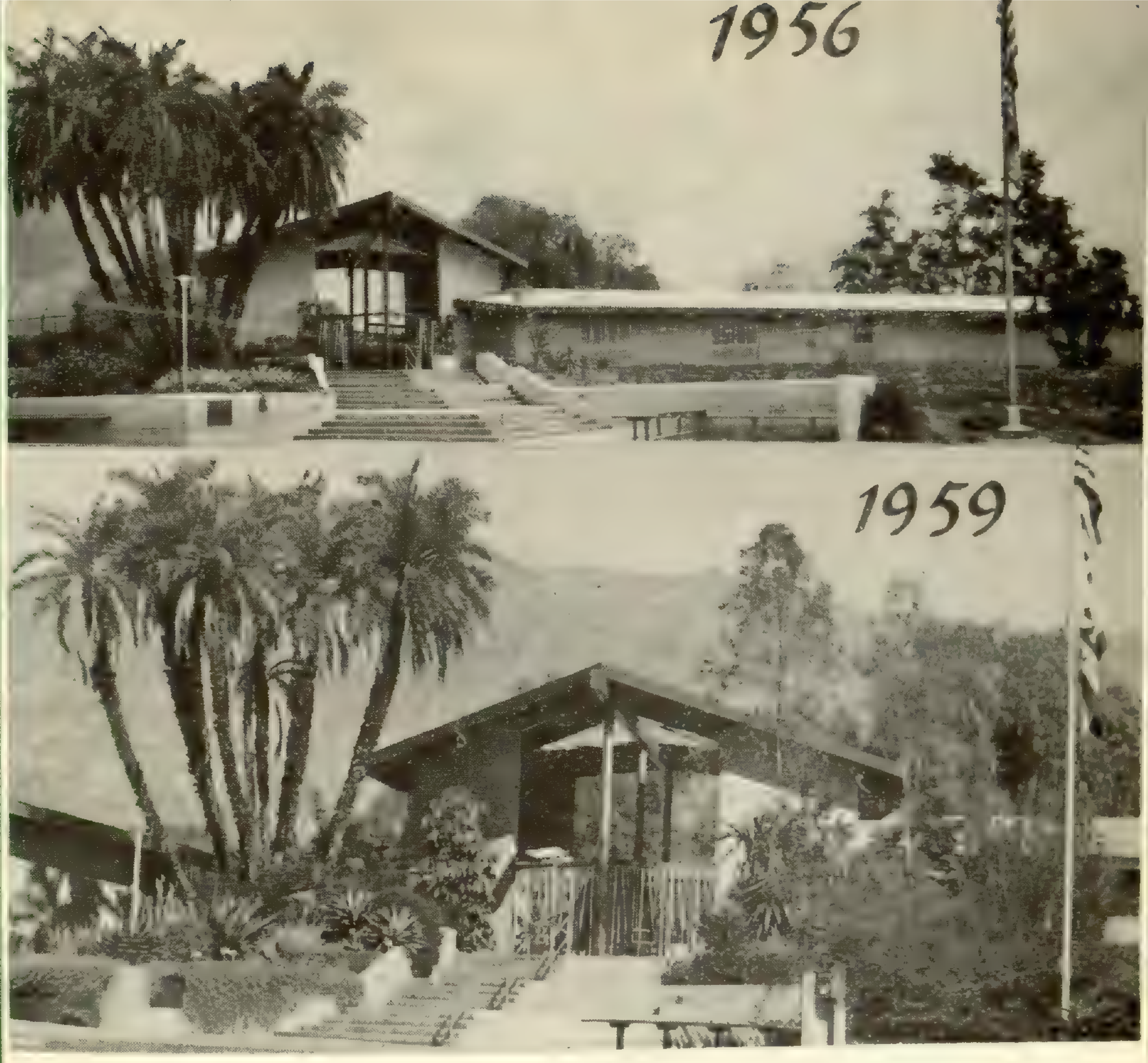

Lasca Leaves

WINTER 1960
Vol. X, No. 1

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VOL. X JANUARY 1, 1960 NO. 1

CONTENTS

HORTICULTURE

The Native Plants of California

PERCY C. EVERETT

We are introducing a new section, "The Native Plants of California", which we presently plan to become a permanent part of *Lasca Leaves*. It will be conducted by Percy C. Everett, Superintendent of Rancho Santa Ana Botanic Garden, Claremont. Through this new column, we plan to bring to you a wide variety of information concerning California native plants. From time to time we will introduce other writers on the subject, and in fact, we hope to make *Lasca Leaves* the clearing center for the dissemination of all sorts of factual information about the native plants of our state. To make this series completely successful, we will need your cooperation. Particularly, we want to know how you are using native plants, what are your results, and what are your chief difficulties. Please send in photographs of your native plant projects. We will try to answer as many questions as possible, either through *Lasca Leaves* or personal correspondence. Due to our inability to get such information, we are very anxious to know what species are being grown in commercial quantities, and by whom, especially the wholesale nurseries.

THE LITTLE SUR MANZANITA

AMONG THE MANY interesting genera of plants native to our western land, none is more beautiful or more useful than the group so appropriately named by the early Californians "manzanitas," translated as "little apples." For years they have been favorites of the writer, and judging from the enthusiastic remarks heard on countless occasions, it would appear there are many others who likewise appreciate their many qualities. Of particular interest is the satiny beauty of the dark reddish-brown bark of the taller species, the wide choice of growth habits, their all-year good looks, and their profuse flowering from December through March, with an occasional bloom throughout the year. After the flowering period, clusters of small, apple-like fruits appear, which gradually change from a dull or bright green through hues of red to rich shades of brown. The fruits remain on the bushes for several months, creating lovely contrasts as they change in shade texture. And with so much emphasis placed on form, color contrasts and texture, the manzanitas admirably fit into the modern landscape picture. It is for these reasons that our first article will discuss one of the newest and most useful of the group, the Little Sur Manzanita (*Arctostaphylos Edmundsii* J. T. Howell).

To set the stage, let me relate some of the interesting facts about this manzanita. In the summer of 1949, Mr. L. L. Edmunds, owner of a fine native plant nursery in Danville, Calif., while searching for seeds of *Ceanothus griseus* v. *horizontalis* near the mouth of the Little Sur River, Monterey Co., came across this low-growing manzanita, which he says was unlike any he previously had encountered. He states there were possibly a dozen plants, 6″-18″ tall, spreading 8′-10′ across, creeping over the edge of an ocean bluff of sandy soil. He visited the site again on Nov. 28, 1950, and Nov. 29, 1951, and both times the plants were in bloom. Mr. Edmunds further stated in a letter to John Thomas Howell, Curator of Botany, California Academy of Sciences, Golden Gate Park, who later described the plant as a new species, that he had never seen elsewhere on the Monterey Peninsula anything resembling this plant. The plants were free-flowering, the flowers being a flesh-pink, and the bright green leaves, especially the young ones, were tinged red on the margins and midrib. He added that he was calling it the "Little Sur Manzanita."

An herbarium specimen collected by Mr. Edmunds, while on his 1951 trip to the site, was designated as the "type specimen" by Mr. Howell (Leaf. West. Bot. 6:202, 1952). Mr. Howell, in his remarks, stated: "The Little Sur Manzanita appears most closely related to *A. pechoensis* Dudley, a species restricted to the coastal hills and mountains of San Luis Obispo Co., but differs in the sub-prostrate habit, subglabrous leaves that are stomatiferous only on the lower side, glandular-puberulent pedicels, and glabrous ovary:

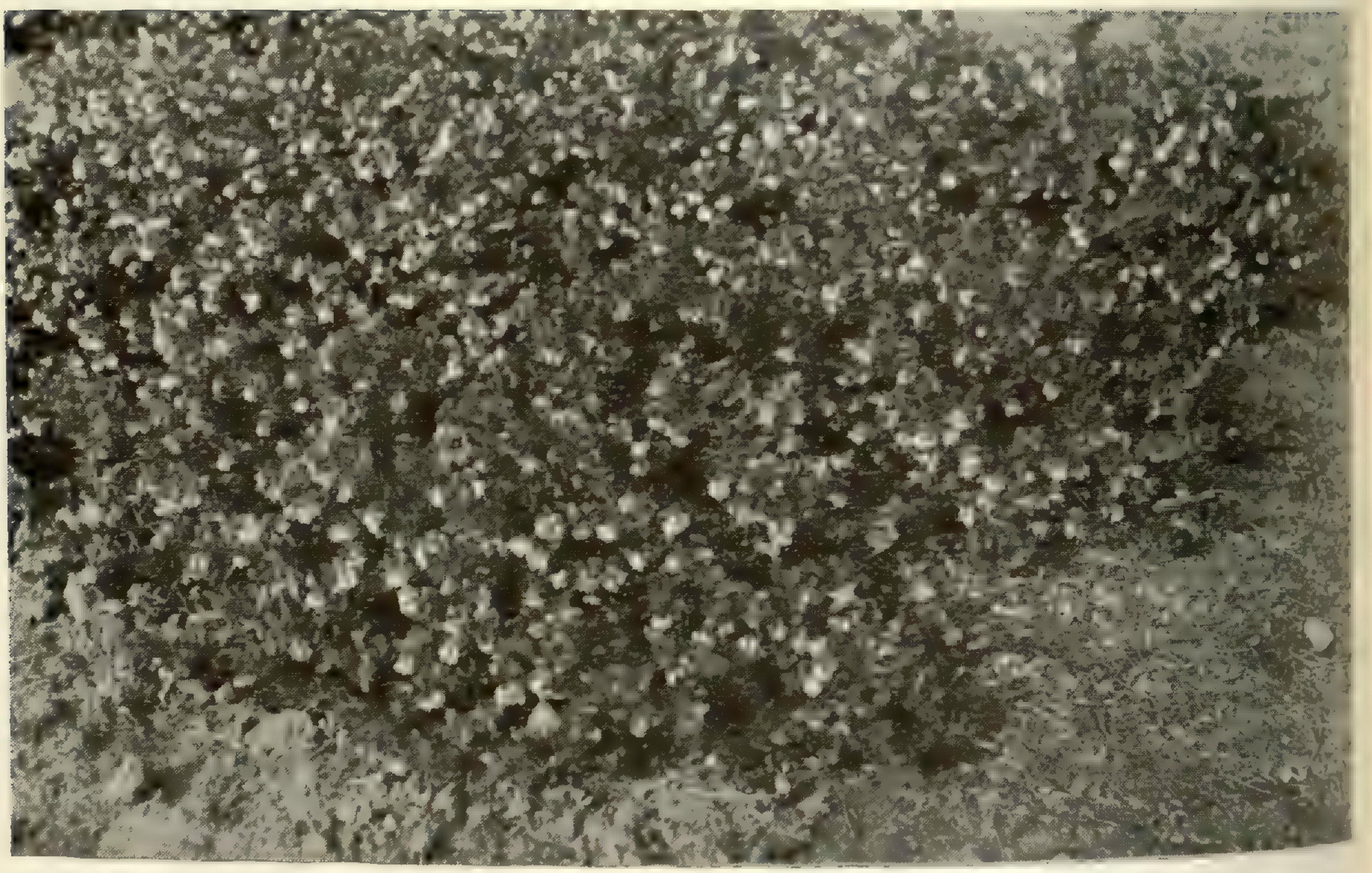
while the spreading habit, the pilose pubescence of the stems and inflorescence, and disposition of the stomata correspond to details in *A. Uva-ursi* as now known in central and northern coastal California." The distribution of *A. Uva-ursi* is quite widespread in that section, coming as far south as San Bruno Mt. in the Santa Cruz Range, San Mateo Co. Although too far apart now to predicate hybrid origin for so isolated a plant, Mr. Howell feels "it is not unreasonable to assume the species was derived from an ancient cross of these two species," i.e., *A. pechoensis* and *A. Uva-ursi*. Also, "*A. Uva-ursi* is not known so far south, but *A. pumila*, a close relative, is not too far away on the dunes at the north end of the Santa Lucia Mts., while *A. pechoensis* is now restricted to the south end of the same range. Perhaps these two species-types have not always been separated by the length of the Santa Lucia Mts., but may once have grown together."

Mr. Howell concludes by saying, "However *A. Edmundsii* may have originated, it is a most interesting and provocative plant, well deserving specific recognition, and horticulturally, as the Little Sur Manzanita, it should become a valued and cherished garden subject. I am grateful of the opportunity to name it in honor of Mr. Edmunds, who is not only a keen student of the California flora, but also a discriminating grower of California plants."

In October, 1953 and 1959, E. K. Balls and I visited the site in Monterey Co. On both occasions the plants were in flower, and in fair condition. Creeping over the edge of the sandy bluff about 50′ above the ocean, they were about 6″-18″ tall, and spreading over areas 10′ or more across. Undoubtedly, the stiff coastal winds keep them "pruned," so one might expect the species to grow somewhat taller in cultivation, which they appear to do. Rooting was taking place all along the flexible stems, a similar condition noted in our cultivated plants. Associated plants were *Ceanothus griseus* v. *horizontalis*, lupine, sand strawberry, Seaside Daisy, Eriophyllum, and other low perennials and sub-shrubby coastal plants. The point where this only known stand grows is on private property, and it can be hoped that this condition will afford some protection from complete eradication. However, the stand is very close to the highway, and protection for all time cannot be counted upon.

Little Sur Manzanita growing vigorously in full sun, planted in the Center Mesa area, north of the Administration Bldg., Rancho Santa Ana Botanic Garden. Photo by author.

Native habitat of the Little Sur Manzanita, *Arctostaphylos Edmundsii* on edge of ocean bluff near the mouth of the Little Sur River, Monterey Co., Calif. Photo by author, Oct. 29, 1959.



The flowering habit of Little Sur Manzanita. The flowers are flesh-pink and contrast well against the bright green leaves. Photo by author in February, 1959, Rancho Santa Ana Botanic Garden.

A more formal introduction to the Little Sur Manzanita is that it is a plant without a basal burl, subprostrate, from 6″-18″ tall, 6′-10′ across, roots along the stems; the branchlets are somewhat hairy, the new tip growth reddish, later turning green, and the rather intricately branching habit is clothed with dark green, broadly ovate, elliptic or roundish leaves, ¾″-1″ long, about ½″ wide; the new leaf growth is a lighter green with reddish margins, and in cooler weather, the leaves are almost completely red. The typical Heath-like flowers are small, white to pink, and grouped in small, open clusters. The fruits are round, small, at first green, then becoming a colorful red, and finally a deep rich brown when fully ripe.

We have no definite date for introduction of this useful plant to horticulture, but it may be safely assumed to have been in 1950. Mr. Edmunds first collected propagation material in 1949. In June, 1950, we received from Mr. Edmunds, three plants which he then called *Arctostaphylos tomentosa* v. *hebeclada*. He told us they were grown from cuttings taken on his first discovery trip to the Little Sur River, but as a temporary measure, he was using the above name until it was definitely decided whether or not his plant was a new species. We planted the three specimens in April, 1953, in full sun, on an open flat of rocky, decomposed granite loam, a far cry from the species' natural habitat. They have grown exceedingly well, no losses have occurred, and the plants are now 14″ tall with spreads to 8 feet. Flowering was first observed in January, 1954, and fruiting in June, 1957. These plants definitely are *A. Edmundsii*. In October, 1953, we gathered a few cuttings from the wild plants, and rooted 26 out of 65. The semi-hard wood cuttings were treated with Hormodin #3, and put in a mixture of ¼ peat moss, ¾ perlite (Sponge Rok). Rooting occurred in about 50 days, but since then our techniques have improved. By using soft, tip cuttings, mist spray, bottom heat, the same rooting medium and by treating the cuttings with Rootone, we are able to get between 75% to 90% rooting within 2-4 weeks. April or May seems to be the best time for taking cuttings, but we have had excellent results throughout the year. Due to inability to visit the wild stand at the proper time of the year, we have done very little with seed germination. Two

lots of seeds collected from our cultivated material were treated with commercial sulphuric acid, one lot for 19 hours, the other for 7. This treatment may have been too drastic, and we only germinated a few seeds, but there were enough seedlings to indicate we need to collect seed from the wild, as many of the plants were hybrids. As cuttings are so readily rooted, there is little reason to bother with seed, and we can keep the species true by such means.

At Rancho Santa Ana Botanic Garden, we have used the species in a variety of locations. Four plants received in 1953 from Mr. Edmunds, under their newly described name, were planted in November, 1953, in an area where they receive full sun for about ⅔ of the day, getting some afternoon shade. Since then, large quantities of cuttings have been taken from the plants, but they have grown together and now make a clump about a foot tall and over 12′ across. Our own propagations have been used in several locations; full sun and tight clay, partial shade and tight clay, full sun and rocky, decomposed granite loam, and sun and partial shade on sandy loamy dunes. To the best of our knowledge, we have not lost more than a dozen plants from well over 100 planted, and most of the losses occurred soon after setting out. So far, we have had no indication of disease or insect trouble to amount to anything serious, even those troubles most commonly associated with manzanitas. Also, it must be realized that our area is subjected to prolonged spells of high summer temperatures, and occasionally to 24°F. or lower in the winter. Some summer watering is necessary, but not more than a good soaking once a month, unless conditions are very unusual.

And why are we recommending this plant so highly? Because, without fail, whenever we have shown it to professional plantsmen and ordinary gardeners, and compared it with other low-growing species nearby, they invariably pick this species as being horticulturally superior. Its attractive green foliage, tidy habit and general all-around good appearance and behavior are readily appreciated.

To date very little has been written about the Little Sur Manzanita in cultivation. In the April, 1957, issue of the Journal of the California Horticultural Society, Dara Emery of the Santa Barbara Botanic Garden, states it is slow growing in heavy soils, needs summer watering, and is very attractive and floriferous. In the same issue, Marjorie Schmidt says for central California that it is a new, distinctive, low-growing plant not over a foot high, and 6′-8′ spread. And in a Santa Barbara Botanic Garden Annual Report, they report it grows as a dense mat with dark green foliage, and the pale pink flowers bloom from December to March. We suggest it be used for groundcovers, banks, rock walls, rock gardens, and as a low filler. In coastal sections, it will accept full sun, and should not be hurt by the salt-laden breezes. Even as far inland as Claremont, we recommend that it be in partial shade, and certainly in high shade in the hotter, interior regions. Although a very sandy loam, almost sand dunes, is its native soil-type, it seems to respond readily in heavy soils, but watering should be applied with more care. If summer burning is noted, irrigate!

One of the most vexing problems we have in recommending a particular native plant, is to know who sells it. The Little Sur Manzanita is grown and sold by at least four wholesale nurseries in California. In southern California, it may be ordered from Deigaard Nursery, Monrovia, and Beeline Nursery, San Dimas. The Saratoga Horticultural Foundation, Saratoga, and Edmund's Native Plant Nursery, Danville, grow it in northern California. Deigaard's and Edmund's are both wholesale and retail. In recommending the Little Sur Manzanita, we hope those who grow it will have as good results and appreciate it as much as we have.

HORTICULTURE

Shade Ground Covers of Distinction

MILDRED DAVIS

THE DISCRIMINATING GARDENER who is satiated with the eternal Algerian ivy *(Hedera canariensis)* and is seeking more interesting material may find it in the following plant list. While these do not serve exactly the same purpose (hillside planting, parkway planting, etc.) yet for smaller, more intimate areas where more distinction is sought, they will serve admirably. Unfortunately, any plant material somewhat out of the ordinary is not found too readily in the average nursery, yet this need not deter the earnest seeker, for given one plant; propagation is not too difficult.

Asperula odorata Sweet Woodruff. An herb used for scenting of linen and in flavoring. It has a sculptured look with deeply cut leaves around a square stem. Height six to eight inches. One small plant will increase by running (slowly to be sure) to cover two to three feet. It is readily grown from tip cuttings and divisions. Shade and moisture are prime requisites for successful culture. The herb section of a nursery might provide a parent plant.

Lysimachia nummularia Creeping Jenny. Its common name is aptly given, for in a wet shady place it will creep rapidly. The leaves are dark green, shiny about ½ inch across. Small yellow flowers dot the stem in summer. One need not fear uncontrolled invasion for the growth inhibitor, maleic hydrazide, may be used as a check.

Micromeria chamissonis Yerba Buena. A native with small roundish leaves (grey in color) on long trailing stems which root at the tips, thus spreading readily. When brushed or trod on, the leaves give off a pleasing "herb" scent. This plant seeks shade and will often be found growing under nearby plants.

Tolmiea menziesii Mother of Millions. Most frequently seen as a house plant. It too is a native growing in woods. The leaves are rather heart shaped, greenish yellow in color which makes for contrast with darker foliage. The leaves make a dense basal mat and the plant spreads for several feet. It is also propagated from small plantlets which form at the tips of the leaf petioles. Whence comes its common name of 'pick-a-back' plant.

Veronica filiformis hugs the ground. Its leaves are dark green, round, about ½ inch in size. It bears tiny lavender blue flowers. In some exceptional situations it might be quite invasive, although that has not been my experience. This might be a substitute for Helxine (Baby Tears).

Polypodium lingua. This fern does not look as the average person expects a fern to look. The leaves are shaped like a tongue from four to eight inches long and about two inches wide. It creeps and slowly covers a given area. The form and scale of this fern make it useful for planting beneath "lush" foliaged materials.

COVER PICTURE

The "then", shortly after the dedication of the Arboretum's new Administration Building on Baldwin Avenue, and the "now", three years later, show how rapidly change in appearances can take place. Barely visible at left corner, lower pitcure is a portion of the Administration Building Wing completed in July, 1959.

Mr. Sellar Bullard, President of the Board of Trustees, dictates the first letter in the new office to Miss Frances Hannah, office secretary.

Santa Barbara Botanic Garden

KATHERINE K. MULLER

THE RECENTLY completed addition to the Blaksley Library building of the Santa Barbara Botanic Garden is expected to facilitate the administrative work of the Garden as well as to aid in the educational program. Construction of the addition, which is the first unit in a long-term plan of future expansion, was made possible by gifts from the Santa Barbara Foundation and from Mr. and Mrs. Sterling Morton through the Chicago Morton Fund.

The upper level of the building is devoted to the Garden administrative office. Built-in

file cabinets, and drawers for membership records, abundant storage cupboards for supplies, and ample room for office machines are all planned to meet the particular needs of the Garden. The extension is located on the slope above the Arroyo Trail and windows along the outer walls look into the tops of the trees planted on this trail. The lower level, adjoining the herbarium, includes an 8 x 10 foot dark room and a room that serves

The new classroom was finished in time for the fall course in "Native Plants for your Garden" offered to members of the Botanic Garden Association.

currently as a combination office and classroom for the horticulturist. As future buildings are constructed, this will be used as a herbarium work room.

Removal of the office files from the main room of the library has permitted additional shelving for books, and will make this room more readily usable for meetings of various sorts without disturbing the office routine.

Story of the Mexican Tiles

ROBERT CASAMAJOR

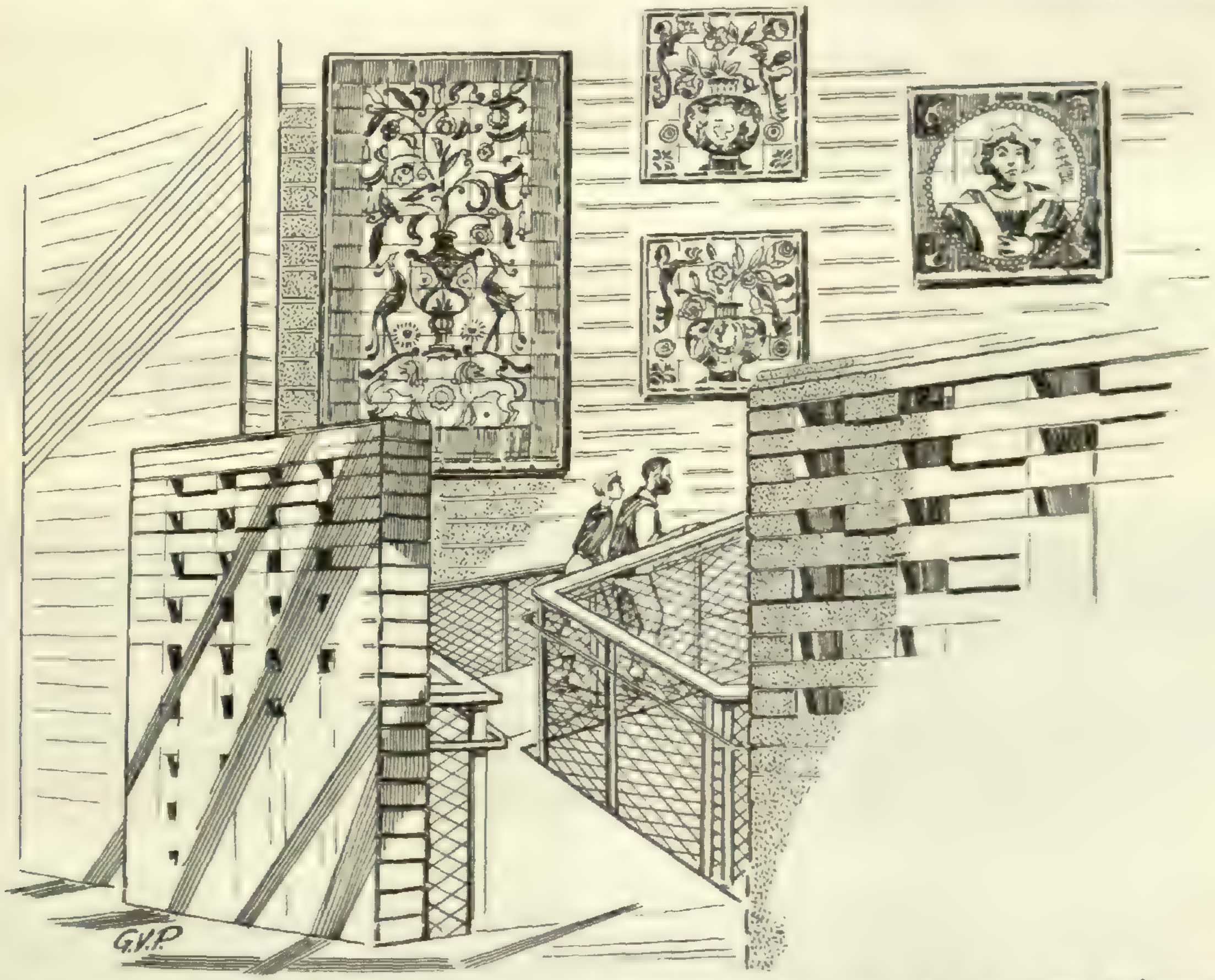
SO MUCH INTEREST has developed over the unique and beautiful tiles hanging on the walls of the entrance ramp at the Arboretum, that it seems fitting to relate the story of where they came from, and how the California Arboretum Foundation acquired them.

Colonel and Mrs. William Green resided in Mexico City over thirty years ago where Colonel Green made his headquarters in his operations in Mexican oil properties.

Some time before 1930, he purchased the old Vosburg Ranch in the Sierra Madre Villa section adjacent to Pasadena, California. He and Mrs. Green lived there in the old ranch house and developed the avocado orchard which still covers part of the thirty-four acres, much of which has now been sub-divided.

One of the purchasers of a part of the Green ranch was Dr. R. S. Harrison, the head of the Department of Radiology at Huntington Memorial Hospital in Pasadena.

After William Green died, Dr. Harrison as a friend and neighbor did many favors for Mrs. Green and she in turn, to show her gratitude, presented Dr. and Mrs. Harrison with the wooden boxes containing the collection of tiles, which the Greens had acquired years ago. These tiles had been made by the Mexican artist and tile maker, of Puebla, Pedro Sanchez. They had long been stored in the old barn on the Green ranch, unopened.



Ten colorful pictures have been fitted into the architecture of the new Arboretum Administration Building Wing. The size of the pictures range from the three smallest, measuring 12x18 inches, to the largest which measures five feet wide by seven and a half feet high. Subjects depicted include: the three ships of Columbus (the Nina, Pinta and Santa Maria); a bust of Columbus; Don Quixote astride his horse and followed by his companion Sancho Panza; and five scenes of peacocks.

