BIENNIAL REPORT
1971 - 1973

COUNTY OF LOS ANGELES

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KENNETH HAHN

ERNEST E. DEBS

BURTON W. CHACE

WARREN M. DORN

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1971 - 1973

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## Anniversary

The 25 th anniversary of the founding of the Arboretum was celebrated February 20, 1973, at a banquet held in the Mediterranean Room of the Brookside Clubhouse in Pasadena. Many of the original founders were present, among them Dr. Samuel Ayres., Jr., who first had the idea to create an arboretum for the people of Los Angeles County and who over the years has helped it in many ways; Howard Miller, who made the presentation a quarter of a century ago that transferred the Arboretum from its original parent, the California Arboretum Foundation, to an agency of the State and County; and former county supervisor, John Anson Ford, who persuaded his colleagues on the Board of Supervisors and, subsequently, State officials, to create the institution known today as the Los Angeles State and County Arboretum. Mr. Ford, whose twenty-four years as a member of the Board of Supervisors has never been exceeded, also played a key role in the development of Descanso Gardens as well as such other public institutions as the Hollywood Bowl and the County Museum.

Other longtime friends and supporters of the Arboretum in attendance were Dr. Frits Went, founding president of the Foundation; Mrs. John R. Mage, Mr. F. Harold Roach, Mrs. Ralph Cornell, Mrs. Forrest Stanton, Dr. Arie J. Haagen-Smit, and the late George Spalding. Mr. Kay Iizuka, president of the Board of Governors, presented on behalf of that body, a future Founders' Garden plaque. This small garden will be built alongside the path leading to the Sunset Demonstration Gardens and will consist of a circulating shallow stream starting from a spring-like fountain with various ground covers, grasses and mosses growing on either side and among the decorative rocks.

Slate Senator H. I. Richardson presented to Mrs. Peter I. Douglas, Foundation president, a scroll from the Board of Supervisors on behalf of Supervisor Peter Schabarum who was unable to attend. Mrs. Douglas accepting. The ceremonies for the evening ended with a few closing remarks by Department Director, Francis Ching.

## AABGA Meeting

Botanists, horticulturists, administrators, and landscape architects representing leading botanic gardens in the united State and Canada arrived in Arcadia on April 15, 1973, to prepare for a four day convention that conducted its principal business at the Arboretum. The participants were all members of the American Association of Botanical Gardens and Arboreta which meets each year at a different member garden to discuss matters of mutual interest. The meeting at the Arboretum centered on ducation an molic services and the kinás of programs botanic institutions offer in these categories.

Department Director, Francis Ching, organized a busy schedule for the 100 recisterca delegates. Darts of each day were given over to taking conforops on womicty of fiola trips that included visits to other botanic gardens in the area, a tour of rural areas where California wildflowers were in bloom, an early-morning exploration of the Los Angeles Flower Market, and a trip to the Monrovia Nursery, which comprises 350 acres of plants in containers, the largest nursery of it kind in the worla. The directors and officers of each place visited conducted tours and also were the presiding hosts at informal luncheon meetings.

On Monay, the 16 th, the first of three successive afternoon symposiums was held in the Arboretum Lecture Hall. With Dr. Mildred Mathias, director of the Botanical Garden-Herbarium of the University of California at

Tos Angeles, serving as chairman, nine panelists adaressed themselves to "The Wonderful world of Plants in Southern California." They were: Mildrea Davis, Iandscape designer; Fred Boutin, botanist, Huntington Botanical Gardens; Dave Verity, Native Plant Specialist, University of California at Los Angeles; Paul Hutchison, rare plant collector, Tropic World; George Spalding, botanical information consultant, Los Angeles State and County Arboretum; Philip Chander, landscape designer; Elmer Lorenz, rare plant collector; Donald P. Woolley, a plantsman; and Fred Lang, lanascape architect, A.I.I.A.

The next day, Joseph Oppe, director of the Arthur Hoyt Scott Horticultural Foundation at Swarthmore College, chaired a discussion on "Future Directions for the American Association of Botanical Gardens and Arboreta." panelists were: Angus Heeps, assistant director, Henry Foundation for Detanical Research; Glenn Park, horticulturist, Chicago Botanic Gardens; Dr. Eichard W. Lightly, coordinator, Longwood Program, university of Delaware; and Carl Totemeir, director, Bayard-Cutting Arboretum.

Dr. Lee Lenz, director of the Rancho Santa Ana Botanic Garden, was chairman of the final symposium, which was concerned with "Educational Programs at hrboreta and rotanic Garaens." Dr. Jacqueline Broughton, eaucation director, Santa Barbara Botanic Garden, spoke on "The Role of the Botanic Garden in Youth Education"; Dr. Roy L. Taylor, director, Botanic Garden of the University of British Columbia, spoke on "The Role of the Fotanic Garden in Graduate Education"; Dr. Elizabeth Scholtz, director, Brooklyn Botanic Garden, spoke on "The Role of the Botanic Garden in fdult Education"; and Dr. Richard W. Lightly on "The Role of the Botanic Garden in Horticultural Education."
H. Mrie J. Maagen-Smit, California's ronowned expert on air poliution, was the principal speaker at the annual AABGA banquet, held the evening of April 17. Dr. Haagen-Smit spoke on "Smog, Plants, and people." The evening ended with the presentation of $A A B G A$ awards of merit and words of thanks to Mr. Ching for his organizational efforts from Dr. Richard A. Howara, director of the Arnold Arboretum of Harvard University and the new president of the $A A B G A$.