Curiosity, as to what the tiles were like, prompted the Harrisons to open the boxes and attempt to put the pieces together. The only place available was the floor of their spacious living room. When they were all assembled, it was obvious to the Harrisons that there was no way they could be used in their home and equally obvious that such rare works of art belonged in some institution where the public could see and enjoy them.

As a friend of the California Institute of Technology, Dr. Harrison offered the collection to them if they could use them in the walls of any of the buildings then under construction.

About this time I was invited to view the tiles spread on the living room floor, and when Caltech regretfully declined the gift, I suggested to Dr. Harrison that he give them to the Arboretum Foundation for use in one of our proposed buildings. Our Director at that time, Dr. Russell J. Seibert, inspected them, recognized at once their value and when Dr. Harrison offered them to us, he arranged to photograph them in Kodachrome, repacked them in the boxes, and stored them in the Coach Barn at the Arboretum, until a way could be found to make use of them.

There the tiles lay for another two years while plans were developing for the new building containing the library, herbarium and large meeting room.

Uncertain as to whether they could be used at the entrance and permanently set in the walls, Dr. William S. Stewart conceived the idea of mounting them in steel frames and hanging them like portraits.

This treatment has been most successful and so pleasing that in addition to the unique character of the tiles themselves they are now displayed in an equally unique and effective manner.

The California Arboretum Foundation, Inc. wishes to thank Dr. and Mrs. Harrison for their generous gift.

LANDSCAPING

Festival of Garden Lighting

JOHN L. THRELKELD

DURING THE MONTH of October the Descanso Gardens Guild and the Department of Arboreta and Botanic Gardens sponsored the Festival of Garden Lights in Descanso Gardens.

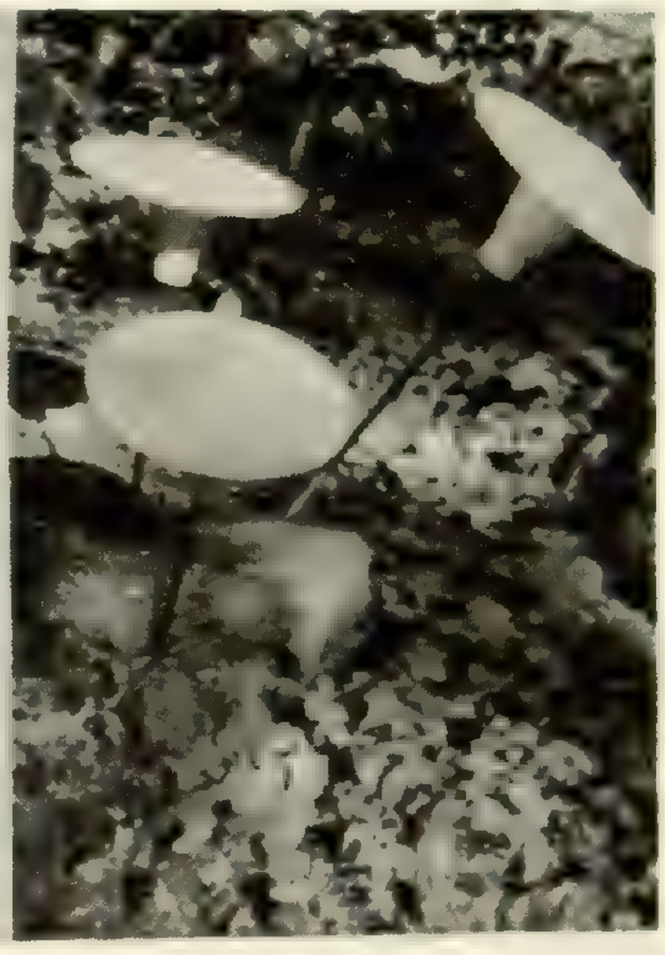
This was the first time that a public show featuring garden lighting exclusively has been presented. The purpose of the exhibit was to present ideas which could be duplicated in home gardens and indeed, anywhere that garden lighting was desired. It was staged to coincide with the change from daylight saving time to standard time to take advantage of the long evenings.

The professional coordinator for the festival was Mr. Don Lewis, owner of a Montrose Light Company. Equipment used was representative of different manufacturers.

Special effects were created by the use of sculpture of human, animal and abstract forms. A water fountain was illuminated as a feature. Interesting stepping stones lighted from above showed the entry way to the display. A concrete block screen wall was installed to show lighting effects which may be achieved with the artistic open pattern of the blocks.

Of particular interest was an outdoor living area, designed to be of maximum use, adapted to artistic night lighting. Here in an artfully designed setting was an outdoor living room, two walls of which were built of sawed pumice stone which was glued to

plywood backing creating an interesting brickwork appearance. Another wall featured a fountain bubbling out of a large piece of feather rock, the water cascading through tiny pools with small ferns growing out of pockets in the rock.



Left: The above fixture is specially designed to illuminate a foot trail such as may be found leading from a patio into the garden or an approach from parking area to house or patio. Center: An interesting feature in the festival of garden lights were two pagodas which were illuminated by low wattage fixtures. Pictured above is a pagoda which was located near the entrance to the Garden House. Right: The lighting fixtures above are made of plastic and are to be had in a wide variety of brilliant colors. They are available at most garden supply dealers and garden lighting equipment stores.

A most outstanding exhibit displayed the uses of fluorescent materials under ultra-violet light. Here ornamental fountains were installed, bubbling water dyed to reflect the ultra-violet light as it cascaded over rocks and spilled from pool to pool. Interesting leaf patterns were reflected in this display. Numerous forms of rocks and sculpture reflected fluorescent colors.

Suspended over the rock fountain was a mobile comprised of pieces of wood, stone and feather rock which had been hollowed to function as a plant container. A large fire pit was sculptured out of a large piece of feather rock. Surrounding the fire pit were

Left: The above fixture is a metal counterpart of the Japanese stone lanterns. A low wattage bulb causes illumination with a very pleasing effect. Center: Manufactured of ceramic tile the above fixture creates an interesting pattern in a garden space to accentuate a garden path entrance. Right: The above fixture is designed to blend in with foliage and flowers to give pathway illumination.

benches of modern design, artifully placed on sculptured pieces of feather rock instead of legs.

Next to the outdoor living room was the food preparation center. Here a charcoal broiler was housed in a piece of sculptured pumice as were adjoining tables and storage shelves. Convenient to the foor preparation area was the dining area. A table, supported by a large pumice stone, had a two place dinner setting with all the table trimmings. An umbrella projected from the stone over the table. Adjacent to the two place table was a sand box which was divided with sand on one side and a small table and benches for children on the other. The entire exhibit was landscaped with such special features as a sculptured Easter Island head, large bird forms and interesting plant materials.

Other types of outdoor furnishings were also displayed.

The festival was viewed by approximately 8,000 persons, most of whom were very expressive of their enjoyment of the exhibits.

It is felt that the Festival of Garden Lights was very successful both as a stimulus to the fall program in Descanso Gardens and as a public service. The Descanso Gardens Guild realized much benefit by receiving a greatly accelerated number of membership applications and by obtaining much press notice.

It is hoped that the event will be an annual affair with steadily widening participation by exhibitors.

The Southern California Horticultural Institute

VICTORIA PADILLA

SINCE ITS INCORPORATION almost a quarter-century ago, the Southern California Horticultural Institute has been the leading organization of its kind in the Southland. Established at first as a purely professional institution, it soon had to open its doors to the amateur gardener, for the excellence of its monthly meetings became so publicized that all plantsmen of any repute clamored to be admitted. Many old-timers today remember with pleasure those early meetings—the dinners at the Mayfair Hotel, the exciting programs held at the University Club, the Elk's Club, and the Friday Morning Club. Those were the days when Jan de Graaf flew from Washington to show his newest bulb introductions, when Mulford Foster made a special trip from Florida to lecture on bromeliads, when the halls were so crowded that many members had to be turned away.

The Board of Directors of the Institute has always been a hard-working, energetic group. Considering the smallness of its number, the Board has been nothing short of amazing in its accomplishments. The formation of the Men's Garden Club of Los Angeles, the establishment of the Los Angeles State and County Arboretum, and the holding of the International Flower Show are among the most noteworthy of its achievements. The Institute, too, has been responsible for awakening interest in civic beautification, and it was largely due to the efforts of such men as Dr. Samuel Ayres, Jr., that organizations like Los Angeles Beautiful were formed.

The year 1959 saw no diminution in the activities of the Institute. Its latest objective is the publication of a history of horticulture in Southern California. This project was initiated by the late Manfred Meyberg, who was sadly disturbed that the men who had devoted their lives to making the South a more beautiful place in which to live were fast becoming forgotten. The book, which will be a sizable volume and amply illustrated,

will serve as a memorial to Mr. Meyberg, who during his life was one of the staunchest supporters of the Institute. Although no flower show was held this year, it is the desire of the Board of Directors to stage another show—one of a more educational nature—in the near future.

The Institute acts in an advisory capacity whenever the need arises for expert horticultural advice. Help is being given in the making up of a flowering-tree calendar, a project started by Los Angeles Beautiful. When the Los Angeles City Zoo, as sponsored by the Friends of the Los Angeles City Zoo, gets under way, the Institute will give its aid by suggesting appropriate plantings.

The meetings for the general membership of the Southern California Horticultural Institute are held monthly on every second Thursday evening at half past seven. The meeting in January is held at the Descanso Gardens in La Canada; that in October at the Arboretum in Arcadia. All other meetings are held in Fiesta Hall, in Plummer Park, 7377 Santa Monica Boulevard, Hollywood. The programs consist not only of a fine lecture, given by an expert in his field, but also a presentation of the newest and rarest in the way of plant introductions. This plant forum is under the capable management of Dr. Vernon T. Stoutemyer of U. C. L. A. Guests are welcome at all the meetings.

An Eminent Scientist

CHARLES DARWIN AND HIS EXPERIMENTS

REWA GLENN

Reprinted from *The New Zealand Gardener,* Vol. 15, Feb. 1, 1959

ON THE 12TH DAY of this month, February, 150 years will have passed since the birth of Charles Darwin. Science has made amazing advances since then, so that some of Darwin's discoveries seem very simple with present-day knowledge. But it needed a Darwin to give the spur to science in the right direction.

His father, a doctor, was the son of Erasmus Darwin, also a physician as well as a follower of the principle of evolution, and his mother, who died when he was eight years old, was the daughter of Josiah Wedgwood, of pottery fame. After her death Charles became a boarder at Dr. Butler's school at Shrewsbury, the home town of the Darwins and the Wedgwoods. It is interesting to note that Samuel Butler, who satirized in his "Erewhon" parts of Darwin's classic "The Origin of the Species", was the grandson of this Dr. Butler.

Charles had no taste for Greek and Latin, the two subjects that were considered as all-important at that time, so that it is not surprising he was rated rather slow to learn. He had a passion for collecting such things as shells, coins and minerals, and became very interested in dogs, birds and chemistry. At the age of seventeen his father sent him to study medicine at Edinburgh, where he stayed for two years. But the only part of the course that interested him was botany, and as that science then was regarded simply as an introduction to other professions, Darwin decided to study for the ministry at Cambridge.

Here he continued his botany lectures under Professor Henslow, who, noticing some worth in his keen student, invited him to his house to meet distinguished men of science: Charles soon became interested in the whole field of natural science: when he accompanied Professor Sedgwick (geology) to Wales he became engrossed in the study of fossils.

It was soon after this visit that he learned there was to be an expedition to complete

the survey of the southern coasts of South America, including Tierra del Fuego. A letter from the commander, Captain Fitzroy, offering him the post of honorary naturalist gave him real cause for excitement. Henslow had recommended him to the captain as an able naturalist and a suitable companion: Charles was always a great favorite with his associates, a happy trait for a long sea voyage.

He was only 22 when, in December, 1831, the Beagle sailed from Plymouth. Fitzroy stayed three weeks at the Cape Verde Islands, and Charles in a letter to his father told him of the delights of strolling under coconut palms, through banana thickets, coffee plantations and viewing the beautiful wild flowers. Two months after leaving England they reached Brazil. While Fitzroy was engaged in surveying, Darwin was able to explore for short distances inland. At Rio de Janeiro he was thrilled to see a tropical forest in "all its sublime grandeur".

Two years were spent in charting the southern coasts of America, and after visiting various islands in the Pacific a course was set for New Zealand. High winds were encountered, and now, in a calm after the storm, the Beagle sailed into the Bay of Islands on December 21, 1835, anchoring opposite the missionaries' homes at Paihia. Darwin, still suffering from sea-sickness, was by this time feeling depressed and homesick, and except for his estimation of the kauri as "noble trees" records little in his diary of the New Zealand flora. After a walk on the near hills he stated that the country was "very impracticable. All the hills are thickly covered with tall fern, together with a low bush which grows like a cypress." But the stay in New Zealand was very short, only nine days. On December 30 the Beagle sailed out of the Bay of Islands and on October 2 of the following year touched the shores of England once more.

Darwin lived in London for six years after his return, married his cousin, Emma Wedgwood, and then bought a property of 18 acres and a three-story brick house at Down, in Kent, 16 miles from London. It was fortunate that his father was wealthy and generous, for Darwin had not yet begun to earn his living by his pen. With the inspiration and knowledge gained through travel he began his life work in earnest: The solving of many problems in natural science. He corresponded with naturalists whom he had contacted during his long voyage and received plants from them. Joseph Hooker, though eight years his junior, was soon an intimate friend. Hooker relates how they often "trudged through the garden, where there was always some experiment to visit."

Darwin farmed part of his property and utilized the rest for gardens, experimental plots and greenhouses. He was the first to discover that sundews and the many plants that belong to the Droseraceae actually trapped insects and were partly nourished by the nitrogen absorbed through their leaves and pitchers. A glance through his "Insectivorous Plants" makes one realize what meticulous pains he took in his experiments. His wife, writing to a friend, said, "Charles is treating Drosera (the sundew plant) just like a living creature and I suppose he hopes to end in proving it to be an animal." (For illustrations of New Zealand Droseras see N.Z. Gardener, March, 1957.)

Orchids also gained Darwin's special interest. Here, too, were plants that were closely associated with insects, in which marvellous devices had been evolved to gain cross pollination. He stated that "these contrivances have for their main object the fertilization of each flower by the pollen of another flower", and in a letter to a friend he said: "I never was more interested in any subject in my life."

Many varieties of English orchids grew near Down. His favorite walk was to this "Orchid Bank". After careful observation of the British orchids he devoted his attention to exotic species. A neighbour lent him the free use of his hot-house, and here Darwin was able to grow many plants that Hooker sent him from Kew, as well as specimens from orchid fanciers who were now interested in his work and experiments. One of these was a lovely orchid from Madagascar with "large six-rayed flowers like stars formed of

snow-white wax . . . and a whip-like green nectary of astonishing length". Some of these nectaries were more than 10 inches long with only the lower inch filled with nectar. Darwin could only surmise that there were certain large moths in its native habitat that were able to reach this sweet juice and so pollinate the flowers. Later one with a very long coiled proboscis was discovered in Madagascar.

On the opposite side of the world the orchids of a new field were arousing interest. A green orchid, first discovered by Joseph Banks in 1769 and named *Pterostylis banksii* by Robert Brown, was rediscovered in 1826 by Allan Cunningham, who described it as "remarkable for the noble size of the flower at the top of a foliaceous stem a foot high". Thomas Cheeseman, in 1862, procured a copy of Darwin's "Fertilization of Orchids" that had just been published. He noticed that no mention was made of Pterostylis, that was plentiful in bush areas about Auckland. He noted the clever device by which this flower gains cross-pollination and sent an account of his observations to Hooker, who passed the letter on to Darwin. In a later edition of the book Darwin gave a full account of the tricky device, and stated that he had taken it "from the admirable description given by Mr. Cheeseman".

At that time the geographical distribution of plants was beginning to interest botanical explorers. How was it that the same species were found sometimes in countries many hundreds of miles apart? The popular belief was that former land connections was the cause. Darwin believed that plants could spread by other means and carried out experiments by soaking seeds in sea water. After 14 days many of them germinated. Birds, too, in his opinion, were carriers not only by eating the berries but by carrying the seeds stuck to their feathers or in mud between their claws, and came to the conclusion that "occasional transport" was far more probable than "continental extensions".

Darwin died at the age of 73 and was buried in Westminster Abbey near the grave of Sir Isaac Newton. Four of his sons inherited his interest in natural science, and three of them were knighted.

Pumice Enters Horticultural Field

NEW ZEALAND PRODUCT SPEEDS UP PROPAGATION

J. W. MATTHEWS

Reprinted from *The New Zealand Gardener*, Vol. 16, Sept. 1, 1959

THE RAISING of plants from seed and cuttings is as old as gardening itself, but for centuries man has been striving to find new and more efficient methods of carrying out these methods of plant propagation.

Some seeds will germinate and develop into sturdy plants if sown in the open ground, but the more delicate types require a great deal of skill, as they must have the right degrees of moisture, temperature and aeration to germinate and grow without damping-off.

Cuttings of many plants also require special attention if they are to callus, root and grow. Lack of efficient treatment results in many failures, and often in poorly-rooted plants.

One of the oldest methods of raising "difficult" seeds, and of striking reluctant cuttings has been the use of sand, but unless just the right grade is used it is liable to become compacted with fatal results to the plants.

Other preparations such as that expanded form of mica known as vermiculite, and a type of pumice subjected to considerable heat and known as perlite, have been used with considerable success. These materials are largely used for insulating purposes, but owing to their light and open nature, have been found useful in horticulture.

The latest aid to propagation is a pure type of pumice ground to a degree which per-

mits the movement of water and air through it, but which does not dry out readily or consolidate. It is now being used extensively by a number of nurserymen who agree that it is superior to other products they have tried for the raising of seedlings or the rooting of cuttings.

Pumice is an inert material which is sterile; consequently the organisms which cause damping-off and other troublesome diseases are not present in it, and seed raised in it does not suffer from these parasites. On account of its light, loose and open nature, pumice does not consolidate when subjected to frequent waterings, which is a very important point, as many seeds will quickly rot, or even if they do germinate, the seedlings will collapse, unless the medium in which they are growing is well aerated.

Aeration, by the way, means a soil that permits air to move through it, and the gases which are secreted by the roots of all growing plants to escape into the atmosphere. When a soil is not adequately aerated, these gases accumulate, the soil becomes toxic and plants die.

Pumice absorbs and holds a limited amount of water, but never becomes soggy and water-logged, and when liquid fertilizers are added to it, a high percentage adheres to the pumice particles, thus enabling the roots of the growing plants to obtain these nutrients without undue effort.

Seedlings growing on pumice usually make rapid growth and the loose medium enables their roots to proliferate without meeting obstruction through which they have to push their way—an effort that can impose a severe strain on a small plant.

Pumice may be used for seed-sowing or rooting of cuttings in its pure form, provided reasonable precautions are taken to ensure moderate watering, shading and protection from draughts. It can also be used with excellent results for loosening up loamy or clay soils; thoroughly mixed with them, it brings about a degree of aeration which facilitates the movement of moisture and air.

Pumice has been found ideal for adding to the standard seed composts and for use in all potting soils to ensure that they will not become "sour", water-logged or compacted. It is not a plant food, but a soil conditioner, and needs to be reinforced with fertilizers if plants are to be retained in it after they have rooted.

Pumice for horticultural uses is being pioneered by Messrs. J. B. Gilberd & Sons Lts., of Wanganui, whose sandsoap has been used by many generations of New Zealanders.

Koelreuteria Formosana

PHILIP E. CHANDLER

SALMON PINK SEED PODS like clustered paper lanterns light up this tree's top for Hallowe'en, following a brief show of yellow flowers in large panicles. The shining compound golden-green leaves rarely attacked by insects of any kind, appear in late February and drop about Christmas exposing the strong yet delicate structure above handsome gray trunk and well-behaved roots that tolerate choice planting closely. A free-form umbrella usually 25'-35' and across, this member of the *Sapindaceae* from Formosa is fool proof to most Southern California locations excepting those of salt and extreme wind, and ideal shade subject for lawn, garden, terrace or streetside. Representative specimens may be seen on La Mesa Place just off 26th Street, Santa Monica, at 353 19th Street also in Santa Monica, and on the east side of Benedict Canyon just north of Sunset Boulevard in Beverly Hills.

Chorisia speciosa

A specimen in bloom on Tallac Knoll at the Arboretum.

The flower, measuring 5 to 6 inches across. Light lavender to orchid.

A mature seed pod with the dark seeds cushioned in white down.

HORTICULTURE

Notes from the Strybing Arboretum

San Francisco, California

ARTHUR L. MENZIES

ARBORETUM HIGHLIGHTS

THE RECENT TREND in architecture and landscape design—the building of houses primarily of wood and with simple lines, and the utilization of the garden as an extension of the house into outdoor living space—has made the use of bamboos most popular. Widely sought by landscape architects and home owners alike, the slow increase and comparative rarity of some of the choicer kinds has forced the prices of these plants into astronomical figures.

Bamboos are perennial woody grasses widely spread throughout the world and are found in tropical, sub-tropical, and temperate zones. They extend from sea-level in some regions to altitudes of 15,000 feet in the Andes. Under favorable conditions some species reach a height of over 100 feet and have culms with a diameter up to 12 inches. The nomenclature of bamboos is most complex and confusing and many of the kinds found growing in the Arboretum as well as in the trade are perhaps misnamed.

The flowering of bamboos is a phenomenon of peculiar interest. Simultaneous flowering of all plants of one species although widely spread throughout the world and growing under many different conditions has been noted. Examples are known of plants grown for years in greenhouses in England which flowered and died at the same time as plants of the same species flowered and died in the tropics thousands of miles away.

The largest, and undoubtedly most beautiful and graceful bamboo in the Arboretum is *Phyllostachys bambusoides*. Planted from a tub some twelve years ago, this plant has developed into a magnificent clump some twenty feet across. The individual culms reaching over 20 feet in height are well spaced and have a diameter of nearly three inches. Nearby is the much smaller and very popular (and expensive!) *Phyllostachys niger*, the Black Bamboo of China and Japan. Growing to a height of 10-12 feet with us, this distinct species has stems green at first, but changing to black the second year. A plant of quite a different type is *Sasa senanensis* var. *nebulosa*. Having slender green stems 4-6 feet tall, this bamboo is noted for its large leaves 10-13 inches long and 2-3 inches wide. Increasing by underground runners, this bamboo spreads rapidly and forms dense thickets so that ample space should be allowed at planting time to prevent its eventual encroachment on choicer plantings.

Horticulturist
Strybing Arboretum

NATIONAL SHADE TREE CONFERENCE

The Southern Regional meeting of the National Shade Tree Conference, Western Chapter will be held on Friday, January 22, 1960 from 9:30 a.m. to 4.00 p.m. at the Los Angeles State and County Arboretum, 301 North Baldwin Avenue, Arcadia, California.

The morning program, beginning at 9:00 a.m. will include:

Registration and a series of lectures by Dr. Mildred Mathias, Dr. William S. Stewart and Dr. Vernon Stoutemeyer.

Luncheon will be between 12:15 and 1:30 p.m.

The afternoon program, beginning at 2:30 p.m. will include demonstrations of the various equipment used by the commercial arborist.

At 3:00 p.m. there will be a conducted tour of the Arboretum grounds.

BOOK REVIEW

Landscaping With Vines, by Frances Howard, The Macmillan Co., New York, 1959, $6.50

In the field of horticulture proper use of ornamental vines is probably less understood than any other phase. There has long been a need for a work of the type represented in this book. Miss Howard has presented in this volume information encompassing four main ideas:

1. The size of the vine.
2. A complete description of the vine.
3. The climatic, soil and exposure tolerances of the vine.
4. The care of the vine.

Directed primarily to the home gardener each point is portrayed in a very concise and clear manner which can be easily used by anyone having sufficient interest to do so.

The work is profusely illustrated by line drawings and photographs which will serve the home gardeners and professional gardeners equally as well in giving postitive identification and good descriptive material. In describing each vine Miss Howard goes into considerable detail giving botanic name, common name, prounuciation, family name, native locale, the major value of the vine, whether it is most useful for its flowers or its foliage, its fragrance, etc.

Very few botanical terms are used, however, the descriptions are remarkably clear. A fine glossary of botanical terms is included along with drawings of leaf outlines and methods of climbing. The descriptive list includes more than 300 vines, many being common, others are uncommon. Some shrubs are listed which are not commonly thought of as being used as vines, which, with proper training will serve the purpose very nicely.

A very brief section covers the care of vines. It comprises less than seven pages, in a book of 230 pages. This is the only factor which may lessen its value to the home gardener.

Designed for use throughout the United States and parts of Canada this work includes a map showing the different temperature zones where vines of certain hardiness may be grown.

In the final pages of the book a table of vines is included which gives the botanic name, height, climbing method, growth form, foliage effect, leaf size, leaf color, flower color, bloom season and fruit classification.

Following the table of vines and their uses is an approximate hardiness list which lists vines for the various zones, as outlined on the map.

An excellent bibliography is included. The book is indexed very well.

Finally it should be said that, "Landscaping With Vines" is a book to be valued not only by the home gardener, to whom the work is dedicated, but also to professional gardeners and horticulturists who desire a good reference book on vines.

JOHN L. THRELKELD

The Garden Flowers of China, by H. L. Li, The Ronald Press Company, New York, 1959, $6.50.

This informative book is a fascinating introduction to the flowery kingdom and will be read with a new enthusiasm by flower lovers everywhere. Its charming and interesting legends and folklore give some insight into the early trends toward domesticating various plants and flowers cultivated before historical times. The material on more recent plants, however, is substantiated by accurate facts from modern technical works on Chinese horticulture.

Dr. Li discusses with deep Oriental feeling many of the best loved garden flowers of China among which are such favorites as the peony, Japanese apricot, cymbidium orchid, chrysanthemum and lotus. These flowers often appear to have a spiritual or inner meaning and special emphasis is placed on their symbolism which is an important aspect of Oriental art. The peony symbolizes wealth and honor; the Japanese apricot suggests hardiness and nobility of character; the orchid is the symbol of modesty, gentility and longevity; and the lotus is the emblem of purity and truth. Flowers indicate the changing seasons with the orchid for spring, the lotus for summer, the chrysanthemum for autumn and the Japanese apricot for winter. When the famous Greek poetess Sappho christened the rose "Queen of Flowers", little did she dream that the rose had been cherished by the Chinese many centuries before. Other flowers treasured for centuries by the Chinese include the azalea, camellia, magnolia, narcissus, jasmine, day lily, pinks, hollyhocks, crab apples, pomegranate, peach blossom, jade flower, to mention a few by name.

This book combines legendary background, historical data and botanical review. An exhaustive bibliography enhances the value of the book. Most of the beautiful illustrations are copies of Chinese originals as much as 850 years old. From antiquity flowers have had a profound effect on Chinese art and literature.

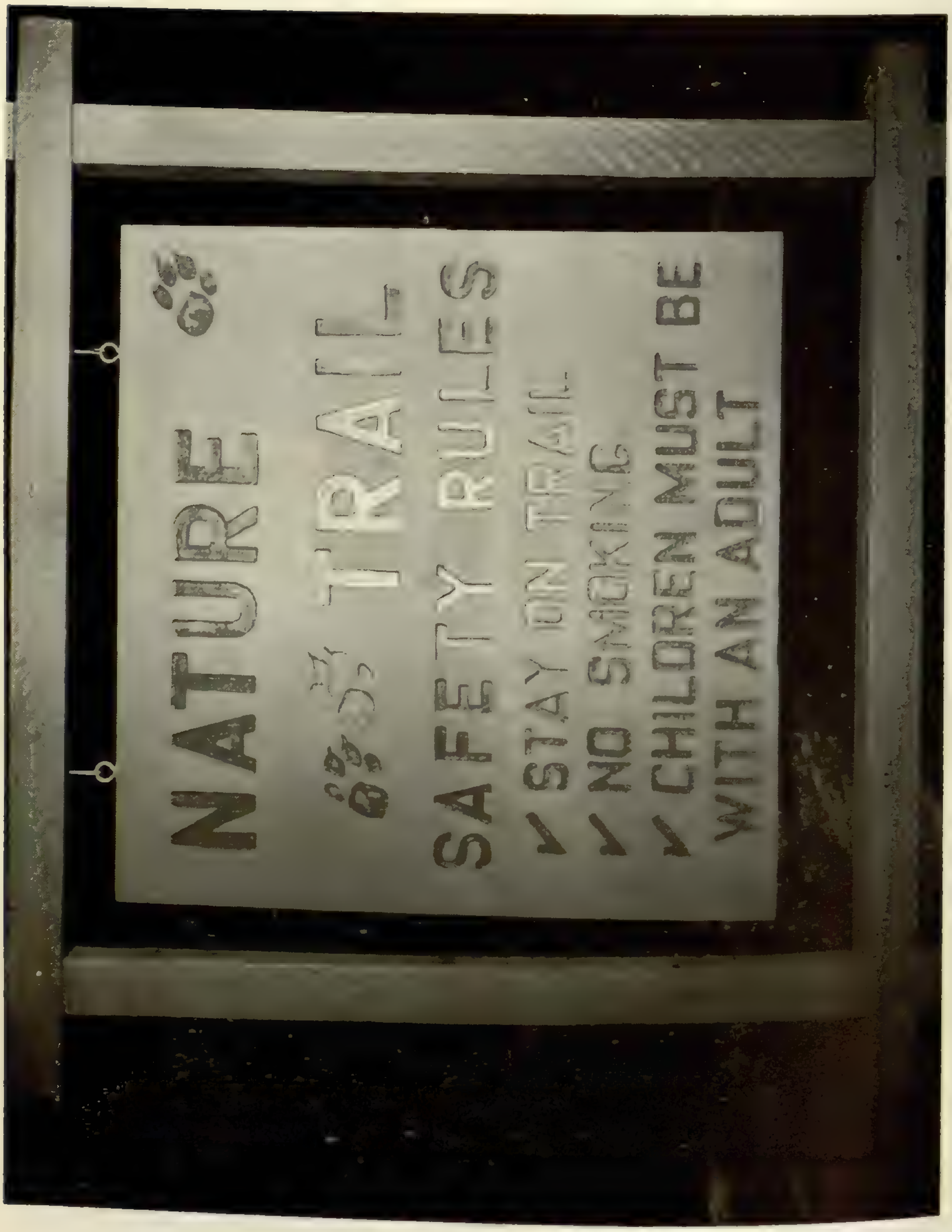
China is indeed "The Mother of Gardens" and Chinese flowers will forever play a most important part in our gardens and in our lives. We are greatly indebted to China for her bounteous contributions to the floral world. The history of China is a record of her gardens.

This new and delightful story of the plants in Chinese gardens and their association with the Chinese people throughout past history has been placed in the library of the Los Angeles State and County Arboretum, Arcadia, California.

BILLIE MCCASKILL

NATIVE PLANT NATURE TRAIL

Descanso Gardens, La Canada, California



This sign marks the beginning of the Nature Trail which winds through the chaparral plant cover in the southwest corner of Descanso Gardens, La Canada.

A typical sign along the Nature Trail. There are ten such markers. A Guide Sheet is available for the Trail at the Information Window.

Lifting up the hinged, front cover of each sign, the visitor will find a brief story explaining the particular nature subject in that area. Photos by Denis Kucera.

ARBORICULTURE

Elm Trees Threatened by Bark Beetle

HAROLD P. MARTINEZ

THE Smaller European Elm Bark Beetle *(Scolytus multistriatis)* is a tiny insect, introduced into the United States in 1909. Its infamous career is well known in the eastern United States concerning the spread and devastating effect of the Dutch Elm disease. Difficult to identify because of its minute size, this insect measures 1/12 inch to 1/8 inch long, colored brownish to black. Adults emerge in May or June, flying to healthy trees, where they feed in the crotches of twigs. The adult female proceeds to drill into the wood and lays eggs in galleries running with the grain of the wood. Upon hatching, the larvae radiate outward eating the inner bark of the tree.

Factual information concerning the beetle in Southern California is scanty. Considerable damage has been found, however, especially in the San Fernando Valley. Evidences of the beetle have also been found in scattered locations throughout the entire Los Angeles Basin.

The life of your elm trees may be prolonged if the following recommendations are followed:

1. Maintain the health and vigor of your trees. A healthy tree is not as apt to be attacked. Thorough watering is essential. Soak the root-zone of your tree to a depth of three to four feet once every three or four weeks, except during the rainy season. This is essential even though your tree appears to have sufficient moisture.
2. Examine the trunk and larger limbs of your trees frequently. The first evidence of beetle may be small pin-holes in the bark of your tree. Adult beetles are active from May through November or possibly December.
3. If you have a beetle problem contact a qualified agency such as the Agriculture Commissioner's Office, Arboretum Department, Park Department, Tree Department or a pest control operator.
4. Destroy all dead, dying or infested elm trees. Dispose of all elm wood in such a manner as to kill all beetles in the wood and prevent future infestations.

The Smaller European Elm Bark Bettle has been instrumental in killing thousands of elm trees throughout the east and midwest. Careful and continuous examinations by state, county and municipal agencies and by property owners followed by prompt effective control measures can save our area from a similar devastation.

NAMES, NOTES AND NEWS

NUMEROUS EVENTS PLANNED FOR DESCANSO GARDENS IN 1960 SPRING SEASON

January 16th: Rose Pruning Demonstration Day, sponsored by the Pacific Rose Society, the Descanso Gardens Guild and the Department of Aboreta and Botanic Gardens. This event will feature a special program with participation from various members of the Pacific Rose Society and dignitaries of local government. As a highlight 2500 bundles of rose cuttings will be given away by the Glendale Area Girl Scout Council whose members prepare and distribute the cuttings. More than 20 rose pruning experts will demonstrate the proper techniques of rose pruning to interested garden visitors. This event in 1959 drew over 3,000 people. The event this year is expected to draw 4,000 or more.

February 27 and 28: The Annual Camellia Show, co-sponsored by the Los Angeles Camellia Council, Ltd., and the Department of Arboreta and Botanic Gardens. This event will be staged out of doors along the garden trails where tables protected overhead by pliofilm will contain thou-

sands of individual cut camellias of most known varieties. Trophies and awards will be presented for choicest flowers.

There will also be flower arrangements featuring camellias, displayed competitively in the Hospitality House and Garden House.

This event in 1959 attracted more than 50,000 people on two weekends. It is difficult to estimate how many people will attend this year on the one weekend. It is a one week affair this year because of other camellia activities which compete for other weekends.

March 12 and 13: Daffodil Show. Co-sponsored by the American Daffodil Society, The Descanso Gardens Guild, and the Department of Arboreta and Botanic Gardens. The daffodil flowers will be displayed on the same pliofilm tables as used in the Camellia Show.

Among the trophies and awards presented will be the Kenyon-Reynolds Perpetual Daffodil Trophy which is a silver piece valued at $1,200.

A full scale flower arrangement show is planned for an undetermined date in April, as is an Iris Show and a Rose Display. The dates of these events and others as they develop will be announced in later issues.

An Editorial

From time to time, it has been suggested that we editorialize on ideas and needs of certain functions concerning California Arboretum Foundation, Inc. or Southern California Horticultural Institute. Several times copy has been prepared but then set aside in preference to publishing the efforts of a contributor.

You will notice that two articles in this issue are reprinted from *The New Zealand Gardener.* This is not an unusual procedure; however, such a practice always twixts an editor's ego in the manner of reminding him that he has failed to present original copy. Reprinting is the crutch with which an editor remains ambulatory.

The literary(?) fare presented in *Lasca Leaves* is varied. The original Editorial Committee set the topic coverage to include: horticulture, gardening, exotic plants, native plants, landscaping, travel in connection with plants, California history; in fact, almost any subject is admissible so long as there is a plant subject relationship expressed or implied.

We are entering our tenth volume of *Lasca Leaves.* Copy for each issue of each volume has been sufficient, but never in surplus. Each issue starts from scratch, articles being obtained as late as three weeks before the issue is mailed.

Now, in publications of limited circulation such as *Lasca Leaves,* and there are many of them, it is not unusual for the Editor to shoulder the major portion of copy procurement. Some editors even write much of the copy—in this practice is hidden the seed of mediocrity, since it can imply authority where authority is impossible when considering a wide subject field.

True, *Lasca Leaves* offers little in materialistic rewards for authorship. No royalties; no reprints; a small circulation number, although our efforts are mailed around the world; very little fan mail. About all we can offer is an opportunity for anyone to see his thoughts in print (the author does receive five free copies of the issue) and to have the satisfaction that he has shared his personal experiences, observations, hobby, research or any other type of plant centered endeavor with a group of fellow plantsmen who will read and thoughtfully consider what they have read.

If we have been fortunate in keeping your attention thus far, we go to press usually (when copy is available) about the 10th of the month preceding each issue. That is: December 10, March 10, June 10 and September 10. It is helpful if copy is typed, double spaced, but if legible, handwritten copy is fine. Two and a half pages of typing, double spaced equals one page in *Lasca Leaves.* Good, sharp focused, glossy printed black and white photographs always add a bright spot of appeal to any article.

P.S. Our present appeal for articles is not intended for the eyes of our regular and faithful contributors, without who's generosity we would have written this editorial long ago.

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Annual Member	$ 5.00 year
Group or Club	5.00 year
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Meetings: 2nd Thursday of each month, Plummer Park,
7377 Santa Monica Boulevard
Fiesta Hall of the Community Building

GRanite 2-4659
Box 688—Arcadia—California

LASCA LEAVES

The official publication of the Southern California Horticultural Institute and the California Arboretum Foundation, Inc.

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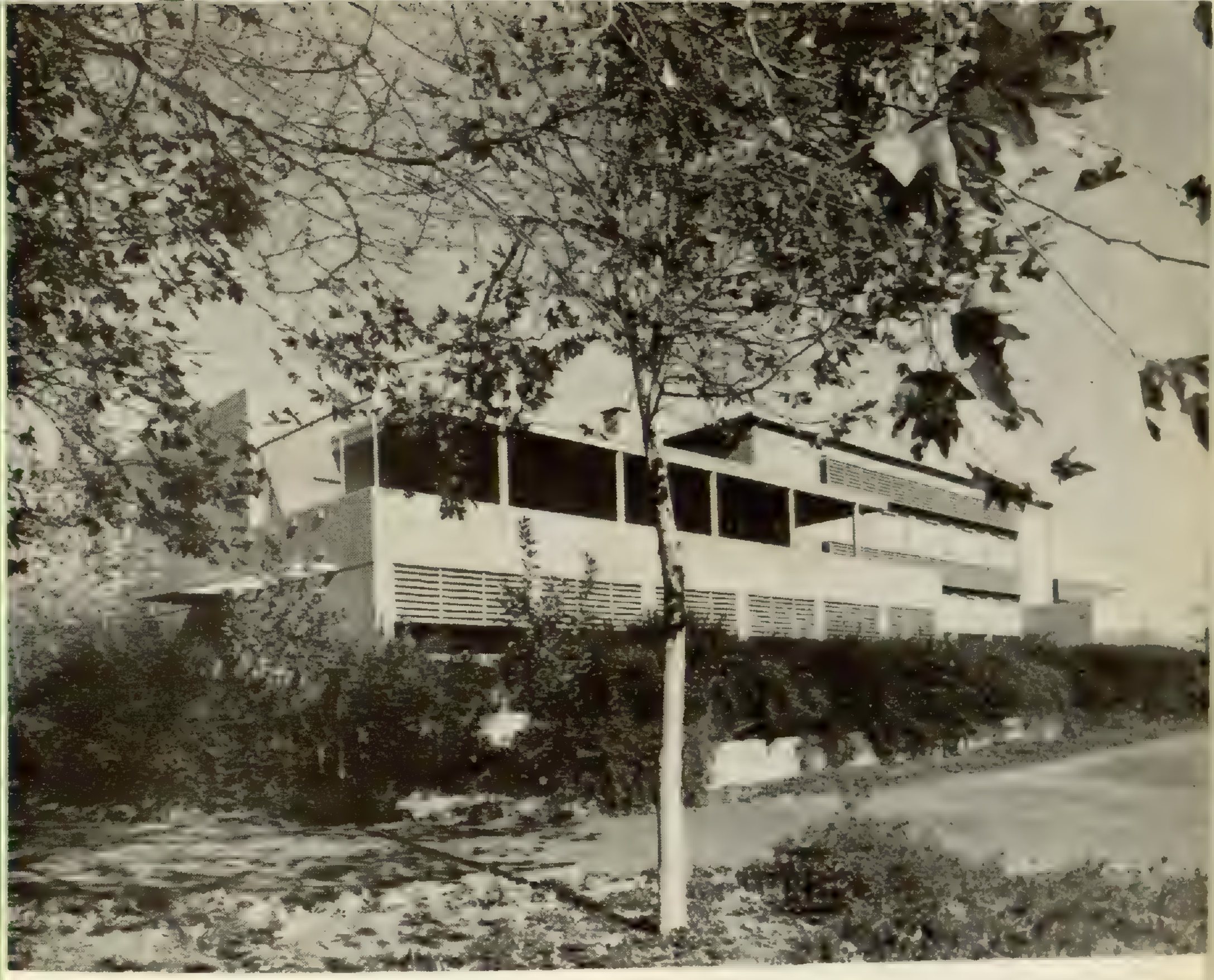

Lasca Leaves

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CONTENTS

TAXONOMY

Observations on Cultivated Ferns:

The Hardy Species of Tree Ferns (Dicksonia and Cyatheaceae)

ROLLA TRYON AND ALICE TRYON

Reprinted with permission from AMERICAN FERN JOURNAL, Vol. 49, No. 4,
October-December, 1959, pages 129-142.

The delicate, lacy leaves characteristic of the ferns are most elegantly displayed in the tree ferns, where the stem becomes a trunk and holds them aloft in silhouette. The cultivation of these handsome plants is unfortunately limited to a few areas in the United States that are generally frost-free and cool and moist, or where local niches, ravines, or lath houses can provide these requirements. Most of the species are native to cloud-drenched ravines or highlands in the tropics and sub-tropics but a few inhabit cooler and drier areas. In sub-tropical Florida and coastal California from San Francisco to San Diego, where they are cultivated, they are imports from New Zealand, Australia, and a few from Mexico. There remains considerable horticultural potential in the group, which encompasses some 700 or 800 species in six genera or more. The groves in San Francisco's Golden Gate Park are especially notable and probably the most unique display in cultivation. Our interest in tree ferns stems from these. We found a total of 8 species in the park, in several groves of predominantly one or two kinds, and there are records that two others have grown there. In the Los Angeles area we have seen specimens or herbarium records of notable collections at the University of California Botanic Garden, La Fleur Nursery, and in the gardens of Dr. W. C. Drummond and Mrs. Fay A. MacFadden, members of the Fern Society. The most complete herbarium collections of cultivated species are in the California Academy of Sciences at San Francisco, the University of California, Los Angeles, and the United States National Herbarium. This study has been made on the hardy tree ferns and we have not considered those grown under glass.

In spite of their distinctive aspect, the tree ferns have not been comprehensively studied and their grouping into genera is a perplexing problem. We have chosen to recognize *Alsophila* and *Hemitelia* in addition to *Cyathea* rather than unite them all under the latter genus as has been done by several recent authors. The nature of the indusium may not be a wholly reliable character nor may it afford the most natural classification. However, until the several hundred species of the family have been adequately studied and a better classification proposed on a sound foundation it seems best not to abandon a character that does have a great deal of utility.

It may be noted here that in several species we have been able to observe both the juvenile and mature plants of the same species and there are some differences in the leaves. The petiole of leaves of young plants may be much longer in proportion to the blade than in old plants and the petiole scales may persist for a longer time. The position of the pinnae, whether plane, somewhat erect or drooping seems to vary both with the age of the plant and the amount of shade it receives. In *Dicksonia fibrosa* and *D. antarctica* the characteristic leaf-cutting may not be found in the young leaves and since there are no differences in indument, it is difficult, if not impossible, to distinguish young individuals. Identification of the tree ferns is most easily done with fertile leaves having the sori mature but not old, thus allowing the indusium to be easily seen. However, we have found many sterile specimens. We have employed in the key characters of these as much as possible. The best vegetative characters appear to be the indument of the blade, the

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[Volume 49, Number 3, of the JOURNAL, pp. 97-128, was issued September 29, 1959.]

color and surface of the petiole, and the scales at its base. Since the scales on the petiole are often deciduous or erode with age it is desirable to observe relatively young leaves. Indument such as wax, hairs, or scales is characteristic in most species and although this often requires at least 15 × magnification to be clearly seen, the diagnostic value of this indument is well worth the necessary careful observation. In most cases where the hairs or scales are deciduous, they are first lost from the larger axes. Therefore, the rachis of the pinnules and the costae are the best places for the examination of the indument, although a similar type may occur on other axes.

We have been especially helped in the preparation of this paper by Dr. Elizabeth McClintock of the California Academy of Sciences whose interest and enthusiasm for the fine specimens in the Strybing Arboretum and Golden Gate Park lent much encouragement. To Dr. W. C. Drummond and Mrs. Barbara Joe Hoshizaki, who shared much information on the collections in the Los Angeles area, we are grateful. Conrad V. Morton graciously invited us to prepare the study for his series on the cultivated ferns and provided us with extensive loans for study from the U. S. National Herbarium. Dr. Robert C. Cooper of the Auckland Institute and Museum kindly lent specimens of the New Zealand species and has sent us some of the attractive Ponga Ware made from the trunks of *Cyathea*. To Mary D. Tindale we are much indebted for her suggestions on some of the Australian species and especially for her excellent paper on the Australian Cyatheaceae published in the Contributions from the New South Wales National Herbarium.[1]

Key to the Hardy Species of Tree Ferns

a. Fertile segments with sori borne on the margins, the indusium of two valves; leaves without scales but with hairs, those at the base of the petiole long and prominent. DICKSONIACEAE. b.

b. Inner valve of the indusium membranous, tan to brown, with a thin, usually slightly erose margin, the outer valve herbaceous to coriaceous, wholly green or with a narrow brownish border; sori borne on the lobes of the segments. In the species treated here the blade of the leaf is narrowly oblanceolate (broader in young plants), the pinnae are nearly sessile, and the hairs at the base of the petiole are stiff, harsh to the touch, and do not become matted; the pith of the petiole is rather dry, not mucilaginous. DICNSONIA. c.

c. Petiole and rachis greenish or mottled with brown when fresh, drying to brown; hairs on the under surface of the pinna-rachises whitish to tan. d.

d. Central pinnae about 3 to 4 times as long as broad with the central pinnules having a long-acute to acuminate apex with many (4-8, usually 5-7) simple teeth to a side. *D. antarctica*

d. Central pinnae about 5 to 6 times as long as broad with the central pinnules having a short-acute apex with few (1-4, usually 2 or 3) simple teeth to a side. . . . . *D. fibrosa*

c. Petiole, at least at the base, and usually also the rachis dark reddish-brown to atropurpureous when fresh or dried; hairs on the under surface of the pinna-rachises reddish-brown to atropurpureous . . . . . *D. squarrosa*

b. Inner and outer values of the indusium very coriaceous, with the margins entire and thick, whitish to brown, sori borne along the edges of the segments. In the cultivated Hawaiian species the blade of the leaf is broadly ovate, the pinnae are stalked, and the hairs at the base of the petiole are weak, forming a mass soft to the touch, becoming matted with age. CIBOTIUM (This genus is to be treated by another author.)

a. Fertile segments with the sori borne between the margin and the costa on the under-surface; leaves, in most of the species including all those treated here, with scales, these especially long and prominent at the base of the petiole, hairs sometimes also present; pith of the petiole mucilaginous. CYATHEACEAE. e.

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[1] 2: 327-361. *pl. 9-15.* 1956.

e. Indusium absent or represented by several appressed, fimbriate scales. ALSOPHILA. f.

f. Leaf tissue coriaceous; blade without small, red squamules. g.

g. Basal portion of the petiole green or partly brownish when fresh, drying to tan or brown, with scales of two different kinds; scales on the under-surface of the pinnule-rachises and costae more or less flat. h.

h. Broad scales at the base of the petiole smoky white, usually with a small brown patch at the very base; scales on the under-surface of the pinnule-rachises and costae usually thickened, tan to yellow or reddish brown, the central portion linear, the margins usually with short spinules of the same color, sometimes with thin, whitish spinules *(Fig. 1)* ..... *A. Cooperi*

h. Broad scales at the base of the petiole light brown to yellowish brown, the basal portion darker; scales on the under-surface of the pinnule-rachises and costae thin, whitish, the central portion ovate to linear, the margins with long, slender spinules, some of them sometimes red *(Fig. 2)* ..... *A. excelsa*

g. Basal portion of the petiole brownish, with nearly uniform brown scales; bullate scales on the under-surface of the pinnule-rachises and costae *(Fig. 3)* ..... *A. australis*

f. Leaf tissue thin-herbaceous; blade with small red, stellate squamules especially evident on the rachises and costae *(Fig. 5)* ..... *A. Colensoi*

e. Indusium present, very thin, cellophane-like to membranous-papyraceous, usually globular, wholly enclosing the young sporangia and later splitting into two to several segments, or saucer-shaped, or hemispherical and partially enclosing the sorus. i.

i. Indusium hemispherical, enclosing only the proximal face of the sorus; rachises with small, red, stellate squamules (as in *Fig.* 5) ..... *Hemitelia Smithii*

i. Indusium globular (or slightly open on the distal face) to saucer-shaped. CYATHEA. j.

j. Pinnules not articulate; petiole smooth to strongly muricate with stout rounded or pointed processes. k.

k. Scales at the base of the petiole of two different kinds; pinna- and pinnule-rachises only scaly beneath, the scales stellate or much dissected. l.

l. Petiole base thick (in large leaves), black, smooth; leaf tissue coriaceous; all scales on the under-surface of the pinnule-rachises and costae whitish, the central portion lustrous, the margins with long spinules, some of the red *(Fig. 7)* ... *C. medullaris*

l. Petiole base slender, dark brown to atropurpureous, muricate; leaf tissue thin-herbaceous; predominant scales on the under-surface of the pinnule-rachises and costae fawn to tan colored, stellate or much dissected, often giving the appearance of a tomentum *(Fig. 8)* ..... *C. Cunninghamii*

k. Scales at the base of the petiole uniform; pinna- and pinnule-rachises pubescent beneath, also often with more or less entire, usually bullate scales. m.

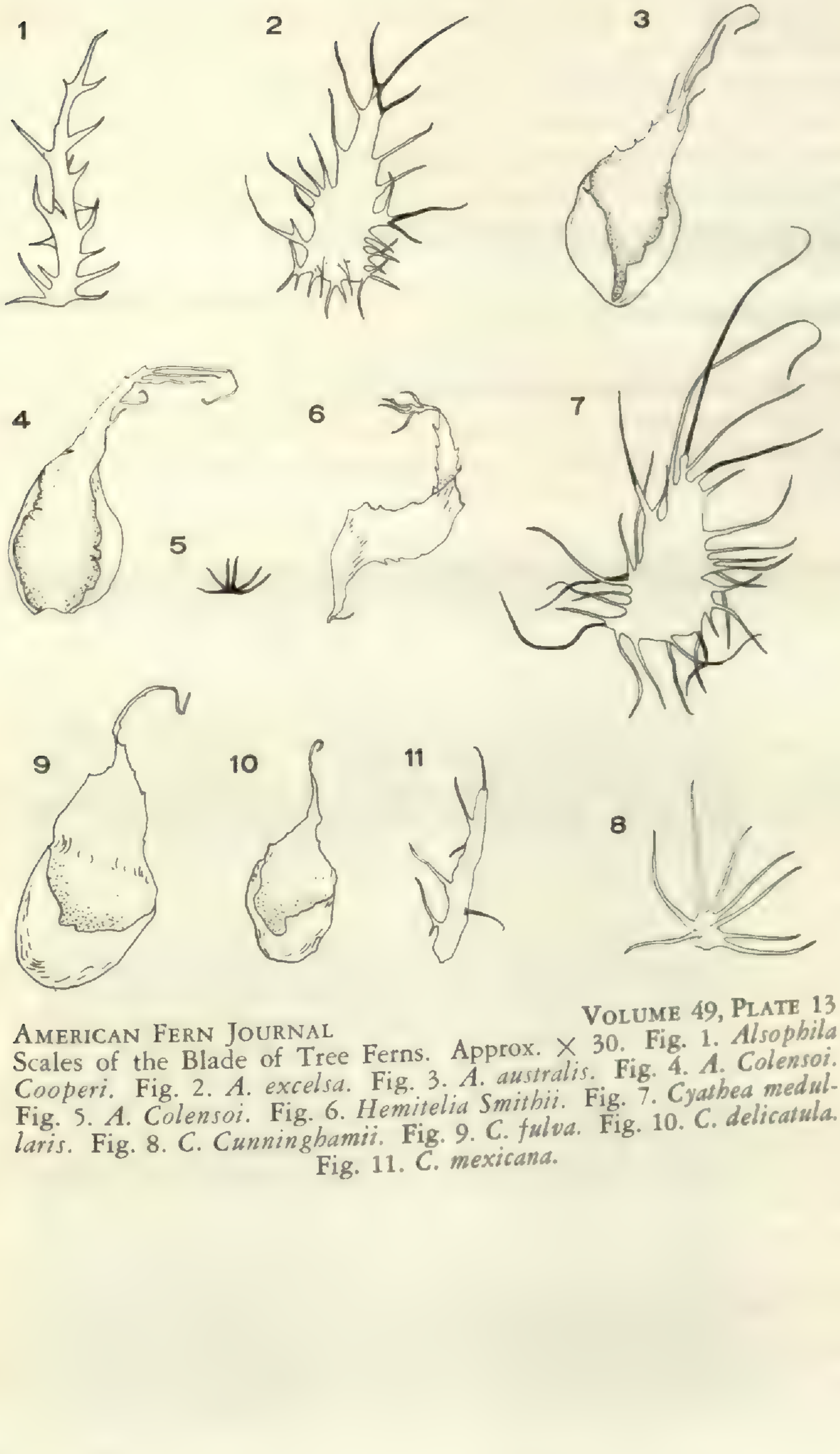
m. Blade white-ceraceous beneath; pinnule-rachises yellowish villous beneath, with few or no scales. ..... *C. dealbata*

m. Blades green beneath; pinnule-rachises strigose to puberlent beneath; also with bullate scales. n.

n. Pinnules of the longer pinnae 1.5-2.0 cm. broad, those of the upper pinnae about 1.5 cm. broad. ..... *C. fulva*

n. Pinnules of the longer pinnae about 1 cm. broad, those of the upper pinnae less than 1 cm. broad. ..... *C. delicatula*

j. Pinnules articulate; petiole with sharp spine-like processes; pinnule-rachises sparingly pubescent beneath and with flat, whitish scales with dark marginal spinules *(Fig. 11)* *C. mexicana*.



AMERICAN FERN JOURNAL VOLUME 49, PLATE 13

Scales of the Blade of Tree Ferns. Approx. × 30. Fig. 1. *Alsophila Cooperi*. Fig. 2. *A. excelsa*. Fig. 3. *A. australis*. Fig. 4. *A. Colensoi*. Fig. 5. *A. Colensoi*. Fig. 6. *Hemitelia Smithii*. Fig. 7. *Cyathea medullaris*. Fig. 8. *C. Cunninghamii*. Fig. 9. *C. fulva*. Fig. 10. *C. delicatula*. Fig. 11. *C. mexicana*.

DICKSONIACEAE

DICKSONIA L'HERITIER, SERTUM ANGLICUM 30. 1788

DICKSONIA ANTARCTICA Labill. Nov. Holl. Pl. Spec. 2: 100, *t. 249*. 1806. Tasmanian Dicksonia.