## Plant Introductions

The Plant Introduction Program continues as one of the Department's Drimary functions. Through June of 1973, the Department has introSuced 62 plant species and has developed contracts with southern California nurseries for introduction of an adaitional 15 . In adaition, the Propagation section is investigating or actively propagating 32 adie ano selections of plants that show hortionitural promise and we consiasfea potential introductions.

Flants introduced to the nursery trade 1971-73 included:

| December, 1971 | Camellia "John Anson Eord" |
| :---: | :---: |
| nocombers: 1971 | Gazania 'Sun-Gola' |
| December, 1971 | Gazania 'Sun-Burst' |
| Fugust, 1971 | Grevellia 'Red Glow' |
| March, 1972 | Grevellia 'Pink Pearl' |
| March, 1972 | Grevellia 'Pink Pygmy' |
| June, 1972 | Viburnum rigicum |
| August, 1972 | Nerium oleander 'Eetite Pink' |
| Eugust, 1972 | Nerium oleander 'Petite Salmon' |

## New Developments

In September, 1972, the Meadowbrook project was started. It required changing the flat area occupied by an annual-perennial display into hills and dales. Close to 8,000 cubic yards of earth were shifted in the process. A l,000-foot winding brook was constructed through this new meadow, never more than 8 feet wide nor more than 18 inches deep in an area in which the grade dropped a minimum of 6 feet. A path follows along the stream, crossing it at several points by means of redwood bridges. The project was funded by the California Arboretum Foundation, Inc. with matching funds from the County of Los Angeles and with much of the construction accomplished by the staff under the supervision of the superintendent and the director.

In the Sunset Demonstration Home Gardens, new features include a site at the north end of the garden developed as a demonstration vegetable garden. To assist those persons living in garden apartments and similar dwellings where the available planting area is limited, another small garden area featuring low-maintenance plants was developed, using railroad ties for a patio deck, and a driftwood fence.

The approach to the Aboretum has been changed considerably with the widening of Baldwin Avenue, the planting of a median strip and the planting of the areas adjoining the on-and-off-ramps of the Foothill Freeway. The entire complex features plants developed by the Arboretum and offers a splendid example of landscaping for beauty instead of viewing traditional stereotype plants. It also was an outstanding demonstration of cooperation between federal, state, county and city agencies. One hundred trees and over 60,000 ground covers have been planted in sufficient variety to provide color most of the year. To facilitate maintenance, automatic sprinkler systems were installed
through the coperative efforts of the Arboretum and the City of nrcadia.

In new garden area just north of the rotunda has been developed with the Arboretum's finest specimen of Tabebuia Chrysotricha (Golden Trumpet tree) as a focal point. This garden will eventually become the Founders' Garden, a gift from the Board of Governors to the CAF in recognition of the 25 th anniversary of the beginning of LASCA. (her developements included the following: a portable 864-foot saran shade area for weekend public lectures and three garden kiosks on which are posted horticultural information and coming events; repairing and resurfacing of roadways; painting county and state historical buildings; refurbishing the youth education building; proviäng electrical service throughout the historical mall for night lighting; instaliing new pumps and jets in the Bauer Pool and Fountain.
he inboretum is engaged in a cooperative program with the Los Angeles County Sanitation District to determine the limitations in the use of effluent (waste) water for irrigating ornamental plants. The prodram involves determining the toxicity (by plant research personnel) of the various chemicals, heavy metals, and salts nommaly found in such waters and the screening of plants for their resistance to these materials. The 17 -acre site has been fenced and water lines are currently being installed to transmit water for the outfall of the sanitation plant to the test site.

Pigures for this reporting period, 1971-73, show an increase of 8.1 percent. In comparison, attendance figures at the Arboretum for the past three biennial periods showed an increase of 3.5 percent. This change in the rate of increase, occurring as it has during a period in which county population has remained almost static, can be attributed to the public's response to an expansion of services, new garden programs, and other developments to be described in the following paragraphs.

$$
\frac{1971-72}{590,028} \quad \frac{1972-73}{626,994}
$$

## Weather

Daily readings of temperature, rainfall and humidity, plus general Wather observations, are recorded and forwarded monthly to the Los Angeles County Flood Control District from the Arboretum weather Station N. I037-E. Additional data is gathered for the U.S. Weather Fureau Fruit warning Service during the frost season which begins wovember is and continues until February 20. These readings are broadcast by radio all over the western united states.

Lowest Temperature

Highest Temperature
Total Days of Rainfall Reaviest Monthly Rainfall Yearly Rainfall


$$
6.5 \text { inches-Dec., } 1971 \text { 11.87 inches-Eeb., } 1973
$$

$$
8.1 \text { inches }
$$

$$
26.2 \text { inches }
$$

Muring the past two year period, the Arboretum has provided on-thejobtraining for 24 persons referred by the state Department of Senabilitation, 31 Work-Incentive recipients, 3 Public Employment Togram employees, I United way worker, and 3 volunteer trainees. The Arboretum had the benefit of over 40.000 hours of maintenance Work provided by persons assigned by the Los Angeles County Department f Public Social Services.