This species and *D. fibrosa* are not readily distinguished but it seems best to maintain them until a thorough study of the species in their native habitat is made. The characters presented in the key are not always correlated and occasional specimens will be difficult to identify. Leaves of young plants and small leaves of older ones are usually impossible to determine. However, all of the cultivated material we have examined was easily determined when the specimens were adequate. Splendid plants up to 12 feet in height, having a crown of 25 or more leaves up to 10 feet long, occur in a grove near Rhododendron Dell along the Main Drive in Golden Gate Park. Among a hundred or more specimens in the park we noted a single plant with an offshoot at the base of the trunk.

Native of Australia and Tasmania.

DICKSONIA FIBROSA Colenso, Tasm. Journ. 2: 179. 1844. Woolly Tree Fern.

The problem of distinguishing this from the previous species has been discussed. We have observed that in cultivated plants the trunks of *D. fibrosa* are generally shorter (the tallest we have seen was 7 feet) and the leaves are also shorter than those of *D. antarctica*. The two species grow together in Golden Gate Park and there plants of *D. fibrosa* may have somewhat stiffer, more erect fronds.

Native of New Zealand.

DICKSONIA SQUARROSA (Forst.) Swartz in Schrad. Journ. **1800**[2]: 90. 1801. Slender or Rough Tree Fern.

Trichomanes squarrosum Forst. Fl. Ins. Prod. 86. 1786.

The long, appressed, leaf-bases give the slender trunks a unique fluted appearance. The two previous species have relatively stouter, unfluted trunks although the leaf-bases are also persistent. Stolons are reported in native plants of this species but we have not observed them in the cultivated plants; rather, they produce offshoots at or somewhat above the base of the trunk. The leaves are often about half as long as those of *D. antarctica* and *D. fibrosa*. There is a handsome grove of these in Delavega Dell in Golden Gate Park with specimens 10 feet tall.

Native of New Zealand.

CYATHEACEAE

ALSOPHILA R. BR. PROD. FL. NOV. HOLL. 158. 1810

ALSOPHILA AUSTRALIS R. Br. Prod. Fl. Nov. Holl. 158. 1810. Australian Tree Fern.

Cyathea australis (R. Br.) Domin, Pterid. 262. 1929.

We do not know of this species cultivated out-of-doors, but it is included because it is commonly confused with *Alsophila Cooperi*. It may be identified by the brownish, muricate petiole-base bearing nearly uniform, bright brown scales, the bullate scales on the under-surface of the pinnule-rachises and costae, and the absence of squamules on the leaves.

Native of Australia and Tasmania.

ALSOPHILA COLENSOI Hook. f. Fl. N. Zeal. 2: 8, *t. 73*. 1854. Creeping Tree Fern.

Cyathea Colensoi (Hook. f.) Domin, Pterid. 262. 1929.

We have not seen living plants of this species although there are specimens documenting its former occurrence in the Strybing Arboretum and the La Fleur Nursery. Native

plants are reported to have prostrate trunks although the apex may be erect and up to 5 feet tall. It resembles *Hemitelia Smithii* in having copious small, red, stellate squamules on the leaves; these are particularly evident on the rachises and costae. The two species are clearly distinct when fertile, for the indusium in *H. Smithii* is conspicuous and hemispherical in form whereas it is absent in *A. Colensoi.* Sterile specimens of *A. Colensoi* may be identified by the following characters: The whitish or tan to light brown scales of the stipe, the bullate or subbullate scales on the pinnule-rachises and costae *(Fig. 4)*, and the simple veins of the ultimate segments. *Hemitelia Smithii* is characterized by dark brown stipe scales, flat or twisted scales on the pinnule-rachises and costae *(Fig. 6)*, and forked veins of the ultimate segments, at least near the base of the segments.

Native of New Zealand.

ALSOPHILA COOPERI Hook. ex F. Muell. Fragm. Phyt. Aust. **5**: 117. 1866. Cooper's Tree Fern.

Cyathea Cooperi (Hook. ex F. Muell.) Domin, Pterid. 262. 1929.

This is probably the most frequent and successfully cultivated species of the tree ferns. It is grown both in Florida and California where we have seen specimens up to 12 feet tall; it is reported to reach three times that height in Australia. Unfortunately this species has been widely distributed under the name of *A. australis;* probably most of these cultivated specimens are properly referred to *A. Cooperi.* In Los Angeles a vigorous strain of this species grown by Mrs. Fay MacFadden and A. W. Roberts has been descriptively

Alsophila cooperi Hook. *(A. australis)*
Photo: G. Hampfler, Longwood Gardens

called Robust Tree Fern. The species is closely allied to *A. excelsa;* these two are clearly distinct from other species in having narrow, reddish scales among broader whitish to yellowish brown ones at the base of the petiole. Both kinds of scales have spinescent-serrate margins. Intermediate forms of scales occur. The species are also characterized and particularly distinct from *A. australis* by the early dehiscence of the petioles, which leave clean, oval leaf-scars on the trunk.

Naive of Australia.

ALSOPHILA EXCELSA R. Br. ex Endl. Prod. Fl. Norfolk. 16. 1833. Norfolk Island Tree Fern.

Cyathea Brownii Domin, Pterid. 262. 1929, not *Cyathea excelsa* Swartz, 1801.

This species is quite close to *A. Cooperi.* The characters by which we separate the two in the key are large adapted from the work of Miss Tindale on the Australian Cyatheaceae. It is rare in cultivation and we have seen only two living plants in Golden Gate Park, the largest of which was 22 feet tall.

Native of Norfolk Island.

CYATHEA J. E. SMITH, MÉM. ACAD. TURIN 5: 416. 1793

CYATHEA CUNNINGHAMII Hook. f. ex Hook. Icones Pl. 10: *t. 985* & text. 1854. Gully Fern.

This is apparently rare in cultivation for we found record of it only at the Strybing Arboretum where there is a single plant having a slender trunk 13 feet in height. The blade of the leaf is of a thin texture and the petiole has scales of two kinds, both having delicate margins which erode. The scales of the blade and axes are stellate in form somewhat resembling those of *Alsophila Colensoi* and *Hemitelia Smithii* but are mostly larger and tan to brown. Some unusual scales may be found on the costules among the sori, of a color and texture similar to the indusium, but subbullate in form and with a reddish brown, stellate apex.

Native to Australia, Tasmania and New Zealand.

CYATHEA DEALBATA (Forst.) Swartz in Schrad. Journ. 1800[2]: 94. 1801. Silver King, Silver Tree Fern.

Polypodium dealbatum Forst. F. Ins. Prod. 83. 1786.

The white, waxy covering on the under-surface of the leaves, which may extend to the rachis and petiole, is distinctive of the species, although it is sometimes absent or poorly developed. Roberts' Nursery has young plants and there are specimens recording it from the Huntington Botanic Garden.

Native of New Zealand.

CYATHEA DELICATULA Maxon, Contrib. U.S. Nat. Herb. 13: 4. 1909.

This and the following two Mexican species were introduced into cultivation by the late Frank Montoya at the La Fleur Nursery in Los Angeles and were originally called *Alsophila armata.* Unfortunately, they have not proved to be as adaptable to cultivation as the Australian or New Zealand species and only a few have survived. Herbarium specimens have been preserved of these species and it is largely from these that we have identified the remaining plants.

The pinnules and ultimate segments in this species are shorter and narrower than those of *C. fulva,* giving a more delicate aspect to the leaf.

Native of Guatemala and Mexico.

CYATHEA FULVA (Mart. & Gal.) Fée, Mém. Fam. Foug. **9**: 34. 1857.

Alsophila fulva Mart. & Gal. Mém. Acad. Brux. **15**: 78, *t. 23*. 1843.

As indicated in the previous discussion this species resembles *C. delicatula*. Both have many bullate scales on the costae, although in this species *(Fig. 9)* they may be twice as large as in *C. delicatula (Fig. 10)*. The indusium, completely enclosing the sorus in both species, is a remarkable, iridescent, cellophane-like tissue. There is a plant in the garden of Dr. W. C. Drummond.

Native of Mexico.

CYATHEA MEXICANA Schlecht. & Cham. Linnaea **5**: 616. 1830.

This species is quite unlike the two previously mentioned Mexican tree ferns in having blackish spines on the petiole and in having the scales of the blade flat, whitish, and with marginal spinules some of which are red *(Fig. 11)*. The pinnules are articulate, leaving clean scars on the pinna-rachises. There are plants in the garden of Dr. W. C. Drummond and at Roberts' Nursery.

Native of Mexico.

CYATHEA MEDULLARIS (Forst.) Swartz in Schrad. Journ. **1800**[2]: 94. 1801. Black Tree Fern.

Polypodium medullare Forst. Plant. Esculent. 74. 1786; Fl. Ins. Prod. 82. 1786.

This is the largest and most impressive of the tree ferns in cultivation. There is a splendid colony of them bordering the Lily Pond in Golden Gate Park, with specimens 25 feet tall or more, and with leaves up to 16 feet long. The petioles of young plants may be greenish, rather than black, and new leaves on older plants may have the petioles greenish on the upper side. The black petiole becomes brown when the leaves are dried at a high temperature. The scales of the stipe base are of two kinds, both having spinescent-serrate margins. The scales of the pinnule-rachises and costae are remarkably beautiful under magnification. The central portion is glistening white with a border of attenuated marginal spinules, some of which are red. Dr. R. C. Cooper gives an account[2] of the decorative pieces called Ponga Ware that are prepared from the trunks of this species and also mentions the former use as food of the pulp in the center of the trunk by the native Maori.

Native of New Zealand.

HEMITELIA *R.* BR. PROD. FL. NOV. HOLL. 158. 1810

HEMITELIA SMITHII (Hook. f.) Hook. in Hook. & Bak. Syn. Fil. 31. 1865. Soft Tree Fern.

Cyathea Smithii Hook. f. Fl. N. Zeal. **2**: 8, *t. 72*. 1854.

The fertile leaves easily distinguish the species but sterile material poses more difficulty because of similarities with *Alsophila Colensoi*. The matter is discussed in the treatment of that species. We have seen only a small, sterile, living plant of *H. Smithii* in the Strybing Arboretum, which has leaves of an unusually thin texture.

Native of New Zealand.

GRAY HERBARIUM, HARVARD UNIVERSITY, CAMBRIDGE, MASS.

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[2] This JOURNAL, 47: 89-91. 1957.

HORTICULTURE

The Native Plants of California

THE VALLEY OAK

PERCY C. EVERETT

"WE ENTERED A COUNTRY I little expected to find in this region. For about twenty miles it could only be compared to a park. . . . The underwood, that had probably attended its early growth, had the appearance of having been cleared away, and had left the stately lords of the forest in complete possession of the soil, which was covered with luxuriant herbage, and diversified with pleasing eminences and valleys; which with the range of lofty rugged mountains that bounded the prospect, required only to be adorned with the neat habitations of an industrious people, to produce a scene not inferior to the most studied effect of taste in the disposal of grounds."

This passage from Captain George Vancouver's journal, describing his impressions while exploring California in the early 1790's, is a characteristic expression of the surprise many explorers experienced when they first beheld the oak-covered central California valleys. The records of the first early coastal expeditions led one to believe all of California was very much a dry, desert land, lacking in forests. Needless to say, the vast park-like vistas of our many kinds of oaks are one of the chief charms of our state. And, without a doubt, the species that excited the most comment was the Valley Oak (*Quercus lobata* Neé). Many famous early-day explorers of our land, such as Vancouver, Fremont, Bolander, Newberry, Brewer and others, all expressed their admiration for the regal beauty of this native oak.

In the course of our duties, it is necessary to collect California plant materials in all parts of the state, at all times of the year. We are envied by many for these opportunities, but the trips are arduous, to say the least. However, there are many compensations, not the least of which is to behold at first hand the ever changing beauty of our land. We are particularly glad when our trips take us through the Great Valley where from the southernmost portion, reaching in many directions, to the uppermost parts of the Sacramento Valley, we are able to observe the Valley Oak. In my opinion, the Valley Oak and the Coast Live Oak (*Quercus agrifolia* Neé) share equal honors, each in its own way, for being the stateliest and noblest of all the native California trees.

In planning a trip last October, we found we needed acorns of the Valley Oak for providing additional trees to our plantings. It had long been the desire of the writer to visit the great "Sir Joseph Hooker Oak" in Chico. What better excuse could one have for the fulfillment of such a wish? In due time we arrived at the scene. To observe this beautiful specimen at first hand, surrounded on all sides by hundreds of others of nearly equal size; to stand in awe of its magnificent proportions; to pick up pounds of acorns from under the mammoth boughs that sweep down to the earth as if to give support and rest to the great bulk; and to stand in its shade with Ed Price of the Davey Tree Surgery Co. and learn about some of the problems of keeping it strong and well, was indeed a wonderful experience. All of this, and my personal admiration for the species, prompted the writing of this article.

In 1877, Sir Joseph Hooker, noted English botanist and long time Director of the Royal Botanic Garden at Kew, England, at the invitation of General John Bidwell, owner of large land holdings and founder of Chico, inspected the oak in company with Asa Gray, famous American botanist. At the time, Hooker pronounced it the largest oak in the world, though we know now it is not. Little did he realize that some day it would

"Sir Joseph Hooker Oak", Bidwell Park, Chico, California.
Photo: P. C. Everett

bear his name, and I'm sure he would be proud of the privilege of having such a noble specimen do homage to his memory. A plaque, attached to a heavy column of cement used to support one of the massive limbs, states the tree is 93 feet tall (it has been reported as 101 and 110 feet); the spread north to south is 153 feet; the largest south branch is 105 feet long; the circumference of the outside branches is 446 feet; the circumference of the trunk, 8 feet above ground level, is 29 feet; and it has been calculated that nearly 8000 people, allowing 2 square feet per person, could stand in its shade. The estimated age is said to be 1000 years; however, numerous studies conducted many years ago by the late Dr. Willis Linn Jepson, noted California botanist, proved there are few, if any, trees of the Valley Oak over 500 years old.

The "Sir Joseph Hooker Oak" is protected for all time against human encroachment by the fact that in 1905 and 1911, General Bidwell and Mrs. Annie E. K. Bidwell granted to the city of Chico 2400 acres for a park, making it the second largest municipal park in the United States. This park is noted for the many huge specimens of Sycamore and Valley Oak, besides making a splendid recreational area. The great value of the "Sir Joseph Hooker Oak" is fully appreciated by the city of Chico, and every attempt is being made to keep it in good health.

It is only natural that such a long-lived species should produce trees of enormous size and historical interest, since it grows best where man flourishes, too. The famous "Forty-

niner's Tree" in Big Oak Flat was probably the first of the Valley Oak to attract attention. It was said to have a trunk diameter of over 11 feet, and was so venerated by the gold seekers that they passed a camp ordinance to protect it. However, it is said they themselves caused its demise, when sluicing operations above caused the land to slip and carry the huge tree along with it.

Other notable specimens of great size are the "Henley Oak," in Round Valley, Mendocino County, and the "Ward Oak," near Visalia, Tulare County. A tree in Priests Valley, San Benito County, is said to have a trunk circumference of over 36 feet. It is agreed by everyone that the "Henley Oak" is the largest of the Valley Oak specimens, though the good people of Chico claim the "Sir Joseph Hooker Oak" is the biggest. It little matters which is the biggest, except that it serves as a guide to know where such worthy specimens are located, and to make every attempt to preserve them. We are losing our heritage fast enough, and all we can do to preserve these native monarchs for posterity will all be for the good.

It is not uncommon for this species of oak to reach 100 feet in height and to assume huge proportions. This is brought about by the fact that it almost entirely inhabits the deep, rich alluvial soils of our inland valleys. It appreciates great quantities of winter and spring rain, and with a water table not less than forty or fifty feet below the ground surface. The lowering of the water table in many areas has been most detrimental to their continued healthy condition. Never is the species found growing naturally near the immediate coast, there being always a mountain range separating it from the direct ocean breezes. Altitudinally, it chiefly is found between 10 and 1400 feet, but may range to 2700 feet in the northern half of its distribution to 4500 feet in the southern portion, and from the San Fernando Valley (a few specimens are said to extend as far as Pasadena) in southern California northward to the Trinity River and Shasta County in the Sacramento Valley.

Best known as the Valley Oak, indicative of its natural habitat, *Quercus lobata* is often called the California White Oak, the Weeping Oak (for its long, pendulous branches), and Roble by the Spanish-Californians who may have thought it was indeed the oak of their native homeland. In many ways, it may be compared to the eastern White Oak in the light green leaves and light gray bark, or even more distantly related to the beautiful Norman or English Oak *(Quercus Robur)*. Captain Vancouver, while exploring the Santa Clara Valley in 1796, recorded that he thought it (the valley) had been "planted with the true Old English Oak."

A general description of the tree is: commonly 50 to 75 feet tall, but not rarely 100 feet; its great crown, in typical form, is broader than high. The long, tortuous branches sweep down to the ground in pendulous, whip-like branchlets. The trunk ranges from 2 to 8 or even 10 feet in diameter, the bark being light gray and divided into cuboid or rectangular plates, 1 to 2 inches across, and split almost to the wood. The leaves are usually 3 to 4 inches long, 2 to 3 inches broad, green above, paler beneath. The lobing is deep, with very few, if any, teeth. The acorn is long and cartridge-like, inserted in a moderately deep, warty, drab brown cup, and is at first bright green, later shading into a mahogany or rich chestnut-brown. Huge crops of acorns are often produced; as much as 2000 pounds in one season can be gathered from the largest specimens. The California Indians relished them, as indicated by the following information noted by Fremont, in his famed Second Expedition of 1844, when he found "an Indian village, consisting of two or three huts; we had come upon them suddenly, and the people had evidently just run off. Their huts were low and slight, made like bee-hives in a picture, five or six feet high, and near each was a crate, formed of interlaced branches and grass, in size and shape like a very large hogshead. Each of these contained from six to nine bushels. These

Quercus lobata Neé, showing close-up of bark and trunk on tree near Atascadero, California.
Photo: C. B. Wolf, 1930

were filled with the long acorns already mentioned, and in the huts were several neatly made baskets, containing quantities of the acorns roasted. They were sweet and agreeably flavored, and we supplied ourselves with about half a bushel, leaving one of our shirts, a handkerchief, and some smaller articles in exchange."

In contrast to this, the hard wood of the Valley Oak is of little importance, being quite brittle, and it was and is now used for firewood. For this reason, the rather derisive common name "Mush Oak" was applied to this tree by the early settlers. The trees are favorites of the woodpeckers, wild pigeons, crows and magpies. Perhaps it is a blessing that commercially this oak is of no value; otherwise it would have been destroyed long ago and much of our rich heritage would have been lost forever.

Horticulturally, the oaks have never been very popular, except for specimen trees in parks and large estates. One reason for this may be the erroneous opinion held by so many people that they are all too slow growing. True, many fine species are rather slow, but there are numerous species that can be grown to quite good size within a few years. Our Valley Oak is among those attaining heights of 30 to 40 feet within a matter of 20 or 30 years. Their culture is not difficult, needing only a few acorns which can be planted directly into the desired location or started in seed beds so as not to hamper the roots. When dormant, they can be readily transplanted bare root within a year. At the old Botanic Garden site, most of our Valley Oaks were nearly 20 years from seed, and though the conditions were not particularly favorable, we had many fine specimens to 40 feet tall. It is well to note that this species holds its foliage until nearly December (depending somewhat on the season), and while it has been said there is little or no fall color produced, we always noted a very lovely soft gold each year. In late spring, the young grayish-pink foliage casts a most enchanting haze over the whole countryside, and it is then our Valley Oak, and other deciduous species too, come into their own. During the

hot, dry summer months, the filtering shade is most welcome, a fact noted by so many early California travelers, and to this day they provide a canopy for many a farm dwelling, and are preserved by cattle raisers for protecting the animals from the furnace-like summer heat.

Jepson pointed out in his "Silva of California" that the Valley Oak has four marked stages of growth in its life history. The pole stage is first, strictly erect trees 10 to 20 feet tall. Then follows the elm stage, trees assuming a vase-like shape, 30 to 60 years old, and 30 to 45 feet tall. Maturity is reached when they take on their normal aspect of the weeping stage, 100 to 300 years old, 50 to 100 feet or more high, and showing a very broad crown of tortuous branches and weeping sprays. The last stage is second youth, old trees that have lost their main branching system, through storm or disease, and as a last burst of strength, produce a growth of ascending branches, frequently irregular in outline and often broken topped.

The first specimens of *Quercus lobata* were collected in the Monterey region in 1792 by Señors Robredo and Esquerra, Spanish naval officers of the Malaspina Expedition. According to early British authorities, the species was introduced into Britain by Mr. Bolander in 1874, and possibly earlier. And there, it is reported, the tree has little to recommend it, being slow of growth and not striking in foliage. Undoubtedly, this fact is due to the coolness of the climate, because this species must have heat as well as deep, rich soil, to do its best. For that reason, it would seem to be an interesting and very useful tree for our hot, interior valleys. So far as we know, it is not more readily subject to diseases than many of our most commonly grown trees. Where planted too near the coast, mildew will often attack the new growth, and among some of the older trees where conditions are least favorable, the leaves are attacked by anthracnose. Rot may take its toll in mutilated or improperly pruned trees. The most serious disease is the oak root fungus, common to many of our oaks, and for which it is a host. This alone might cause some hesitancy about planting it. However, let us fully enjoy while we may the many natural park-like groves, and whenever and wherever possible, preserve these giants that add so much to California's beauty.

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COVER

Introducing the "new" look of the Administration Building at Rancho Santa Ana Botanic Garden, Claremont, California. The new wing, far right, adds 7000 square feet of space. Photo: Paul Kennedy.

Mr. Robert Casamajor examining a few of the 650 framed lithographs of orchids from the Louis M. Boyle collection, which he was instrumental in obtaining for the Arboretum.

Robert Casamajor

THE CALIFORNIA ARBORETUM FOUNDATION has suffered a great loss in the death of its president, Robert Casamajor, on February 19, 1960. Mr. Casamajor was born in Brooklyn, N. Y. in 1885 and had lived in Pasadena for many years. A business man with a deep interest in horticulture, he carried his hobby of collecting and growing orchids to a high state of perfection. Among his horticultural activities, he had served as President of the Pasadena Flower Show Association, was President of the Southern

California Horticultural Institute for three years, was a member of the Men's Garden Club of Los Angeles, and was one of the founders of the Los Angeles State and County Arboretum. He had served as President of the California Arboretum Foundation as well as President of the Board of Governors of the Department of Arboreta and Botanic Gardens of Los Angeles County during the past year.

During the past several years, while acting as chairman of the Orchid Committee of the California Arboretum Foundation, Mr. Casamajor was instrumental in establishing an outstanding orchid collection at the Arboretum and in making the Arboretum the Southern California headquarters for those interested in orchids.

The Arboretum is indebted to Mr. Casamajor for facilitating the acquisition of the antique Mexican tiles in the entrance foyer which were so generously donated by Dr. and Mrs. Richard S. Harrison.

It was also through Mr. Casamajor's alertness that the Arboretum was able to acquire the valuable collection of orchid lithographs.

Mrs. Casamajor, other members of his family and his many friends must take great pride in knowing that Southern California is a more beautiful place because he lived here.

SAMUEL AYRES, JR., M.D.

Best of show—This beautiful cymbidium, entered in the Second Annual Orchid Show staged at the Los Angeles State and County Arboretum, Arcadia, was awarded the "Best of Show." This is the Cymbidium Cleo Sherman cultivar Memoria Robert Casamajor. From Independent Star-News.

Rancho Santa Ana Botanic Garden

PERCY C. EVERETT

SINCE THE GARDEN MOVED to Claremont some eight years ago, rapid progress has been made in the development of the general plantings and several specialized areas such as Rock Garden, Desert Garden, Desert Sand Dune, Coastal Sand Dune, Historical Garden, and Plant Communities. An average of 15,000 plants have been added each year. To cope with the very important and expanding scientific activities, it has been necessary to make several additions to the physical plant, and to change the hours when the Garden is open to the public.

The most important project was the completion of a reinforced concrete, completely air conditioned, two story wing on the east end of the Administration Building, adding over 7000 square feet. This extra space provides much needed room for the rapidly growing herbarium; several separate study rooms and a laboratory for the graduate students; a 100-capacity assembly hall for seminars and for public use; as well as storage space for supplies and publications. Louvers were installed across the windows on the front of the entire building, in keeping with the design of the new addition; air conditioning was installed for the library, and a new coat of paint was applied to the entire building.

To beautify the main entrance to the Garden, a handsome new gateway was constructed of native rock and redwood, providing an approach of dignity and beauty. A

New main entrance gateway, constructed of native rock and redwood. Photo: Paul Kennedy

The Library with Mrs. Munz, librarian. Photo: Paul Kennedy

new restroom was built at the north end of Indian Hill mesa. To take care of increased nursery activity, a 10′ x 40′ section was added to the aluminum lath house.

It is of interest to all of our many friends and potential visitors that the Garden is now open to the public every day of the year to 5 p.m., except on four holidays, New Year's Day, Fourth of July, Thanksgiving, and Christmas. Advance reservations for guide service may be made for every day except Saturday and Sunday. Attendants will be on the grounds on Saturday and Sunday for those seeking information and other help. Colored post cards of Garden scenes and various publications on California native plants may be purchased at the Garden. The Botanic Garden is located about two blocks north of Foothill Boulevard (Highway #66) in Claremont.

PLANS REVEALED FOR U. S. EXHIBIT AT 1960 FLORIADE

New Aspect of America to be shown abroad for first time

The "garden variety" American way of life will be demonstrated abroad for the first time. With the opening March 25th in Rotterdam of the U. S. Exhibition at the 1960 Floriade, an aspect of America will be revealed that is almost unknown to the people in other lands.

The family garden will be planted to bloom throughout the entire six month Floriade and landscaping will include evergreens, cherry and redwood trees.

Co-sponsors of the U. S. display, which will cover three-and-one-half acres, are the Foreign Agricultural Service of the U. S. Department of Agriculture and the American Horticultural Council. The Council, which has been working for nearly a year to obtain materials and organize the exhibits, is representing amateur, professional and commercial horticultural organizations of the nation, as well as private citizens interested in horticulture.

Mrs. Lee Wray Turner

Mrs. Lee Wray Turner

Executive Secretary, California Arboretum Foundation, Inc.

ON MARCH 31, 1960 MRS. LEE WRAY TURNER retired as the Executive Secretary of the California Arboretum Foundation, Inc. She was the first to hold this office, which was created in April, 1955.

Previous to joining the Foundation, Mrs. Turner was the Director of Film Location Bureau for the Assistance League of Southern California. Through her efforts of manag-

ing private properties for motion picture locations, funds received from the major studios for the privilege of using the Arboretum contributed substantially to the early success of the Foundation's program.

Under her direction, the membership of the Foundation tripled in number during her five year term of office.

Mrs. Turner was instrumental in promoting such financial aids to the Foundation as the sale of peacock feathers, feeders for ducks and other bird life, colored picture postcards of Arboretum views, Kodachrome transparencies, certain horticultural publications and herb charts and recipe booklets.

Yearly, at least 150,000 people enjoy riding the famous "Jeep Train". This was possibly one of Mrs. Turner's most important supervisorial responsibilities.

By choice, Mrs. Turner wished always to remain in the background at any meeting or gathering of the Foundation membership. However, her sparkling blue eyes and captivating ready smile, never failed to draw the members and brightened any function she attended. She will be remembered by all of us in her role of a charming and interested hostess.

Although she will not be in the office, she will continue to be associated with the Foundation in a very active manner on a volunteer basis.

The Board of Trustees of the Foundation, during their regular March dinner meeting, paid honor to Mrs. Turner, expressing their sincere thanks for her many accomplishments in the name of the Foundation.

To Lee, we wish the best of luck and happiness in the years to come and tender her a most heart felt 'au revoir'.

BOOK REVIEW

Le Monde des Plantes, by Fernand Seguin and Auray Blain. 186 pp. Illustrated with colored frontispiece, 2 colored maps, 6 color plates and 467 color photographs. Published by Centre de Psychologie et de Pédágogie, 8225 boulevard Saint-Laurent, Montreal 11, P. Q., Canada. 1959. $2.75, plus postage.

It is rare that an elementary textbook is deserving of review and that a text of any kind is of general interest. However, this little volume, written for eighth and ninth grade classes in Botany, makes the conventional book drab and uninteresting in contrast. Over four hundred of the almost five hundred plates are excellent reproductions in color of original kodachromes taken largely at the Montreal Botanic Garden by Dr. Blain, staff cytologist and geneticist. Only a few of the plates have suffered in reproduction and the quality of most is excellent. The plates are arranged to illustrate the parts of a plant, and the common plants in several families and major groups of the plant kingdom. Colored charts are used where photographs would not be effective. The whole format of the book shows the experience of both authors in popularizing the sciences in movies, radio and television. They are to be congratulated on another successful production.

Le Monde des Plantes is a book which pleases the eye, attracts the reader and should be a pleasure for the beginning student. If you have a child learning French here is an easy-to-read book which will give him Botany as well. If you are a green-thumber needing some elementary information on plants attractively presented this book will prove a useful addition to your library. All too often our references are monotones and unattractive. This book is a model of what can be done and should provide inspiration to many a student, author and publisher. An English edition is in preparation which will give the book even wider circulation and is certain to be met with similar acclaim since it fills a long-felt need. *Le Monde des Plantes* is recommended for every reference shelf from library and schoolroom to that of the professional taxonomist, horticulturist or just plain plant-lover.

MILDRED E. MATHIAS

CALIFORNIA NATIONAL FUCHSIA SOCIETY

Annual Fuchsia Flower and Shade Plant Show, sponsored by the California National Fuchsia Society, will be held Saturday and Sunday, June 18 and 19, in the Long Beach Municipal Auditorium, Long Beach, California. The show will be open to the public from 2 p.m. to 10 p.m. Saturday and from 12 noon to 9 p.m. Sunday. Admission will be $1.00.

Individual garden displays will be exhibited by California National Fuchsia Society's 30 branches, extending as far north as San Luis Obispo, featuring landscaped gardens, outdoor living areas, unique ideas and natural settings. The show will be developed around the theme "Fact or Fantasy".

Garden areas by other cooperating garden clubs will feature related shade plants.

Individual entries are open to the public as well as to society members. These will include hundreds of fuchsias, fuchsia blossoms, begonias, ferns, African violets, gloxinias and bromeliads. Separate classifications will be provided for novices who have not won a ribbon or trophy in any previous show and for experienced amateurs.

Blossoms of fuchsia seedlings for future introduction, as well as recent year's choice introductions, will be on exhibit by some of California's most prominent hybridizers.

Hundreds and hundreds of fuchsia blossoms, each variety displaying its proper name and growing habits, will be on exhibit to the viewing public.

Additional displays will feature the latest in garden equipment and material for gardeners. The Southland's most prominent shade plant horticulturists and TV and radio garden personalities will be at the show to give individual advise on garden problems.

Grand introduction of the show will take place Saturday at 2 p.m. when Miss Fuchsia Queen of 1960 will cut the ribbon, thus ushering in the opening of the show officially.

Miss Fuchsia of 1960 will be officially crowned Saturday evening by Miss Betsie Gayle Davis of Inglewood, last year's queen. Thereafter the Fuchsia Queen of 1960, assisted by her two princesses, will award over 50 trophies to winners in the various classifications.

California National Fuchsia Society is a non-profit organization with a zest to stimulate interest in and the culture of fuchsias and other shade plants, and is probably the largest shade plant society of today.

HORTICULTURE

Plant Nutrients and Manures
How the Various Elements Affect Growth

H. JACKS
Massey Agricultural College, Palmerston North

Dr. Jacks, a widely known soil scientist, has prepared for the readers of *The New Zealand Gardener* a series of articles on the role of fertilizers and other nutrients in plant nutrition . . . these articles . . . provide the scientific explanation for the reactions of plants to the various fertilizers and manures.
(Reprinted from *The New Zealand Gardener* Vol. 15, No. 11 July 1, 1959 and Vol. 15, No. 12 August 1, 1959)

NO FERTILIZER recommendation can be made generally valid, as crops for which they are made are grown under different conditions, which make fertilizer treatments subject to study of soil, climatic and crop factors over a considerable period. Only then can recommendations be made for a definite soil type and district.

To obtain favorable responses to fertilizer treatment the grower must pay attention to the following:

1. Improvement of soil physical conditions (aeration, drainage, soil structure, water holding capacity) by sound methods of cultivation and by maintenance of organic matter, i.e. either by application of animal residues, compost, mulches, or by growing of green manure crops.

2. Improvement of soil reaction levels and their maintenance to suit the crop.

3. Use of balanced proportions of the main nutrients, and application of adequate amounts to ensure optimum yields under the prevailing conditions. Control of trace element deficiencies.

4. Placement of fertilizers in the most beneficial way, and use of these materials at the right time. Avoidance of materials likely to be injurious to certain crops.

5. Use of good seed of vigorous varieties selected for respective regional conditions.

6. Control of weeds, diseases and pests.

In general, although we discuss individual plant nutrients and their effects on growth, they must be considered in the light of being part of the plant as a unit. They can increase yield when acting in combination with other substances, and can depress yield when applied in excess either by being toxic to the plant or by upsetting the uptake of other elements essential for healthy plant development.

Nitrogen is associated with plant proteins, important growth processes and manufacturing and growth-promoting substances. Its lack affects the size, color and yield of crops and the length of the growing period. In excess it induces luxuriant top growth, but the root system remains ineffective to supply sufficient moisture, especially under conditions of partial drought. Spongy and weak tissues are produced in excess of strengthening tissues, and susceptibilities to the effects of climatic variations and diseases are increased. In addition, ripening is delayed and quality of produce is often depressed. When applied in combination with phosphoric acid and potash, it is instrumental in increasing yield and quality. Plants cannot absorb nitrogen from the air, where it constitutes 78 percent of the atmosphere, but this is utilized by certain groups of micro-organisms. Leguminous plants live in association with certain bacteria which supply them with nitrogen in combined form. These bacteria fix nitrogen from the air and provided soil conditions and nutrient supplies are adequate, may add up to 200 lb. of nitrogen per acre. Small amounts of nitrogen are also washed in by rain.

Nitrogen is not supplied by soil forming minerals but by the soil organic matter. The only soils rich in nitrogen are those amply supplied with organic matter, e.g. peaty soils, their nitrogen content being made available to plants by fermentation processes of soil micro-organisms. In mineral soils, nitrogen supplies are meager and they generally respond to supplementary applications. Plants take up nitrogen in the nitrate and ammonium form (urea, a compound rapidly absorbed by plants is also transformed into ammonium by an enzyme present in plant tissues). In most soils both forms have proved equally effective in plant nutrition and the availability of both forms to plants is sometimes of advantage. Under favorable conditions the ammonium form is rapidly transformed into the nitrate form by the action of micro-organisms. The maintenance of satisfactory reaction levels is important to ensure optimum conditions for the beneficial soil organisims. The ammonium form may, however, be of disadvantage where magnesium deficiency is prevalent, as ammonium restricts the uptake of magnesium, while nitrate promotes it.

Phosphorus plays an important part in the nutrition of soil organisms responsible for the transformation of organic matter, it is instrumental in the utilization of energy by plants and the formation of plant fats, it is an essential constituent of vital cell constituents and of many enzymes. Deficiences are made manifest by poor root development,

small leaves with greenish-red, reddish-brown, purple or bronze color, flowering and ripening are retarded, fruits are small.

Bacteria supplying leguminous plants and through them other plants with nitrogen, can only function when adequately supplied with phosphorous and potash. Adequate supplies should also be given for early growth (seeds or cuttings), as the plant requires a well developed root system for absorption of available soil supplies. Excess effects of phosphorous are highly exceptional. A high phosphate content of plant produce is desirable for the nutrition of man and animals. Soil supplies of this element represent a rather difficult problem. Supplies available to plants are rapidly converted into unavailable forms, especially in acid soils.

Added amounts are normally utilized by plants during the first year, a large part of additions being locked up by soil processes. By placement of phosphate in bands the locking-up process can be delayed, plants are able to use larger proportions of additions as these are exposed to lower amounts of soil than occurs under normal conditions of applications. In soils with high fixing power it is of advantage to use less easily soluble materials, e.g. serpentine super.

A proportion of soil phosphorus exists in organic combinations and becomes available to plants when organic matter is decomposed. Apart from supplying phosphorus to plants, organic matter is instrumental in delaying fixation, and mobilizing supplies from mineral matter. Unlike nitrogen, which in the nitrate form is rapidly leached out of the soil, phosphorus is not subject to leaching. Topsoil removal by surface erosion is the greatest cause of losses. Soils to which regular additions of phosphate have been made can thus be enriched to an extent of allowing reduction of applications after certain levels have been attained.

Potassium is taken up by plants in very large amounts. It is very mobile in the plant and accumulates where growth processes are most active. Deficiency symptoms are mostly discernible in older leaves. It acts on the vascular mechanism of plants, reducing the tendency to wilting, promotes the uptake and assimilation of energy giving carbondioxide from the air, the formation of sugars, fats and proteins, etc. It is corrective against excess nitrogen, contributing to hardening of supporting tissues bringing about resistance to lodging, and better quality fibre in plants grown for production of this material. It also gives better keeping qualities to fruit, and increases the resistance of plants to disease. An excess of potassium uptake may cause thick skin and delayed ripening of citrus fruit, and in all crops reduce the absorption of magnesium, thus accentuating any deficiency of this element. Potassium present in soil minerals becomes available to plants on weathering. Additions of potassium to the soil may to some extent be fixed by soil complexes and become unavailable to plants. Light soils are particularly poor in this element and small and frequent applications should be made to reduce leaching losses. Leaching losses in heavy soils are small owing to locking up processes. In soils high in lime content potassium deficiency may occur owing to antagonistic effects of these two elements. Deficiency is revealed by yellowing of tips and margins of older leaves, which may extend to the center and base of leaves. Yellow parts of leaves turn reddish-brown or brownish-grey and die off later. The rest of the leaf remains healthy and green. Deficiency symptoms may be particularly marked during drought periods.

To be continued

LASCA CALENDAR

Iris Society Flower Show—April 30 and May 1, 1960, Arboretum.
Arboretum District Flower Show—May 7 and 8, 1960, Arboretum

Antelope Valley Test Station

A Progress Report

DONALD P. WOOLLEY

The Los Angeles County Department of Arboreta and Botanic Gardens maintains a small test site in the Antelope Valley near Palmdale, California. This article presents a brief report of the plantings covering a 17 months period. The first report, published in Lasca Leaves, Autumn 1958, Vol. VIII, No. 4, covered the first 14 months of the site's establishment.

Maximum summer temperatures during the period reported, 1959, reached 107°F. Lowest winter temperature was 15°F. The plants received weekly maintenance of watering and weeding.

Performance of the plants has been tentatively and empirically rated as follows: 1—Fair; 2—Good; 3—Excellent.

GROUND COVERS	
Clematis heraclaefolia	1
Pyracantha (sport)	1
Rosemary	1
SHRUBS	
Acacia albida	1
Berberis wilsonii	1
Callistemon lanceolata	2
Callistemon salignus	3
Ceanothus crassifolius	1
Cercidium torreyanum	1
Cistus spp.	3
Cotoneaster serotina	1
Eleagnus umbellata	1
Eucalyptus erythronema	3
Eucalyptus rodantha	2
Eucalyptus rugosa	3
Fontanesia phyllyraeoides	1
Genista spp.	1
Ilex wilsoni	3
Lagerstroemia indica (dwarf)	3
Ligustrum ibolium	1
Maclura pommifera	1
Prunus pumila	1
Prunus sieboldi	1
Pyracantha spp.	1
Salvia grahami	1
Sophora davidi	1
Viburnum Opulus sterile	1
Vitex agnus castus	1
TREES	
Actinostrobus pyramidalis	1
Albizzia julibrissin rosea	2
Broussonetia papyrifera	2
Catalpa ovata	2
Chilopsis linearis	3
Cupressus stricta	2
Golden Locust 'Sunburst'	2
Liquidambar orientalis	3
Maytenus boaria	3
Parkinsonia aculeatus	1
Pawlonia lilacina	2
Pinus halepensis	2
Pinus pinea	2
Pistacia atlantica	3
Quercus acutissima	3
Quercus variabilis	3
Washingtonia filifera	2

Clianthus speciosus (Sturt Pea or Desert Pea) made excellent growth during the summer, 1959, and set an abundance of seed.

Seven new Eucalypts were tried and although they were very small, only one specimen was damaged. These will be included in the 1961 Progress Report.

Rabbits and ground squirrels continue to cause damage during the winter months.

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LASCA LEAVES

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ARBORETA AND BOTANIC GARDENS

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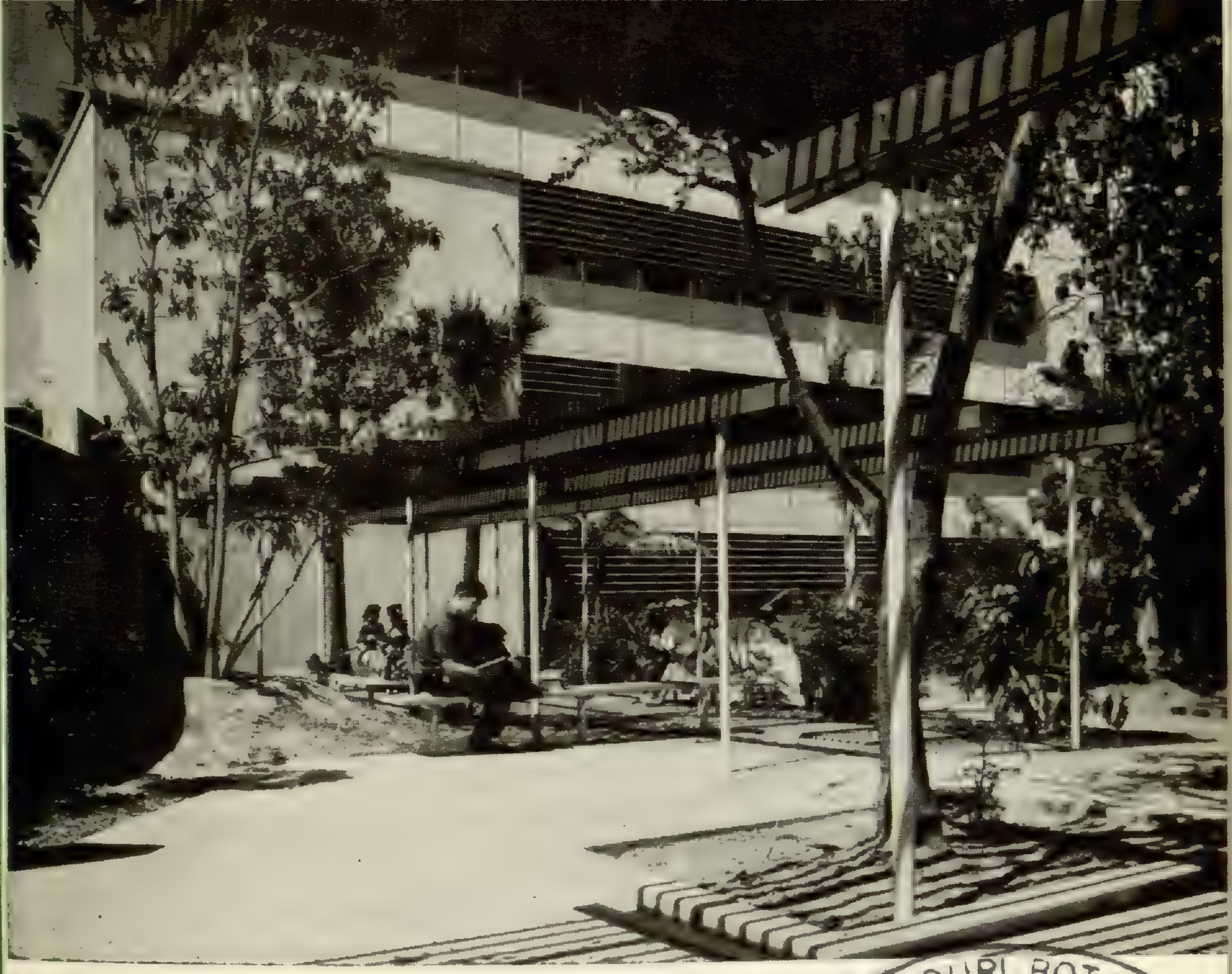

Lasca Leaves

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Botany at UCLA

LYLE PYEATT

The Department of Botany at UCLA has moved from its original quarters in the Physics Building to the new four-story Botany Building recently completed in the north end of the Botanical Garden. The increased facilities include, in addition to administrative and staff offices, eight teaching laboratories and a classroom with a total area of nearly 6000 sq. ft. and eight research laboratories with approximately the same area. Growth rooms with controlled light and temperature conditions for plants grown by students in the elementary classes provide an unusual feature. The collection of nearly 300,000 herbarium specimens, previously stored in the Plant Physiology Building, is now located in a multilevel unit within the new building. Adjacent to the herbarium are a taxonomic reference library of 1600 volumes, and ample study and work areas.

A pleasant, shaded patio at the rear of the building will be used as an informal, outdoor classroom. Landscape plantings around the new structure and in the patio have been completed by Botanical Garden personnel. Many of the accent trees, including specimens of *Phoenix roebelenii, Phoenix reclinata,* and *Livistona australis,* were formerly on the Vavra Estate.

The new building, opposite the Plant Physiology Building, brings together in one area the various fields of interest within the Department. The lower level of the Plant Physiology Building has been completed to provide several temperature and light control rooms and a research laboratory. On the upper level are two research greenhouses with a total area of 4800 ft., a teaching laboratory and a research laboratory.

The new four-story (two levels are below this view) Botany Building at UCLA. Located between the Plant Physiology Building and the Botanical Garden, this newest facility rewards the student with an unusual opportunity to study botany in the closest proximity with the many necessary tools of this science.

With the new building located on the grounds of the Botanical Garden, requirements for plant materials can now be provided more efficiently. Students may use the garden during regular class and laboratory sessions and the field and lath house are more readily accessible for research projects that require outdoor growing space.

There are 12 academic staff members in the Department of Botany, a non-academic staff of 10 and 45 graduate students. Research activities include: Taxonomy of native and ornamental plants, electron microscope studies of the cell wall, studies on photoperiodism, endogenous rhythms, mineral nutrition, virology, medical mycology, soil fungi, marine algae, plant hormones including auxins and gibberellins, and other subjects.

The Department of Botany offers opportunities of graduate study for the M.A. and Ph.D. degrees. The programs leading to these degrees are very flexible, making it possible for students to prepare for careers in teaching, research or a combination of teaching and research. In addition to the classical botanical fields of Anatomy, Morphology and Taxonomy the department includes the fields of Plant Physiology, Medical Mycology, Virology, Genetics and Evolution. This unusual breadth, which is one of the unique and desirable characteristics of botany at UCLA, will be increased with the addition of an Ecologist to the academic staff next fall.

The Botanical Garden occupies approximately eight acres along a ravine in the southeast part of the campus. A diversity of growing areas is provided ranging from aquatic to dry, exposed slopes. Plantings of special interest are succulents, palms, camellias, conifers and Australian plants, especially *Acacia* and *Eucalyptus*. Botanical Garden facilities include a lath house, a small screen house for controlled pollinations, a plot for the field growth of experimental plants and a small greenhouse for tropical plants. Classes from several departments within the University and nearby schools and colleges make use of the garden. These classes represent such diverse activities as ornithology, art and cinematography. In addition to its use in instruction the garden offers a park-like atmosphere on the busy campus. It is frequently visited by staff and patients from the adjacent Medical Center as well as by the general public. Youth groups find it an area for nature study. Nurserymen and home-owners study the many mature specimens. Guided tours may be arranged for large groups.

HORTICULTURE

The Native Plants of California

BERBERIS PIPERIANA (Abrams) McMinn

EDWARD K. BALLS

The original botanical description of *Berberis Piperiana* which appears in Phytologia (of the New York Botanical Garden) for 1933 (1.-91) under the name *Mahonia Piperiana* reads:

"Frutex erectus 2-5 dm. altus; foliolis 5-9 frequenter 7, jugo inferiore a petiole basi distante ovato 2.5-6 em. longis, dentibus 7-9 spinosis. Stems erect 2-5 dm. high; leaflets 5-9 commonly 7, the lower pair usually distant from the base of the rachis, ovate 2.5-6 cm. long, spinose-dentate, with 7-9 teeth on each margin—upper surface glossy green rather finely reticulate, the lower surface gray-green and papillate; racemes 3-7 cm. long, densely or rather loosely fascicled; berry blue-black, ellipsoid-ovoid. Usually on thinly wooded slopes Arid Transition Zone; Jackson and Josephine Counties, Oregon to Mendocino and northern Lake County, California. Type locality:

Left: *Berberis Piperiana* in flower. Right: Clusters of blue-black berries soon follow the soft yellow flowers. Flower photo: P. C. Everett, April, 1960; berry photo: E. K. Balls, May, 1960.

along Pacific Highway near the Siskiyou Summit, Jackson County, Oregon. (Abrams & Benson 10176 March 9, 1924) A fruiting specimen was collected in the same vicinity in September, 1927 (Abrams 12136)."

The note following this description states that most California botanists had referred these plants to *M. aquifolium,* but Piper showed clearly that it was not this species and placed it under *M. dictyota,* from which it is now seen to be clearly distinct.

Charles Vancouver Piper (1867-1926) for whom the plant was named, was agrologist for the U. S. Dept. of Agriculture and author of the "Flora of the State of Washington" (1906) and was the first botanist responsible for drawing attention to the differences between *B. aquifolium* and this species.

B. Piperiana is fairly common over the range given for it in the original statement. Dr. Munz, in his "A California Flora" (1959) places the distribution of the species in Mixed Evergreen Forest, Douglas Fir Forest, and Yellow Pine Forest, from Lake to Del Norte and Siskiyou counties and southern Oregon, from 3000 to 5000 ft., and extends the distribution of this species as "less common in Chaparral and Yellow Pine Forest, San Gabriel Mts. to San Diego Co. and Lower California." The flowering time is given as between March and June, but in cultivation with us plants come into flower as early as January and February, with often a slight second flowering after late rains in April or May.

It seems therefore very probable that *Berberis Piperiana* has been in cultivation for many years under the name *Mahonia aquifolium,* and could well be responsible for some of the variation reported in the latter species. It is an evident possibility that seed collectors in the region where the two species are most abundant should have collected both together before the recognition of the two species was made. In areas in northern California in Trinity, Siskiyou and Mendocino Counties, I have seen wide colonies of this species. It has often covered several hundred square yards. *B. aquifolium* is apparently rare, for in the travels over a period of eleven years with

Mr. P. C. Everett, we have not once come across native plants of *B. aquifolium* south of the Oregon border. The herbarium records here at Claremont have only two specimens of this latter species from California, one from Trinity Co. and the second from the Warner Mts. in Modoc Co. Over the border in Oregon, *B. aquifolium* is more abundant as one travels northwards.

So far as we have been able to observe the two species under conditions of cultivation in Southern California, *B. Piperiana* would appear to be the more handsome plant, with rather broader and darker-colored leaflets and stronger, reticulated veining on their upper surfaces. One single leaflet measured was 3½ inches wide by 4⅜ inches long; and leaflets of this size are not uncommon. The growth of this species is often more dense, though the stems will frequently grow taller—up to eight feet, or more. The individual racemes of flowers in *B. Piperiana* are rather longer than those of *B. aquifolium,* up to 4½ inches. The flowers are a soft yellow, similar to other species of the genus. The berries are in general larger and carried in very heavy, handsome clusters.

We have noted that in our hot, dry summer climate the leaves of *B. aquifolium* are quite subject to the attacks of leaf-miner and tend to become ragged or shabby, while this evil is much less evident with the more robust *B. Piperiana.*

W. J. Bean in his "Trees & Shrubs Hardy in the British Isles" (1929) says of *B. aquifolium,* "Few evergreen shrubs introduced from abroad have ever been so valuable in British Gardens as this . . . Raised from seed it varies to a considerable extent." This praise could undoubtedly be shared between the two species. Directly, there is little or no reference to *B. Piperiana* in the literature of horticulture as the species seems to have been overshadowed by *B. aquifolium,* or not recognized as separate from it, by collectors and growers alike.

The first attempts made by the Rancho Santa Ana Botanic Garden to grow this species were not very successful. From seed we had no germination though a number of treatments were given, such as: soaking in water and lye, burning pine needles on the planted flat, holding in the refrigerator for periods up to two and one-half months, and so on. Bare root plants brought in from the wild in 1940 established and some plants were grown from tip cuttings. While many of these grew, on the steep, east slope where they were planted, shaded by a heavy growth of pines, only six remained alive by 1948, one to two feet tall. In 1951 the remaining four were moved into cans for transfer to the new site in Claremont. Here they were planted out in an open flat area in the very rocky, decomposed granite of an old wash, and they continued to improve in condition year by year until they are now four feet tall and three feet through. They started flowering, after their move, in 1955 and fruits were borne the following year. These plants have continued to flower and fruit every year since then. While they are still not the most handsome group of this species in the garden now, their present condition would seem to suggest that in the old garden the site was too dry for the heavy competition which the roots of the rather dense planting of pines produced. The Berberis in that area were probably starved.

The first successful growing from seed was from a small quantity collected in the old garden, in Orange County, in 1949. This seed was placed in a glass jar with moist sand, closed, and kept in the refrigerator at 38° F. for somewhat over three months. The seed had started germination while in the refrigerator, before it was planted into flats. Fifty-five plants were planted out from this collection in 1953, in two different areas, and to the present time only one of these has been lost. The first planting was made in a sunny, flat area in rocky, decomposed granite, with very sharp drainage. The second went to an area of heavy clay soil with some light shade from young trees

of *Arbutus Menziesii* and *Cercis occidentalis.* This latter group is now one of the finest in the garden. While those in the open sun and sharply drained granite are somewhat less vigorous they are still excellent plants to six feet tall and five feet or more through. Both colonies have been flowering and fruiting freely since 1955 (a little over two years from seed). In the heavier soil with rather more irrigation plants are now up to eight feet tall, with a spread up to ten feet.

Other collections of seed, both from the wild and collected in the garden have been stratified either by placing them in moist sand or sphagnum moss in glass jars in the refrigerator, or later, by placing the flats in which the seed was already planted directly into the refrigerator held at a temperature of 38° to 40° F. Germination regularly takes place in approximately three months and is usually a very high percentage of the seed sown.

So far as we know, the only nursery which is offering this valuable plant is the Claremont Nurseries, on Foothill Boulevard, just west of Indian Hill Boulevard.

ALL ABOARD

On May 28, 1960, the California Aboretum Foundation, Inc., proudly displayed and put into service their new Jeep Train.

As the picture shows, the design of the Train is a complete change from the present equipment. Now visitors face forward, eliminating the squirming and turning to view points of interest "now on the right" or "now on the left" of the tram. Also, no longer is there that feeling of flying off the bench as the tram rounds a corner.

The tram trailers represent more than two years of planning by the Arboretum Staff to develop a design that would meet the Arboretum's special needs. Final working plans were made by the engineers of Weld-It Co. of Los Angeles and the fabrication of the trailers was completed by the Taylor-Dunn Manufacturing Co. of Anaheim, California.

The new equipment initiates an Arboretum Foundation plan to replace all of the older trams as funds become available. The purchase and maintenance of the new touring equipment is made possible by the generosity of the visitors who take the Arboretum tour.

HORTICULTURE

Plant Nutrients and Manures

H. JACKS
Massey Agricultural College, Palmerston North

(First half of article appeared in Lasca Leaves, Vol. X, No. 2, Spring 1960, pg. 45. It is a reprint from *The New Zealand Gardener* Vol. 15, No. 11 and Vol. 15, No 12).