Neetinge at the Arboretum

Muring 1971-73, the Arboretum served as a meeting place for the societies, garden clubs, and civic organizations listed below:

Fhebono Bonsai Society


Hexacan fascomation of Botanical
Gardens and Arboreta
rrcadia Garden Club
modniaiskerra madre mewcomers

IELKK. Mondyumai Bonsai Gladiolus society
Burba Gomen's Club Greater Los Angeles Rose Council
Cactus \& Succulent Society of Amsrica

Californiá associates
California Association of murserymen

CaIifornia Garden Club
Chamber of commerce

Country Cousins
Comidaiom Sooiety

Higgers Garden Ciub

Entomological Clut of Southern California

Epiphylium goojety
Mloralia Guila

Herb Society
Judges Council of Southern California

Ias Jardineras Garden Club
Long Beach Amateur Orchid Society
Los Angeles County Employees Association

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    Ragoles Comaty Schools Santa Fnita Bonsai
\becausem's Gerden Club Southern California Camellia
    Council
#mpark College
    ational Ferb Society
racific Rose Society
Masadena Arts Council
Masadena morticultural Society
Fasadena Star News
San Gabriel Valley Branch Cactus
    & Succulent Society
San Gabriel Valley Orchid
    Hobbyists
    Southern California Daffodil Society
    Southern California Gladiolus
        Society
    Southern California Hemerocallis
        & Amaryllis Society
    Southern California Iris Society
    Southland Orchid Show. Inc.
    Theodore Payne Foundation
    United Way
    Women's Club of Bellflower
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Plower Shows and Special Events Held at the Arboretum - 1971-73
ril Show
Qu：ロップー・

Baiduin fonanza
Begonia Show Hugo Reid Roundup
Mryai Shon


Camelida Snom

Darly Camellia Show
Eoiphyllum Show
Pall wum show
Eondation Annual Luncheon

Gladiolus Show
Femerocallis \＆Amarvilis chow
Herb Show

Iris Show
Rose Show
San Gabriel Valley Eegonia Show
San Gabriel Valley Eall Elower and Garden Show

Spring Flower Show
Theodore Eayne Lectures（6）
25th Anniversary Dinner

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1973
In keeping with Department response to the needs of the community, the Public Services Division greatly expanded its publications program in this period, introducing some new brochures and revising and reprinting older publications. New publications are a Guide to Fond Ecology, Home Vegetable Gardening, and Poisonous plants of Southern California. Over 25,000 of these brochures have been distributed to the public, to hospitals and other public agencies. Requests from the public prompted the start of a series of leaflets on various horticultural subjects. Those produced so far are:

Iiving Irees for Christmas, Growing Azaleas in the Home Garden, and Guideline for Growth and Care of Scotch and Irish Moss.

Publications produced on a regular basis are:
Gargmat mewsietter - monthiy
amenaras - monthly
Schedules: Adult Education - fall and spring
Minicourses - yearly
Sunday Lecture/Walks series - yearly
Theudure Tayne foundation Loctures - yomily

A major pubilcation of the Department is its quarterly magazine, iASCA Leaves, distributed by the publisher, the California Arboretum Fomminion, to its members and to educational institutions and botanic gardens all over the worla.

The Public Services Division serves the communications media with news releases, features, photographs and radio spot announcements and arranges and assists television location broadcasts.

Printing

Offset printing services are provided for all divisions in the Department and for associated supporting foundations. Examples are: forms, seed lists, announcements, material for Arbor Day teacher manuals, horticultural instructions. Total printing by the division in this biennial period is 800,000 sheets of paper.

## Guided Tours

Waing this niennial period the greatest change in guided tours took ace at south Coast botanic Garden as a natural consequence of the Garden's being opened to the public seven days a week. The first Guided tour (by tram) was conducted in November of 1970. In April, 473, as aemand for tours rose, tram tickets were introduced, similar $\therefore$ Ghose useb at the zrboretum. As oxpectea, the pubilo responded Cry favorably to the convenience of having a ticket that would assure a seat at a specified time, thereby precluding the need to wait around in the tram loading area. Also, as at the Arboretum, the free tickets marked stimulated pubiic donations. At the Arboretum, the tram tour war lengthened to include a regular stop and walking tour of the new aquatic garden. At Descanso Gardens, tram tour service renained at the same level as in the previous biennial period but with yreater pubiic convenience provided by the introduction of tickets as at the other gardens.

School Pield Trips

The Department's three facilities are popular study areas for the 1.37 million students in the 95 school districts in the county of Los Angeles. Field trips for grades 3 through 12 are offered at each facility and are conducted mainly by volunteers. At the Arboretum, 50 volunteer field leaders were given intensive classroom and field training in two basic subject areas: plants and Man and Early California History. The curricula is developed in accord with approved State of California textbooks in the social and natural sciences with emphasis given to developing an understanding of man's roles in relation to his environment, utilizing the student's own school and home environment as a frame of reference.

Attendance and number of trips at each garden in this biennial period dra as follows:
$\qquad$
Arboretum
Total Trips I,550
Total Attendance $\quad 26,000$
Descanso Gardens
Total Trips 950
Total Attendance 14,000
South Coast Botanic Garden
Total Trips 300
Total Attenảance 6,700

Succial Events, Services, Public Relations

The Department supplies the audio-visual, graphic arts, printed matter, special tour and other requirements associated with the flower shows, lectures, concerts, meetings, and special events held at each facility. It is broadly responsible for the safety, conduct, and requests of the 1.2 million people who visit the three gardens annully. Included in this category are the handing of complaints, documenting accidents, assisting the ill or injured, helping to curtail vandalism, issuing car passes and wheelchairs, issuing mosquito fish (gambusia) from an aquarium filled and maintained by tour guides, issuing brochures and other printed information, providing special tours for senior citizens and other minority groups, setting up audio-visual equipment, maintaining and constructing public signs and looking after the wildiffe in each garden, all of uich are classified as wildiffe sanctuaries.

## EDUCATION

Through its Education Division, the Department continually updates educational programs that are relevant to the public needs in the field of horticulture, botany, gardening, California History and the various areas of nature study and conservation.

Each program utilizes the expertise of staff specialists and the horticultural and botanical resources of the three gardens.
current programs are:

Youth Education and School Programs
Adult Education Classes

Mini-Courses
Horticultural Information Service
Plant Science Library
Arboretum Historical Museums
Work Experience, Teachers and Volunteers Training
Arbor Day Program

Youth Education and School Programs

The Youth Education Program provides a gardening and nature-related curriculum throughout the year at each of the three gardens. Workshops are provided for children 6 to 14 years of age and are scheduled after school, Saturdays, and during summer vacations.
1971-72 1972-73 Total

Youth Classes -
Three Facilities
ittendance
5,946
5,987
11,933

## Adult Education Classes

Day and evening classes for adults are cosponsored by the Department, Pasadena City College, Los Angeles Harbor College, U.C.L.A. and affiliated foundations. They are designed to serve the horticultural interests of the home gardener and those interested in environmental and nature-art subjects. The following classes were offered in this period:

Agricultural Chemicals
Birds and Our Environment
Bonsai, Advanced
Bonsai, Begimning
Bonsai, Intermediate

California Heritage
Container Gardening
Contemporary Flower Arrangements
Down to Earth Art
Environmental Flower Arrangement, Advanced

Hlower Arrangements
Hower Arrangements, Advanced
Garden Insects and Diseases
Herbs
Home Gardening
Home Gardening, Advanced
Home Gardening, Basics
Home Horticulture
Home Landscape Design
Japanese Flower Arrangements

Orchid Culture
Plant Identification
Plant Propagation
Poisonous, Medicinal and Edible Plants

Shade Gardening
Sketching and Painting
Taxonomy of Flowering Plants
Treasures in Nature
Vegetable Gardening

Total Adult Classes for the biennium were:

| 1971-72 | 1972-73 | Total |
| ---: | ---: | ---: |
| 35 | 40 | 75 |
| 16.310 | 23.122 | 39.432 |

## Mini-Courses

The adult education classes offered by this Department have largely been scheduled according to traditional semester periods, the classes meeting, for the most part, during evening hours in accord with standard adult education practices. Attendance at these evening classes has demonstrated that this scheduling should continue. At the same time, it has become clear that there is a sizeable segment of lie public that has (I) free hours during the day; and (2) would lik: Lo cover a subject in less than the semester period. As a cunsequence, the California Arboretum Foundation, with the assistance of the Arboretum staff, introduced in the fall of 1972, a series of
mini-courses that would meet for from three to five sessions, three hours per session. A dozen subjects were offered, many at beginning and advanced levels. Public response has substantiated the efforts made to design and prepare these short, intensive courses which are expected to become part of the curricula offered by the Education Division.

Subjects offered were:

Aboriculture I \&II
Botany I \& II
California History
Container Gardening
Edible, Poisonous and Medicinal Weeds

Genetics and Plant Breeding

Hanging Baskets
Holiday Decorations
Plant Diseases
Plant Physiology
Soils, Hydroponics and Fertilizers

Terrariums

## Horticultural Information Service

During 1971-73, the Horticultural Consultant, George Spalding, answered nearly 8,000 public inquiries.

Telephone Inquiries

| 1971-72 | 1972-73 | Total |
| :---: | :---: | :---: |
| 3,378 | 3,608 | 6.986 |
| 484 | 470 | 954 |
| 3,862 | 4,078 | 7,940 |

Mr. Spalding also wrote 93 "Plant of the Week" features for the Pasadena Star News, a column informing citizens of the habits and culture of a specimen plant currently in bloom at the Arboretum and suitable for the homeowners. He prepared an annotated list of

Australian plants used in California landscapes and was a consultant for eight publications of the Time-Life Garden Series. Mr. Spalding's final major contribution to the Department was his authorship of "A History of the Arboretum: The First Twenty-Five Years," written to commemorate the Arboretum's 25th anniversary.

We are saddened to report that Mr. Spalding died on January 12, 1974, at the age of 59. He had been with the Arboretum since its inception in 1948. His extensive knowledge of its history, his expertise in the field, and his helpful nature will truly be missed by the staff and his many friends.

Plant Science Reference Library

At the end of this biennium, the library contained 18,305 catalogued books and pamphlets and subscribed to 528 periodicals. Volunteers gave 1,585 hours of assistance in cataloguing old collections, eliminating numerous duplicate books, renovating leather binding, typing index cards, and performing reference work under the direction of the Plant Science Librarian. The library is open weekdays to the mublic on a reference basis only.

Arboretum Historical Museums

A total of 15,285 visitors in 1971-72 and 18,784 in 1972-73 visited the Department's newest historical building, the Santa Anita Depot. Over 90 donors donated 615 artifacts, among them an original E. J. Baldwin gold watch.