Calcium is applied to the soil to bring acid soils into a pH range favorable to plants grown, to allow optimum development of microbial life and earthworm activity, and thus improve soil structure and to supply this nutrient to plants. The large amounts of lime applied to soils are mainly for improvement of physical conditions. Calcium affects water absorption in plants, protein, sugar and fat production, etc. Excess of calcium restricts the uptake of potassium, it can therefore induce deficiencies of potassium and also those of other elements, i.e. iron, zinc, copper, manganese and boron. It is not mobile in the plant and accumulates in older tissues. Deficiencies occur first in younger tissues, but symptoms (yellowing of leaf margins) tend to merge gradually into healthy tissues. Leaf margins are contorted and may show brown spotting.

Magnesium is important in the production of sugars, protein and fats, in enzyme reactions and in the formation of vitamins. It promotes absorption and translocation of phosphorus. Application of compounds containing magnesium to the soil may take some time before they are effective. Absorption of sprays through the leaves is more rapid. Uptake of this element is favorably affected by nitrate and adversely by ammonium, potassium and calcium. Deficiency symptoms first appear in the older leaves and migrate to younger leaves later in the season. Since magnesium takes part in the formation of chlorophyll, its deficiency brings about spots between leaf veins. Leaves acquire a checkered or stripey appearance. Affected areas do not die, but take on various colors, e.g. yellow, yellowish-grey, brownish-red, violet and may be shed in large numbers. Adverse effects on yield may be prevented by spraying with magnesium sulphate.

Sulphur, is essential for enzymes controlling vital plant processes. It is needed by legumes and soil micro-organisms. It is usually supplied in other fertilizer materials, e.g. superphosphate, sulphate of ammonia and potash, etc. Deficiency symptoms are similar to those of nitrogen, i.e., uniform yellowing of leaves and reduced growth.

Boron, is necessary for growth processes and absorption and translocation of substances by the conducting vessels. Its deficiency is therefore first discernible at growing points. These show curling, malformation, sunken lesions, etc. Deficiencies are more frequently observed on light soils than on heavy ones. An effective treatment is the application of borated super. or 15-30 lb. per acre of borax. Sudden droughts and excess lime accentuate boron deficiency. Excess is dangerous and revealed in injuries to older leaves and to roots.

Iron, is a key element in various processes vital to effective plant growth. Deficiency symptoms first appear on the young shoots, leaves remain small and have a pale-yellow color sometimes turning almost white. Deficiencies are more prevalent in trees and shrubs than in annual crops. Iron applied to the soil may be fixed before it can be taken up by plants, but chelated compounds (organic complexes) have given greater success. It can also be supplied by spray applications, e.g. the fungicide ferbam used for control of leaf-spots contains iron.

Manganese, like iron is necessary for plant chlorophyll, reduction of nitrates and respiration, and acts as go between (catalyst) in many other vital processes. Its deficiency occurs mainly in light soils of high pH; appears first in older leaves where areas between veins are bleached while leaf veins remain green. Potassium promotes the uptake of iron and magnanese. A single spray application of manganese sulphate with hydrated

lime prepared like Bordeaux Mixture 6:8:100, controls this deficiency for 2 to 3 years.

Copper, promotes the formation of enzymes and vitamins. Deficiency symptoms are most noticeable when water is in short supply. Leaves and twigs may turn yellow and die. Its deficiency in pastures causes serious stock diseases. Spraying with fungicides containing copper controls this deficiency. Excess soil applications must be avoided.

Zinc, typical deficiency symptoms occur in fruit trees. These show up as dwarfed growth and "little leaf" together with rosette like formations, shortening of internodes of young shoots and loss of green color of foliage. The deficiency may occur on localized parts of trees. It can be controlled by an annual application of zinc sulphate with hydrated lime prepared as is Bordeaux Mixture.

Molybdenum, is required in minute amounts for the assimilation of nitrates and fixation of atmospheric nitrogen by the nodule bacteria living in association with leguminous plants. Its deficiency causes "whip-tail" of cauliflowers. When applied in excess it may be injurious to plants and animals. Rates of application range from 1 oz. per acre of pasture to 1 lb. per acre for cauliflowers.

Other nutrient elements. Cobalt deficiency brings about a disease affecting the grazing animal. Its presence in the plant is instrumental in the manufacture of vitamin B-12 which is essential for man and beast. Iodine and fluorine are required for the formation of hormones and development of teeth. Vanadium and wolfram replace molybdenum in the requirements of some free-living notrogen fixing bacteria in the soil.

Organic manures (animal and plant residues) contain nitrogen, phosphorus, small amounts of potash and very small amounts of trace elements and growth promoting substances. Contents in major nutrients are considerably lower than in fertilizers. Their greatest value lies in their beneficial effects on the soil, for apart from adding nutrients, organic matter promotes microbial processes and earthworm activity, improves soil structure, and with it aeration and water holding capacity. It has an adjusting effect on soil temperature, delays the fixation of phosphate in the soil, and during decomposition it aids in the release of nutrients from soil minerals. It is also a source of slowly available nitrogen and other nutrients to plants and its effects are discernible over several seasons. Organic manures create in intensive agriculture the necessary conditions for successful use of fertilizers, i.e. good soil properties for crop establishment and optimum growth further promoted by the addition of nutrients in fertilizers. Plant residues with a low nitrogen content, e.g., straw, sawdust, etc., can cause temporary nitrogen deficiency for crops growing in soil to which these materials have been added. This is due to the micro-organisms concerned in breakdown processes requiring certain amounts of nitrogen which they withdraw from the soil if the material is not able to provide it. The nitrogen content of micro-organisms is set free again after their death. When using organic material poor in nitrogen, heavier dressings o finorganic nitrogenous compounds should be applied to speed up the decomposition processes and avoid nitrogen deficiency in plants.

Farmyard manure, poultry manure, compost are still widely used in many regions as the main nutrient additions to the soil. Wide variations in the nutrient content of the above may occur according to the type of animals, their feeding, bedding and the method of conservation. The mean montent may be 12 lb. nitrogen, 6 lb. phosphoric acid and 10 lb. potash per short ton of manure. All organic waste products should be used for compost, and the value of compost could be greatly increased by mixing 30 lb. sulphate of ammonia, 60 lb. superphosphate, 30 lb. muriate of potash and 75 lb. ground limestone with every ton of waste material.

Dung. Is effectively distributed over our pastures by the grazing animals. A large part of the nutrients taken up by animals is thus being returned to the soil. When collected from cattle or poultry yards and distributed over cultivated ground it may add approxi-

mately 40-100 lb. nitrogen, 30-60 lb. phosphoric acid, 40-60 lb. potash, 80-100 lb. lime, 20-40 lb. magnesium and other elements per short ton. Distribution and incorporation into the soil should closely follow collection to avoid loss of nutrients by volatilization.

Green manures. These represent a very cheap and effective way of improving soil fertility. Green manures take up soil nutrients which may have otherwise been lost from fallow land by leaching and weed growth. When legumes are grown as green manure crops, considerable amounts of nitrogen are also added to the soil, provided the soil is well supplied with phosphate and potash. The advantages of green manure crops for intensively cultivated areas can be summarized as follows: 1. Conservation of nutrients; 2. Supply of organically combined nutrients after incorporation into soil, for a long lasting period; 3. Increased biological activity in soils; 4. Increase in the release of nutrients from soil minerals owing to products of fermentation and biological activity; 5. Improvement of soil structure; 6. Supply of organic matter to the subsoil by intensive root distribution; 7. Loosening of subsoil by root growth; 8. Protection of soil against surface (sheet) erosion.

Mulching is a process by which the soil is covered by plant residues such as straw, grass, sawdust (or even paper or plastics). Mulches protect soil from direct sunlight and its effect on loss of soil moisture by evaporation, and prevents shattering of surface structure by the impact of raindrops. Under mulches root distribution is effective in the top layer of soil, and this leads to better utilization of the nutrients supplied by fertilizers. They also add nutrients to the soil but their decomposition is hastened by application of additional nitrogen, e.g., 1 oz. per sq. yard of sulphate of ammonia.

Horticultural Nomenclature

V. T. STOUTEMYER

A rose by any other name would smell as sweet according to a character in a Shakespeare play. However, in horticulture, the confusion of names is often a source of difficulty and possible financial loss. There are whole streets of cities where the species of trees actually planted were not those listed on the purchase invoices. The extensive synonyms of names of camellias existing in the trade a few years ago when their popularity began to revive, cost some collectors hundreds of dollars in needless acquisition of duplicates. Also, incorrectly named plants in nurseries violate the present California Code and may meet difficulty if shipped across county lines.

We shall avoid a discussion of the question of common names, which are usually regional or local. Such names as "cypress" or "cedar" are too uncertain in their meaning. On the other hand, we must admit that names such as "American elm" "butternut" or "pin oak" are widely understood and have been stable for a long time. There are doubtless instances of common names which have been more stable over the years than the Latin binomials. Common names for plants appeal to the layman and the Latin binomials sometimes seem a bit remote or even ridiculous. However, much of the reluctance to use the scientific names of plants is blind prejudice. We are gratified to observe the widespread use of the Latin names by professional plant growers in horticultural catalogs, advertisements and wholesale price lists. Garden writers likewise are using them freely. After all, these names are no more difficult or complicated than the names of human diseases or the Spanish place names which we in California use freely every day.

One of the great needs of the modern world is for universal systems of communication which transcend national barriers. The musicians have long had a uniform world-wide system of notation and you could easily have a symphony orchestra with men

from a hundred different nations. The symbols of the mathematician are likewise universally understood. Botanical descriptions of plants have been published in Latin from the time of the founding of modern plant taxonomy and this convention has been followed by botanists of all nations. A few eccentrics have published descriptions of new plants in national languages but these are not recognized by botanists.

There have been some irritating changes of horticultural plant names in the past few decades. Some of these were due to changes of the official rules. Others were due to the finding of prior valid publications and to the drastic reorganization of certain plant groups by the taxonomists. However, the situation has improved and the rules seem to be nearing a condition of stability and finality. The rules for botanical names are found in the current International Code of Botanical Nomenclature. These rules were originally formalized about a century ago and have been revised at intervals by the various international botanical congresses. Since horticulturists necessarily give names to plants which would be lumped together by the botanists, they have a supplementary set of rules. These can be found in the International Code of Nomenclature for Cultivated Plants which was issued in 1958. A copy of this document can be purchased from Arnold Arboretum, Jamaica Plain 30, Massachusetts.

The term "variety" as used by botanists and horticulturists unfortunately has entirely different meanings. In order to avoid this confusion, horticulturists are now rapidly adopting the substituted term "cultivar," which is a coined word derived from the term "cultivated variety." The term "cultivar" has a very broad area of reference and it includes (1) line bred selections which come relatively true from seed, such as are most varieties of garden flowers grown from seed; (2) vegetatively propagated clones; and (3) line-hybrids, which are plants with uniform characteristics produced at will by the crossing of selected parents maintained for the purpose. Doubtless the word "cultivar" will come into common horticultural use just as the earlier invented word "clone" is now standard, but there is no compulsion to adopt it.

The new code for cultivated plants was prepared by several cooperating international groups of horticulturists, foresters and other agriculturists. It has already been approved by the last International Horticultural Congress at Nice, France, in 1958 and presumably will have the official approval of the other sponsoring organizations in due time. At this point, the writer wishes to express the personal wish that the various shade tree and arbori-cultural organizations will also in due time take appropriate official actions endorsing this code. We think that the present outlook for stability and uniformity in both botanical and horticultural nomenclature is very good indeed. We believe that these two codes represent a sane and constructive approach to a difficult problem. Doubtless both may need some future development and revision. The writer personally does not agree with some of the policies adopted for the naming of cultivars in the present code, but nevertheless urges that horticulturists conform to it and fervently hopes that there will be no misguided schismatic movements such as have occurred in the past. Quite a substantial portion of the confusion of plant names in America has been caused by the mistaken rebellion of certain American botanists and the introduction of the American code of botanical nomenclature early in this century. Happily, most of the traces of this fiasco have about disappeared.

Another movement which now seems to be nearly dead was that which was sponsored by the American Joint Committee on Horticultural Nomenclature which was set up in 1914 by the National organizations of nurserymen, florists, park executives, pharmacologists, and landscape architects in cooperation with many specialized plant societies. They issued a book "Standardized Plant Names," in

1923 and a revised edition of this in 1942. Some taxonomists in the U. S. Department of Agriculture assisted in the preparation of these two volumes, but systematic botanists have, in general, never had a high regard for the work. For a time it was used widely in the preparation of nursery catalogs, but it never was able to achieve wide enough acceptance to achieve its aims. Presently it does not even have the support of the leading organization of its sponsors, The American Association of Nurserymen. We shall be greatly surprised if it is revised and reissued. A recent release from the national office of the American Association of Nurserymen indicates that the organization is planning to use instead the new revision of Bailey's Hortus as the source of plant names. Apparently this organization may soon turn over the work of their present plant registry committee to the American Association of Botanical Gardens and Arboretums, which has present secretarial headquarters at the Arnold Aboretum. This organization has agreed to conduct registration for a two-year trial period. If this is successful, the aboriculturists would logically want to use the same clearing house for plant names of trees.

At the present time, the work of searching and clearing plant names for registry is done by the various specialized plant societies. Some of these are purely national in scope of activity, but some are international at least to a degree. At the present time, nine organizations have the official approval of the last International Horticultural Congress as centers of registration for cultivar names in their particular specialized plant groups. We may expect to see the list grow rapidly and we hope that there will be a trend toward a more truly international and perhaps more comprehensive type of organization for doing this necessary work.

Personally, we regard the proposals to use the next edition of Hortus as a source of plant names and to use the Bailey Hortorium as the clearing house for the specialized plant group organizations as logical and wise at the present time. If we are not to be bound by a dead hand, we must have a living, working center of authority. Most botanists and botanical institutions tend to ignore the taxonomic problems of cultivated plants and there are few if any other institutions which would have facilities for the job. The Herbarium at U.C.L.A., by agreement, is the central repository of ornamental cultivated plants in the California University system and is working closely with the Bailey Hortorium on the revision of the plant manuals of the late L. H. Bailey.

We believe that the varietal or cultivar names of trees will become increasingly important in the future, especially in street tree work, because of the need for uniformity and for predictable size and shape. The extra cost of vegetative propagation is very trivial in comparison with the greater satisfaction obtained by planting trees whose performance is more nearly predictable. Some institutions such as the park system of Rochester, New York, the various Arboretums, the Saratoga Horticultural Foundation, have done notable work in assembling and making available colonial selections of trees of great value. Another compelling reason for uniformity and correctness of name is the legal angle which is already important under the California Code.

We have tried to show the shape of things to come and we believe that the picture is definitely encouraging. We do think that there is room for a greater future unification of horticultural groups and that gradually a more efficient machinery for plant registration and a more unified system can be developed. We recommend that the various arboricultural groups take a sensible, forward looking attitude and cooperate with the work of the American Association of Arboretums during this interim trial period. We believe that this venture is very likely to succeed.

Department of Floriculture and Ornamental Horticulture
University of California Los Angeles

Dodonaea viscosa purpurea

The following two letters, received by Mr. Lyle Pyeatt, bring us one step closer in our knowledge about the popular 'Purple Hop Bush'.

DUNCAN & DAVIES LTD., NEW PLYMOUTH, NEW ZEALAND

15 March, 1960

Dear Sir,

Thank you for your letter of 1 March. Re *Dodonaea viscosa purpurea.* As far as I am aware, this plant was found growing in this Island in its native state on the coast near a town called Blenheim which is in the Marlborough province. This is at the extreme north east corner of the South Island of New Zealand.

However, I have written to a botanical friend living in Marlborough, who I think has something to do with the finding of this plant, and as soon as I get a reply I will attach it to this letter.

The green variety is common on many of the coastal parts of New Zealand and was largely used by the natives for timber, as it is one of our hardest timber we have. It was used for tool handles, fighting and ceremonial implements, and other articles where extremely hard timber was necessary.

Thanking you,

Yours faithfully,

V. C. DAVIES

DUNCAN & DAVIES LTD., NEW PLYMOUTH, NEW ZEALAND

22 March, 1960

Dear Sir,

Re *Dodonaea viscosa purpurea.* I have just had word from a friend who lives in Blenheim and is familiar with the origin of the purple leaved Ake Ake.

The information as received by me is: "It was a chance seedling and the coppery leaves in the young stage of the plant attracted the attention of an old lady.

She nurtured it and it grew into a nice tree and produced a few seeds. She sent the seeds to Mr. Robert Nairn, Nairns Nurseries Ltd., 166 Lincoln Road, Christchurch, N.Z., who sowed the seed and it came true to colour. Naturally he was delighted, and sent the old lady back a few small plants.

Meanwhile the original continued to grow and to produce more seeds which was given to every person who was interested in New Zealand native plants and who visited her home.

The old lady's garden was situated near the hills at Tua Marina, where the ordinary Ake Ake trees grew in abundance. Her copper leaf plant was a chance "sport".

Trusting this information will be of use to you.

Yours sincerely,

V. C. DAVIES

Two facts are missing: (1) The date of the original find, and (2) the little old lady's name!

Bobby Vargas (Information Aid, Descanso Gardens) explains the art of flower arranging in Children's Education class conducted at the Arboretum.

The area of the Children's Gardening class at the Arboretum had to be doubled in size during the 1959-60 sessions. Foreground plots show original site of the gardening area.

A Professional Gardener School

Plans are going forward at the Los Angeles County Department of Arboreta and Botanic Gardens for the opening of a Professional Gardener School this fall at the Arboretum in Arcadia.

That California has become the nursery-stock and flower-seed production center of the United States was stated in a recent "Training Requirement" study, conducted by the California State Department of Education. This same study reported that the garden horticulture and nursery industries of California need more and better trained personnel than are now available. To assist in training young men and women for a career in professional gardening horticulture and to meet this need, the Arboretum is planning a curriculum to be scheduled for five half-days a week for a period of one year.

The curriculum of the new school will consist of two parts: 1, lectures of four hours a week will include classroom studies in botany, plant identification, plant physiology, greenhouse management, floriculture and arboriculture; and, 2, practical experience will give the student an opportunity for on the job training. Experience in horticultural and gardening work will range from the greenhouse, nursery and other plant production centers to planting and maintenance of established field areas. The Department's horticultural facilities include climatic zones of seashore, inland, and desert communities. The practical phase will consist of sixteen hours a week.

Prospective students will be expected to meet the following minimum requirements: Age—17 to 25; Education—completion of high school; Health—good; Marital status—single; and present evidence of interest in following a career in horticulture. Students planning to enroll are required to submit, in writing, a brief biography attesting to the above requirements.

Registration for admission to the Professional Gardener School will be accepted through September 1, 1960.

COVER

Many an alumnus of the Botany Department at UCLA, your Editor included, sighs with envious emotions on visiting the campus and seeing the modern, spacious and obviously efficient new Botany Building. Completed this spring, one realizes that the student of today will miss the thrill and adventure of botanizing on the fourth floor of the Physics Building. To the current freshman, the pleasant, shaded patio at the rear of south side of the new building will serve as an informal, outdoor classroom. A very short walk from this patio moves the class into the Botanical Garden proper.

The World We Live In

EDWARD HUNTSMAN-TROUT

The world we live in is complex, and fascinating; full of excitements and challenges. Beginning slowly and haltingly with the industrial revolution of some hundred and fifty years ago, techniques and skills have developed at a constant *accelerando*. Within the span of my lifetime, the horse has given way to the motor car; and, not content with speed on the highway, man has invaded the sky in the airplane. The magic lantern has grown to become the motion picture, and the motion picture now must compete with T.V. Finally, practically all of us have still to catch up with the scientific and technological explosions of the last decade or so, indeed of the past few years. Few of us understand or even know about all the changes in our economy which characterize the brave new world.

It is a new world true enough; but with all that, the human animal is substantially what he was many thousands of years ago, and most certainly what he was at certain high points, as I think of them, in the history of mankind,—the golden age of Greece, the high renaissance in Italy, the Elizabethan age in England, and the pioneer days and the birth of a new republic here in America.

In many ways, we are far ahead of our forbears,—in our control of sanitation and public health, in the near elimination of infant mortality, in the increase of the common life span, and in the currently expanding social pattern toward a real brotherhood of man.

However, in many other ways, I feel that our new and exciting toys are coming on faster than our ability to judge their worth and to use them properly, and that we are in real danger of falling flat on our faces. I am not thinking of possible or impossible trips to Mars, nor of the problems of nuclear fission and the hydrogen bomb, nor of the dark cloud of communism which lowers over yonder. I am thinking only of the every-day world which we have made for ourselves, the world in which we live and work. As a landscape architect, I propose to discuss with you LANDSCAPE in that context; not the cosmetics of landscape architecture, the latest thing in tropicals or patented roses, in aluminum or plastic gadgetry, but the matter-of-fact structure of the common out-door world which we most use, specifically, our roads and streets, the byways, the highways, and the throughways; any one of which at most any time is most embarrassingly apt to turn into just a plain auto park.

As to LANDSCAPE, there are three kinds. First comes the urban landscape, the city, of which it has been said by Parkinson that "civilization is the art of living in cities". New York and San Francisco have suffered but they are still fair examples of the true city; for how long, as the tide now runs, who knows? Then there is rural landscape, the country, which is founded on productive farmland, or ranchland. One of the surprises of a journey out of our valley is the discovery that generous fragments of the rural world are still in good working order. Last is the wilderness, the untamed, unhumanized landscape, where man is an onlooker, a transient; the native out-doors which is something to be enjoyed and to be used as need be, but not to be wantonly squandered as it has been everywhere.

So, in this our southern California, what have we left to talk about? Here we have never had a really and truly *city*. According to one architect and planner, our COUNTRY is being swallowed up by the subdividers at the rate of two hundred and fifty acres each day. As for WILDERNESS, the little mountain chaparral and canyon brushwood that still remains to us is by definition not our subject.

What we shall talk about is that never-never land, the impossible, the non-existent, suburb; the welter of black-top paving, power poles, houses, shopping centres, and what have you, that sprawls from Chatsworth to Santa Ana, from the ocean to San Bernardino, and beyond; the sprawl that smothers any possibility of a true city and wipes out whatever of country there was; where I have lived and worked for the most of my life, liking the country as it was with all my heart, and little liking what man has done there.

Aesthetically and economically, the suburb has never quite "come off". The nearest approach to success has been in the pre-bulldozer development of rugged tracts, either with over-size lots of an acre or more, resulting in a cross between country and wilderness, or with postage-stamp lots, where building is catch-as-catch-can, climbing up and down slopes, and organically arranged through force of contours into tight clusters with waste lands between, resulting in a cross between city and wilderness. In both cases, never a great made earthen slope but often a retaining wall. These are both worthy a look for the charm of friendly adaptation of building to building and of building to site. And they can both pretty much take care of themselves, so long as the bulldozer stays out. OUR subject is the run-of-the-mill suburb which blankets the open country, mostly in checker-board layout; sometimes *de luxe* and costly, customized; sometimes minimum tract housing. Let's see what we can find to quarrel about, and what might be possible by way of betterment.

To ask for betterment, to propose changes and checks in the established order of boom-town expansion, is to ask for the moon. It will deny many rights of exploitation. It will contradict established custom. It has truly been said that "we are unable to mobilize much cultural support for aims which do not yield an immediate payoff for somebody producing some commodity for some market". I still believe in asking for the moon. It's your world, it's our world, if enough of us will step out and take it. and for that reason I hope that you will lend a thoughtful ear to my argument, not being obliged to subscribe further than you may feel inclined.

In brief, the argument is,—

First,—for economy of land use, for conservation of country and of wilderness, full use of all occupied land areas for economy of maintenance and for the elimination of sprawl.

Second,—the creation of communities that are self-contained, of human size, that is, walkable for primary schools, shopping, and neighborhood activities, with country and city both at hand; communities defined by greenbelt, parkway, or freeway.

Third,—Communication control, by a comprehensive traffic plan; for rapid transit, to relieve freeway congestion and the glut of city streets from freeways pouring in; for expressways designed for speed with safety and planned to connect and not to enter communities, with restricted use; for highways for miscellaneous traffic at medium speed, supplementing expressways to bound and connect residential communities, etc.; for byways, dead end streets to dwellings; for elimination of all street parking (present lawn areas may provide space for private off-street parking); for pedestrian ways separated from motor traffic; for power poles, etc., on highways only.

Fourth,—smog and noise control, and whatever else may be necessary to restore and maintain the humane city.

And perhaps that is enough of asking for the moon. At any rate, think about it, particularly the livable city. No one should be forced to suburban life for want of a proper humane city.

However, I have here a small bouquet of slides, shot hurriedly, from the hip so to speak, and at random, with no time to wander and pick and choose. I offer them as a companion to comment, to consider the possibilities of ways and means to mitigate the

suburbs as they are. As the pictures are shown, remember that landscape architecture, whether garden or park or street, or whatever, is,—

First of all,—the out-door creation of space, of volume; in three dimensions, call it a room (or a hall), with floor, and walls, and ceiling.

Second,—the creation of order, of some kind and of some degree, the creation of an entity, a thing, with related parts.

Third,—the promotion of communication; the physical movement of people and things; the communication of ideas, ideals, emotions. Here we add a fourth dimension, time—past, present and future. Robert Oppenheimer calls for a "shared tradition, a certain slowness of change, so that the past is meaningfully present in the present, and meaningfully relevant to the future".

Remember, too, that the essential conditions of landscape architecture (and of architecture) are such that no picture can convey the actuality which has been created. The created space must be entered into, and walked about it, in order to be realized, and I hope that these slides and comments may lead you to walk about your neighborhood with a critical eye and an enquiring mind.

BOOK REVIEW

Zulu Journal. Field Notes of a Naturalist in South Africa, by Dr. Raymond B. Cowles, Professor of Zoology, University of California, Los Angeles. University of California Press, 1960.

A Californian member of the Veld Trust, who introduced himself very modestly as a South African zoologist working near Los Angeles, once sent us an article about the wild flowers and shrubs of his native land that he had discovered growing in gardens west of the Sierra Nevada Mountains. Years later he helped us in our fight for the protection of the sea birds with a thoughtful analysis of the hygienic role of these predators in eliminating diseased and weak fish from the vast shoals around our coasts.

Then a magnificently printed, bound and illustrated volume from the University of California Press, *Zulu Journal: Field Notes of a Naturalist in South Africa.* arrived with a brief note from the author, Professor Raymond B. Cowles. This was the former contributor to *Veldtrust;* and from the dust cover I learned that he had been consultant to Walt Disney when he made *The Living Desert* and to *Life* when it published the series, "The World We Live In."

My reaction in this situation can only be compared with what the river digger feels when he uncovers a diamond among the bantoms on his sorting table.

A FLAWLESS GEM

Like the digger I reached for the scales, my own experience of the wild life, the people and conservation work between the Umzimkulu and Pongola Rivers, to determine the carat weight of the literary discovery. After reading it time and again and line-by-line, I found that here I had a flawless gem stone of purest blue-white quality.

This book could hardly have been otherwise. Everything in Professor Cowles's background and training seems almost to have predestined him to write with love, understanding and great technical knowledge about the country of Chaka and Dingaan, which most South Africans know only from history books as the scene of murder and wars, where the rivers flowed with blood. He was born in 1896 at the Adams Mission Station and spent his boyhood in the valley of the Umzumbwe River, encircled by the Drakensberg to the west. His mother had also grown up in that valley and helped to provide a college education for her brothers by skinning the birds they collected for sale to museums. For the first 14 years of his life his own education "consisted largely of the acquisition of practical first-hand natural history." While collecting anthills to feed the chickens he kept as a source of pocket money, he made the discovery, "of

which even the Zulus were ignorant," that the Nile monitor lizard, what we know as the leguan, does not lay its eggs in the warm sand but in the termitaria. Reporting on the habits of these lizards later served as part of his Ph.D. requirements.

SYMPTOMS OF DANGER

This book is possibly of greater importance to the professional soil conservationist in South Africa—and especially those who are engaged on the reclamation of native areas—than it is for the growing army of "nature lovers." It is a great naturalist's urgent warning—not only for the farmers but all the people—about the rapidity with which the symptoms of danger are developing.