Oucen Anne Frolic

On September 24, 1971, the California Arboretum Foundation and its volunteer organization, Las Voluntarias, plus members of the Arboretum staff, the Foundation Board of Trustees, the Board of Governors and the president of the Descanso Gardens Guild, combined to present the "Queen Anne Frolic," on the mall in front of the Queen Anne Cottage. An evening, first-of-its-kind fund-raising party, the event was successful beyond all expectations and netted close to $\$ 5,000$, most of which was earmarked for seeds and plants at the Arboretum for the following year. Highlights of the entertainment were rides in horseless carriages, dancing and special tours of the historical buildings.

Work Experience, Teacher and Training Programs

Consultation was provided for the Instructional Services Division of Los Angeles County Schools in developing a model for In-Service Teacher Training in environmental studies.

The Department also sponsors an "Enrichment Program for Gifted Elementary Students" in which a staff specialist develops a program with a local school teacher providing 15 students with six weeks of work experience on the Arboretum grounds as part of their school curriculum.

A second Work Experience Program provides for training of a number of high school students who work for experience two hours per day, five days per week for one school semester. The students work in the Herbarium, Research, Horticulture or Youth Education sections and are required to write a paper at the end of their service.

In cooperation with the Personnel Administration and the Manpower Duvelopment Training Act (MDTA), the Department provides classroom and field training at its three facilities for unemployed persons interested in horticultural pursuits.

## Rrbor Day Program

Past Arbor Day celebrations that have taken place on the grounds of each of the Department's gardens have been replaced by school-centered Wograms available to all elementary schools in Los Angeles County. The aim of the new program is to reach a greater number of young roople than heretofore possible and to involve them more deeply in the basic meanings of Arbor Day: conservation and beautification of the environment. The essence of the program is a handsome, tcacher resource kit consisting of directions for tree planting, lo-inch $x$ l2-inch folder containing a sample school program, and a list of organizations supplying information on ecology and related subjects. In 1973, 60 County school districts took part in the program, 482 schools presenting programs to their students, faculty, arents, and friends. Each participating school received a 6-foot trce grown by the Arboretum, along with the packet of resource material.

## ABC

Number Schools Participating

18
AIhambra
4
Arcadia
10
Azusa 2
Baldwin Park 3
Bassett 3
Bellflower 3
Beverly Hills 2
Bonita 2
Burbank 3
Charter Oak 3
Claremont 5
Compton 29
Covina Valley 12
Downey 6
Duarte 6
East Whittier 3
El Monte 3
El Rancho 4
El Segundo I
Garvey
2
Glendale 14
Glendora 9
Hacienda-La Puente 5
Hawthorne I
Hermosa Beach 4
Inglewood 4
La Canada 4
Lawndale 9
Iittle Iake 5
School
District

Long Beach
Los Angeles 9Los Nietos114Lowell3Lynwood4
Manhattan Beach ..... 92
Monrovia
Montebello ..... 17
Norwalk ..... 1
La Mirada ..... 7
Montclair ..... 2
Ontario ..... 1
palos Verdes Peninsula ..... 17
Pasadena ..... 26
Pomona ..... 8
Redondo Beach ..... 4
Rosemead ..... 5
Rowland ..... 5
San Gabriel ..... 4
San Marino ..... 1
Santa Monica ..... 7
South Pasadena ..... 3
South Whittier ..... 6
Temple City ..... 6
Torrance ..... 25
Valle Lindo ..... 3
Walnut Valley ..... 2
West Covina ..... 3
Whittier ..... 3
Wiseburn ..... 3

The major garden improvement was the completion of a $\$ 41,000$ water distribution system that now surrounds the outer perimeter of the gardens and replaces old and broken lines that had previously caused water loss and insufficient water pressure. Over a million galions of high quality spring water is piped from Hall Beckley Canyon in the foothills, thereby reducing the need for more costly and lower quality water purchased from the local water company. All pipes in Hall Beckley Canyon have also been replaced, increasing substantially the amount and availability of water for the dry summer season at the garden.

A major clearing of the 20 -foot-wide firebreak that runs alongside the fence through the chaparral area was completed during the last half of this biennium. The fence serves to keep deer and other wildife from entering the main body of the garden; the firebreak provides a safety barrier against the spread of the dangerous fires common to chaparral vegetation and which, if left unchecked, will encroach across bare ground. Together with the garden's Chaparral Trail, the firebreak provides thousands of students with the opportunity to study the botanic and environmental aspects of a natural plant community.

Two patios were completed within the oak forest to form the nucleus of a permanent, all-year exhibit area aimed at providing the public with ideas on landscaping and patio design. Eventually, as many as eleven patios will be constructed, sited so as not to intrude upon established garden landscaping and plantings, and making possible flexible facilities for staging a variety of flower shows
and gardening demonstrations.

Descanso Gardens is world famous for its forest of native oaks and the thousands of camellia plants growing underneath them. This juxtapostion is horticulturally favorable for most camellias but not for the oaks, which tend to develop root rot fungus as a result of warm weather and moist soil required by the camellias. The nature of oak root rot fungus was not known at the time the camellias were planted, nearly a half a century ago, but has been the subject of a continuing research project by this Department. It was found that one means of helping to preserve the oaks is to remove the soil around the base of each tree so as to expose the large roots. Construction of these basins, which have about a 6-foot radius, and cleaning them out periodically was accomplished.

## Attendance

$$
\begin{array}{ll}
\frac{1971-72}{461,547} & \frac{1972-73}{428,648}
\end{array}
$$

## Weather

Descanso Gardens weather charts are made available to the Los Angeles County Flood Control District Hydraulic Division.

Data for the weather season, October I to september 30:

Lowest Temperature
Highest Temperature
Total Days of Rainfall
Heaviest Monthly Rainfall Dec. 1971-8 inches Feb., 1973-11. 66 inches Yearly Rainfall 10.33 inches 28.51 inches

Societies, garden clubs, and civic organizations meeting at Descanso Gardens, 1971-1973:

Altadena Women's Club
Art League of Eagle Rock
California Associon of Nurserymen
Campfire Girls, Glendale
Catalina Art Association
Civil Service Commission of
Los Angeles County
Daffodil Society of Los Angeles
Diggers Garden Ciub
Employees Association (LACEA)
Eugene Field School P.T.A.
Fremont School P.T.A.
Glendale Art Association
Glendale Chrysanthemum Society
Glendale College Symphony
Glendale Foothill Art Guild
GIendale League of Women Voters
Glendale Newcomers
Highland Park Art Guild
Jet Propulsion Laboratory
La Canada Bonsai ociety

La Canada Elementary School P.T.A.
La Canada Players
La Canada Valley Beautiful
La Canada Women's Club
Las Artistas Art Club

Las Feliz Women's Club
Los Angeles Cameliia Council
Mid-Valley Art League
Mountain Avenue School P.T.A.
P.E.O. Chapter C.M.

Pacific Rose Society
Palm Crest School P.T.A.
Pasadena Garden Club
San Fernando Audubon Society
Southern California Camellia Council
Southern California Edison Company
Theodore Payne Foundation
Unity Court \#92- Amaranth
University of Chicago Fund Workers Verdugo Woodands School P.T.A.

Flower Shows and special events held at Descanso Gardens, 1971-1973:

Annual Rose Pruning and Planting Program

Art Exhibits (7)
Art Festival
Bonsai Show

California Association of Nurserymen

Camellia Féstival
Christmas Decorations Exhibit
Chrysanthemum Show

Chrysanthemum Tea Members Only

Concerts (5)

Daffoaill Show
Descanso Gardens Guild Annual Meeting and rea

Early Camellia Show
Red Carpet Preview
San Fernando Audubon Society Meeting
Theodore Payne Lectures (6)

Landscaping at South Coast poses a special challenge because the garden is sited on a former trash dump. Maintenance, cost, beauty, selection, and horticultural potential are landscaping factors which at South Coast are difficult and sometimes impossible to reconcile. The challenge is to make the best accommodation among them that conditions permit, not only in the interest of the community which wishes to enjoy the beauty of colorful plants, but also because South Coast Botanic Garden is a unique example of the reclamation of a landfill operation and the object of continued interest by environmentalists and other botanic gardens all over the world.

The conversion of many lawn areas to ground covers and maximum use of mulching has brought a natural beauty to the garden while reducing maintenance costs. Approximately 22 acres of previously undeveloped area on the west side is now being seeded routinely with annual rye grass to safeguard against erosion, at the same time making an otherwise bleak area more attractive until final landscaping can be completed.

Continued problems with the lake and stream complez due to seepage resulted in settling of the stream bed and lowering of the lake water level. Work to raise the stream bed to establish a new channel has been completed and further lake repair work is currently underway. A project of great benefit to visitors as well as the staff was the asphalt paving of the main tram roads which greatly minimized a serious dust problem.

1971-72
54,631

1972-73 77,811

Attendance at South Coast increased 64.8 percent over the previous biennial period. This dramatic increase resulted from several factors, primarily grounds development bringing added botanical and horticultural interest, an increase in the number of tram tours and public information services, and expanded publicity in all segments of the communications media. Also, as information about this garden and its landfill origin has spread, it has attracted the attention of public officials from other cities many of whom are making personal visits to learn at first hand how problems related to escaping methane gases, subsidence and high soil temperatures are handled.

## Weather

South Coast Botanic Garden weather charts are made available to the Los Angeles County Flood Control District Hydraulic Division and the garden issues a monthly chart for palos Verdes Peninsula.

Data for the weather season, October I to September 30:

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1971-72 \quad 1972-73
$$

Loriest Temperature

$$
310 \text { - Jan. 4, } 1972 \text { 250 - Dec. 9, } 1972
$$

Hiyhest Temperature
Total Days of Rainfall
$100^{\circ}$ - July 28,1972 1030-June 20, 1973

17
Dec. - 6.71 inches Feb., 1973-5.35 inches
7.23 inches
19.83 inches

During 1971-1973, South Coast Botanic Garden served as a meeting place for the following societies, garden clubs, and civic organizations:

| Costa Verde District Garden Club | San Pedro Adult School |
| :---: | :---: |
| cub scouts | Silver Spur Garden Club |
| Euchsia Society | South Bay Bromeliad Associates |
| Gardeneers Garden Club | South Bay Garden Club |
| Girl Scauts | South Bay Herb Society |
| Green Thumbs Garden Club | South Coast Cactus \& Succulent society |
| Los Angeles City Department of Parks and Recreation | Volunteer Bureau, Torrance |
| Neptune Garden Club | Welcome Wagon of Palos Verdes |
| Palos Verdes Women's Club | Wilmington Women's Club |

Flower shows and special events presented at south coast Botanic Garden:

Annual Meeting South Coast Botanic Garden Foundation

Birdwalk Training Program -
Audubon Society
Bromeliad Associates Meeting
Bromeliad Show

Costa Verae District Flower Show Exhibit of Insectivorous Plants

Fiesta De Fiores

Flower Show Juages School

Flower Show - Silver Spur Garden Club

Holidays in the Garden Christmas Exinibit

Lectures and walks (9)
South Bay Cactus \& Succulent Society Meeting

South Bay Herb Society Meeting
South Coast Cactus \& Succulent society show

The Gardeneers Garden Club Flower show

Youth Ecology Fair

## RESEARCH

Department research projects are mainly directed toward the study and solution of environmental problems within the community.