His final chapter on Man tells how, even for scientific man, there is a limit to natural resources. In South Africa our first approach to the problem was from the point of view of agricultural method—the application of certain engineering works and isolated test plot discoveries; and then, on the basis of this experience, there emerged very gradually the idea of an ecological balance, of "working with nature." But Professor Cowles has a somewhat different approach. He looks into the future of conservation and preservation of nature, not only in Zululand but as a global phenomenon, in the light of man's truly animal behaviour. He maintains that he has as much right as the anthropologist, the sociologist, the economist or the political scientist to enter this field since *Homo sapiens* is also an animal, responsive to environmental factors in a manner that, at the fundamental level, is simply that of an animal organism.

It is a section of the book of such importance to members of the National Veld Trust and others in this specialised field of conservation, that I will review it in more detail in the next issue of *Veldtrust*.

T. C. ROBERTSON

Demonstration Turfgrass Plots

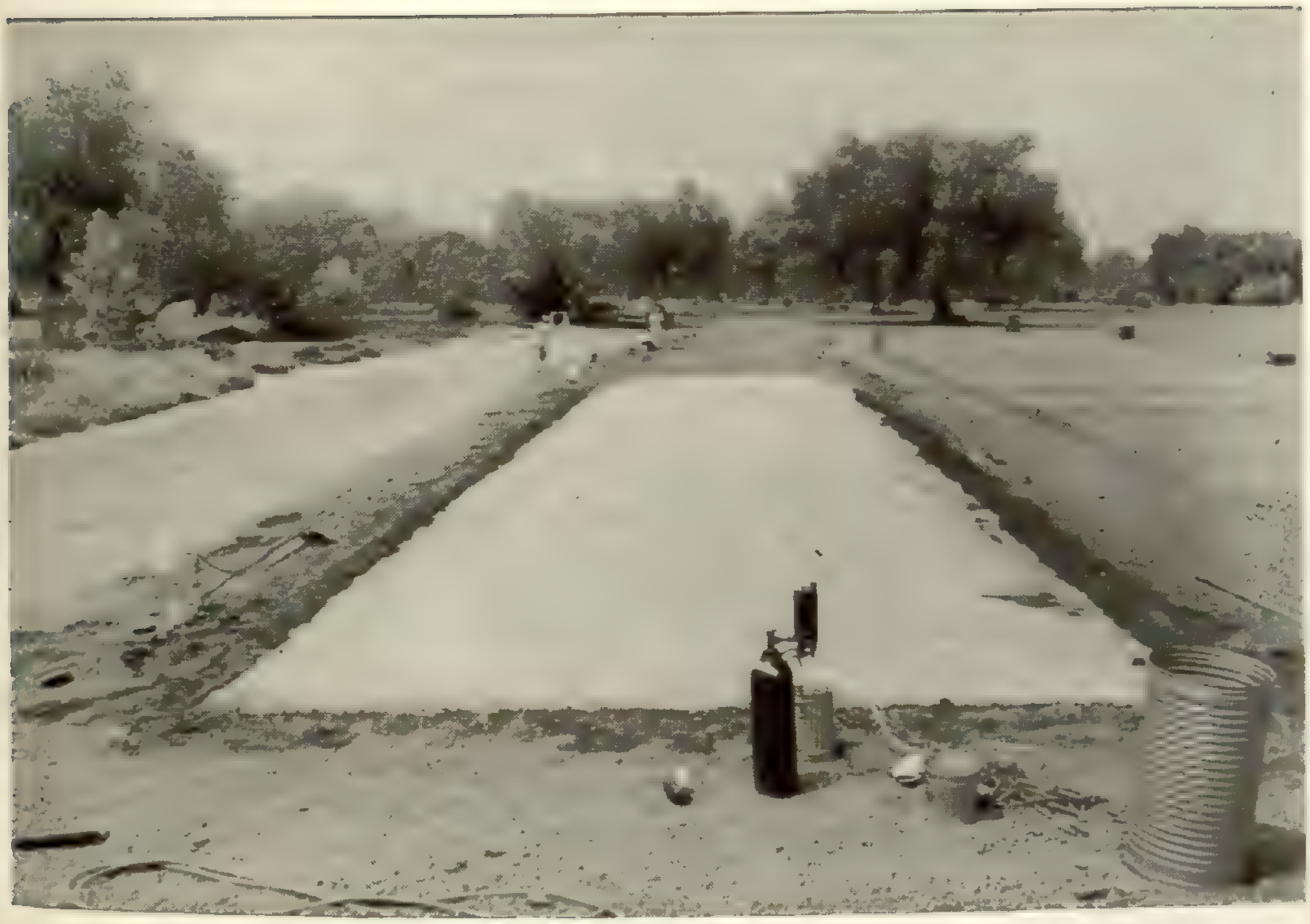
Twenty-three different varieties of lawn or turfgrass have just been established in plots at the Arboretum in Arcadia, to serve as demonstration and test plantings. These grass plots will allow the home owner, landscape architect and professional turf men an opportunity to make side by side comparisons of the current popular grasses with new introductions.

The planning, establishment and future work with these plots is a cooperative project between the Department of Arboreta and Botanic Gardens and the University of California Agricultural Extension Service. Mr. Wayne C. Morgan, Los Angeles County Farm Advisor represents the University and Dr. Louis B. Martin represents the Arboretum.

The following groups of grasses can now be observed as they develop into mature turfs: 1) seeded pure stands of fescues and bluegrasses; 2) seeded commercial lawn mixes; 3) vegetatively propagated varieties of improved bermudas, zoysias and bent grasses; and, 4) dichondra.

Since some of the improved species of bermuda grasses, zoysias and bents do not come true to type from seed, it is necessary to plant these by the use of small pieces of the plants. Examples of this method of propagation can be seen in the plots in the form of sprigs, stolons, plugs and sod.

From the very beginning of soil preparation to the final steps of planting, the plots have been used to test and observe the newest products and methods available for lawn establishment. The results of these and other trials will be published and made available to the general public and home owner.



A plastic tarp covers a new grass seed bed. Soil beneath tarp is being sterilized with methyl bromide gas, prior to planting the seed. In this area, north of the Arboretum Adm. Bldg., will be 20 demonstration turfgrass plots.

Children's Education Program at Descanso Gardens, La Canada, offers gardening experience similar to that of the Arboretum. The Lakeside Cottage, background, is the Children's Education Center and is used for classroom activities in nature study.

TWO BOOK REVIEWS

Now that Spring and Summer are hard upon us it is a good time to think about going to the country and partaking of edible plants and herbs. The books mentioned below contain many plants that grow in the West even though one specifies Eastern North America and the other was written in England.

Edible wild plants of Eastern North America, by Merritt Lyndon Fernald and Alfred Charles Kinsey. Revised by Reed C. Rollins. New York, Harper, 1958. 452 p. Bibliography. Indexed. $6.00.

This is not a new edition of Fernald's book in the true sense, as the original edition has proved to be fundamentally sound and major revisions have not been required. It has been brought up to date in nomenclature and currently accepted interpretations of certain species. Some of the war-time plates have been replaced by better copies. Pagination is the same.

Unlike the herbals with their curative lore, this is mainly a factual account of plants that are edible, including a chapter on poisonous plants. Scientific name, key-characters, habitat, range, season of availability, and uses are given for each plant. The descriptive text gives a short history of uses by the Indians and others and even some recipes for preparing many of the plants. The arrangement is in four chapters: edible plants classified according to uses (soups, cereals, etc.), poisonous flowering plants, detailed enumeration and discussion of edible wild flowering plants and ferns (bulk of the text), and mushrooms, seaweeds and lichens. The danger of consuming the wrong plant is stressed throughout. In fact, the discussion of poisonous plants discourages anyone but an experienced botanist from attempting to live off the country. It is interesting to note that one of the late authors is Alfred Charles (Before-the-Report) Kinsey. The writers have experimented with many of these foods. There are 25 photographic plates prepared by the authors and 129 line drawings by Edwin J. Hertl and Helen P. Schiefer.

For a meal available in any part of the country in the autumn the authors suggest: "a chief entrée of giant puff-balls, pasture mushrooms, fary-rings or some other species, hickory-nut [or walnut] bread and butter, a potherb of sow-thistle or a mess of seaside plantain cooked like string-beans, escalloped roots of goat's-beard, jelly or marmalade from any one of two hundred sources, a choice of scores of fruits for dessert, cheese with thistle-flowers or sundew-leaves as rennet, and tea from many mints or from sweet fern, sassafras or strawberry leaves."

Cinquefoil; herbs to quicken the five senses, by Hilda Wauton Leyel. With drawings by Mildred E. Eldridge. London, Faber, 1957. 368 p. Indexed. 35/ ($4.90).

Here is a book one can browse through for poetry, medical remedies, botanical illustrations, plant histories, or philosophy of the author. It is the fourth volume in a series of herbals called "the Culpepper House Herbals" which in eight volumes will cover the herbs used in medicine and the arts." The first volume was *Herbal delights,* "devoted to herbs for pleasure", the second was *Compassionate herbs,* "showing how healing herbs first gained their reputation on the battlefields", the third *Elixir of life* "describes the herbs that have been used to prolong and sustain life". Ensuing volumes will deal with specific herbs for each organ of the body. The last volume will be about the use of herbs in industry. The above information comes from the author's preface to *Herbal delights.*

Cinquefoil treats herbs that are beneficial to the five senses. Mrs. Leyel is a firm believer in the efficacy of herbal medicines and the benefits of nature and natural treatment. She feels that too little attention is given to this and too much to the new wonder drugs.

Her book takes up Herbs for the Eyes, Herbs for the Sense of Smell, Herbs for the Sense of Hearing, Herbs for the Sense of Taste, and Herbs for the Sense of Touch (skin and extremities). Each chapter starts with a short essay giving some anatomy, philosophy, diseases and remedies of the organs connected with the senses—eyes, ears, nose, tongue and skin. The beautiful drawings are expertly done against a light blue background. The rare copper-plate engravings of the Five Senses by the famous botanical artist of the late sixteenth century, Crispin de Pas are reproduced for the first time in this book. The plants are listed under the popular name, then given full nomenclature, botanical names, other popular names, foreign names (French, German, Italian, etc.), astrological connotation, symbol, parts used, natural habitat, constituents, and action. A brief history of the plant is given and poetry chosen for each is actually on the plant itself, showing a great familiarity with literature and herb lore on the part of Mrs. Leyel. The reader whether an ardent herbalist or not can derive great enjoyment from this book.

An example of the treatment: "In homeopathic from *Daphne Mezereum* is a cure for ciliary neuralgia following operations, particularly after the removal of the eyeball; for hay fever, and post nasal adenoids and for the ears when they are too sensitive to cold and feel as if the cold air were blowing into them."

Or for a more familiar plant: "Apple juice neutralizes the acid products of indigestion. The fresh juice of the wild apple will remove warts from the skin and a poultice of apples relieves weak and inflamed eyes.", or "Medicinally the Cherry tree cures nasal and bronchial catarrh. It has valuable astringent and pectoral properties and acts as a good sedative."

Even if one does not agree with the author in her thesis that herbs are the only medicine to cure catarrh and other allergic diseases which dull the senses, there is no doubt that we would be better for a simpler life and diet, with less exposure to vile fumes and synthetic foods.

"Snake-venom, tide and time,
These wait for no man
Haste, make haste!
Use me as a potion, liniment or paste,
And even dragons may be safe defied!"

T.C.H.

DORA M. GERARD, UCLA

NAMES, NOTES AND NEWS

Dr. Mildred E. Mathias was an invited participant at a Conference on Tropical Botanical Problems of Concern to the United States, held at the Fairchild Tropical Garden, May 5-7, 1960. This conference was sponsored by the Division of Biology and Agriculture of the National Academy of Sciences—National Research Council and received financial support from the National Science Foundation.

For the second time, Dr. Mathias is going to Peru this summer to continue collections of plants of pharmacological interest. This work is under the auspices of the Department of Pharmacology, University of California, Los Angeles, Medical Center. She plans to return to Los Angeles in early August. In addition to collections in the Amazon Basin between the drainage of the Huallaga and Ucayali Rivers, the group plans to collect in Amazonian Ecuador in the Pastaza and Napa drainages.

"THE PACIFIC COAST'S CONTRIBUTIONS TO HORTICULTURE"

15th Horticultural Congress and Annual Meeting
American Horticultural Society
November 9-12, 1960

Wednesday—November 9. Preconvention Tour.
8:00 A.M. Disneyland—(Advance reservations required)
2:00-5:00 P.M. Registration
5:30-6:30 P.M. Reception—get-together
6:30 P.M. Board of Directors—Dinner Meeting

Thursday—November 10. Program—Huntington-Sheraton Hotel
Chairman, Dr. P. A. Munz, Director Rancho Santa Ana Botanic Garden
9:30 A.M. "Buckets of Pollen and Tons of Seed," Howard S. Bodger, Bodger Seeds Ltd.
10:15 A.M. "Historical Notes on Camellia," Douglas G. Thompson, President, Pacific Camellia Society.
11:00 A.M. "Eastern Pot Plants in Western Gardens," Philip E. Chandler, Horticultural Consultant and Lecturer.
12:00 Noon Luncheon—Huntington-Sheraton Hotel. "Coastal Gardens—Roots in Mexico and the Orient," Peggy Sullivan, Landscape Designer.
1:45 P.M. Buses leave for Huntington Botanical Gardens Tour. Return at 4:30 P.M.
7:00 P.M. President's Dinner—"The Gene—1960 Model," Dr. G. W. Beadle, Nobel Laureate and Dean of Faculty, California Inst. of Technology.

Friday—November 11 (Armistice Day)
9:00 A.M.—Buses leave for Los Angeles State and County Arboretum. Chairman, Dr. Wm. S. Stewart, Director Los Angeles State & County Arboretum.
9:30 A.M. "The History of Horticultural Explorations on the Pacific Coast." Harlan Lewis, Professor and Chairman, Department of Botany, U.C.L.A.
10:00 A.M. "The Challenge of Teaching An Applied Program in Horticulture." O. A. Batcheller, Chairman, Ornamental Horticulture Department, California State Polytechnic College, Kellogg - Voorhis Campus, Pomona.
10:30 A.M. "The University's Research Contributions to Horticulture." Daniel G. Aldrich, University Dean of Agriculture, University of California.
11:00 A.M. "Pacific Coast Horticulture—Big Business Today." John H. McElroy, Program Leader, Special Projects—Agricultural Exten. Service.
12:00 Noon Luncheon at Arboretum. "Brothers Under the Skin"—Horticulture and Landscape Architecture. Ralph D. Cornell, Landscape Architect.
1:30 P.M. Tour of the Arboretum.
2:45 P.M. Buses leave for Huntington-Sheraton Hotel.
3:00 P.M. Plenary Session. President's Report. Secretary's Report. Treasurer's Report. Committee Reports. Election of Officers & Board Members 1961
7:00 P.M. Annual Banquet—Awards. Introduction of 1961 Officers

Saturday—November 12
8:30 A.M. Buses leave Huntington-Sheraton Hotel for Tour of Nurseries: Perry's Plants—Montebello, Buena Park Greenhouses, Monrovia Nursery. (Lunch enroute or at Monrovia Nursery)
3:30 P.M. Return to Huntington-Sheraton Hotel.

NAMES, NOTES AND NEWS

WILDFLOWER SANCTUARY DEDICATION

Nature Conservancy, S. Calif.
Mrs. T. L. Edmiston, Press
5502 Markland Drive, L.A. 22
Parkview 1-0924
May 9, 1960

The Dedication of the 320 acre Butte Valley Wildflower Sanctuary on April 30, one of the three in the Antelope Valley established by Los Angeles County, marks a significant act in the history of conservation. Acting upon a resolution from the California Garden Clubs, Inc., calling for the establishment of Wildflower Sanctuaries in appropriate locations throughout the state, the Board of Supervisors initiated a study by the Department of Parks and Recreation which resulted in the creation of three Wildflower Sanctuaries and the possibility of others, each with distinctive flora and differing soil and environmental characteristics which will be of great recreational and scientific interest. The Wildflower Sanctuaries also officially serve as soil and water conservation preserves.

At the high point of the Dedicatory Address by National Park Naturalist, Will Neely, the speaker declared the Wildflower Sanctuaries to be not only sanctuaries for wildflowers, but all nature, as well. A Scott's oriole, rarest of the species in the state, burst into song from an adjacent Joshua Tree, in eloquent accord.

Supervisor of the District, and strong supporter of the sanctuaries, Warren G. Dorn, pointed out the important of preserving some of the natural beauties for which the desert is famous.

Recognizing the significance of the Wildflower Sanctuaries, representatives of sixty-six vitally interested scientific, educational, conservation, and outdoor recreational organizations joined with the Nature Conservancy in an Appreciation Luncheon following the Dedication.

Roland Case Ross, Southern California Chapter Nature Conservancy Chairman, said, "We come in gratitude to commend the wisdom and foresight of the Board of Supervisors for setting aside some of the worthy specimens of Nature's Garden, so that we, our children, and the generations to come, can know some of the native glories of California." A score of spokesmen voiced appreciation of the "Field Labratories", "Living Museums", "Natural Gardens", and "Wildlife Preserves", all inherent in the Wildflower Sanctuaries.

Theodore Payne, 88 year old wildflower authority who has made California native plants world renouned, received a standing ovation. "This is a dream come true," Theodore Payne declared. "The creation of these Wildflower Sanctuaries is important for their historic, scientific, and aesthetic values, and for sound economic reasons, as well. Hundreds of thousands of tourists have spent millions of dollars in the wildflower areas. Yet, in the last fifty years, I have seen California's glorious carpets of purple and gold all but disappear. This is a life-long dream come true. Some of the wildflower fields will be saved!"

John Anson Ford, on whose motion the county directed the study of Wildflower Sanctuaries to be made, said, "This is a profound treasure—a Wildlife Preserve." He commended the vast and growing number of people aware of the necessity of protecting some of our natural heritage while yet we may.

Speaking for Norman S. Johnson, Director of County Parks and Recreation, Carl Gerhardy, who conducted the Advance Planning studies, welcomed both scientific study and observation and public enjoyment and protection of the areas, stating that the county is eager to cooperate in making the sanctuaries natural laboratories for field observation, and at the same time, natural reserves for the enjoyment of all, and in harmony with conservation.

D. Ralph Rutledge, Executive Secretary for Southern California Nature Conservancy, thanked the county for adequately signing the areas as suggested by the Nature Conservancy, and for the pledge of cooperation in scientific possibilities. The Nature Conservancy will continue its interest in the areas, cooperating in any way possible to learn the unknown factors in the reproduction of wildflower fields year after year, and in developing techniques for using, yet preserving, this splendid series of Wildflower Sanctuaries of Wildlife Preserves.

A special exhibit of Wildflower Portraits by Jane S. Pinheiro gave a strikingly beautiful and highly significant setting for the Appreciation Luncheon honoring what is believed to be the first area to be so dedicated by any County Government—"A dream come true" for conservation.

WEATHER RECORD — 1959

Los Angeles State and County Arboretum, Arcadia, California

MONTH	TEMPERATURES AVERAGE MIN.	AVERAGE MAX.	PEAKS MIN.	PEAKS MAX.	MEAN	RAINFALL INCHES	EVAPORATION INCHES	% RELATIVE HUMIDITY
January	45.6	70.5	38.0	86.0	61.0	2.35	1.985	39
February	42.5	65.0	36.0	82.0	53.7	6.40	1.580	45
March	47.8	78.4	44.0	89.0	62.9	.....	4.110	31
April	53.8	78.7	47.0	97.0	66.2	1.19	4.105	41
May	53.9	76.9	44.0	84.0	65.4	trace	4.805	49
June	59.0	86.0	52.0	95.0	72.5	.....	5.665	43
July	60.4	93.9	59.0	109.0	77.1	.....	7.545	40
August	62.6	89.8	53.0	104.0	76.2	.....	7.585	34
September	60.4	80.4	53.0	102.0	70.4	.07	5.265	39
October	54.3	84.2	46.0	98.0	69.2	.03	4.455	36
November	48.5	80.3	44.0	90.0	64.4	.....	3.535	25
December	44.6	70.0	36.0	90.0	57.3	1.56	2.405	30
					Total Inches	11.60	53.040	

GENERAL OBSERVATIONS

The lowest temperature, 35 deg. F. was recorded on February 18th. The highest temperature, 109 deg. F. was recorded on July 10th. During the year there were fifteen mornings of 40 deg. F or less. A temperature of 90 deg. F. or more was recorded on seventy-three days; eight of these days the instruments registered 100 deg. F. or more. The lowest relative humidity reading occurred in November; the highest were in May.

Rainfall was measured on twenty-four days for a total of 11.60 inches for the year. 1959 was a dry year compared with the previous year of 1958 when 25.42 was recorded. The greatest precipitation occurred during the storm of February 16th when our rain-gauge recorded 2.80 inches.

A total of 53.040 inches of water loss through evaporation was measured during the year. This total was 3.790 inches more than during the previous calendar year.

J. T. McGah, Plant Recorder and Weather Observer

WEATHER RECORD — 1959

University of California, Los Angeles, Subtropical Horticulture Area

MONTH	TEMPERATURE AVERAGE MIN.	AVERAGE MAX.	PEAKS MIN.	PEAKS MAX.	PRECIPITATION TOTAL MONTH
January	43.9	67.3	36	79	2.05
February	41.0	63.5	35	77	5.56
March	46.2	75.3	38	87	0.00
April	50.3	74.5	46	92	0.00
May	51.1	72.4	41	78	0.77
June	56.3	77.9	51	86	0.00
July	62.2	85.5	55	102	0.00
August	60.4	84.4	52	98	0.00
September	59.6	83.0	54	104	0.01
October	54.8	79.1	46	99	0.00
November	49.1	77.2	44	89	0.02
December	46.7	68.7	37	89	1.41
				Total inches	9.82

Lyle E. Pyeatt

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LASCA LEAVES

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LOS ANGELES COUNTY DEPARTMENT

of

ARBORETA AND BOTANIC GARDENS

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CONTENTS

The Sydney Botanic Garden

R. H. Anderson

Situated on the foreshores of Port Jackson and close to the heart of the city, the Sydney Botanic Gardens consist of some 66 acres of closely cultivated land and are surrounded by 125 acres of park lands comprising the Sydney Domain.

As Botanic Gardens they are noteworthy for the unusually wide range of plants that can be grown outdoors, between three and four thousand different species being successfully cultivated. The temperate climate enables plants from many lands to be grown in the open and most visitors from overseas are impressed by this feature. The collection of outdoor palms, for example, is regarded as one of the most extensive of its kind. A former Director of the Royal Botanic Gardens, Kew, Sir Edward Salisbury, commented on the value of this particular collection.

Being close to the city the Gardens are visited by many thousands of people, particularly in the spring, when the well-known Spring Walk gives a colourful display of Azaleas, flowering Peaches and Plums, Wisteria, Eupatorium and other shrubs. This walk is over 100 years old, having celebrated its centenary in 1956.

From many points in the Gardens, fine vistas of Sydney Harbour may be glimpsed through the framework of trees across spacious lawns.

The area on Farm Cove has been the traditional landing place for Royalty visiting Australia and a number of commemorative trees have been planted in the Botanic Gardens by them. Such trees still remaining include:

Martiusiella imperialis, a native of Brazil, planted by the Duke of Edinburgh in 1868 when visiting Sydney on H.M.S. Galatea.

Melaleuca viridiflora, the "Broad-leaf Paper Bark" of N.S.W. and Queensland, planted by the Duke of York (later King George V) in 1881.

Livistona australis, the "Cabbage Tree Palm" of Eastern Australia, planted by the Duke of Clarence in 1881.

Araucaria columnaris, a native of New Caledonia, planted by the Duchess of Cornwall and York in 1901.

During the visit of Her Majesty Queen Elizabeth II and the Duke of Edinburgh, commemorative trees were planted at Government House, and in addition trees were planted in pots which were subsequently placed in their permanent position in the Botanic Gardens by the Governor of New South Wales, Sir John Northcott.

Aproximately 570 official botanic gardens are listed throughout the world and, although many of these, particularly the European ones, are of great age, the Sydney Botanic Gardens are older than 80% of such establishments. In the southern hemisphere only the Botanic Garden at Rio de Janiero is older than those of Sydney.

Our Gardens have been associated with the development of Australia from the first days of white settlement and are unique in that, within their area, began the agriculture and horticulture of a continent. For no other area in any of the continents can such a claim be made.

EARLY DAYS

When the First Fleet arrived in Sydney in 1788 many plants and seeds were brought from England, Rio de Janiero and the Cape of Good Hope. From England was brought seed of crop plants, such as wheat and corn. From Rio de Janiero came plants and seeds of coffee, cocoa, cotton, bananas, oranges, lemons, guavas and the cochineal prickly pear.

The Cape of Good Hope supplied figs, bamboo, sugar cane, apples, quinces and

pears. Governor Phillip had the urgent responsibility of growing food crops immediately upon his arrival and an area was cleared near Sydney Cove where some of the introductions were planted. The area, however, was far too small for the growth of crops so other ground was selected to the east of Sydney Cove where a small stream and some alluvial soil gave promise of suitable conditions. The ground was cleared and to it were entrusted the first crops in Australia, the place soon being known as Farm Cove. In July 1788 Governor Phillip reported "a farm 9 acres in corn" and so began the history of Australian agriculture.

The area forms part of the present Botanic Gardens, the oblong beds of the Middle Gardens being preserved as more or less following the first furrows ploughed in Australia. In 1952 a stone and plaque were placed on the site to commemorate this part of our history (6J 4 q.).

INAUGURATION OF THE BOTANIC GARDENS

For the first few years of settlement the areas under cultivation were used primarily for supplying the Governor and officers with fruit and vegetables and for many years portion of the Gardens continued to be used for such purpose. In a plan endorsed by Governor Phillip in 1792 the farm at Farm Cove was named the Governor's Farm and early Governors tended to regard the areas at Farm Cove as adjuncts to Government House. Governor Phillip, however, set aside a large area for parks and gardens which was subsequently known as the Phillip Domain. This included the present Botanic Gardens and Domain, but extended far beyond the present boundaries, including Hyde Park and adjoining ground.

Subsequently the various areas became more definitely defined by roads, walls and fences. The Macquarie Wall was built through portion of the Phillip Domain during the early years and portion of this built about 1812 still remains along the northern side of the Spring Walk (6H 6u).

The official date for the inauguration of the Botanic Gardens as such is June 13th, 1816. This is the date inscribed on Mrs. Macquarie's Chair which is carved out of rock on the eastern point of Farm Cove. It marked the completion of Mrs. Macquarie's Road which was commenced in 1813 and which represented part of Macquarie's efforts to define the Domain and the Gardens. Charles Fraser was appointed to supervise the Gardens, although his actual title is in some doubt. He was known variously as Colonial Botanist and Superintendent in later years, but his task of supervision can be said to have begun in 1816. Thus although the official birthdate of the Gardens is taken as 1816 it can be claimed that portions of them have been under continuous cultivation since 1788.

COMPOSITION OF THE GARDENS

The Botanic Gardens in their present form consist of 4 portions, the Upper Garden, Middle Garden, Lower Garden and the Garden Palace Grounds. The Middle Garden is the oldest portion of the gardens and it was here that the first cultivation began. In 1825 about 5 acres of land west of the creek were added to it. The main entrance to it was at the point (7K4n) at present marked by 2 palms (*Livistona chinensis*) which were brought from the Island of Bourbon, now the Island of Reunion, in sugar barrels by Jules Bourbon in 1847.

The Middle Garden has always been closely cultivated. The well-known Spring Walk was first planted with azaleas and other plants in 1856 when the soil on the southern side of the wall was removed to a depth of 2½ feet and replaced with soil and compost from Rose Bay.

THE UPPER GARDEN

Originally the Upper Garden consisted mainly of a kitchen garden for early Governors, about 5 acres being devoted to this purpose. In addition various buildings such

as stables, workshops and official residences used in general maintenance of the Gardens were erected upon it. Space was also provided for the various propagating grounds and green feed for various animals and birds was grown. A garden road bordered by a paling fence led from the main entrance to the Middle Garden and this was the only portion to which the public had access.