A new project in this biennium is concerned with municipal wastewater and sludge management. Its ultimate goal is to set criteria for the use of effluent waters to irrigate horticultural plants as an alternative to dumping such waters into the ocean. The project involves the study of the relative toxicity of various metals found in effluent waters and the corollary study of the resistance of various ornamental plants to the toxic materials. Seventeen acres of land, known as Sar Jose Creek Test Station, at the junction of the Pomona and San Gabriel River Freeways, have been leased from the Sanitation District for future testing.

Air Pollution

Studies in this continuing research project show that a poliutant of the photochemical oxidant type may react with plant tissue when it enters the leaf and cause leaf injury yet be destroyed itself. A pollutant may also react with chemical substances on or in the leaves and be destroyed but yet cause no plant injury. In either instance, the plant is serving to cleanse the air of pollutants. Numerous studies of air cleansing by plants have been conducted to determine the most efficient species and to ascertain the conditions most conducive to air cleansing by plants.

The inheritance pattern of air pollution tolerance in plants is of consiásrable importance to the plant breeder who desires to develop tolerant varieties. Studies have shown that tolerance to ozone, Feroxyacetylnitrate (PAN), and ambient photochemical oxidants in Detunias is due to a small number of genes which act primarily in an additive maner but show some degree of dominance. The magnitude of the heritability estimate indicates that the breeder can readily select for tolerance in this species.

PDre Retaraant Plant Project

Laboratory studies of plant flammability are continuing. Data show that moisture content and leaf thickness are important factors governing fuel ignition. The moisture retention capacity of a plant and not the moisture content appears to control fuel surface temperature during heating.

## Pathology

Practical field control of Armillaria mellea (oak root rot fungus) with cyoloheximide is an important consideration. Injection of adult oan treve was made at Huntingion Library for the purpose of delimiting the ramges of concentration and application rate of cycloheximide. Concentretions at 100 ppm to 400 ppm of cycloheximide produced no Visible injury to the tree. Leaf necrosis appeared at higher rates of injection, however, and new leaves and shoots sprouted in abundance within three weeks after application.

## Plant Breeding

F selection program is underway with petunias to develop varieties more tolerant of photochemical oxidants.

A number of controlled pollinations were made among cictus selections that show promise as low fuel types for use on green belts around hiliside homes and as low maintenance cover for woodland sites. The goar is to develop a prostrate type with a good root system, high diought tolerance, resistance to insects and aisease, and with desirable ornamental properties.

CaIlistemon interspecific crosses were maäe to provide a measure of species relationships as evidenced by their ability to cross and segregate for various traits. An understanding of the inheritance of verious traits will in turn provide a better understanding of the possible parentage of a number of putative hybrias presentiy in the nursery trade.

Attempted crosses between yellow-and purple-flowered tabebuias is continuing in an effort to obtain trees with the desired features of both gromps.

## PIant Virus Program

The stuay of tobacco mosaic virus (TMV) on various ornamental plants has revealed a general acceptance of species of plants to mmv infection. Resistance among different plant species to virus infection can be correlated with virus replicating capacity. Monocotyledonous plants ank Eerns are shown to be capable of infection by this virus. physiological studies on virus resistance by means of plant hormone andiontio: arr ight ana dark treatment inaicates á arect correlation

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of virus resiftance with metabolic mechanisms of the plant. Sus-
ceftibls plarts react differently to these treatments because of
Iacr of resistant Eactors.
EGrDarium
Muming the biemrium, 1,326 individual collections totaling about
5,000 botanical specimens were acquired by the Herbarium. Of the
vaiecziors, a total of 693 specimens were obtained from the Annola
Amarytum, Eamnes Irboretum, Eairchild Tropidal Garden, and the U.S.
Bational frboretum, through the specimen exchange program. Over
2,600 specimere mave been mounted and incorporatea into the Herbarium
madah Fresently comtains over 10,000 mounted specimens. Over 2,000
excharge sheets were distributed ard over 500 specimens were sent
for referral to herbaria overseas.
Special research has been devoted to the following genera: Acacia,
Eucamptus, Grevillea, Melaleuca, and Kunzea. These studies were
unfuraken in the interest of elucidating the proper scientific
ci..ssificatior of the species within these groups and the speaies
iri Our living Irboretum collection.
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program conductea through Ias Voluntariar involving volumteers
assisting ir the ferbarium, leamning herbarium techniques, ana how to
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The plant Reconas Unit is responsible ior the maintenance of identi三ied ana labeled plants, plant data, the seed collection and cxanang prognam and the dissemination and collection of weather deta.

During tre bienmium, I, 320 accessions were posted from botanical Geubens, nurseries and individuals. Some of the outstanding adFitoms to our introduction progyam came irom the following sources:

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Camelria japonica hybrias - U.S. Department of Agriculture
Imbatiens humzias - U.S. Department of Agriculture
    (collectea in the wilds of New Guinea)
moye species
Gadiolus species
Fain: species
Van\mp@code{us genera}
VEryume genera
Warious genera
Oarimuz gesmeza
Zartuus genera
Verione genera
Varions qamera
Varioms gamerá
- U. S. Pepartment of Agricurture (collexted in the wilas of New Guinea)
- J. W. Ioubser - South Africa
- Caifomia Jungie Gardens (large coliection)
- Aritaki Arboretum, Japan
- Canberra Botanic Gerdens, Gustralia
- Christchurch Botanic Gardens. New zealand
- Hong kong Herbarium, Hong Kong
- Hortus Botanicus. Bornova-Izmir. Turbey
Verione genera
Varions asmera
Vaxions gemera
- Marimurtra Botanic Gardens. SDair
- Monrovia mursery and select Nursery
- United States National Arboretum, Washington, D.C.
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| $1971-72$ | $\frac{1972-73}{404}$ |
| ---: | ---: |
| 403 | 554 |
| 1,150 | 484 |
| 4.446 | 4.126 |

Seed and Pant Exchange

Ir acouriance with Arboretum poilcy, seed ana piart materials were distributed on an exchange basis to various arboreta, botanic gardens, müseries ana inaividuals in the united states and aroma the world. Venhars of the California Arboretum Foundation, Inc., were given an ailotted number of seed envelopes of easily germinatea but highly Ornamental plants that are not generaliy available to the public. over 6,500 entelopes of diverse rinds of seed were distributec. Some OE the foreign botanic qaraens with whom we exchanged seed and plant naterial Ere: Fong Kong Ferbarium; Christchurch Botanic Garaens, New aediand; University of Ghana Botanic Gardens, Ghana; Salishury bobaric Garaens, Rnodesia; Kyoto Takeda Herbal Garden, Japani Taitan EORESE Fsebarch Institute, China; Universidad Austral, Valaivia, Orise; $\quad$ aurim Botanique, wantes, Fance; University of pretoriá Botanic Gaudans. Fretoria. South Efrica; etc. F particularly outstaming coljection of twenty-one accessions of bougainvillea hybride wore sent to us by the Dnited Getees Derartment of Agricultural EnPeximent Statior, GIen Dale, Maryland. Tiotother greatly climatically defired colioctions of seed were sent to us by Chistchurch Eotanic


 sury urat tre bourty oneration and meintananoe ot this Department.





Yoiunngans (uzs boluntarias) which mesulted in a contribution of








-ramaments ion mbial information ard beauty.

graがaj semvices.


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InSmation Contex - Staff the infomation window during peak
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Douns. Serve as fiela leaders in the school field trip program. Estorical Buildinge - Staff the Santa hinta Depot and provide specAL tours to visitors on Tuesday, Wednesday and Sunday mornings and Tommeday ank Sunday aftemoons. Assist in builiang mainterance fy canming, polishing and lamderins items as needed and by proWicing fuesh flower arrangemente in rooms viewed by the public. Wate yut in hastorioal researoh on the Balawin Eamily, California argutactur ana the Rancho period of Californa history inoluding catalognt of slides, post cards, costume and photographic colleaEEOns.
 watrons of ine iborary. In the herbarium, assist in labeling and nonting conlecteá specimens. Yout EMothtor Erogram - Teach classes on weekday afternoons and durine the smmer. Maintair, water, and clean up the greenhouse cné nursery areas ana assist in registering adults and youths for the Eretretum Education Programs. Assist in preparing and mailing all information materials to schools in conection with the frbor DE: y y mamat
DOHETIONS AND SRIES

JUUY I. 1971 ThROUGH JUNE 30, 1973

Moneray Ungations $542.829 \quad 551.154$
Wor-Moratary Donations 25,133 16,342
Grconds trmations $\quad$ 9,479 $\quad$ 25,085
Mant salos
$\begin{array}{r}578 \\ \hline\end{array}$
1.728

GEand motas
$\$ 79.029$
$\$ 84,309$
arne of the princtpai donations contributing to the preceding couals mate as follons:

Faboustom Zevelopment Erojects 10,453


Ehniaction - History of the frboretum 4,300
Th Fratiens for Clark Iractor 3,606
Euncmetration Bome Gerden 3,328
Mont Fugchases 3.149
Getan zor hal seasons 2,000

Descmaso Gatrens Guila

Whe guize scompered of neanly 700 civiommaed citinens who assist

oE Inostees tho hoic office on a rotating basis.

Dureng the Liennium, the Guila contributed over 552,000 in Eunds to varions special gevaer development plojects which included:
I. Vrgiopment of a Garaen Eitchen in the Fospltaity House to $\therefore$ : fost as a distlay and wort center for the Guild and other oundurizy service quoupe:
2. a continage prognem for physically, emotionamy and mentaliy Bandicmpaed ohiveren;
3. Equmovinip or cosponsorship of flower shows, concerts and sataza svents ammainy:
$\therefore$ amoridinc funes for the puxchase of plants ane bulbs for garaen cotor, for furmishings for the Hospitality Hoase and for reAuryening the Eird Observation Station.

In Gabiuion to monetary Gonations, the Guild, through its volunteers,




 Soutr Soust Sutania Garden Foundation
 An qog. Treve were 221 members as of June 30 , 1973.

The fombetion sponsoremeny eretts; among them in this biemium, FW, Whiog Pair, whon attracted more wisitors than any other

 The Ermaditon continues to cosponsor and assist in adult ane youth

 of couporl and other support functions.

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swoupes and Supplies

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1972-73
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s \quad 20,061
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$51,575,692$