It was not until 1876 that the area was made available to the general public. The present entrance gates (7L1s) were erected in 1872-1873, the cost being L408, and subsequently the adjacent areas were cleared and landscaped. Various stone dams were built in the creek between 1870 and 1880.

THE LOWER GARDEN

The Lower Garden was added to the Gardens as the need for expansion became pressing. Some of it was laid out by Charles Fraser, and Surveyor-General Mitchell's plan of 1833 shows it in a form roughly agreeing with the present boundaries.

The waters of the harbour, however, in those days came up nearly as far as the present refreshment kiosk and a great amount of reclamation was required. Silt dredged from the mouth of the Tank stream in Sydney Cove was used as filling, in addition to excavations from city buildings.

Indeed much of the soil in the Botanic Gardens came from outside sources. The natural soil except for a few patches was poor with rock close to the surface. The reclaimed areas of the Lower Gardens, especially where filled with silt, provided some of the best and deepest soil.

The present sea wall built of stone was commenced about 1848 and finally completed in its present form in 1878. Mrs. Macquarie's Road ran through the Lower Gardens along the stone wall bordering the Middle Garden, but was closed about 1850. The present broad walk running along the upper part of the Lower Garden on the southern and eastern sides corresponds roughly with the old road.

The line of Swamp Mahogonies (*Eucalyptus robusta*) bordering this road are still in existence on the northern side of the stone wall (7H8r). They were planted by Jack Wright who held a potato stall in the markets.

Some of the native trees or seedlings from them which grew originally on the area still survive. Probably some of these trees were growing when the First Fleet arrived. The small clump of Swamp Oaks (*Casuarina glauca*) growing near the Maiden Memorial Pavilion (7G7s) forms such a survival. The Forest Red Gum (*Eucalyptus tereticornis*) (8G4q) and the Bangalay (*Eucalyptus botryoides*) (3F6m) are probably other examples.

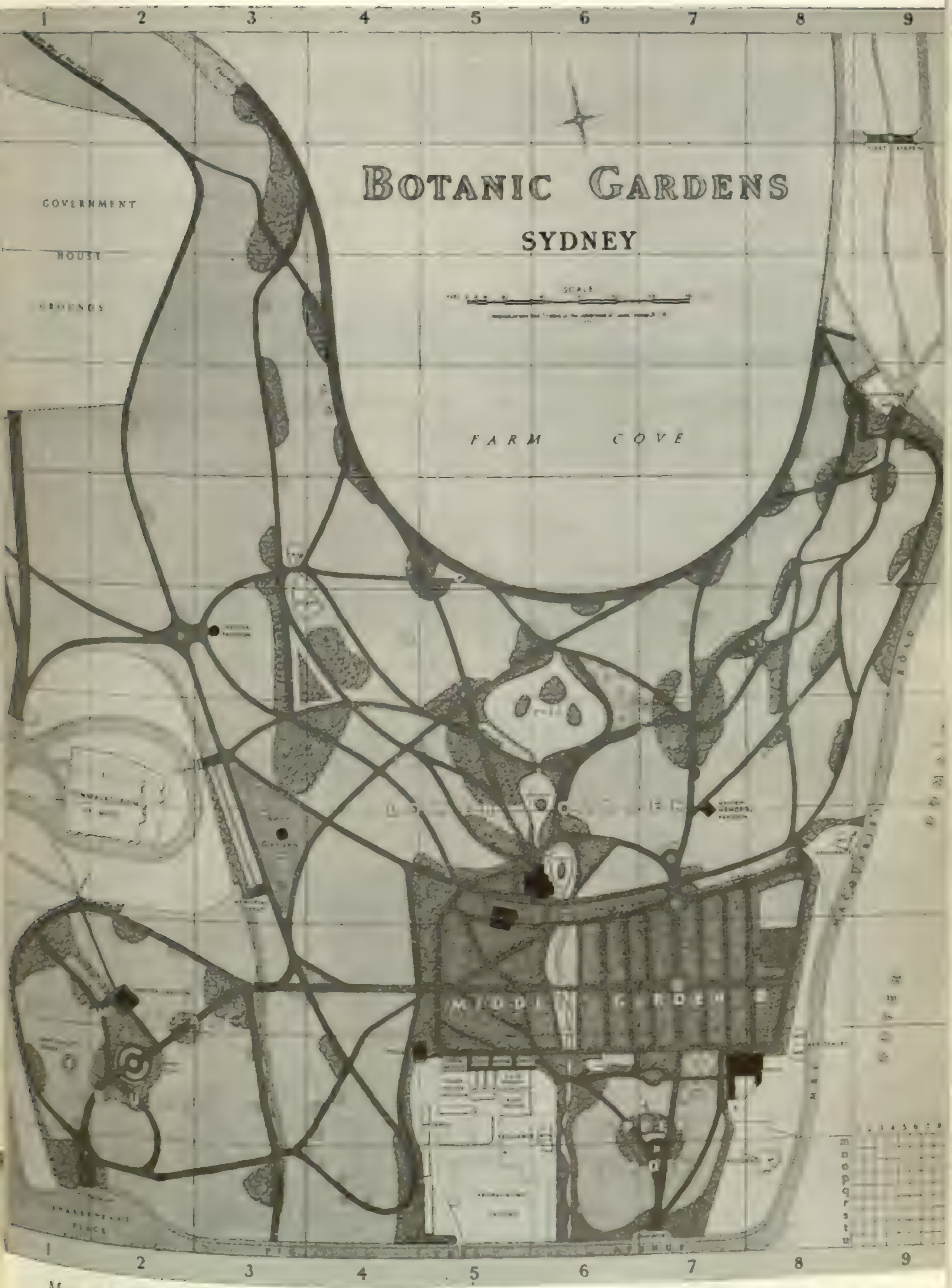
GARDEN PALACE GROUNDS

Originally this area was enclosed by a paling fence and used partly for grazing the Governor's stock. On it at various times were situated 3 windmills held on leases granted by Governor King, and some difficulty was experienced in finally ejecting the lessees. One of these windmills was situated approximately on the spot where the statuary "Huntsman and Dogs" now stands (2H3u). The State Bakery was also situated nearby.

In 1869 an ornamental rail fence was constructed along Macquarie Street, enclosing the grounds in a more fitting manner.

In 1879 the grounds were prepared for the International Exhibition and the imposing Garden Palace erected. This was destroyed by fire in 1882 and the grounds became known as the Garden Palace Grounds and virtually part of the Botanic Gardens. The main entrance gates of iron and stone opposite the Public Library were finished in 1889 and formed a very appropriate entrance. Above the centre gate is a representation of the Garden Palace.

In 1900 the last addition to the Botanic Gardens was made by the inclusion of



Map of Sydney Botanic Gardens. Text figures such as (6H 6u) refer to map coordinates along the edges and in the quadrate square, lower right hand corner.

5 acres of land from the Inner Domain on the west side of Farm Cove. The widening of Macquarie Street, in 1912 resulted in a strip of land about 20 feet wide being taken from the Gardens.

ADDITIONS TO PLANT COLLECTIONS

The early development of the Gardens was stimulated by the great interest shown in Australian plants by botanists and nurserymen in other parts of the world. Most of the important botanic gardens and similar institutions considered it most desirable to have a "New Holland" collection of plants and this led to a brisk exchange of seeds and plants. The Sydney Gardens provided the centre for such exchange and gradually valuable collections were added to the existing plants.

The early officers-in-charge took part in expeditions which added naturally to the Gardens. Charles Fraser accompanied Oxley on his three exploring expeditions during 1817-1819, during which many districts were visited in New South Wales and many

One of the original cabinets used by Sir Joseph Banks. Frame above contains specimen of *Banksia ericifolia*, collected by Banks near Sydney in 1770. A picture of Sir Joseph Banks appears to the left of the cabinet. Photo: Australian Consolidated Press Ltd.

View from the Gardens looking towards Sydney Harbor Bridge. Queensland Bottle Tree, *Brachychiton rupestre,* on right and Red Gum on left. Photo: Australian News and Information Bureau.

specimens and plants obtained. Fraser also visited Tasmania, New Zealand, Norfolk Island, Western Australia and Queensland and carried out a very active exchange with overseas botanical institutions. Richard Cunningham lost his life while on Mitchell's second expedition to the Darling River, being killed by the blacks after having wandered away from the main party in his search for plants. Allan Cunningham accompanied Oxley on his expedition in 1817 during which he collected specimens of 450 different species. He spent several years from 1817-1822 on the survey ship "Mermaid" exploring and surveying the Australian coast line, collecting many plants and specimens. He explored many parts of New South Wales including the Illawarra, Blue Mountains, Bathurst and North Coast districts, going as far north as Moreton Bay in Queensland. He also visited New Zealand and Norfolk Island.

Charles Moore, during the 48 years he was in charge of the Gardens visited many districts in New South Wales, and collected in various Pacific Islands, including the New Hebridies, Solomon Islands and New Caledonia. He also visited Europe on three occasions. Many of the plants collected were added to the Sydney Gardens. Later directors continued the work of building up the collections, and at present time an exchange of seeds is being carried on with approximately 185 Australian and overseas institutions. The establishment of well-grown plants within the Gardens was no very easy

matter as the natural soil was poor in most parts and required much building up. Watering facilities were also inadequate. Moore in 1850 complained of the scarcity of water as he was limited in dry seasons to a few casks each day from the Hyde Park Fountain fed by Busgy's Bore. In 1852 Moore lamented the loss of most of his workmen who joined in the gold rush of that year.

Early regulations governing the conduct of the Gardens were few. Smoking was prohibited in 1848 and the ban remained until 1921. In 1838 a regulation was issued forbidding cultivation of vegetables in the Gardens, following on Allan Cunningham's protest and resignation. The Director in 1848 had the right to refuse entry to all persons "not cleanly and decently dressed; and all young persons not accompanied by some respectable adult".

SCIENTIFIC STATUS

Botanic Gardens require a scientific background in order to carry out their proper functions. The National Herbarium of New South Wales provides such scientific service for the Sydney Botanic Gardens. It contains the State's collection of plants and is the centre of research on systematic botany in New South Wales.

The Herbarium includes over 700,000 specimens, many of which are of considerable scientific and historical value. Research work has been active particularly since 1896 when J. H. Maiden assumed office, and as a consequence the Sydney Botanic Gardens have gained an international scientific status.

Apart from publication in the journals and proceedings of various scientific societies, many publications have been issued direct from the Herbarium, including Maiden's monumental "Critical Revision of the Genus Eucalyptus", the "Forest Flora of N.S.W." and other works; Blakeley's "Key to the Eucalypts"; Rupp's "Orchids of New South Wales"; and Anderson's "Trees of New South Wales". Since 1939 the results of research work have been published in the "Contributions from the New South Wales National Herbarium".

In continuation of the tradition of being of service to primary industry the botanical section identify and report on many thousands of weeds, poison plants, and fodder plants, sent in by farmers and pastoralists every year. In addition services are provided for the general public, State and Federal Departments, the University and local governing bodies.

The greater part of the Herbarium has been developed during the past 60 years. Prior to 1899 efforts to form a State Herbarium were of a very spasmodic nature, only a few thousand specimens being attached to the museum of the Sydney Botanic Gardens. In 1899, however, the present building (7K) was erected, and in the words of J. H. Maiden, Government Botanist at that time, "the Herbarium had at last a habitation and a home."

The first collections of New South Wales plants made by Banks and Solander in 1770 were lodged in the British Museum, and it was not until 1905 that a number of these were presented to the New South Wales Herbarium by the trustees of the British Museum. Other early collections made by Dr. John White, William Paterson, Robert Brown and George Caley were placed in various European herbaria.

In 1816 Allan Cunningham was appointed King's Botanist, and the large collections made by him were sent to the Royal Botanic Gardens, Kew, and to the British Museum. In the same year, on the establishment of the Sydney Botanic Gardens, Charles Fraser

was appointed Colonial Botanist and made fairly large collections of plants. Most of them, however, were subsequently lost through neglect, the residue being sent to England. The German naturalist, Dr. Ludwig Leichhardt, collected freely between 1844 and 1846, and although many of these specimens were sent to Germany, a number were placed in the Sydney Botanic Gardens Museum.

Forest Red Gum, *Eucalyptus tereticornis*. One of the survivors of the original vegetation of the area. Compare tree size and park bench to right. Photo: Australian Consolidated Press Ltd.

Charles Moore, on taking office as Colonial Botanist in 1847, stated that not a vestige remained of the herbarium formed by his predecessors. During his long term a small collection of plants was gradually accumulated, but on J. H. Maiden taking office there was still very little evidence of a representative State collection. A fairly large portfolio containing some 150 pages represents a survival of this collection.

On it is written in Maiden's handwriting: "One of twelve books of specimens which constituted the National Herbarium of New South Wales up to May, 1896". In the annual report of 1898 Maiden states that the number of named specimens in the Herbarium was probably less than 15,000.

In 1899 a new building was provided, and this was formally opened in 1900. From that time onwards systematic additions were made to the collections until at the present time the Herbarium contains over 700,000 specimens.

California Native Plant Garden

MARK ANTHONY

Descanso Gardens has long been famous for its camellias, azaleas and roses, but now under the guiding hand of Theodore Payne the California Native Plant Garden has been established. It is located on a ten acre site, rich in native growth, near the western boundary of the Gardens.

In order to facilitate this work the California Native Plant Gardens Committee comprised of: Dr Wm. S. Stewart, Arthur Barton, Percy Everett, Conrad Fanton, Theodore Payne, John L. Threlkeld, and Sim E. Jarvi, was formed and the Garden was formally dedicated on May 1, 1959.

After trails and roads were laid out, a boulder strewn stream was constructed through fern canyon to the little lake in the lower part of the Garden.

First the native pines, firs, junipers and cypress were set out; next came a sizable planting of California redwoods, both *S. sempervirens* and *S. gigantea.* Then ceanothus, in dozens of kinds, were planted. After these, came hundreds of native species, too numerous to mention.

The largest percent of these plants were donated by Mr. Payne from his nursery, but others came from the Santa Ana Botanic Garden or were grown here at Descanso. From our water canyon north of the Gardens we brought in a planting of Humboldt lilies that bloomed to perfection this spring. A large planting of native blue eyed grass (*Sisyrinchium bellum*) was also moved to the native area. Many of these new plants were quite small. Mr. Payne planted drifts of California poppy, lupin, baby blue eyes, godetia, clarkia, gilia, phocelia and coreopsis so as to have a carpet of flowers around and underneath until the plants became larger.

The plants are labelled with both common and botanical names so that people going through the Garden can learn what to plant in similar spots in their own gardens.

A rest area, covered with native grape vines, has just been finished on the edge of the Native Garden. This structure allows a person to rest leisurely and see the entire garden spread out before him.

Trails leading from the Native Garden continue into the back country behind the Gardens and open up an entirely new area to hikers and nature lovers alike.

The Native Plant Committee sponsors three or four lectures a year which highlight subjects dealing with California native plants.

Educational Programs

Los Angeles County Department of Arboreta and Botanic Gardens

The 1960, Fall Semester of the Educational Programs began with the Adult Education Courses on September 12 and September 19. The following sample schedules of the various educational activities report the details of all programs.

This fall, the Department initiated its Professional Gardener School. It is too early to report in detail the progress of this newest venture. A resume of the entrance requirements and daily program is included for the record.

Dr. Louis B. Martin is in charge of all the educational activities for the Department. Mrs. Gertrude Woods supervises the Children's Program for the Arboretum and also aids in the supervision of the same program at Descanso Gardens. Mrs. Dorothy Pool is in direct charge of the Children's Program at Descanso Gardens.

In addition to the 'Formal' courses for children, there are special guided tours at both the Arboretum and Descanso Gardens for Elementary Grade level children. Mrs. Woods and Mrs. Pool direct this activity at their respective locations.

Adult Program

SCHEDULE OF COURSES — FALL, 1960

Course	*Day*	*Inclusive Dates*	*Time*	*Instructor*
ARBORETUM, FALL 1960: Co-sponsored with Arcadia Unified School District; Fee $2.00 each course:				
1. Intro. Home Horticulture	M	Sept. 12-Dec. 12	7-10 PM	Don Woolley
2. Plant Propagation	T	Sept. 13-Dec. 13	7-9:00 PM	George Lewis
3. Home Landscaping	W	Sept. 14-Dec. 14	7-9:00 PM	Tom Parker
4. Ident. of Cultivated plants	W	Sept. 14-Dec. 14	7-9:00 PM	Dr. Enari
ARBORETUM, FALL 1960: No fee:				
5. Botanical Sketching	T	Sept. 13-Dec. 14	9:30-11:30 AM	Gerry Patten
ARBORETUM, FALL 1960: Co-sponsored with UCLA Extension; Fee $25.00 for each course:				
6. Sprinkler Systems in Landscaping #836AB	M	Sept. 19-Dec. 12	7-9:30 PM	Norman Hammer
7. Plant Combination Theory #832AB	M	Sept. 19-Dec. 12	7-9:30 PM	Philip Chandler
8. Principles of Landscape Design #806AB	T	Sept. 20-Dec. 13	7-9:30 PM	Scott Wilson
DESCANSO GARDENS, FALL 1960: Co-sponsored with Pasadena City College, Extended Day; no fee:				
9. Intro. Home Landscaping	M	Sept. 12-Dec. 12	7-10 PM	Mark Anthony
10. Home Landscaping	M	Sept. 12-Dec. 12	7-10 PM	Frank Halverson
11. Botanical Sketching	M	Sept. 12-Dec. 12	7-10 PM	Gerry Patten
12. Orchid Culture	W	Sept. 14-Dec. 14	7-10 PM	Glenn Hiatt
DESCANSO GARDENS, FALL 1960: No fee:				
13. Botanical Sketching	Th	Sept. 15-Dec. 15	9:30-11:30 AM	Gerry Patten

COURSE DESCRIPTION

Intro. to Home Landscaping or Horticulture:

For the home owner. Non-technical, includes facts and procedures of planting, pruning, fertilizing, watering and maintenance of the home grounds. Introduction to plant materials.

Home Landscaping:

Basic principles of layout and construction. Attention to individual landscape problems of the home owner. Recommended to follow either Introduction to Home Landscaping or Horticulture.

Plant Propagation:

Fundamental facts and procedures of seeding, cutting, budding, layering and grafting methods of propagation. Lectures and greenhouse work. Home owner and hobbyist level.

Identification of Cultivated Plants:

Learning to know and recognize ornamental plants, exotic and native, through the use of botanical vocabulary and plant "keys".

Botanical Sketching:

Use and appreciation of basic art forms. Pencil and sketch pad medium. Plants, whole or in part, used as models.

Orchid Culture:

Major genera and included species. Culture practices and greenhouse operations for orchids. Some workshop sessions.

Sprinkler Systems in Landscaping: #836AB:

Design, layout and installation of modern sprinkler systems. The automatic sprinkler controllers. General code requirements. Considers pumps, fountains, pools and drains.

Principles of Landscape Design #806AB:

Basic principles of good landscape design. Considers sites, site utilization, plant materials, soils, sprinkler systems, design and construction.

Plant Combination Theory in Professional Landscaping #832AB:

This course, which assumes a reasonably thorough familiarity with basic plant identity and cultural requirements, offers inquiring study of plant material use in relation to sight and structure. Lecture and demonstrations will alternate with group discussions.

Professional Gardener School

The following information is intended as a guide only, to the curriculum of the Professional Gardener School which this Department will start this fall.

I. Conditions and Minimum Requirements for Enrollment.
   1. Title—Gardener Apprentice
   2. Age—17 to 25
   3. Single
   4. High School graduate
   5. Male or female
   6. Must complete one year minimum training for any credit.
   7. Must enroll in one Adult Education night course in Fall, Winter and Spring.

8. Must read and report on a minimum of one book per month, chosen from recommended Reference Library reading list.
9. Must prepare and present a minimum of one seminar during the year.
10. Must maintain a grade of 75 in all Lecture Phase work. Major portion of grade will be based on examinations.
11. Must maintain a grade of 'competent' in Practical Phase work.

II. Operation:
1. The School will be in session one-half day, 8:00 AM to 12:00 PM Noon, Monday through Friday.
2. Four (4) hours a week will be devoted to the Lecture Phase; and sixteen (16) hours a week devoted to the Practical Phase.
3. The first student class will be in session for one year from beginning date.

III. Subjects — Lecture Phase
1. Botany
2. Soil, Fertilizer, Water
3. Propagation
4. Floriculture
5. Aboriculture
6. Plant Identification
7. Plant Pathology
8. Plant Physiology
9. Entomology
10. Turfgrass, Weed Control
11. Plant Genetics
12. Review, Exams, Seminars

IV. Work Areas — Practical Phase
1. Greenhouse
2. Australian
3. Descanso (Camellias)
4. Mediterranean and Bamboo, Palms
5. Descanso (Roses)
6. South Africa
7. Nursery
8. Tallac Knoll
9. Demonstration Garden and Herb Garden
10. South America

Children's Schedule

Los Angeles State and County Arboretum, Arcadia

FALL SCHEDULE — 1960 — REGISTRATION BLANK

INFORMATION:

1. Each child is eligible for one class.
2. Registered children will be admitted and dismissed at the 291 Old Ranch Road Gate.
3. Wear outdoor clothing and shoes suitable for unsurfaced trails. No beach walkers please!
4. When registration slip is returned, your child *is accepted unless you are notified* that registrations are closed.

SCHEDULE

Subject	*Grade*	*Time*	*Day*	*Begins*	*Ends*
Indoor Gardens	1	3:00-4:00	Wed.	Oct. 5	Nov. 9
Indoor Gardens	2	3:00-4:00	Fri.	Oct. 7	Nov. 11
Exploring Nature	3-4	3:45-5:15	Tues.	Oct. 4	Nov. 8
Advanced Nature Study	5-6-7	4:00-5:30	Thurs.	Oct. 6	Nov. 10
Gardening	4-5-6	10:00-12:00	Sat.	Oct. 1	Jan. 28

Christmas Trees	3-4	3:30-5:00	Tues.	Nov. 22	Dec. 20
Holiday Plant Craft	5-6-7	4:00-5:30	Wed.	Nov. 16	Dec. 21

Children's Program

Descanso Gardens, La Canada

FALL SCHEDULE — 1960 — REGISTRATION BLANK

INFORMATION:

1. Each child is eligible for one class.
2. Registered children will be admitted and dismissed at the Lake Cottage.
3. Wear outdoor clothing and shoes suitable for unsurfaced trails. *No beach walkers please!*
4. When registration slip is returned, your child *is accepted unless you are notified* that registrations are closed.

SCHEDULE

Subject	*Grade*	*Time*	*Day*	*Begins*	*Ends*
Indoor Gardens	1-2	3:30-4:30	Wed.	Oct. 5	Nov. 9
Exploring Nature	3-4	4:00-5:30	Fri.	Oct. 7	Nov. 11
Gardening	5-6-7	10:00-12:00	Sat.	Oct. 1	Jan. 28
Holiday Plant Craft	5-6-7	4:00-5:30	Thurs.	Nov. 10	Dec. 22

Ferns Cultivated in California

LYGODIUM

BARBARA JOE

The Japanese climbing fern, *Lygodium japonicum,* is an impressive fern when seen as a trim, large screen of soft green foliage. An interesting lattice is formed by planting several of the ferns in a row and allowing them to cover a frame of string or wire. Tightly twining in habit, the fern will grow for considerable distances upon a support. What is seen as the "twining stem" of the fern is actually the rachis or midrib of the frond. The entire frond extends from the ground to the tip of the growing point, sometimes a distance of several yards. The foliage portions are the pinnae of the frond rather than the individual fronds as one might believe. Climbing leaves are unusual among ferns, for ordinarily the climbing parts are the stems or rhizomes. In the wild, this climbing habit serves to carry the foliage above the surrounding vegetation to points of better light and air.

This fern is grown outdoors in pots or beds in southern California. However, greenhouse specimens, found throughout California, are usually more luxuriant in growth. Aside from providing some type of support for this semi-hardy species, the remaining cultural practices are the same as required by ferns in general, that is a medium shade,

and a soft soil with a good amount of organic matter. Propagation is by spores or by divisions of the underground rhizome.

The genus *Lygodium* is composed of forty species which are all climbers. They are distributed in tropical and subtropical regions of all continents. The hairy underground rhizome gives rise to fronds of indefinite growth. The midrib is stem-like, long and twining, bearing the alternate pinnae, which are easily mistaken for fronds. The pinnae are borne on short stalks which branch dichotomously into two pinnules. The pinnules are variously pinnate or palmately divided. The fertile pinnules are somewhat contracted, and have along their margin a fringe of short, narrow lobes. Each lobe bears two rows of sporangia which are covered by a hard, scale-like indusium.

The only species presently cultivated in California is *L. japonicum*, frequently misnamed *L. scandens* in the trade.

Lygodium japonicum Swartz. Japanese Climbing Fern. Pinnules light green, 4-8 in. long, and nearly as wide, deltoid; terminal segment pinnatifid, the lateral ones 2 or 3 on each side, very unequal, the lower ones long stalked and pinnate; margins serrate. Asia and Australia. Semi-hardy to tender. *L scandens* Swartz with which this species has been confused has less divided fronds, the segments being simple and ovate, or lobed at the base. Other species reported to be cultivated in the United States are *L. circinnatum* (Burm.) Swartz, *L. palmatum* (Bernh.) Swartz, and *L. volubile* Swartz. The tightly twining habit and the fertile parts borne on marginal lobes readily distinguish members of this genus from all others.

Lygodium japonicum, fertile pinnae. Note that the pinnae are borne on a short stalk, and then branch dichotomously into two pinnules.

COVER PICTURE

Lygodium japonicum, Japanese Climbing fern. Left, portion of frond with sterile pinnae. Right, fertile pinnule.

REGISTRATION OF NEW CULTIVARS

PERCY C. EVERETT

As a member of the American Association of Botanical Gardens and Arboretums, the Rancho Santa Ana Botanic Garden, Claremont, California, has agreed to assist in the registration of all new cultivars and to supply its facilities as a repository for the necessary records, for the following genera: *Arctostaphylos, Ceanothus, Dendromecon. Fremontia, Garrya,* and *Romneya.* Anyone wishing to introduce a new cultivated variety in any of the above genera, in accordance with the rules as set forth by the International Code of Nomenclature for Cultivated Plants, should consult with the above institution before proceeding. Information and forms will be provided to formally inaugurate the necessary steps for registering a new cultivar.

BOOK REVIEW

Budget Landscaping, by Carlton B. Lees. 152 pp. Illustrated with line drawings. Published by Henry Holt and Co., 383 Madison Ave., New York 17. 1960. $3.95.

This volume tells in a direct manner the essence of landscaping a small home. Written in a clear concise style, with numerous examples, it presents concepts, ideas, and practical methods of immediate value to anyone involved in home landscaping on a relatively small scale.

Section headings are: The Viewpoint; Defining The Space; The Front Yard; The Back Yard; The Material; Getting Your Lot on Paper; Analyzing Your Landscape, and; Organizing The Garden. Within the sections are intriguing discussions under such titles as: Logic in a small lot; A 1900 house brought down to earth and up to date; Parking in the front yard; On a postage stamp; Overcoming the bulldozer; Variety in fifty by sixty feet, and; A hint of the past.

Landscaping on a limited budget is the theme of the book and is truly shown in the "Do it yourself" approach and methods given. It is a book which in the words of the author "—is hoped, will help many families who live in ordinary house on ordinary city or suburban lots in neighborhoods either new or old."

The author conducted the Budget Landscaping class for five and one-half years at Kingwood Center, Mansfield, Ohio. Many of the valuable examples presented were actual home landscaping problems brought to class by the homeowner and solved in conjuction with him. Some of the solutions include a scheduled development of the property over a period of several years thus budgeting time as well as money.

Although the book has the flavor of eastern and mid-western landscaping the basic concepts of good landscape design and the methods are equally applicable in the west.

"Budget Landscaping" is recommended for the layman who has an urge to create within his landscape space an area that is more useful, attractive, and enjoyable to him. It is a book for 1960 living!

WILLIAM S. STEWART

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LASCA LEAVES

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